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GENERAL SESSION

and

**PARASESSION on LANGUAGE,
GENDER, AND SEXUALITY**

Edited by

Chundra Cathcart
I-Hsuan Chen
Greg Finley

Shinae Kang
Clare S. Sandy
Elise Stickles

**Berkeley Linguistics Society
Berkeley, CA, USA**

Berkeley Linguistics Society
University of California, Berkeley
Department of Linguistics
1203 Dwinelle Hall
Berkeley, CA 94720-2650
USA

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A note regarding the contents of this volume

The following authors also presented papers at the conference, though their work does not appear in this volume: Mary Bucholtz; Alex Djalali, Scott Grimm, David Clausen, and Beth Levin; Young Ah Do; Luke Fleming; Kyle Gorman; Sverre Stausland Johnsen; Jungmin Kang; Salikoko S. Mufwene; and Jong-Bok Kim and Peter Sells.

Foreword

We are pleased to present the proceedings of BLS 37, held at UC Berkeley in February 2011. We would like to thank the contributors to this volume and all those who attended and participated in the conference.

Clare S. Sandy

GENERAL SESSION

Liquid Dissimilation as Listener Hypocorrection

CARISSA ABREGO-COLLIER

University of Chicago

Introduction

The listener misperception hypothesis of sound change (Ohala 1981, 1993a,b) has been a fruitful area of inquiry over the past several years, in part because it makes testable predictions. According to this line of inquiry, phonological rules arise due to mechanical or physical constraints inherent to speech production and perception. Cross-linguistic tendencies in grammars are thus conceptualized as the phonologization of intrinsic, universal phonetic biases.

Liquid (or lateral) dissimilation is a widely attested co-occurrence restriction on identical [lateral] features within a phonological domain (usually a word). One prediction made in Ohala (1993a) is that long-distance processes such as liquid dissimilation should have their origins in listener *hypercorrection* of liquid coarticulation—that is, misattributing to coarticulation a feature that is intrinsic to the target.

The present study focuses on understanding the origins of liquid dissimilation by testing listener identification of targets along an /r/-/l/ continuum to explore perceptual compensation for co-occurring liquids, which have been shown to have robust long-range coarticulatory effects (Tunley 1999; Heid and Hawkins 2000; West 1999a, 2000). Section 1 gives background on liquid dissimilation in languages, the phonetics of liquids and their coarticulatory properties, as well as how listener hypercorrection is predicted by the mechanism behind liquid dissimilation under Ohala's (1993b) assumptions. Section 2 introduces a perceptual experiment designed to test for listener perceptual compensation patterns for co-occurring liquids, with results reported in Section 3. Finally, Section 4 discusses the novel findings and shows that listeners' categorization of co-occurring liquids is more consistent with a *hypocorrection* rather than hypercorrection account.

1 Background

1.1 Liquid dissimilation in language

Phonological dissimilation and assimilation (harmony) are widespread in natural language. Both can be viewed as constraints pertaining to the co-occurrence of some salient feature within some defined boundary, codifying a preference in the language for certain segmental features either to be dissimilar or to agree. These restrictions may appear either as some kind of static avoidance generalization over the lexicon (root-internal or morpheme structure constraints), or as active phonological processes in which one segment or feature ‘triggers’ a change in the underlying ‘target’ to promote or avoid similarity in the surface form.

Languages whose phonemic inventories include both a rhotic and a lateral phoneme often exhibit co-occurrence restrictions on liquids. More specifically, typological surveys of co-occurrence phenomena find that liquid *disagreement* (in static roots) and *dissimilation* (in derived environments) far outnumber the cases of liquid agreement/harmony across languages (Suzuki 1998; Hansson 2010).

Below are two well-known examples of active liquid dissimilation. In each language, dissimilation is triggered when a liquid-containing morpheme is suffixed to a root containing an identical liquid. Non-dissimilating cases are shown in the (a-b) examples, and dissimilation is shown in (c-d).

- (1) Latin: /l/ → [r] / l..._
 - a. /nav-alis/ → [navalis] ‘naval’
 - b. /episcop-alis/ → [episcopalis] ‘episcopal’
 - c. /sol-alis/ → [solaris] ‘solar’
 - d. /lun-alis/ → [lunaris] ‘lunar’
- (2) Georgian: /r/ → [l] / r..._
 - a. /phizik-uri/ → [phizikuri] ‘physical’
 - b. /kimi-uri/ → [kimiuri] ‘chemical’
 - c. /reakti-uri/ → [reaktiuli] ‘reactive’
 - d. /phrang-uri/ → [phranguli] ‘French’

The cases of Latin and Georgian typify many of the facts about liquid dissimilation across languages. Liquid dissimilation is usually found in languages which include one lateral and one rhotic in their phonemic inventory, tends to be triggered non-locally rather than by adjacent segments, and is generally unbounded and cannot be blocked by non-liquids, though it can be blocked by intervening liquids (Suzuki 1998; Walsh Dickey 1997). Notably, while in Latin an underlying /l...l/ sequence triggers dissimilation on the surface, in Georgian there is a restriction against /r...r/ sequences surfacing; both types appear equally prevalent in languages.

1.1.1 Exploring the perceptual origins of liquid dissimilation

Why do identical liquids co-occurring at a distance tend to trigger dissimilation? As Alderete and Frisch (2007) note, co-occurrence phenomena have become significant empirical domain for several different research paradigms in linguistics over the past several years, including the listener misperception hypothesis. The present paper approaches this question with a perceptual account in view, using American English as a case study. While American English lacks a liquid dissimilation rule, there is evidence that speakers are sensitive to co-occurring liquids: In some (rhotic) dialects, /r...r/ may optionally surface as [Ø...r] or [l...r] in casual speech (cf. *ape(r)ture, flustrated*); see Hall (2007) for documentation. Furthermore, not having a rule against identical co-occurring liquids means that speaker-listeners should not be phonotactically biased against surface /r...r/ or /l...l/ sequences.

1.2 The phonetics of English liquids

As in many languages with multiple liquids, the rhotic and lateral in English are considered minimally different according to their [lateral] feature specification. Acoustically, the first and second formants of American English /r/ closely approximate those of a “canonical central vowel,” with the primary acoustic cue of a dramatically lowered third formant; F3 closely approximates the frequency of F2 (Espy-Wilson et al. 2000). The spectrum above F3 is also marked by a diminution of intensity. Meanwhile, the lateral is marked by not only changes in formant frequencies, but also changes in glottal source amplitude and spectrum, as well as in the amplitudes of peaks at the transition out of the consonant (Prahler 1998).

English /l/ and /r/ exhibit significant influence on the acoustic signal of neighboring syllables (Heid and Hawkins 2000; West 1999a,b; Tunley 1999; Espy-Wilson et al. 2000; West 2000). /r/ is distinguished most prominently by a markedly low second and third formant, the effects of which persist for at least its neighboring segments and, it appears, even further away. Meanwhile, the lateral causes F2 and F3 to raise for neighboring segments (Heid and Hawkins 2000). For American /r/ and /l/, found strong coarticulatory effects both from vowel to liquid and liquid to vowel in local contexts have been found (Lehman and Swartz 2000; Hashi et al. 2003).

Studies of longer-distance (non-adjacent) liquid coarticulation in American English is lacking. For British English, whose /r/ and /l/ formant frequencies are generally comparable to those in American English (Kelly and Local 1986), initial and intervocalic /l/ and /r/ can affect formant frequencies as many as five syllables before, and the effects can “pass through” up to two stressed syllables (Heid and Hawkins 2000). West (1999a) also found articulatory evidence of liquid influence on vowels several syllables preceding for a speaker of British English.

Finally, there is evidence that speaker-listeners have perceptual access to liq-

liquid coarticulation (West 1999b; Tunley 1999; Heid and Hawkins 2000; Coleman 2003; Hawkins and Nguyen 2004). Tunley’s (1999) thesis showed that incorporating articulatory variation in synthetic /ərVCə/ sequences increased intelligibility by as much as 28%. English speakers are also able to correctly anticipate the liquid in upcoming word and identify a liquid partially embedded in noise based on surrounding contextual cues (West 2000).

1.3 Predictions made by Ohala (1993b)

Ohala (1981, 1993a) not only recognized the implications of perceptual compensation for sound change, but posited such compensation—or more specifically, the imperfect application thereof—as a primary mechanism of sound change. While listeners normally perceptually reduce or factor out the effects of coarticulation on the target sound, failing to adjust or attribute these effects to their contextual source sometimes could lead listeners to perceive variation as intrinsic to the target (what Ohala has termed *hypocorrection*). In other cases, listeners accustomed to adjusting for variation might be led to *overcompensate*, misattributing a feature that is actually intrinsic to the target to coarticulation (*hypercorrection*).

It is hypercorrection that Ohala (1993a) hypothesized to be responsible for non-local phonological phenomena like liquid dissimilation, since the temporally long cues of liquids would “create an ambiguity as to where the feature is distinctive and where fortuitous” (Ohala 1993:251). Listeners hearing two identical liquids within a phonological domain (usually a word) may misattribute the perceived occurrence of one liquid to the resonance effects of the other, and begin to adjust their mental representations of the underlying sounds, possibly leading to an eventual dissimilation rule in the language.

This hypothesis depends largely on at least two things: First, for Ohala’s type of hypothesis to be able to account for attested phenomena like liquid dissimilation, we must look for acoustic-auditory cues (like long-distance resonances) that could plausibly support observed phonological behaviors, which was demonstrated in Section 1.2. Second, it must also be the case that listeners indeed engage in a sort of ongoing “normalization” process in the way that Ohala postulates. Research has shown convincingly that despite the speech signal being extremely variable and complex, listeners not only compensate for variation, but also show at least partial access and control over fine-grained, sub-phonological details of the speech string (Whalen (1990); Kingston and Diehl (1994); Gaskell and Marslen-Wilson (1997); Beddor et al. (2007); Tilsen (2007); Sonderegger and Yu (2010), among others). While we know that listeners are aware of contextual variation induced by the presence of /l/ or /r/ in a speech signal, for liquid dissimilation, what we now also want to know is both *whether* and *how* listeners use that information to compensate for liquid-to-liquid coarticulation within a prosodic word.

2 A perceptual experiment

A perceptual phonetic study was conducted to test listener compensation when two liquids were present, to find how perception of a synthesized segment on a continuum between /r/ and /l/ might be affected by the presence of a second, conditioning liquid consonant (either /r/ or /l/). As a control, listeners also categorized ambiguous liquids without another liquid in the word. /d/ was used because of its relatively small, much less enduring coarticulatory effect on formant transitions; it serves as a baseline for comparison with the liquid-condition results.

2.1 Hypotheses

Given the task of categorizing an ambiguous target liquid in the context of an unambiguous liquid trigger, how will listeners tend to categorize the target? If hypercorrection is the correct explanation, then the story is something like this: The presence of a conditioning /r/ in a word should cause the category space to narrow for /r/ in the target position. This is because listeners, sensitive to the coarticulatory effects of /l/ on its surrounding environment, would filter out the contextual variation brought on by conditioning /r/ (for instance, its tendency to lower F3 in surrounding syllables). Thus, listeners encountering an ambiguous liquid in the target position would be more likely to identify it as /l/ than they would in a ‘neutral’ environment. The listener misperception hypothesis predicts that at least some of the time, this sensitivity would work against the listener, in effect causing him or her to overestimate the effects of coarticulation vs. cues intrinsic to the target.

Finally, since either /r...r/ or /l...l/ may trigger liquid dissimilation in languages, we also expect that the reverse of the above should be true for the effect of conditioning /l/. These hypotheses are summarized in (3) and (4):

- (3) *Hypothesis A*: When the conditioning consonant is /r/, listeners will be more likely to hear the continuum consonant as /l/ (the category space of /l/ will widen).
- (4) *Hypothesis B*: When the conditioning consonant is /l/, listeners will be more likely to hear the continuum consonant as /r/ than in the control (/d/) condition (the category space of /r/ will widen).

The experimental design can also shed light on whether a directionality bias exists for perceptual compensation of co-occurring liquids. Phonological dissimilation rules do not seem to show a cross-linguistic preference for right-to-left or left-to-right processes; however, West (1999a, 2000), and Heid and Hawkins (2000) all claim to find stronger anticipatory coarticulation in small-scale studies, so if a phonetic bias exists, it will be useful to know how listeners make use of this information. In addition, both onset (intervocalic) and coda (pre-nasal) conditioning

consonants will be tested, since listeners show sensitivity to acoustic differences between pre-vocalic and pre-consonantal liquids (Kochetov 2004) and differences in strength of effect might be observed based on the prosodic position of the conditioning consonant.

2.2 Stimuli

Using Praat (Boersma and Weenink 2010), a phonetically trained native speaker of American English was first recorded at a sampling rate of 48 kHz uttering the speech strings [ˈara] and [ˈala]. The flanking vowels were closely matched for pitch, intensity, and first three formant frequencies so that the strings differed by consonant only. Stress was consistently on the vowel preceding the target segment to control for any effects of stress correlates (intensity, duration) on perceptual salience.

Using [ara] and [ala] as endpoints, a 7-step continuum was synthesized. A script¹ determined the formant structure of the two speech signals using an LPC algorithm with 9 linear-prediction parameters, then calculated the formants at intervals of 5 ms with an analysis window of 50 ms. The sound was then reverse-filtered using the calculated formants, giving a source. At each time step, the script calculated new formant values at 7 intervals between the original /r/ and /l/ values. The source was then filtered through the new formants to produce seven synthesized /aXa/ sequences (where X = a step on the continuum between /r/ and /l/). Table 1 gives the calculated F2 and F3 values for each continuum step.

Table 1: Formant values for target (synthesized) consonants.

Continuum step	F2 (Hz)	F3 (Hz)
1 /r/	1407	1969
2	1317	2106
3	1416	2363
4	1452	2626
5	1412	2801
6	1403	3020
7 /l/	1331	3314

Finally, each of the seven sequences was spliced into twelve different conditioning environments (see Table 2), also recorded by the phonetically trained native speaker. These varied by conditioning consonant (CONDC = l, r, or d), whether the conditioning consonant was an onset or coda (CODA = y or n), and whether the

¹ Thanks to Ed King in the UChicago Phonology Lab for writing and providing the Praat script.

target preceded or followed the conditioning consonant (TARGET POSITION = 1 or 2), resulting in a total of 84 unique stimuli.

Table 2: Conditioning environments (stimulus types).

CONDC	TP=1		TP=2	
	CODA=n	CODA=y	CODA=n	CODA=y
/d/	aXada	aXadna	adaXa	adnaXa
/l/	aXala	aXalna	alaXa	alnaXa
/r/	aXara	aXarna	araXa	arnaXa

2.3 Participants

Sixteen native speakers of American English between 18 and 23 years of age (11 females, 5 males) participated in the study. None reported any known history of speech or hearing disorders. All participants were compensated either with course credit or nominal cash upon completion of the one-session experiment.

2.4 Task

The experiment consisted of four blocks. There were two main *trial blocks* divided by TARGET POSITION; half the subjects completed the blocks in one order and half in the reverse. Each block consisted of 42 stimuli presented 10 times each for a total of 420 trials per block, in randomized order, with a break between blocks. In a soundproof booth, subjects were instructed to listen to the entire word and then respond as quickly as possible using a manual response box to indicate whether they heard /l/ or /r/ (forced-choice) in the target position. For each trial, a visual reminder of the task appeared on a monitor. As soon as a response was registered, the next stimulus was immediately presented, and so on until the end of that block.

Each trial block was preceded by a *training block*. During the training, 12 stimuli were presented, but only unambiguous /r/ and /l/ were used as target consonants. At least 80% of the targets had to be correctly identified to complete the training; if not, subjects were given one more chance to score over 80% or else be determined ineligible to complete the study. No one was ultimately disqualified by the training.

Although not incorporated into the analysis of the data, reaction time was recorded as a way to ensure that subjects listened to both the target and conditioning consonant before responding. All listener responses with reaction times which were shorter than the duration of the stimulus were excluded. Results were then statistically analyzed using linear mixed-effects modeling.

3 Results

The model began by including four fixed-effect predictors, which were TARGET (continuum step), CONDITIONING CONSONANT, CODA, and TARGET POSITION. Non-significant factors were successively eliminated from the model, resulting in just the significant two-way and main effects shown in the results below. To allow for listener-specific and stimulus-specific variation, as well as to control for the possibility of subject fatigue over the course of the experiment, random intercepts of TRIAL, SUBJECT, TRIAL:SUBJECT and STIMULUS were also included. Table 3 shows the significant fixed-effects results of the model.

Table 3: Estimates for significant fixed-effect predictors in the mixed-effect model.

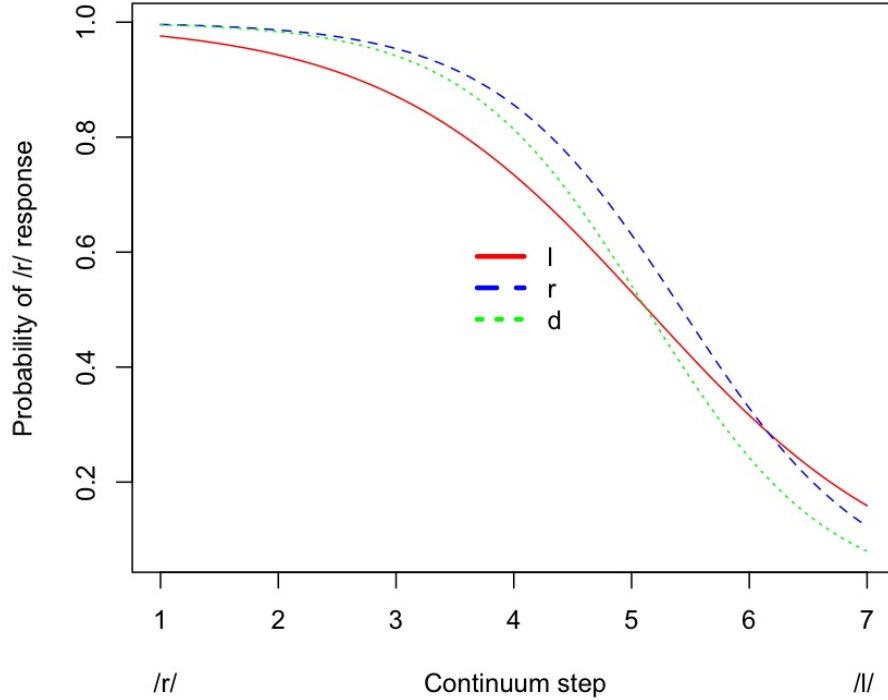
	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	6.294596	0.513587	12.256	<2e ⁻¹⁶ ***
CONDC=l	-1.477787	0.616761	-2.396	0.0166 *
TARGET	-1.170735	0.099006	-11.825	<2e ⁻¹⁶ ***
CONDC=l:TARGET	0.284985	0.135777	2.099	0.0358 *

Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.' ' ' 1

Neither TARGET POSITION nor CODA were found to be significant predictors of listener RESPONSE. Turning to the factors which directly relate to the main Hypotheses A and B, TARGET was a significant factor ($p < .001$), confirming that listener response to the perceptual judgment task differed based on the quality (i.e., continuum step) of the target consonant. We also find a significant main effect of conditioning /l/ on RESPONSE. Meanwhile, /r/ as a conditioning consonant did not significantly affect RESPONSE, either as a single predictor or in any interaction effects. The effect of /l/ is also seen in the interaction effect between TARGET and CONDC=l ($p < .05$).

Figure 1 plots partial effects of a mixed-effects model fit, with predicted RESPONSE as a function of TARGET and CONDITIONING CONSONANT. As expected, the control conditioning environment, /d/, shows virtually 100% /r/ responses at the /r/ end of the continuum, and near-zero /r/ (high /l/ response) at the /l/ end of the continuum. When /r/ is the conditioning consonant, results are similar, with at-ceiling /r/ responses for the /r/-end of the continuum and near-zero /r/ responses at the opposite end. Although the boundary shift along the /r/-/l/ continuum appears to occur later when CONDC=/r/ than when CONDC=/d/, which would suggest an assimilatory effect, the regression model failed to find significance in the interaction

Figure 1: Predicted RESPONSE as a function of TARGET and CONDITIONINGC



between $COND C = r \times TARGET$. This will be discussed further in Section 4.

In summary, significant effects are found when the conditioning consonant in the word is /l/ versus when there was no second liquid in the word. The probability plot illustrates that overall, listeners are more likely to judge the target consonant to be /l/ when there is another /l/ in the word, meaning that listeners perceptually assimilate the target to the trigger. The presence of /l/ causes continuum liquids to be identified as /l/ more often than in the control condition.

At the far right end of the continuum only, when the target was most clearly /l/-like, the predicted trajectory in Figure 1 seems to show that listeners were more likely to identify the target as /r/ when the trigger was /l/ than in the baseline condition. Thus, in a limited number of cases, /l/ caused listeners to perceptually dissimilate.

4 Discussion

4.1 Listener (mis)perception patterns of liquid-to-liquid coarticulation

The experimental findings, especially the interaction effect of $CONDITIONING C = /d/ \times TARGET$, at least partially support the general expectation under the assumptions of the listener-misperception paradigm, that the presence of two liq-

uids within a word should cause perceptual boundaries to shift. However, the results ultimately contradict the original hypotheses (see Section 2.1, (3) and (4)) stemming from the hypercorrection account in a number of important ways. The prediction that the presence of /r/ should effect a higher rate of /l/-identification for the target liquid in Hypothesis A was not borne out, as conditioning /r/ did not have a significant effect for this study.

Meanwhile, Hypothesis B predicted that the occurrence of /l/ should cause listeners' /r/-/l/ category boundary to shift toward more responses of /r/ in identifying the continuum liquid. A significant effect of conditioning /l/ was found, but the empirical data supports the opposite of what was expected. The fixed-effects results of the linear model demonstrate that having a conditioning liquid of /l/ makes a significant difference on listener phonological judgment of the target liquid when compared with the baseline (COND_C=d). The probability plot above further illustrates what kind of difference it makes: a clear instance of /l/ was present in the word, listeners in general were more likely to identify a continuum liquid as /l/ than in the condition where two liquids did not co-occur, thus widening the category space of /l/ and perceptually assimilating.

It is surprising that /l/ causes perceptual *assimilation* of continuum liquids (particularly those towards the left on the /r/-/l/ continuum; x-axis in Figure 1). Previous research on fricative-vowel coarticulation (Mann and Repp 1980), vowel-to-vowel coarticulation (Tilsen 2007), and vowel-nasal coarticulation (Beddor and Krakow 1999), among other phenomena, has fairly consistently found that listeners deal with contextual variation by perceptually “undoing” the effects of coarticulation in identification tasks. In the present study, which used an established experimental paradigm (identification task for a synthetic continuum spliced into various contexts) to shed light on a previously untested phenomenon (liquid-to-liquid coarticulation), listener perceptual patterns did not filter out coarticulation. Instead, listeners' identification of the continuum liquid was altered by the presence of conditioning /l/ by *strengthening* rather than undoing the effect of coarticulation, whereby /l/ causes the continuum liquid to be perceived as /l/-like more of the time.

4.2 A hypocorrection account for liquid dissimilation?

Recall the results predicted by the listener misperception account for liquid dissimilation, as given in Section 2.1. The predictions were based on the assumptions that liquid coarticulatory influence is long-ranging, robust, and available to listeners. It also assumes that listeners will normally filter out coarticulatory noise, and that the nonlocal nature of liquid coarticulation would make listeners prone to hypercorrective perceptual errors, misperceiving intended acoustic cues as contextual residue.

The most significant finding suggested by the results of this study is that if dissimilation indeed has its origins in listener (mis)perception of coarticulation, the data are more consistent with a *hypocorrection* rather than a *hypercorrection* ac-

count. Hypocorrection and hypercorrection have often been defined in terms of perceptual compensation as “undoing” coarticulation; however, the current results suggest that for liquid-to-liquid coarticulation, listener compensation involves perceptually assimilating, rather than dissimilating, co-occurring liquids, at least when there is an /l/ present in the word.

While several studies have found experimental evidence for the perceptual motivations of assimilatory processes in phonologies, such as place assimilation (Ohala 1990), to date there is a dearth of work showing that the origins of dissimilation are also perceptual. Furthermore, a convincing empirical case showing dissimilation to result from hypercorrection has not yet been made. The results of this study indicate that hypercorrection is not a viable explanation for the perceptual data we find. Since listeners are shown not to normally correct for the effects of liquid coarticulation, it does not follow that listeners’ perceptual errors would be prone towards hypercorrecting for coarticulation. Furthermore, conceptualizing hypercorrection in a more general as over-application of usual perceptual tendencies, whatever they might be, would still logically result in liquid *assimilation*, which is only rarely attested among languages.

However, it may be possible to conceive of liquid dissimilation as perceptually motivated, but by a special kind of hypocorrection instead. Hypocorrection may not merely be a failure to undo coarticulation, but rather a failure or avoidance of listeners’ usual perceptual patterns for a given coarticulatory phenomenon. With such an understanding, the story would be this: For co-occurring liquids, listeners are shown to usually “compensate” in an assimilatory direction. Therefore, a hypocorrective failure to do so should result in dissimilation—the phenomenon we seek to explain.

What remains a puzzle for now is that the plotted curves suggest that for the most /l/-like point of the continuum (step 7), we actually find a small probability that listeners will categorize this liquid as /r/, and at a higher probability than in the baseline condition. If this were the trend throughout more of the continuum, we might be led to a different interpretation of the results, since it would indicate that listeners are adjusting for /l/ coarticulation by perceiving a second /l/ less often. Yet oddly, this effect shows up only for the final continuum step, reversing the pattern for the majority of the curve. Prior to the experiment, phonetically trained researchers assessed the resynthesized sounds and found them to be a good /r/-/l/ continuum with clear phonemic endpoints and gradually more ambiguous sounds towards the middle; however, perhaps the final continuum step was not sufficiently /l/-like as to be unambiguous for listeners.

4.3 Other issues

Since TARGET POSITION was not a significant predictor of RESPONSE, it does not appear that the relative positions of the target and conditioning consonant af-

fect listener compensation. On one hand, this is unproblematic from the standpoint of observed phonologies; both regressive and progressive dissimilation is found in languages. On the other hand, given the greater robustness of regressive coarticulation found by Heid and Hawkins (2000) and West (1999a) in comparison to progressive effects, we might have expected that listeners would make use of that information. However, both of these studies used only one (British) speaker to collect data, yet we know that wide interspeaker variability in both anticipatory and perseverative coarticulation has often been observed (Magen (1997); see also Newman et al. (2001) for more on interspeaker variability in producing acoustic cues). Collecting production and perception data from a larger subject pool might show that anticipatory and perseverative coarticulation are equally strong for liquids.

The experimental results give rise to the question of why the presence of /l/ significantly influences listener identification of a continuum liquid while /r/ does not, especially since /r/ has been reported to have just as strong resonances as /l/. Interestingly, Heid and Hawkins (2000) have speculated that rather than a simple gradient effect as the distance from the liquid grows, there are two distinct effects occurring, a long-range effect and a more local one. Indeed, in many languages with liquid dissimilation, quite a bit of phonetic material intervenes between the liquids, not just a single segment. For instance, with optional /r/-dissimilation in American English, the dissimilating (target) /r/ tends to be consonant-adjacent and is often further than one segment away from the triggering /r/ (Hall 2007). The presence of /r/ may have a more significant effect if stimuli with more intervening syllables are used in follow-up studies, and also with the target consonant in different prosodic positions (rather than onset-only, as in the present study). Another factor to consider is that perceptual (non)resistance to coarticulation, as well as coarticulatory influence exerted in production, varies by dialect and speaker (Bladon and Al-Bamerni 1976; Tunley 1999). More language- and dialect-specific work still needs to be done on listener perception patterns, and on larger groups of speakers.

5 Conclusion

Listeners have long been known to have perceptual access to the fine-grained acoustic details that accompany coarticulation, and to use these acoustic cues in phoneme discrimination. A novel aspect of this study is that, while past studies have generally found listeners to perceptually undo the acoustic effects of coarticulation, the results here suggest that for liquids, listeners adjust their perception in the same direction as coarticulation, strengthening rather than undoing the effect. American English speaker-listeners engage in perceptual compensation for coarticulatory effects of liquids in a way that causes the category space of /l/ to widen when another /l/ is in the word compared to a baseline, thus perceptually assimilating the co-occurring liquids. Since a hypercorrection account assumes that listeners would normally perceptually dissimilate, it cannot adequately explain the origins of liquid

dissimilation. Meanwhile, in the case of liquids, dissimilation could actually result from a failure to compensate in the usual direction, suggesting dissimilation may be a special case of hypocorrection.

References

- Alderete, John D. and Stefan A. Frisch. 2007. Dissimilation in grammar and the lexicon. In Paul de Lacy, ed., *The Cambridge Handbook of Phonology*, 379–398, CUP.
- Beddor, Patrice Speeter, Anthony Brasher, and Chandan Narayan. 2007. Applying perceptual methods to the study of phonetic variation and sound change. In Maria-Josep Sole, Patrice Speeter Beddor, and Manjari Ohala, eds., *Experimental Approaches to Phonology*, Oxford.
- Beddor, Patrice Speeter and R.A. Krakow. 1999. Perception of coarticulatory nasalization by speakers of English and Thai: Evidence for partial compensation. *Journal of the Acoustical Society of America* 106(5):2868–2887.
- Bladon, R.A.W. and A. Al-Bamerni. 1976. Coarticulation resistance in English /l/. *Journal of Phonetics* .
- Boersma, Paul and David Weenink. 2010. Praat: doing phonetics by computer [Computer program]. Version 5.1.31.
- Coleman, John. 2003. Discovering the acoustic correlates of phonological contrasts. *Journal of Phonetics* 31:351–372.
- Espy-Wilson, Carol, Suzanne E. Boyce, Michel Jackson, Shrikanth Narayanan, and Abeer Alwan. 2000. Acoustic modeling of American English /r/. *Journal of the Acoustical Society of America* 108(1):343–356.
- Gaskell, M. Gareth and William D. Marslen-Wilson. 1997. Integrating form and meaning: A distributed model of speech perception. *Language and Cognitive Processes* 12(5/6):613–656.
- Hall, Nancy. 2007. R-dissimilation in American English. In *Proceedings of the 37th Annual Meeting of the Berkeley Linguistic Society*, volume 33, University of California Press.
- Hansson, Gunnar Olafur. 2010. *Consonant Harmony: Long-distance interaction in phonology*. University of California Press.
- Hashi, Michiko, Kiyoshi Honda, and John R. Westbury. 2003. Time-varying acoustic and articulatory characteristics of American English [r]: a cross-speaker study. *Journal of Phonetics* 31:3–22.

- Hawkins, Sarah and Noel Nguyen. 2004. Influence of syllable-coda voicing on the acoustic properties of syllable-onset /l/ in English. *Journal of Phonetics* 32:199–231.
- Heid, Sebastian and Sarah Hawkins. 2000. An acoustical study of long domain /r/ and /l/ coarticulation. In *Proceedings of the 5th Seminar on Speech Production*, 77–80.
- Kelly, J. and John Local. 1986. Long-domain resonance patterns in English. In *Proceedings of the IEE Conference on Speech Input/Output*.
- Kingston, John and Randy L. Diehl. 1994. Phonetic knowledge. *Language* 70(3):419–454.
- Kochetov, Alexei. 2004. Articulation contrasts in different syllable positions: Language-particular and language-independent asymmetries. *Language and Speech* 47(4):351–382.
- Lehman, Mark E. and Bradford Swartz. 2000. Electropalatographic and spectrographic descriptions of allophonic variants of /l/. *Perceptual and Motor Skills* 90:47–61.
- Magen, H.S. 1997. The extent of vowel-to-vowel coarticulation in English. *Journal of Phonetics* 25:187–205.
- Mann, Virginia A. and Bruno H. Repp. 1980. Influence of vocalic context on perception of the S-s distinction. *Perception and Psychophysics* 28(3):213–228.
- Newman, S. R., S. A. Clouse, and J. L. Burnham. 2001. The perceptual consequences of within-talker variability in fricative production. *Journal of the Acoustical Society of America* 109(3):1181–1196.
- Ohala, John J. 1981. The listener as a source of sound change. In C. S. Masek, R. A. Hendrick, and M. F. Miller, eds., *Papers from the Chicago Linguistic Society parasession on language behavior*, 178–203, Chicago Linguistic Society.
- Ohala, John J. 1990. The phonetics and phonology of aspects of assimilation. In J. Kingston and M. Beckman, eds., *Papers in Laboratory Phonology I: Between the grammar and physics of speech*, 258–175, Cambridge University Press.
- Ohala, John J. 1993a. The phonetics of sound change. In Charles Jones, ed., *Historical Linguistics: Problems and Perspectives*, Longman.
- Ohala, John J. 1993b. Sound change as nature's speech perception experiment. *Speech Communication* 13(2):155–161.

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- Prahler, Adrienne. 1998. Analysis and synthesis of the American English Lateral. Master's thesis, Massachusetts Institute of Technology.
- Sonderegger, Morgan and Alan Yu. 2010. A rational account of perceptual compensation for coarticulation. In *Proceedings of the 32nd Annual Conference of the Cognitive Science Society*.
- Suzuki, Keiichiro. 1998. A typological investigation of dissimilation. Ph.D. thesis, University of Arizona.
- Tilsen, Sam. 2007. Vowel-to-vowel coarticulation and dissimilation in phonemic-response priming. In *UC Berkeley Phonology Lab Annual Report*, 416–458, University of California.
- Tunley, Alison. 1999. Coarticulatory influences of liquids on vowels in English. Ph.D. thesis, University of Cambridge.
- Walsh Dickey, Laura. 1997. The phonology of liquids. Ph.D. thesis, University of Massachusetts, Amherst.
- West, Paula. 1999a. The extent of coarticulation of English liquids: an acoustic and articulatory study. In *Proceedings of the 13th International Congress of Phonetic Sciences (ICPhS XIII)*, volume 3, 2271–3.
- West, Paula. 1999b. Perception of distributed coarticulatory properties of English /l/ and /r/. *Journal of Phonetics* 27(4):405–426.
- West, Paula. 2000. Long-distance coarticulatory effects of British English /l/ and /r/: An EMA, EPG and acoustic study. In *Proceedings of the 5th Seminar on Speech Production*, Oxford University Phonetics Laboratory.
- Whalen, D. H. 1990. Coarticulation is largely planned. *Journal of Phonetics* 18(3):3–35.

Carissa Abrego-Collier
Department of Linguistics
1010 E. 59th Street
Chicago, IL 60637

carissa@uchicago.edu

Sound Feature Interference Between Two Second Languages: An Expansion of the Feature Hypothesis to the Multilingual Situation in SLA

RIKA AOKI & FUMIAKI NISHIHARA

Department of Language and Information Sciences, University of Tokyo

Introduction

In this paper, we examine whether interference¹ exists between one second language (L2) and another L2 in a monolingual setting, and suggest that the existing second language acquisition (SLA) theory known as the feature hypothesis (Flege 1995) should be extended to this interference. In particular, we conducted an experiment on English Voice Onset Time (VOT) by Japanese learners. In the original feature hypothesis of Flege, it was suggested that L2 features not used in L1 will be difficult to perceive for the L2 learner. We modify the hypothesis so that it could cover the difficulty in acquiring features which have not appeared in former acquired language(s). Moreover, the result of present study implies that interference can occur non-directionally (i.e. both from a previously learned L2 to an L2 learned later and vice versa), and regardless of learners' proficiency.

It is common that a speaker has multiple L2s. Although there are a considerable number of studies on multiple L2 learning especially in the areas of pragmatics (Williams and Hammarberg 1998, Jordà 2005) and lexis (Dewaele 1998, Rossi 2006), the phonological acquisition of multiple L2s is not well documented. Moreover, most SLA theories on phonological learning refer to the relationship between one's first language (L1) and L2, not mentioning the relationship between multiple L2s. Therefore we need to expand a relevant SLA theory so that we can explain multiple L2 acquisition.

A number of researchers have proposed theories of phonological acquisition by L2 learners. One of the most important theories is the Speech Learning Model (SLM) of Flege (1995), which explains the sound acquisition process of L2 learners who have a certain amount of L2 learning experience. Flege explains that the

¹ Here the term "interference" refers not only to negative transfer but also to positive transfer.

proficiency of L2 pronunciation largely depends on perception ability, and hypothesizes that distinctive features play an important role in perceiving and producing L2 sounds. In other words, L2 features not used in L1 will be difficult to perceive for the L2 learner. This hypothesis is called the feature hypothesis, and has been supported by several previous studies (Munro et al. 1996, McAllister et al. 2002). However, it is still unknown whether it is possible to apply the feature hypothesis to multiple L2 learning.

Our claim will be that the feature hypothesis could also be applied to multiple L2 acquisition, and therefore SLA theories should consider not only L1 and L2 but also multiple L2s as well. We propose an extended version of the feature hypothesis as follows: an L2 feature is easy to acquire if the feature is used in any acquired language. To prove this, we conducted an experiment on English VOT by multiple L2 learners.

In the next section, we will define the terminology on additional languages used in this paper. Then we review the literature on additional language acquisition and existing models of SLA in section 2. In section 3, we explain the method of our experiment on VOT. Section 4 shows the result of the present experiment. Finally, we expand the feature hypothesis and furnish an argument against other probable expansions in section 5.

1 Terminology on Additional Languages

In this section, we review the terminology on additional languages which frequently appears in the studies of SLA and state our own definition.

A considerable number of studies have dealt with three or more languages within one person. Nevertheless, there is no common view on what additionally acquired languages should be called, and different researchers use different terms for them. Before turning to an examination of terminology in previous studies, we shall briefly outline here our definition of additional languages.

We classify an individual's languages in terms of the critical period. Namely, we define L1 as language(s) acquired during the critical period, and L2 as language(s) acquired after the critical period. It should be noted that one person may have multiple L1s or multiple L2s.

Let us now look at the terminology used in previous studies. In research on additional language acquisition, it is common practice to use terms based on the concept of the linear order of language learning. In this "linear model" (Hammarberg 2010), the language acquired first is called L1 (first language), the second acquired is L2 (second language), and the third one is L3 (third language): in this way, learners' languages are numbered in an acquisition order.

In the linear model, L3 can refer to three completely different situations: (i) L3

as a native language;² (ii) L3 as the first non-native language;³ (iii) L3 as the second non-native language.⁴ This practice has become common because it is apparently quite simple and clear. However, there are various problems and contradictions, as referred to in Hammarberg (2010). According to him, the linear model fails to cover the following five situations: (i) languages acquired simultaneously; (ii) language(s) acquired with only scanty knowledge; (iii) language(s) acquired with limited types of knowledge;⁵ (iv) language(s) acquired intermittently; (v) language(s) acquired almost unintentionally due to the closeness of the languages.⁶

There is another model which approaches acquired languages differently from the linear model. The basis of this model is the critical period hypothesis, which we hereby name the “CP model”. That is, an acquired language is named based on whether it is learned before or after puberty, and those acquired before puberty are L1s, while those after puberty are L2s. Following this model, some of the problems mentioned above could be solved. For example, in the linear model, it is impossible to determine the acquisition order of languages acquired simultaneously. On the other hand, in the CP model the order does not matter in determining L1/L2 because the definition of L1/L2 does not include the acquisition order, and the model allows one to possess multiple L1/L2s (Cawhalho and da Silva 2006, Davidiak 2010).

Hammarberg (2010) proposes another terminology for acquired languages, especially those which are learned after one has acquired the first L2. He focuses on these languages because he thinks they have a special status due to the knowledge, experiences, and strategies which a learner can gain from learning the first L2. Therefore, in his definition, he distinguishes L1 (acquired before puberty), L2 (acquired after puberty), and L3⁷ which is defined as follows:

[T]he term *third language* (L3) refers to a non-native language which is currently being used or acquired in a situation where the person already has knowledge of one or more L2s

² Though this situation seems to be rare, Davidiak (2010) reports twins with three “native languages.” The twins have a German-native-speaker father and a Spanish-native-speaker mother, and were brought up in an English-speaking society, namely New York. Thus the twins can handle three languages as native languages.

³ For example, in a study of English acquisition in the Catalan Countries in Spain, Jordà (2005) described the language condition of Catalan-Spanish bilingual learners as L1 for Catalan, L2 for Spanish, and L3 for English.

⁴ This can be seen in Williams and Hammarberg (1998), where the informants were native speakers of English who learned German as L2 and Swedish as L3.

⁵ Hammarberg (2010) states that it is difficult to determine which type of linguistic knowledge, that is, reading, writing, listening or speaking, is required for a learner to be judged as having acquired a language.

⁶ Hammarberg (2010) provides Scandinavian languages as an example: people with Swedish knowledge can easily comprehend Norwegian and Danish with minimal disruption.

⁷ Hammarberg (2010) proposes alternative unabridged forms of L1, L2, and L3 as primary, secondary, and tertiary language, respectively, instead of traditional first, second, and third language. This is because the traditional terms based on ordinal numerals are reminiscent of the linear model.

in addition to one or more L1s. (Hammarberg 2010:97)

In this paper, we follow the CP model, the one based on the critical period hypothesis. This is because of the fact that phonological acquisition tends to be the “first ability to be lost” (Piske et al. 2001) after the critical period, compared to the acquisition of other linguistic levels such as syntax or semantics, which can be understood from the fact that some researchers claim an earlier critical period closure for phonology (Seliger 1978, Long 1990). In addition, although some of the previous studies on the SLM follow the linear model and others employ the CP model, the age of learning has been considered as one of the most influential factors on L2 sound acquisition (Flege 1998, Piske et al. 2001). This suggests the validity of the CP model.

2 Previous Studies

In this section, we examine several previous studies. First we review the literature of additional language acquisition both in non-phonological areas (2.1) and in phonology itself (2.2). In 2.3, we discuss problems of the previous studies. Finally, we provide an introduction to Flege (1995)’s sound acquisition model, the SLM, and its component, the feature hypothesis, in 2.4.

2.1 Non-phonological Additional Language Acquisition

Although a considerable number of studies on additional languages have dealt with “L3,”⁸ they have been superficial so far. These studies have described the multiple L2 situation, but few studies have tried to establish a new theoretical model of language acquisition. In consequence of this, such a new model is inevitable.

Most of these previous studies discuss pragmatic (Williams and Hammarberg 1998, Jordà 2005) and lexical (Dewaele 1998, Rossi 2006) acquisition of “L3,” and phonological studies are relatively rare. For example, Williams and Hammarberg (1998) describe the pragmatic strategies of English native speakers who learned German and Swedish in that order. They found that the learners adopted a strategy in speaking Swedish. This strategy was observed in German but not in English. Thus, it can be concluded that L3 acquisition was influenced not by L1 but by L2. As for lexical studies, Rossi (2006) observed L3 (Spanish) lexical learning process of two groups of learners: those whose L1 was English and L2 was French; and those whose L1 was French and L2 was English. We may note, in passing, that Rossi’s study was conducted in Canada, a bilingual society.⁹ The result shows that the influence of French on Spanish lexis was great regardless of the groups, which

⁸ It should be noted that there exists no consensus on the definition of L3 as discussed in section 1.

⁹ In contrast, Williams and Hammarberg (1998) conducted their research in largely monolingual society.

indicates that what played an important role in L3 lexical acquisition was language typological distance rather than acquisition order.

2.2 Phonological Additional Language Acquisition

A small number of phonological studies such as Tremblay (2007), Wrembel (2009), Llama et al. (2010), and Wunder (2010) have investigated patterns and influential factors of sound acquisition of multiple L2s. Their results indicate that one L2 (acquired earlier) has an impact on the acquisition of another L2 (acquired later). For example, the study of Tremblay (2007), which observed the influence of L1 English and L2 French on L3 German production, found some effects of L2, although those of L1 were greater in all experimental groups categorized in terms of L2 proficiency and L2 exposure. In the study of Wrembel (2009), the fundamental frequency distribution of L3 English by native Polish speakers whose L2 is German was investigated. She claims that L3 was affected by L2 rather than L1. Llama et al. (2010) investigated the phonetic influence of typological distance and L2 “privileged status.” Their participants were two groups of L3 Spanish learners: those who spoke English as L1 and French as L2; and those who did the opposite. The result suggests that L2 privileged status was a stronger predictor. Wunder (2010) studied Spanish VOT by L3 learners with L1 German and L2 English. She concluded that L3 VOT was affected by both L1 and L2, while she stressed the importance of L1.

2.3 Problems of Previous Studies

As mentioned in 2.1 and 2.2, there are a number of previous studies on additional languages. However, these studies lack completeness in terms of the following three factors: (i) sociolinguistic situation; (ii) the direction of interference; (iii) proficiency in the source language.

Here “sociolinguistic situation” indicates language use in a society, especially bilingualism or monolingualism.¹⁰ Most previous studies on interference between multiple L2s have been conducted in multilingual societies such as the Catalan Countries in Spain (Jordà 2005), and the Francophone states in Canada (Dewaele 1998, Rossi 2006). Studies conducted in monolingual societies are relatively rare. As for the direction of interference, previous studies have put focus on the transfer from an earlier acquired L2 to a later acquired L2. We must not forget, however,

¹⁰Definitions vary as to bilingualism. It is useful to make a distinction between individual bilingualism and social bilingualism. Individual bilingualism is about personal language usage. On the other hand, social bilingualism is about language usage in a certain society. Social bilingualism is compatible with individual monolingualism, and vice versa. A French monolingual person in Quebec, a French-English bilingual region, is a good example. We will use the term “bilingual/monolingual” in the social sense.

the possibility that a later acquired L2 has an effect on the acquisition of an earlier acquired L2. Most previous studies employ the linear model to define L2, and it follows that they tend to think unidirectionally. The third problem concerns the proficiency in the source language.¹¹ In previous studies, the proficiency in the source language tends to be quite advanced. For example, Llama et al. (2010) report that their participants had a high command of their L2. However, little attention has been paid to source language with lower proficiency.

Thus, there are various problems in previous studies on additional language. What is more, these studies have reported only their observations on additional language acquisition, without referring to existing models in SLA. Therefore, it is necessary to expand the existing model so that we can explain the observations of additional language studies.

However, looking at the existing models, additional languages do not seem to be taken in consideration. These models explain interference from L1 to L2, but not between multiple L2s. Before discussing this problem, let us review one of the existing models, namely the Sound Learning Model (SLM).

2.4 SLM and the Feature Hypothesis

Among a number of SLA models, the SLM of Flege (1995) is one of the most influential models in sound acquisition. Flege places special emphasis on the acoustic nature of L2 sounds rather than their phonological categories. He also stresses the close connection between production and perception:

The production of a sound eventually corresponds to the properties represented in its phonetic category representation. (Flege 1995:239)

The SLM is composed of several hypotheses. Among these hypotheses, we focus on the feature hypothesis, which deals with the sound system difference between L1 and L2. The feature hypothesis predicts that learners may find difficulties when they perceive/produce sounds with features not used in their L1. As an example of the feature hypothesis, Munro et al. (1996) investigated the production of English /ə/ by Italian native speakers, and report that the participants found difficulty in producing the sound. This is because their L1 does not have the retroflex feature.

It is noteworthy that “feature” in the feature hypothesis is not identical to “feature” in general phonology. Flege’s “feature” includes not only phonological features but also phonetic differences. English aspiration is a good example. In English, aspiration is not distinctive, and therefore is not a phonological feature. On the other hand, the feature hypothesis considers English aspiration as a feature because there is a phonetic difference between aspirated and unaspirated consonants.

¹¹In this context, “source language” refers to the causer of interference, while “target language” indicates the causee.

As mentioned above, the feature hypothesis explains interference between L1 and L2. However, we still need to investigate whether it is possible to apply the feature hypothesis to multiple L2 learning. In the present paper, we show the validity of the expansion of the feature hypothesis to multiple L2 acquisition. Thus, the extended version of the feature hypothesis would be the following: an L2 feature is easy to acquire if the feature is used in any acquired language.

3 Method

To examine the validity of the expansion of the feature hypothesis, we conducted an experiment on English VOT by Japanese learners. In this section, we briefly review established facts about VOT in relevant languages (i.e. Japanese, English, Chinese) and show the details of the experiment.

3.1 VOT

In this study, we tested the validity of the extended feature hypothesis in terms of the VOT value of English stops produced by Japanese learners. An important point we wish to stress is that we included Chinese experience as a factor in the present experiment. To begin with, we briefly explain the functions of VOT in the three languages: Japanese, English, and Chinese.

VOT varies among different languages. Aspirated consonants do not appear in Japanese. Although there is no aspirated consonant as an independent phoneme in English, English voiceless stops and affricates (/p/, /t/, /k/, /tʃ/) in a stressed syllable (without being preceded by /s/) are pronounced as aspirated consonants. Namely, aspiration is not phonologically distinctive in English, but aspiration plays an important role in phonetics. On the other hand, in Standard Chinese, aspiration has a phonological distinctive function: there are three unaspirated stops (/p/, /t/, /k/) and three aspirated counterparts (/p^h/, /t^h/, /k^h/). In addition, it has three pairs of affricates (/ts/-/ts^h/, /tʃ/-/tʃ^h/, /tʂ/-/tʂ^h/). VOT can be also affected by places of articulation (Cho and Ladefoged 1999), vowel context (Morris et al. 2008), and tones (Liu et al. 2008), although not all previous studies support this.

Chinese stops show the longest VOT, followed by English and Japanese, respectively. Comparing Chinese and English, Chinese has much longer VOT (Chen et al. 2007). According to Homma (1985), VOT of Japanese is much shorter than that of English.

In contrasting aspirated and unaspirated consonants both phonetically and phonologically, the difference in VOT value rather than absolute VOT value is the key to distinguish the two sounds. In fact, the VOT of aspirated consonants is longer for female or older speakers rather than male or younger speakers (Yao 2009), but to distinguish aspirated consonants from unaspirated ones is not problematic because there are considerable differences between the two in terms of VOT value

regardless of their absolute value.

Thus, Japanese learners are not good at producing sufficient VOT as long as native speakers of English and Chinese. In fact, Homma (1985) and Riney and Takagi (1999) reported that VOTs of stops produced by Japanese learners of English are shorter than English native speakers. Just as in English production, Japanese learners find difficulties in Chinese VOT (Wang and Shangguan 2004). These difficulties can be explained by the feature hypothesis. That is, their inaccuracy is due to the fact that Japanese, their L1, does not have an aspiration feature.¹²

The different status of VOT in English and Chinese also affects L2 teaching. In fact, aspiration is taught explicitly in Chinese classrooms in Japan, while not in English ones. Thus, Japanese learners of English, provided that they have not studied Chinese, do not pay attention to aspiration.

3.2 Subjects

Three groups of speakers participated in the recording. No subjects reported any known speech or hearing disorders.

- Experimental group ($n = 6$): Japanese native speakers who had learned Chinese for 1-4 years.
- Non-native control group ($n = 6$): Japanese native speakers who had never learned Chinese.
- Native control group ($n = 2$): English native speakers from England who had been teaching English at a university in Japan for more than two years.

Both Japanese groups received the “standard” language training of English in Japan (six years of instruction in junior and senior high school, and some language classes at university). They were either undergraduate or graduate students in Japan, and had not lived in English-speaking or Chinese-speaking regions for longer than one year.

3.3 Equipment

The recording was carried out in the soundproof booth of the University of Tokyo. A digital audio recorder (Cool Edit Pro Version 1.2) and a dynamic microphone (SONY ECM-MS957) were used for the recording. The audio signals from each

¹²VOT exists in Japanese consonants as indicated in Homma (1985). However, Japanese VOT can be considered articulatory rather than functional. In fact, Japanese VOT is almost as short as unaspirated consonants in English and Chinese. In addition, Japanese does not contrast between longer VOT (aspirated) and shorter VOT (unaspirated) either phonetically as in English or phonologically as in Chinese. Therefore, this paper considers that Japanese does not have a VOT feature.

speaker were digitized at 44.10 kHz with 16 bits of amplitude resolution. The digitally recorded audio signals were edited with the sound analysis program Praat Version 5.2.11 (Boersma and Weenink 2011). Aspiration boundaries were carefully determined by listening to selected parts of the audio signal and by visual inspection of the speech waveform and spectrogram.

3.4 Tasks and Procedure

Fifty-four meaningful English target words with all possible combinations in terms of place of articulation (labial, alveolar, velar), height of succeeding vowel (high, mid, low), and aspiration (aspirated, unaspirated) were selected. We put these target words and filler words into carrier sentences as follows: *don't say "X", say "Y"* (see Appendix).

Target or filler words were positioned in X or Y or both, and every word was paired up with a semantically related word in the same carry sentence; for example, *spice/pepper* (both target), *pass/fail* (former: target; latter: filler), or *fire/water* (both filler). Thus we made 54 English sentences, sorted these task sentences at random, and printed them. Every subject was asked to look through the sentences once, in order to check if there were any unknown words. After that, they were required to read aloud the task sentences at natural speed. They were allowed to repeat if they made an error.

4 Results

Table 1 and Figure 1 summarizes the result of the experiment. We conducted a two-way ANOVA with the main effect of group (experimental group, non-native control group, native control group), the main effect of aspiration (aspirated/unaspirated), and their interaction. This test shows group effect ($F(2,728) = 35.81, p < .001, \eta^2 = .098$), aspiration effect ($F(1,728) = 383.02, p < .001, \eta^2 = .526$), and interaction of the two main effects ($F(2,728) = 18.49, p < .001, \eta^2 = .051$) were highly significant.

Table 1: Mean VOT Values Produced by Each Subject Group

	Aspirated	Unaspirated
Experimental Group	88.2 msec	31.5 msec
Non-native Control Group	53.4 msec	24.7 msec
Native Control Group	78.3 msec	21.9 msec

In Figure 1, an important point is the VOT differences between aspirated and unaspirated stops in each subject group. The non-native control group did not show substantial VOT difference, while the experimental group and the native group did.

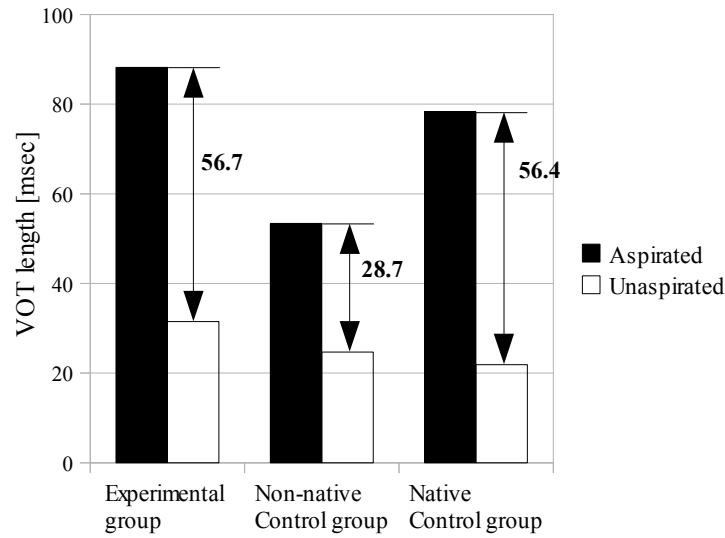


Figure 1: The VOT Difference in Each Subject Group

Here, we should note that the VOT difference of the experimental group was similar to that of native control group. Though the mean VOT of the experimental group was longer than that of the native control group, this point is not important when we discuss the acquisition of the aspiration feature. This is because, as mentioned earlier, the difference in VOT value is more critical to aspiration contrast than absolute VOT value.

The results indicate that the experience of Chinese contributed to the production of English VOT. In other words, the acquired category in Chinese (i.e. aspiration) helped the distinction in English, even though the participants had learned English before Chinese and had higher proficiency in English (target) than Chinese (source).

5 Discussion

This section firstly proposes our expansion of the feature hypothesis based on the findings in the previous studies and our experiment (5.1). In 5.2, other possible expansions of the hypothesis will be discussed, and we argue for the validity of our expansion.

5.1 Main Findings and the Expansion of the Feature Hypothesis

As mentioned in section 4, the VOT difference between aspirated and unaspirated stops was sufficient both in the experimental group and the native control group, but not in the non-native control group. This can be interpreted that the experimental

group is native-like in terms of aspiration, while the non-native control group is not. It suggests that one L2 (i.e. Chinese) affected the other L2 (i.e. English) in a monolingual setting, although the proficiency of the source language was not necessarily high in any participants in the experimental group.

This result does not agree with the original feature hypothesis, which states that learners will have difficulty in perceiving and producing target language features not used in L1. In this experiment, L1 and the target language of the experimental group were same as those of the non-native control group. It follows that the VOT acquiring pattern of the two groups should be equal according to the original formation of the feature hypothesis.

Therefore, if we try to explain our result in terms of the feature hypothesis, it is required to extend it, as mentioned in 2.4: an L2 feature is easy to acquire if the feature is used in any acquired language. This extended version of the feature hypothesis can account not only for our results but also for those of previous studies which report interference between multiple L2s.

5.2 Background Factors in Interference Between Multiple L2s

Comparing with the setting of our experiment with those of previous studies (Tremblay 2007, Wrembel 2009, Llama et al. 2010, Wunder 2010), differences in three main factors can be found as in Table 2.

Table 2: Major differences in the background factors

	Previous Studies	Our Study
Sociolinguistic Situation	(Relatively) Bilingual	(Relatively) Monolingual
Direction of interference	Earlier Acquired L2 → Later Acquired L2	Later Acquired L2 → Earlier Acquired L2
Proficiency of Source Language	High Proficiency	Low Proficiency

These factors have been touched on in 2.3. Our extended version of the feature hypothesis is not subject to these three factors. Now we discuss the relationship between these factors and the expansion of the feature hypothesis. There are several objections which can be raised against this extension, and indeed it is possible to extend the feature hypothesis in a more limited way. Putting together the results of previous studies and the present study, however, such limited extensions are not satisfactory.

First of all, we might extend the feature hypothesis only to bilingual settings if we merely consult previous studies in bilingual societies. Considering the present study was conducted in a monolingual setting, it can be concluded that the feature hypothesis is applicable regardless of bilingualism.

In the same way, it may be possible to extend the feature hypothesis to explain interference from an earlier acquired L2 to a later acquired L2. Although most previous studies have observed the influence from an earlier acquired L2 to a later acquired one, our finding was in the opposite direction. Therefore, it is possible to suggest that interference could occur in both directions: either from a previously acquired language to a newly acquired one, or vice versa.

Finally, it has often been the case that the proficiency in the source language was relatively higher than that of the target language. In the present study, however, the source language (i.e. Chinese) proficiency of the participants was not as high as the target language (i.e. English) proficiency. Therefore, it can be suggested that one L2 can affect the other L2 acquisition regardless of one's proficiency in the source language, which means that the production of learners with any proficiency level could be explained by the feature hypothesis.

Thus, our extended version of the feature hypothesis can cover not only traditional interference from L1 to L2 but also multiple L2 interference regardless of background factors which other expansions fail to deal with. Moreover, it is noteworthy that we observed interferences which had not been discussed in previous studies. Our experiment was conducted in a monolingual society, and the interference direction was from a later acquired language with low proficiency to an earlier acquired one.

We therefore extend the feature hypothesis as follows: an L2 feature is easy to acquire if the feature is used in any acquired language.

References

- Boersma, Paul and David Weenink. 2011. Praat: Doing Phonetics by Computer (Version 5.2.11) [Computer software]. Retrieved from <http://www.praat.org/>.
- Cawvalho, Ana M. and Antonio J. B. da Silva. 2006. Cross-Linguistic Influence in Third Language Acquisition: The Case of Spanish-English Bilinguals' Acquisition of Portuguese. *Foreign Language Annals* 39(2):185–202.
- Chen, Li-mei, Kuan-Yi Chao, and Jui-Feng Peng. 2007. VOT Productions of Word-initial Stops in Mandarin and English: A Cross-language Study. In *Proceedings of the 19th Conference on Computational Linguistics and Speech Processing*, 303–317.
- Cho, Taehong and Peter Ladefoged. 1999. Variations and Universals in VOT: Evidence from 18 Languages. *Journal of Phonetics* 27:207–229.
- Davidiak, Elena. 2010. One? ¿Dos? Drei! A Study of Code Switching in Child Trilingualism. Ph.D. thesis, University of Iowa.

- Dewaele, Jean-Marc. 1998. Lexical Inventions: French Interlanguage as L2 Versus L3. *Applied Linguistics* 19(4):471–490.
- Flege, James E. 1995. Second Language Speech Learning Theory, Findings, and Problems. In Winifred Strange, ed., *Speech Perception and Linguistic Experience: Issues in Cross-Language Research*, chapter 8, 233–277, Timonium, MD: York Press.
- Flege, James E. 1998. The Role of Subject and Phonetic Variables in Second-Language Learning. In M. Catherine Gruber, Derrick Higgins, Kenneth S. Olson, and Tamra Wysocki, eds., *Papers from the 34th Annual Meeting of the Chicago Linguistic Society, Volume II, The Panels*, 213–232, Chicago: Chicago Linguistic Society.
- Hammarberg, Björn. 2010. The Languages of the Multilingual: Some Conceptual and Terminological Issues. *International Review of Applied Linguistics in Language Teaching* 48(2–3):91–104.
- Homma, Yayoi. 1985. *Nichieigo-no onkyō onseigaku [Acoustic Phonetics in English and Japanese]*. Kyoto, Japan: Yamaguchi Shoten.
- Jordà, Maria P. S. 2005. *Third Language Learners: Pragmatic Production and Awareness*. Clevedon, UK: Multilingual Matters.
- Liu, Hanjun, Manwa L. Ng, Mingxi Wan, Supin Wang, and Yi Zhang. 2008. The Effect of Tonal Changes on Voice Onset Time in Mandarin Esophageal Speech. *Journal of Voice* 22(2):210–218.
- Llama, Raquel, Walcir Cardoso, and Laura Collins. 2010. The Influence of Language Distance and Language Status on the Acquisition of L3 Phonology. *International Journal of Multilingualism* 7(1):39–57.
- Long, Michael. 1990. Maturational Constraints on Language Development. *Studies in Second Language Acquisition* 12(3):251–285.
- McAllister, Robert, James E. Flege, and Thorsten Piske. 2002. The Influence of the L1 on the Acquisition of Swedish Vowel Quantity by Native Speakers of Spanish, English and Estonian. *Journal of Phonetics* 30:229–258.
- Morris, Richard J., Christopher R. McCrea, and Kaileen D. Herring. 2008. Voice Onset Time Differences Between Adult Males and Females: Isolated Syllables. *Journal of Phonetics* 36(2):308–317.
- Munro, Murray J., James E. Flege, and Ian R. A. Mackay. 1996. The Effects of Age of Second Language Learning on the Production of English Vowels. *Applied Psycholinguistics* 17(3):313–334.

- Piske, Thorsten, Ian R. A. MacKay, and James E. Flege. 2001. Factors Affecting Degree of Foreign Accent in an L2: A Review. *Journal of Phonetics* 29(2):191–215.
- Riney, Timothy J. and Naoyuki Takagi. 1999. Global Foreign Accent and Voice Onset Time Among Japanese EFL Speakers. *Language Learning* 49(2):275–302.
- Rossi, Silvia Luisa. 2006. L'interférence lexicale dans l'acquisition d'une troisième langue : Effet langue seconde ou distance typologique? [Lexical Interference in L3 Acquisition: The Effect of Second Language or Typological Distance?]. Master's thesis, University of Calgary.
- Seliger, Herbert W. 1978. Implications of a Multiple Critical Periods Hypothesis for Second Language Learning. In William C. Ritchie, ed., *Second Language Acquisition Research: Issues and Implications*, 11–19, New York: Academic Press.
- Tremblay, Marie-Claude. 2007. L2 Influence on L3 Pronunciation: Native-like VOT in the L3 Japanese of English-French Bilinguals. Paper presented at The L3 Phonology Workshop, Freiburg, Germany.
- Wang, Yunjia and Xuena Shangguan. 2004. Riben xuexizhe dui Hanyu Putonghua busongqi/songqi fuyin de jiagong [How Japanese Learners of Chinese Process the Aspirated and Unaspirated Consonants in Standard Chinese]. *Shijie Hanyu Jiaoxue [Chinese Teaching in the World]* 18(3):54–66.
- Williams, Sarah and Björn Hammarberg. 1998. Language Switches in L3 Production: Implications for a Polyglot Speaking Model. *Applied Linguistics* 19(3):295–333.
- Wrembel, Magdalena. 2009. L2-accented Speech in L3 Production. *International Journal of Multilingualism* 7(1):75–90.
- Wunder, Eva-Maria. 2010. Phonological Cross-linguistic Influence in Third or Additional Language Acquisition. In *Proceedings of New Sounds 2010*. Held at Poznań, Poland, 1-3 May.
- Yao, Yao. 2009. Understanding VOT Variation in Spontaneous Speech. In *Proceedings of the 18th International Congress of Linguists (CIL XVIII)*.

Appendix: Examples of experimental sentences

1. Don't say "pan," say "can."
2. Don't say "tool," say "cable."
3. Don't say "keep," say "tie."
4. Don't say "store," say "shop."
5. Don't say "score," say "team."
6. Don't say "wood," say "steel."
7. Don't say "dead," say "living."
8. Don't say "toy," say "school."
9. Don't say "folk," say "spoon."

University of Tokyo
Department of Language and Information Sciences
3-8-1, Komaba, Meguroku, Tokyo 153-8902 Japan

galangalanga@gmail.com, nisihara@phiz.c.u-tokyo.ac.jp

Learning cues to category membership: Patterns in children's acquisition of hedges

MARISA CASILLAS AND PATRÍCIA AMARAL

Stanford University and University of North Carolina at Chapel Hill

Introduction

When we think of children acquiring language, we often think of their acquisition of linguistic structure as separate from their acquisition of knowledge about the world. But it is clear that in the process of learning about language, children consult what they know about the world; and that in learning about the world, children use linguistic cues to discover how items are related to one another. This interaction between the acquisition of linguistic structure and the acquisition of category structure is especially clear in word learning.

0.1 Linguistic Hedges and Category Membership

In order to refer to items in the world, speakers must know about the relations between them: their category structure. An item's category membership is perceived as gradient rather than absolute. Members of semantic categories have different degrees of prototypicality, according to their properties (e.g. Rosch & Mervis 1975). For example, while native speakers might regard a robin as a good instance of the category BIRD, they are likely to see a chicken as a more peripheral member of that category. In language learning, it has been proposed by Heider (1971) that central members of a category are learned earlier than peripheral members.

Linguistic hedges provide the hearer with information about an item's position with respect to the structure of a category. For example, hedges like *par excellence* or *a typical X* require the highest degree of category membership, while other hedges (e.g. *kind of*, *sort of*, and *almost*) encode vagueness or fuzziness in membership (Lakoff 1973). The interpretations of *sort of* and *almost* both involve identifying central and peripheral members of a category, though their meanings differ. The use of *sort of* in (1) indicates that although a croissant can be considered a dessert, it is not the best instance of this category. The use of *almost* in (2) indicates

that the necklace being referred to is not a rainbow, but strongly resembles a typical rainbow, e.g. due to the number of colors it has, or the overall configuration of its strands.

- (1) A croissant is sort of a dessert.
- (2) That necklace is almost a rainbow.

Typically, the meaning of *almost* involves an ordering. To interpret a sentence with *almost*, the hearer must identify a set of ordered elements along a certain dimension, i.e. a scale (Hitzeman 1992; Amaral & Del Prete 2010). In (2), under the interpretation above, *almost* operates on a prototypicality scale, on which we rank possible arrangements of colored lines with respect to how well they resemble a “good” rainbow (the most prototypical one). Another interpretation for (2) is available, namely one that relies on a temporal scale: (2) could also be uttered as a description of an incomplete necklace that is not a (full) rainbow yet, but will eventually become one, once e.g. its blue and violet beads are added. The succession of steps ending in the fabrication of a full rainbow necklace is what underlies this use of *almost*.

The use of these expressions shows that speakers make a range of subtle distinctions within the structure of semantic categories. Learning about similarities and differences between items, and identifying properties associated with a certain category are important skills for the language learner in dealing with vagueness (a property of all natural languages). Semantic categories have fuzzy boundaries, and this is part of the semantic knowledge of adult native speakers. If children are sensitive to the meaning of linguistic hedges, their notions about category structure can be informed by the use of these expressions in the linguistic signal.

0.2 Hedges in Language Acquisition

Previous work on the acquisition of *almost* has shown that children are sensitive to the different scales required by its semantics. They use this knowledge to learn about distinctions in the semantics of different types of gradable adjectives (Syrett 2007). In a corpus study of Child Directed Speech to four children, *almost* systematically occurs as a modifier of expressions involving an ordering on some domain, often as a modifier of expressions denoting endpoints of temporal paths, like “becoming a man” as in (3):

- (3) A: Do men have to shave, and boys, too?
M: Boys when they’re almost men, not little boys like you. (Adam, file 38; Syrett 2007:153)

Almost also operates on a prototypicality scale, sometimes co-occurring with *like*:

(4) M: Tell me what color the bookcase is.

N: Red.

M: Almost. It's pink. (Nina, file 17; Syrett 2007:153)

(5) E: This is almost like tapioca. (Eve, file 7; Syrett 2007:153)

Other uses of *almost* as a hedge presuppose an awareness of category structure and the identification of properties associated with a certain category:

(6) A: Look this is almost a beehive it got little holes. (Abe, 3;10.14)

In a comprehension study on the acquisition of *almost* by 3- to 5-year-olds, Amaral (2010) shows that children understand the meaning of *almost* when they grasp the underlying scale required by the meaning of the adverb. For example, 3-year-old children understand an expression of the type 'almost X' about 60% of the time when *almost* operates on a numeric scale (e.g. *He has almost 5 blocks*) or on a directional spatial path (e.g. *The frog jumped almost to the lily pad*). A consistent, adult-like interpretation of the adverb as a modifier of different syntactic categories seems to be reached only at age five (Amaral 2010).

To our knowledge no study has focused on the acquisition of *almost* or other expressions as hedges, which encode information about degrees of category membership. Adults use hedges when offering children information about categories (e.g. "A moth is sort of a butterfly, but..."), and in that context, the hedged description introduces a new word-referent pair by building on existing knowledge. The child who understands the meaning of the hedge phrase *sort of* is invited to make the inference that the object in question shares some properties with butterflies but is not, strictly speaking, a butterfly.

Little is known about the acquisition of hedges and their role in word learning, and yet learning about differences between members of a category is important in mapping words to their referents. This study investigates whether children are sensitive to the use of the linguistic hedges *sort of* and *almost* and, if so, whether they associate these hedges to non-prototypical members of a category or incomplete objects/objects-to-be.

We ask the following questions:

1. Are children sensitive to the use of hedges by other speakers?
2. Do children associate hedges to objects that are incomplete or to non-prototypical category members?
3. Are children sensitive to differences in meaning among hedges?

Our results indicate that from age three children can identify the use of a hedge by another speaker, and by age five they can reliably use this information to distinguish between more and less prototypical members of a category. The structure of the paper is as follows: In section 1 we present our experiment. Section 2 describes the results and section 3 presents a discussion of our results and future work.

1 The Experiment

Our participants were 3-, 4-, and 5-year-old children, all native English speakers. We collected data from twelve participants in each age group for a total of 36 children.

1.1 The Task

Participants took part in a four-alternative forced choice task that lasted approximately 10–15 minutes and comprised a total of 12 trials (4 fillers and 8 critical trials). At the beginning of each trial, the participant was given a set of four semantically related pictures to look at. Two of the pictures were competitors for a category, one prototypical member and a non-prototypical member (e.g. “butterfly” and “moth” for the category BUTTERFLY), and the two other pictures were semantically related non-competitors (e.g. “bee” and “mantis”). After the children had a moment to look at each picture, they were told that a copy of one of the pictures would be hidden inside of a Mystery Box, and were asked to close or avert their eyes while the experimenter hid the picture inside. Then a puppet was allowed to peek inside the box and give the children a clue about which picture was hidden. Following the puppet’s clue, children were asked to point to which of the four pictures they thought was most likely to be hidden. Sessions were recorded on a camcorder for later review and coding.

1.2 Manipulations

1.2.1 Use of Hedge

Knowledge of hedges was tested through the clue that the puppet gave. Clues took the form of a linguistic frame, in which the noun phrase always occurred utterance-finally. In the 8 critical trials, which all featured competing pictures (e.g. “butterfly” and “moth”), the puppet used both hedged and unhedged frames (see Table 1): “It’s almost a ____,” “It’s sort of a ____,” “It’s a ____,” and “In here there’s a ____.” This last frame (“Long unhedged”) was added to match the syllable length of the hedged frames, while leaving the *unhedged* category label in utterance-final position. Clues were played through a small speaker inserted inside of the puppet’s head so that each participant heard the same acoustic signal.

Because we are interested in the children’s knowledge of hedge phrases themselves, and not in (related) cues to uncertainty such as pausing, filler usage, intonation, or lengthening, the recordings of the frames were made with a confident declarative tone and their acoustic properties were kept constant across all the frames. These other cues to uncertainty or hedging are most likely relevant to word learning in the same way that the hedge phrases are, but we do not look into them

Figure 1: Experimental setup: Participants were given a four-picture set to review. A copy of one picture was hidden by the experimenter in the "Mystery Box." Children were asked to guess which picture was hidden after hearing a verbal clue from the puppet, who had peeked into the box.

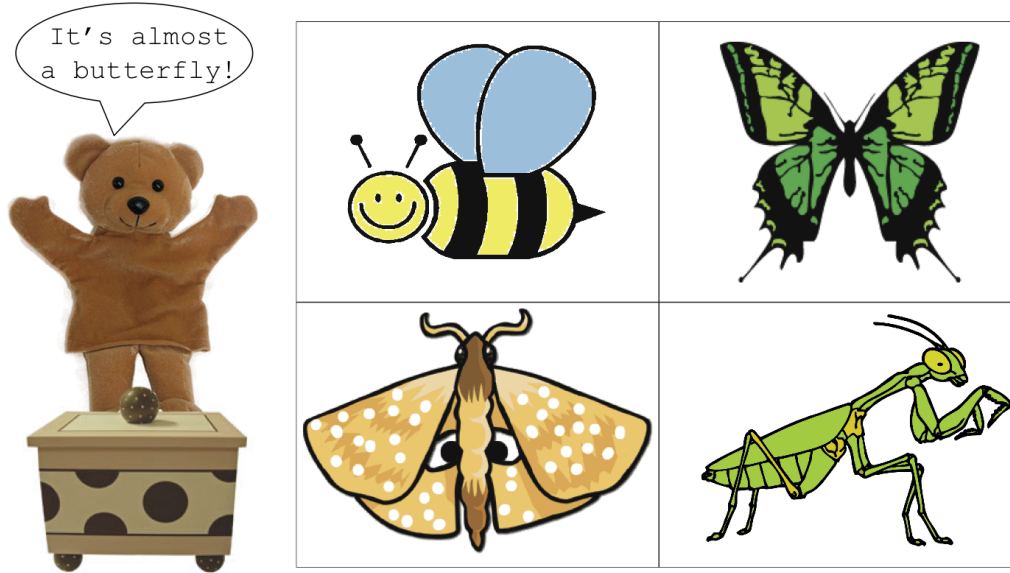


Table 1: Clue "frames" used by the puppet. Each frame appeared twice on critical trials. Filler trials only used the Default frame.

Unhedged frames	Hedged frames
<u>Default</u> : It's [a butterfly].	<u>Almost</u> : It's almost [a butterfly].
<u>Long</u> : In here there's [a butterfly].	<u>Sort of</u> : It's sort of [a butterfly].

here. Previous work on children's perceptions of speaker reliability has demonstrated that children are highly sensitive to these cues (Koenig & Harris 2005; Sabagha & Baldwin 2001), but little work has tried to control what factors are actually contributing to these perceptions.

Our prediction is that, if children understand the meaning of *sort of* and *almost*, then they will be more likely to choose the non-prototypical competitor when they hear a hedged frame in the clue. In the case that they hear an unhedged frame, they should be more likely to choose the prototypical competitor.

Further, we predict that there will be a developmental effect of the interpretation of hedges. Namely, that younger children will show a strong prototypicality bias, more often choosing the prototypical competitor in response to a hedged frame.

1.2.2 Prototypicality vs. Completeness

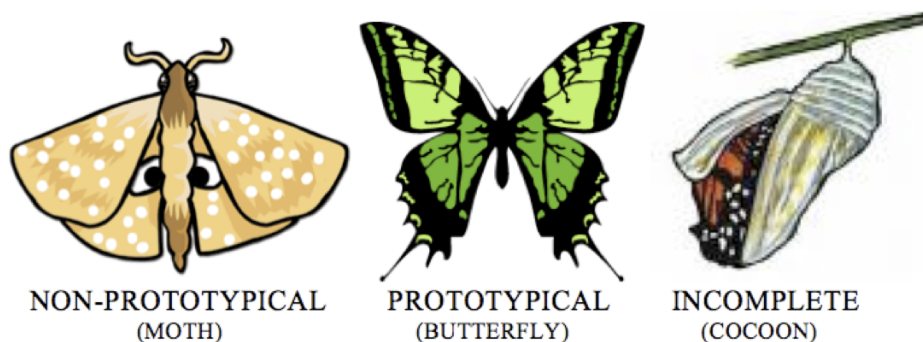
As we said above, *almost* may operate both on a prototypicality and on a temporal scale, while *sort of* only denotes fuzziness of membership related to prototypicality. When describing a moth that strongly resembles a butterfly, we may say *It's almost a butterfly*, relying on a scale of prototypicality. We might also indicate the relation of a moth to a butterfly by saying *It's sort of a butterfly*: although a moth is not a good exemplar of the category BUTTERFLY, it shares certain significant properties with a prototypical one (e.g. having wings). On the other hand, if we want to refer to the life cycle of a butterfly, in which there is a temporal path culminating in the transition to a winged form, a fully mature larva breaking out of its cocoon can be described as *almost a butterfly*. But this interpretation is not available to the expression *sort of a butterfly*.

Children may perform differently on these different dimensions of category membership, and so we decided to test them separately. In the following, we refer to these dimensions by the terms Prototypicality and Completeness.¹ In the Prototypicality condition, the two competitors differed with respect to degree of category centrality. For each category, a picture of a good exemplar and a peripheral exemplar were both provided (e.g. butterfly/moth, sock/Christmas stocking). In the Completeness condition, competitors were related on a temporal scale, one picture representing the fully grown or complete exemplar and the other an object-to-be or an incomplete version of the object (e.g. butterfly/cocoon, sock/partially knit sock). The possible competing pictures for the category BUTTERFLY are shown in Figure 2.

Each participant was assigned to one of two between-subject conditions: Prototypicality or Completeness. Participants were split evenly within age groups so that each condition had a total of 18 participants. If children have acquired the difference in meaning between the two hedges, we predict that they will show a benefit for their comprehension of *sort of* on the Prototypicality condition and a benefit for *almost* on the Completeness condition. While *sort of an X* describes a non-prototypical member of category X, *almost an X* may indicate either that the described item resembles a prototypical member of category X or that it is an incomplete X/an X-to-be. The fact that the latter instances are more frequent in corpus data leads us to expect that *almost* be more readily understood in the Completeness condition.

¹ This is a general term that we chose to refer to the temporal scale that can be involved in the meaning of *almost*.

Figure 2: The prototypical, non-prototypical, and incomplete stimuli for the category BUTTERFLY used as competitors in the picture sets. Each participant only saw either Prototypicality relations or Pcompleteness relations. The other seven categories were: TREE, FROG, ROOSTER, SANDWICH, CASTLE, SOCK, and DOLL.



1.2.3 Man-made and Natural Kinds

The critical item categories were grouped into man-made (SANDWICH, CASTLE, SOCK, and DOLL) and natural kinds (BUTTERFLY, TREE, FROG, and ROOSTER). The man-made and natural kinds distinction was included to avoid any possible bias associated to differing knowledge of, or attention to attributes across these two category types. For example, a child who is not aware that a tadpole will become a frog will not be well-equipped to respond to the clue *It's almost a frog*. That same child, however, may find the clue *It's almost a sandwich* easy to respond to, since she is familiar with the process of sandwich-making. Thus, in addition to making our categories as familiar and culturally appropriate as possible, the man-made vs. natural kinds distinction allows us to ensure that children's behavior wasn't limited to a single category type.

A second reason for this manipulation comes from previous studies on word learning. Andersen (1975) provides evidence for a developmental trend in the acquisition of vague category boundaries within the semantic field of artifacts. In her study, young children (around age 3) tend to rely on salient perceptual properties of objects to make decisions about category membership. Only later do children combine these physical properties with functional properties as criteria for drawing category boundaries. In another study also focusing on labels for artifacts, it was found that in naming contexts, categorization by function is more likely only in older preschool children, at least 4-year-olds (Kemler Nelson et al. 2000).

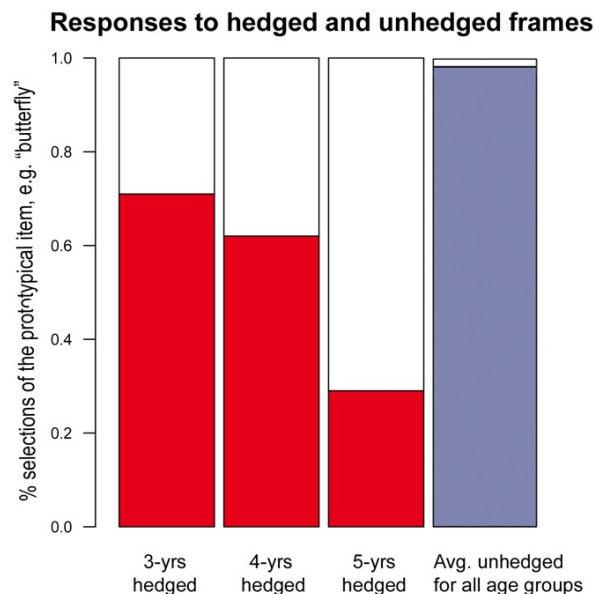
Given that functional properties only apply to man-made objects, the inclusion of both man-made and natural kinds would allow us to see if the integration of functional properties creates any bias in learning the category structure of man-

made items. If older preschool children take into account functional properties in their decisions about categorization, this may play a role in identifying prototypical and non-prototypical members of man-made categories.

Returning to the Completeness condition, on a temporal scale, a picture of a chick fulfills the description “It’s almost a rooster” better than a picture of a rooster. But, this is not the case with the description “It’s sort of a rooster,” in which the best option (rooster or chick) is less clear, and adults may even be more likely to choose the rooster, despite the use of a hedge. This distinction between the meanings of *almost* and *sort of* applies more weakly to the man-made items: a picture of a sock in the process of being knit is a better answer than a prototypical sock whether the clue is, “It’s almost a sock” or “It’s sort of a sock.” If children are picking up on the subtle differences in meaning between these hedges, it should be evident in their differential responses in the Completeness condition, and may even be stronger for natural kinds than man-made objects.

Since there were only 12 trials, randomization was constrained to keep the man-made and natural kind trials evenly spread throughout the session. The order of trials was shuffled for each participant so that fillers were dispersed evenly throughout the 12 trials, starting at the first trial. The placement of images in the 2×2 picture sets were randomized for each trial, with the caveat that the competitors always appeared diagonal from each other (not in the same row or column).

Figure 3: Response averages to hedged frames by age group. Age-collapsed response averages to the default (unhedged) frame is added on the right for comparison. Children in all three age-groups consistently chose the prototypical item in response to the default frame.



2 Results

Children and adults were at or near ceiling on the Default frame trials, almost always choosing the prototypical competitor in response to a clue like *It's a butterfly*. The effect of hedge was significant ($p < 0.05$), meaning that overall, children and adults were significantly more likely to choose the non-prototypical or incomplete competitor in response to a hedged frame. From Figure 3, it is clear that though this effect holds for all age groups of children, there is a strong developmental effect. Three-year-olds take the hedge phrase into account in their responses, but only about 25% of the time. Five-year-olds, on the other hand, are much more likely to treat the hedge phrase in an adult-like way (about 70% of the time). T-tests indicate a significant difference between 3- to 4-year-olds and 5-year-olds ($p < 0.05$), but no difference between 3- and 4-year-olds. This suggests that the 4–5 year age span is an important developmental time for the acquisition of the meaning of hedges.

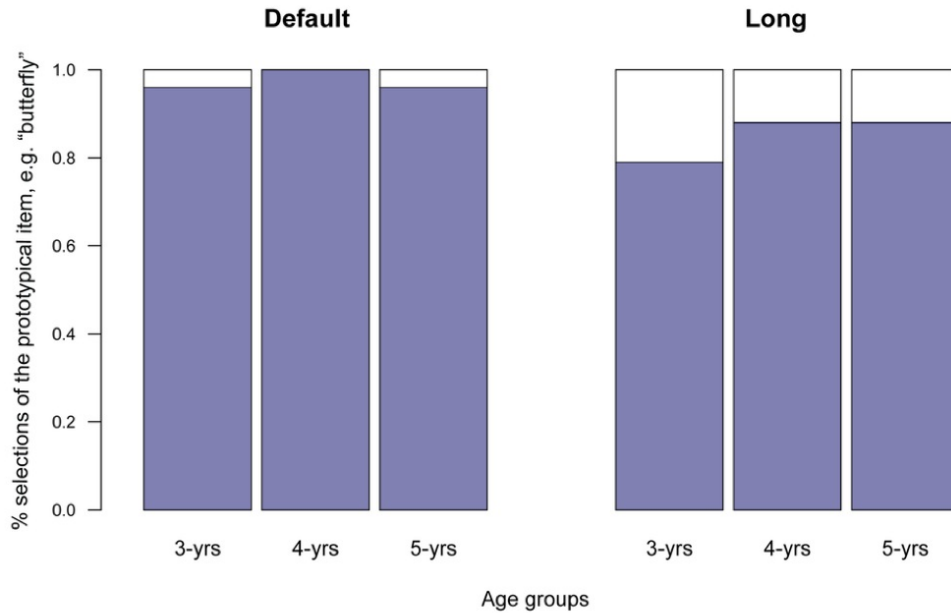
A mixed-effects model was fit to analyze the effects of the separate manipulations: age, use of hedge, “type of frame”, Prototypicality vs. Completeness, and Man-made vs. Natural kinds. In addition to a significant effect of age (by year and age in months), there was a significant interaction between age and frame, and age and the Long unhedged frame. These interactions stem from two results. First, performance with *almost* was slightly better than with *sort of*, though the effect is not a significant one. Second, and primarily, children treated the Default unhedged frame and the Long unhedged frame differently.

Some children appear to use the length of the frame (e.g. in syllables) as a cue to modification, corresponding in this case to non-prototypicality of the category member. For them, longer-than-expected descriptions are less likely to apply to typical category members, falling in line with Gricean maxims of Manner and Quantity. This behavioral pattern was most common among 3-year-olds, who show a marginal difference ($p = .08$) between the Long and (short) Default unhedged frames.

While responding to each trial, children were encouraged to share any comments they had about the set of pictures or their reasoning for selecting one over the others. These data allow us to peek beyond their forced-choice responses, giving us a richer interpretation of their behavior. The video recording of each child's participation was reviewed by two paid, naive coders who transcribed the children's spontaneous commentary, any hesitation in their response (in comparison to the easier filler trials), and any coping strategies the children used in approaching the task.² In this paper, we will not address these coping strategies, but leave a more in-depth analysis of these behaviors for a later date.

² E.g. choosing two pictures that might **both** be valid answers. In these cases, children were reminded that they could only choose *one* picture.

Figure 4: Comparison of the two unhedged frames.



2.1 Spontaneous Commentary and Hesitations

From their forced-choice response data alone, we cannot tell whether children are more likely to choose non-prototypical category members in response to hedged frames because (1) the hedged frames are longer, and so the Gricean inference applies to all but the Default frame, or (2) the hedged frames contain a hedge phrase, or (3) both. Here the children's spontaneous commentary provides a great deal of insight about how they interpreted the use of hedges. Children's explanations and commentary often focused on the lexicalized hedge phrase itself or the category features it brought to light:

About the hedge:

1. He didn't say it was a sock, he said it was sort of a sock.
2. He told me it's sort of like a rooster.
3. Sort of a castle? Because it has the same top as a castle. It's almost a castle but it's just one big tower.

About category features:

1. It was something like a butterfly. This is like a butterfly, it has wings.
2. It's not big, it doesn't have a tail. The grownup [rooster] and the baby [chick].
3. Almost a frog... It's green like a frog, it has feet like a frog.

Although there were no significant differences between the two hedges in this task, in the Completeness condition children’s comments on the frame “It’s almost a ____.” were revealing. Children refer to temporal paths to explain their choice of the incomplete or object-to-be competitor:

About temporal paths:

1. Because this tadpole will grow into a frog it’s almost a frog.
2. Oh it’s almost a sock but not a sock yet; because it’s not a sock it’s knitted.
3. When butterflies are in cocoons they turn into this. Butterflies aren’t in cocoons.

Coder reliability for the presence of hesitation compared to filler trials was 75.5%. Taking only those trials which both coders marked as a “hesitated” response, we found that participants hesitated on 54% of hedged trials and 12% of unhedged trials. Over two-thirds of the hesitations on unhedged trials were in response to the Long unhedged frame, and the rest were dispersed evenly.

Table 2: Comparing results from the forced-choice responses and children’s hesitations, it becomes clear that 4-year-olds fall into an intermediate category in which they superficially look like 3-year-olds, but appear to incur processing costs when presenting with a hedge, like 5-year-olds.

Response measure	3-year-olds	4-year-olds	5-year-olds
“Prototypical” response to hedged frames	77.1%	68.8%	* 37.5%
Hesitations during response	36.2%	* 59.6%	64.0%

The forced-choice response data showed 5-year-olds diverging from 3- and 4-year-olds in their use of hedged phrases to select non-prototypical options. This suggests that four-year-olds have not yet advanced in their knowledge of hedges from their performance at three years of age. However, when we compare hesitation data, as in Table 2, we see that 4- and 5-year-olds *both* diverge from 3-year-olds, hesitating more often in response to the prompts.

The increase in hesitation with age indicates that the older children are more likely to take their time to process all of the information given in the frame, while younger children are more likely to jump ahead with their (prototypicality-biased) guess. Taking these data into account, then, it appears that 4-year-olds fit nicely into an intermediate category between 3- and 5-year-olds, in which they are more likely to be sensitive to hedge use, but may not have mastered its association with non-prototypicality yet.

3 Discussion

From age three children are just beginning to take linguistic hedges into account, and they tend to choose the prototypical object in response to both hedged and unhedged cues. Younger children are more likely to rely on length of description as a cue to category membership: shorter descriptions are interpreted as unmodified and

hence as referring to a central member of the category. Heider (1971) assumes that central members of a category are learned earlier and hypothesizes that children would make more errors on peripheral category members than adults. We believe that this may explain the higher percent of hesitations found overall with hedged frames. In this case, identifying the appropriate referent involves mapping the linguistic description to a non-central category member (that the child is likely to be less familiar with), incurring processing costs that result in greater response delay.

By age 5, children distinguish hedged from unhedged frames in an adult-like manner. This finding shows that 5-year-olds understand the contribution of this type of modification. Furthermore, this result supports previous findings on the acquisition of the meaning of *almost*: only 5-year-olds displayed an adult-like pattern in the interpretation of the adverb with all types of scales considered in Amaral (2010). This suggests that at age 5 children have generalized the semantic value of *almost* across different syntactic categories. In the present study, age 4 presents a middle-point for the developmental trend since children this age pair with 3-year-olds in the forced-choice task, but with 5-year-olds with respect to their pattern of hesitations.

Frames and frame-like units are relevant in acquisition (e.g. in learning morphological patterns and in forming syntactic categories, cf. among others Mintz 2003). However, little is known about the role that frames play in learning semantic categories, and in particular about the role that hedged frames play in learning about category structure.

In future studies, we intend to expand this research in two directions. First, we will analyze the adult baseline, in particular the adults' sensitivity to differences in meaning between the two hedges considered in this task. Second, in line with our interest in the role of hedges in word learning, we intend to investigate how children use their knowledge of hedges to make inferences about category membership of unfamiliar objects.

References

- Amaral, Patrícia. 2010. Almost means 'less than': preschoolers' comprehension of scalar adverbs. In *On-line Proceedings Supplement of BUCLD 34*, Boston.
- Amaral, Patrícia and Fabio Del Prete. 2010. Approximating the Limit: The Interaction Between *Quasi* 'Almost' and Some Temporal Connectives in Italian. *Linguistics and Philosophy* 33(2):51–115.
- Andersen, E. S. 1975. Cups and Glasses: Learning that Boundaries are Vague. *Journal of Child Language* 2(1):79–103.
- Heider, E R. 1971. On the internal structure of perceptual and semantic categories. Unpublished paper, Psychology Department, University of California, Berkeley.

Patterns in children's acquisition of hedges

- Hitzeman, J. 1992. The selectional properties and entailments of “Almost”. In & J. Marshall Denton C. P. Canakis, G. P. Chan, ed., *Papers from the 28th regional meeting of the CLS*, Chicago: CLS.
- Kemler Nelson, D.G., A. Frankenfield, C. Morris, and E. Blair. 2000. Young Children's Use of Functional Information to Recognize Artifacts: Three Factors that Matter. *Cognition* 77(2):133–168.
- Koenig, M A and P L Harris. 2005. Preschoolers mistrust ignorant and inaccurate speakers. *Child Development* 76:1261–1277.
- Lakoff, George. 1973. Hedges: A study in meaning criteria and the logic of fuzzy concepts. *Journal of Philosophical Logic* 2:458–508.
- Mintz, Toben. 2003. Frequent frames as a cue for grammatical categories in child directed speech. *Cognition* 90(2):91–117.
- Rosch, Eleanor and Carolyn Mervis. 1975. Family resemblances: Studies in the internal structure of categories. *Cognitive Psychology* 7:573–605.
- Sabbagh, M A and D A Baldwin. 2001. Learning words from knowledgeable versus ignorant speakers: Links between preschoolers theory of mind and semantic development. *Child Development* 72:1054–1070.
- Syrett, Kristen. 2007. Learning about the Structure of Scales: Adverbial Modification and the Acquisition of the Semantics of Gradable Adjectives. Ph.D. thesis, Northwestern University.

Marisa Casillas
Department of Linguistics
Margaret Jacks Hall, Stanford University
Stanford, CA 94305-2150

Patrícia Amaral
Department of Romance Languages & Literatures
320 Dey Hall, CB 3170
Chapel Hill, NC 27599

middyp@stanford.edu, pamaral@unc.edu

The Status of the Macrostem in Reduplication in Ndebele and Zulu*

TONI COOK

University of Pennsylvania

Introduction

In Bantu languages, the Macrostem is the portion of the verb complex that begins with the object marker (if present) and extends rightward to the end of the complex. Along with the verb stem, it has been seen as a privileged domain for a variety of processes, reduplication among them. In the mutually intelligible Nguni languages Zulu and Ndebele, reduplication is argued to be restricted to draw exclusively on non-inflectional Macrostem material (Downing 2001, 2009; Hyman et al. 2009; Sibanda 2004). However, data presented here show that, under certain conditions, inflectional non-Macrostem material may be included in the reduplicant as well. Crucially, all such material comes at the left edge of the stem; the requirement that inflectional material *within* the Macrostem be excluded from the domain of reduplication goes unviolated. Additionally, when material at the left edge is included, the reduplicant+base complex no longer behaves as a single tonal domain, challenging the notion that RED+base is a compound verb stem (Downing 2003, 2006; Inkelas and Zoll 2005).

1 The Macrostem and the Domain of Reduplication in Zulu and Ndebele

The examples in (1) show that the Macrostem begins with the initial segment of the verb root, or object marker if one is present, and continues to the end of the verb complex. It is bold below, the constructions are grammatical in both Zulu and Ndebele:

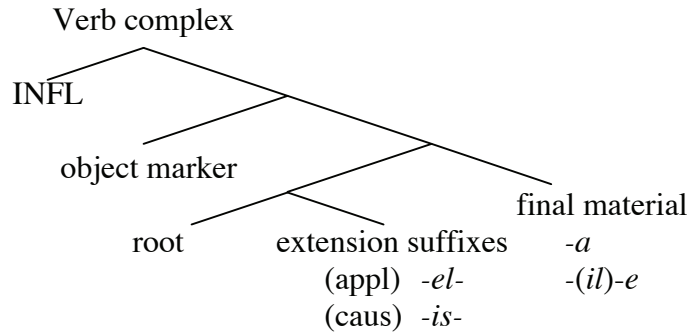
- (1) a. i. *u-ya-sí-théng-a* ‘You are buying it’

* Thanks to Nosipho Khumalo for providing the Zulu judgments described in this paper, and for generously sharing her language with me.

- | | | |
|-------|------------------------|--------------------|
| ii. | <i>u-ya-théng-a</i> | ‘You are shopping’ |
| b. i. | <i>u-sí-théng-il-e</i> | ‘You bought it’ |
| ii. | <i>u-théng-il-e</i> | ‘You shopped’ |

According to Downing (2001), the Macrostem encompasses everything from (and inclusive of) the object marker to the final vowel— an *-a* or *-e* in (1). This conception of the Macrostem has its origins in Kisseberth (1984), but the key aspect of the Macrostem is that it is part of a hierarchical, binary structure— a sub-part of the full verb complex whose internal structure is outlined in Meeussen (1967) and detailed in Myers (1987), Hyman and Mtenje (1999), Downing (2001) and others. This structure is shown below:

(2) Internal Structure of Bantu Verbs



We see in (2) that the Macrostem neatly matches with a portion of the morpho-syntactic structure of the full verb complex (everything below INFL). When the verb root is fully syllabic (minimally CVC), such as *-theng-* ‘buy’ in (1), reduplication must pull exclusively from Macrostem material in both Zulu and Ndebele. In both languages, the reduplicant is a disyllabic constituent that is prefixed to the verb stem, with the meaning that the action denoted by the verb is performed carelessly and/or without skill. For CVC roots, the object marker is excluded, and for roots of this size and bigger, reduplication in these languages is nearly identical (tone marked is underlying, following convention, the RED+base complex is bracketed):

- | | | |
|-----------|------------------------|------------------------------------|
| (3) a. i. | <i>u-ya-sí-théng-a</i> | → <i>u-ya-sí-[théng-a+theng-a]</i> |
| ii. | <i>u-ya-théng-a</i> | → <i>u-ya-[théng-a+theng-a]</i> |
| b. i. | <i>u-sí-théng-il-e</i> | → <i>u-sí-[théng-a+théng-il-e]</i> |
| ii. | <i>u-théng-il-e</i> | → <i>u-[théng-a+theng-il-e]</i> |

The first requirement on the reduplicant is that it must fully parse the root from L → R; we assume that the RED morpheme is a bare [σσ] template. After the root *-theng-* is parsed into the reduplicant, there remains one vowel slot that needs to be

filled, since all non-word initial syllables in Ndebele and Zulu must be CV.

The final vowel on the reduplicant is the same for all the constructions in (3); it is an *-a* throughout. So, for the examples in (b), the perfective suffix, *-il-e*, is barred from appearing in the reduplicant. What we see instead is the default verbal final vowel, *-a* (Mutaka and Hyman 1993, Downing 1997), which is argued to essentially mark the reduplicant as an instance of a verb stem, lacking any inflectional features. In other analyses of Ndebele reduplication (Hyman, Inkelas, & Sibanda 2009, Downing 2001), this is due to a constraint penalizing the inclusion of inflectional material (like the perfective suffix) in RED. Suffixal inflectional material (which is part of the Macrostem), is barred from RED in both Ndebele and Zulu.

2 Reduplication of Consonantal Roots

When we turn to sub-minimal roots (those with a prosodic shape of C or VC), significant differences emerge between the reduplicative patterns in these two languages; we'll look first at roots which consist of a sole consonantal segment. If the root + default final *-a* fails to satisfy disyllabicity in Ndebele, an empty augmentative morpheme *-yi-* is called on to bring the reduplicant up to two syllables. For a verb like *-dl-* 'eat':

- (4) a. *u-dl-a* → *u-[dl-a-yi+dl-a]* ‘you eat’ (Ndebele)
 * *u-[yi-dl-a+dl-a]* (Ndebele)
 * [*u-dl-a+u-dl-a*] (Ndebele)

In the Zulu dialect described here, an acceptable reduplication does not exist:

- b. *u-dl-a* → **u-[dl-a-yi+dl-a]* (Zulu)
 **[u-dl-a+u-dl-a]* (Zulu)

What (4) shows is that for verb complexes consisting of a consonantal root and the bare minimum of additional material (a subject marker and final vowel), reduplication is impossible in Zulu, while in Ndebele the empty morph *-yi-* is permitted to appear in the reduplicant, and render it disyllabic. Since *-yi-* does not have any morphosyntactic affiliation, it does not come from outside of (nor, strictly speaking, from within) the Macrostem.

We do see *yi-* in Zulu however, in cases where the full verb complex (rather than some sub-constituent like RED) is sub-minimal; this happens with the imperative of sub-minimal roots:

- (5) *yi-dl-a* **dl-a* (same judgments for both Zulu and Ndebele)
 ‘eat!’

The difference, which seems to be an innovation in this dialect of Zulu (since Zulu reduplicants containing *-yi-* are documented in Doke 1943), is that *-yi-* may

not appear word-internally in Zulu. In Doke (1943), based on a version first published in 1927, he presents some reduplicated forms, dubbed “the diminutive” (p.149):

- (6) *-fa* ‘die’ → *-fayifa* ‘feel unwell’

If the verb stem contains an object marker (part of the Macrostem), it may be pulled in to the reduplicant to bring it up to the two syllable requirement. In Ndebele, the *-yi-* variant is also permitted:¹

- (7) *u-zi-dl-a* → a. *u-ya-[zi-dl-a+zi-dl-a]* ‘you eat them’ (Z&N)
 b.**u-ya-[zi-dl-a+dl-a]* (Z&N)
 c. *u-ya-zi-[dl-a-yi+dl-a]* (N only)

In both Zulu and Ndebele, object markers can be incorporated into reduplicants (7), and we saw in (4) that with a verb complex which consists of the bare minimum of material, there is no way to achieve disyllabicity in the Zulu reduplicant, whereas in Ndebele, *-yi-* can be called on to save the construction.

3 Asymmetries in the Interaction of Reduplication and Long Form Verb Morphology

The common thread between the two languages regarding reduplication of consonantal roots is that a (syllabic) subject marker is not available for prosodic circumscription into the reduplicant. However, other prefixal material that is outside the Macrostem (i.e. between the subject marker and object marker) may be pulled into the reduplicant in Zulu, but not in Ndebele.

- [illegible]

For the Zulu examples in (a), the present long form/focus marker *-ya-* may be recruited into the reduplicant, but *-yi-* is not allowed – the mirror opposite of the pattern we see in Ndebele. The exact nature of this long form morphology has

¹ When a verb contains an object marker (*-zi-*), the verb must appear in its 'long form' and in the present affirmative, the *-ya-* is how the long form, or non-phrase final version, is marked.

been discussed in detail elsewhere (van der Spuy 1993, Buell 2007); some have claimed it is an aspectual distinction (Botne and Kershner 2000), and others that it is a matter of focus— that when no other element is focused, default focus is assigned to the verb.

Regardless of any semantic or TAM effects, a verb receiving long form morphology is most closely tied to the syntactic frame in which the verb appears. If the verb is final in some XP constituent, long-form, also called disjunctive, morphology is required. The *-ya-* morpheme that marks present verb forms as ‘long’ is outside the Macrostem; it occurs when the verb is *not* followed by a (non-object-marked) complement, or an adjunct belonging to a particular class.

- (9) a. *u-ya-dl-á* “You are eating” vs. *u-dl-á kahle* “... well.”
 b. *u-ya-fúnd-a* “You are reading” vs. *u-fúnd-a kahle* “... well.”

However, in the recent past (perfective), long form marking is realized by the morpheme *-il-* which occurs between the verb root and the final vowel, an *-e* for this tense (as seen in (1) and (3)).

- (10) a. *u-dl-il-e* “You ate” vs. *u-dl-e kahle* “... well.”
 b. *u-fund-il-e* “You read” vs. *u-fúnd-e kahle* “... well”

It seems then that *-ya-* and *-il-* are serving the same function; they mark long form morphology signaling that the verb is final in an XP; *-ya-* is the long form marker for the present, and *-il-* for the recent past.

Since we saw that *-ya-* can be included in reduplications of sub-minimal roots, it would be logical to expect the same of *-il-*, in Zulu at least. But, this isn’t the case— *-il-* is never permitted on reduplicants. Just as it was unacceptable with reduplications of the fully CVC root *-theng-* in (3), it is equally bad with a sub-minimal consonantal root like *-dl-*.

- (11) a. *u-dl-il-e* “you ate” → i. **u[dl-il-e+dl-il-e]* (Z & N)
 ii. **[u-dl-i+u-dl-il-e]* (Z & N)
 iii. *u-[dl-a-yi+dl-il-e]* (N)
 reduplication is impossible (Z)

While both languages prioritize the Macrostem in reduplication, Zulu “opts” to go to prefixal non-Macrostem material rather than recruit Macrostem material at the right edge of the construction.

Given that *-ya-* and *-il-* are both morphemes that mark long form verbs, indicating that they are final in some XP, we may presume that these morphemes are introduced at the same point in the derivation and should be equally accessible for prosodic circumscription into the reduplicant. The constraint *INFLECTIONAL which is used in work by Downing, Hyman, Inkelas, and Sibanda should rule out

-ya- in the reduplicant by the same token that it rules out -il-. The grammaticality of Zulu reduplications containing -ya- shows that instead of penalizing the inclusion of “inflectional” morphemes, we need to instead formulate an analysis that addresses the question of why material at the left edge is more accessible than material at the right.

4 Reduplication of VC Roots

The behavior of the other class of sub-minimal roots, those with a prosodic shape of VC, is in many ways similar to roots consisting of a single consonantal segment. In Ndebele C and VC roots are alike in excluding any Macrostem material from the reduplicant, meaning that nothing to the left of the object marker is ever permitted in. This contrasts with how VC roots behave in Zulu, where they show more freedom than their consonantal counterparts in permitting non-Macrostem material into reduplications. The fact that they *do* behave differently is interesting, seeing that the initial V in VC roots has been argued to be extra-metrical, so we would predict that the two types of sub-minimal roots would show identical patterns (Downing 1998).

The differences between Zulu and Ndebele regarding patterns of reduplication in VC roots is, in some ways, similar to what we observed for consonantal roots, but not identical. This shows that the V in VC roots is not extra-prosodic (or at least, not extra-prosodic at every level of phonological processes), since certain reduplications that were impossible with C (consonantal) roots are acceptable with VC roots. We saw in (4) that a syllabic subject marker may not be pulled into the reduplicant, but subject markers that occur before vowel-initial roots become glides, and may be recruited to fill out the [σσ] template in Zulu. In Ndebele, a y- is used to break up the vowel hiatus that would otherwise obtain between the final vowel of the reduplicant and the initial vowel of the root (Sibanda, 2004), a strategy that is disallowed in Zulu.²

- | | | | | | | |
|---------|-----------------|---|----------------|-----|----------------------------|------------|
| (12) a. | <i>u-enz-a</i> | → | <i>w-enz-a</i> | i. | [<i>w-enz-a+w-enz-a</i>] | (✓ Z, * N) |
| | ‘you make...’ | | | ii. | <i>w-[enz-a+y-enz-a]</i> | (* Z, ✓ N) |
| b. | <i>sí-akh-a</i> | → | <i>s-akh-a</i> | i. | [<i>s-akh-a+s-akh-a</i>] | (✓ Z, * N) |
| | ‘we build...’ | | | ii. | <i>s-[akh-a+y-akh-a]</i> | (* Z, ✓ N) |

However, it’s important to note that in (12), the contrast is not in the reduplicant (the lefthand constituent), but rather on the base. So, even in constructions where it is not appearing in RED per se, -yi- may not appear verb-internally in Zulu.

As was the case with the absence of -yi-, the lack of y- word-internally appears innovative (or dialectal) as well, as Doke (1943:150) gives:

² In the closely related and mutually intelligible language, Swati, a glided subject marker may also be included in reduplication (Hyman 2009).

- (13) a. *-ona* ‘sin’ → *-onayona* ‘sin somewhat’
 -onawona
and from Downing (2009) on Zulu (her ex. 3c):
 b. *uk-os-a* ‘to roast’ → *uk-[os-a+y-os-a]*

The bracketings given in (12) are based on the language in which the construction is grammatical. When morphemes to the left of the verb stem are pulled in to the reduplicant, we have seen that they occur on both the reduplicant and the base (with object markers like *-zi-* in both languages, and with the long-form marker *-ya-* in Zulu). So, it is reasonable to assume that when the subject marker occurs on the base, as it does in the grammatical Zulu examples, it is on the reduplicant as well. Conversely, in the grammatical Ndebele examples, from which the subject marker is excluded, we can assume that the reduplicant begins with the initial segment of the base, a vowel, rather than the non-vocalic subject marker.

5 The Significance of Including Non-Macrostem Prefixal Material in the Reduplicant

The Ndebele data discussed in this paper have been discussed and analyzed elsewhere, but what do the new data from Zulu add to the picture of Nguni reduplication? While both languages prioritize the Macrostem in reduplication, Zulu “opts” to go to prefixal non-Macrostem material rather than recruit Macrostem material at the right edge of the construction. We see this in (11) with consonantal roots, and not surprisingly, the pattern of excluding material from the perfective suffix from the reduplicant is also found with vowel-initial sub-minimal roots (VC):

- (14) a. *u-enz-il-e* i. $\rightarrow [w-enz-a+w-enz-il-e]$ * $[w-enz-i+w-enz-il-e]$ Z
 u-enz-il-e ii. $\rightarrow w-[enz-a+y-enz-il-e]$ * $w-[enz-i+y-enz-il-e]$ Nd
 ‘you made’

We saw in (8), with the availability of *-ya-* to be included in Zulu reduplicants, that labeling a morpheme as inflectional is not sufficient to explain the data for Zulu. The fact that (glided) subject markers may be included as well is an indication that a particular morpheme being “inflectional” is not the deciding factor in determining whether or not it may be included in the domain of reduplication.

Additionally, the distinction between glided and vocalic subject markers, i.e. the former may be included in Zulu reduplications while the latter may not, shows that the underlying status of morphemes is not alone responsible for whether or not a particular piece of the verb complex may be included in the reduplicant. For instance, the status of the 2nd singular subject marker *u-*, vis à vis reduplication, is dependent on the prosodic structure of the verb stem that follows. If it is conso-

nantal, *-dla* ‘eat’, *-ma* ‘stand’, *-fa* ‘die’, then the *u-* subject marker is not allowed within the domain of reduplication, and reduplication is in fact impossible. However, if the stem is sub-minimal but vowel-initial *-enza* ‘do’, *-akha* ‘build’, *-ehla* ‘descend’ then the *u-* subject marker (which becomes a *w-* glide when in hiatus with another vowel) is permitted and reduplication goes through.

With *-ya-*, object markers, and glided subject markers, we have seen that what seems to matter is not whether a morpheme is inflectional, but on what side of the structure it occurs. If it is to the left of the verb root, it is permitted into the reduplicant, but if to the right of the root, it is barred.³

(15) Macrostem material and reduplication in Zulu & Ndebele

	Zulu	Ndebele
Macrostem, non-inflectional	✓	✓
Macrostem, suffixal inflectional	*	*
non-Macrostem, prefixal inflectional	✓	*

6 The Macrostem, Reduplication, and Domains within the Nguni Verb

If Macrostem constituency can be violated in Zulu to include prefixal, non-Macrostem inflectional material (as in the last row in the table above), what is the basis for recognizing the Macrostem as a constituent in the first place?

In the Nguni languages (a family of closely related and mutually intelligible Southern Bantu languages which consists of Xhosa and Swati along with Ndebele and Zulu), the Macrostem is a domain relevant for tonal spreading. It has been shown that a high tone from within the Macrostem will spread to the antepenultimate syllable of the Macrostem, which is basically just the antepenultimate syllable of the full verb complex (Khumalo 1987 on Zulu).

- (16) a. i. *u-ya-dóndólázela* ‘you are walking with a cane’
and when it combines with a high-toned subject marker:
b. ii. *bá-yá-dóndólázela* ‘they are walking with a cane’

The reduplicant is argued to form a tonal domain with the base, i.e. it is part of the Macrostem tonal domain (Downing 2001, Sibanda 2004). For CVC roots, the fact that the RED+base complex forms a tonal domain independent of prefixal material doesn’t interact with the tonal specification of prefixal material, since such morphemes are outside the domain of reduplication for fully syllabic and larger roots. For Ndebele and Zulu, then, we have:

³ More accurately, to the right of the “extended root” (Odden 1996), the causative *-is-* and applicative *-el-* are allowed in the reduplicant (if room in the template remains once root material proper is exhausted).

- (17) *u-ya-théng-a* → *u-ya-[théng-á+theng-a]*
 ‘you are shopping’

The question that then arises is, what if a low-toned prefixal morpheme (like *-ya-*) is pulled in to the reduplicant in order to satisfy disyllabicity?

There are several different hypotheses we might formulate regarding what we predict to see in a reduplicated form with the input morphemes: *u*, *ya*, *dl-á*.⁴ Will the high tone of the root ‘scope over’ the Macrostem and appear on the initial *-ya-*? Is tone assigned prior or subsequent to reduplication? What we find is:

- (18) a. *u-ya-dlá* → *u-[ya-dl-á+yá-dl-a]*
 contrast with a low-toned root:
 b. *u-ya-akh* → *u-[y-akh-a+y-akh-a]*

In (18a) the first occurrence of *-ya-* is realized with a low tone— since both the morpheme itself and the preceding subject marker are lexically toneless, this is not surprising. Neither is it a surprise that the second occurrence of *-ya-* bears a high tone, spreading from the high-toned verb root *-dlá* (following the rule of local tone spread detailed in Downing 1990). From (18), it looks like tone association must happen subsequent to reduplication, otherwise we would expect both occurrences of *-ya-* to surface with low tone.

Since the data in (18) behave largely in accordance with our expectations, it may be more fruitful to examine examples where a high-toned prefix (rather than a low-toned one like *-ya-*) is pulled into the reduplicant. In non-reduplicated forms, if the high-toned progressive prefix *-sá-* immediately precedes the verb root, the high does *not* spread onto the root, apparently respecting the boundary that blocks high tones from spreading from prefixal material into the Macrostem domain. The data from *non*-reduplicated forms lend empirical justification to the Macrostem as a meaningful morphophonological constituent in the Nguni verb complex.

- (19) *u-sá-phék-a* ‘you are still cooking’

However, whatever force is keeping the H from *-sá-* in non-reduplicated forms from spreading to the root is not in effect in reduplication (the root *-lwa* ‘fight’ is low-toned).

- (20) *u-[sá-lwá+sá-lwa]* ‘you are still doing a bad job of fighting’

⁴ A high tone on a verb root typically doesn’t surface on the final syllable. However, with sub-syllabic consonantal roots, the only TBU available is the final vowel, so in such cases, the final vowel will bear a high tone.

What we see in (18) is simply that low-toned prefixal morphemes are subject to rightward high tone spreading, the contrast between (19) and (20) shows that pulling a morpheme into the reduplicant affects whether its tone may spread or not. In (19), when *-sá-* is part of the chunk of prefixal morphemes to the left of the Macrostem, its H is blocked from spreading to the verb root, but when the morpheme is part of the reduplicant, the H is permitted to spread to the penult. While the distinction between Macrostem and non-Macrostem material appears to be valid for non-reduplicated forms, it is erased under reduplication.

While the H carried by *-sá-* must be marked lexically— and must be present throughout the derivation (though not necessarily realized)— the rules governing tonal spreading must apply late, after the establishment of the relevant morphophonological domains. The data put forward here are not intended to argue that the Macrostem is an ‘ad hoc’ constituent, but rather to question its relevance in reduplication. The key points here are concerned with issues of morphological and phonological affiliation, and the flexibility of the boundaries between certain domains in the verb.

A related question has to do with the implications of these data for the theory that the RED+base complex is a compound verb stem (first proposed in Downing 2003, and taken up as well in Inkelas & Zoll 2005). The example in (20) shows that, tonally, the RED+base complex behaves like a single verb stem, in that the high tone of the first syllable is permitted to spread to the penult of the full form. However, the underlying morphological affiliation of *-sá-* is outside the verb stem, and it seems somehow misleading to characterize such prefixal material as part of the verb stem. A more accurate description of the phenomenon is that the morphophonological boundary (likely that of the Macrostem) that blocks the H of *-sá-* from spreading onto the stem is voided under reduplication. In other words, the Macrostem and reduplication domains cannot co-exist in reduplications of sub-minimal roots.

7 The Left-Right Asymmetry in Penalizing Inclusion of Inflectional Material in Reduplication

We have seen that, in many cases, identifying the domain of reduplication as the (Macro)stem combined with a constraint *INFL picks out the right constituent to undergo reduplication. *INFL is never violated at the right edge— the perfective ending *-il-e* is never allowed in the reduplicant, but on the left edge, a number of inflectional morphemes may be included in reduplications of sub-minimal roots (long form present *-ya-*, progressive *-sá-*, and glided subject markers). Focusing on Bantu, Hyman (2008) gives a number of examples where the left edge of a phonological object is “stronger” than the right edge; that is, more clearly demarcated, and able serve as a locus of contrasts that are either neutralized or not permitted in later syllables.

There seem to then be at least two different ways of analyzing the mismatch in the requirement that inflectional morphemes be excluded from the right, but may be permitted on the left: 1) the asymmetry is due to the underlying morphosyntactic structure (Embick 2010), i.e. the (lefthand) morphemes that may be pulled into the reduplicant are merged earlier than those which are excluded (on the right), or 2) the asymmetry is due to the phonology prioritizing RED-base alignment on the left edge.

Both analyses have some appealing aspects— the structural account forces us to rethink what the constraint *INFLECTIONAL really means, and the more surface-oriented account gives another example of left » right asymmetries in Bantu morphophonology. Although the Bantu verb complex typically begins with a subject marker, the left in “left » right asymmetries” does not refer to the subject marker, but rather to the left edge of the stem.

In Zulu in particular, one such example comes from palatalization in the passive, first mentioned in Doke, but analyzed more recently in Beckman (1993). When the passive suffix *-(i)w-* is added to a verb stem, all labials will palatalize, except if the labial is the first segment in the root (or the first consonant in the root, in the case of vowel-initial roots):

- (21) a. *-saba* → *-saj-wa*
 ‘to be afraid’ ‘to be feared’
 b. *-phupha* → *-phutsh-wa*
 ‘to dream’ ‘to be dreamed’

In (b), we see that the *ph* (an aspirated [p^h]) which occurs in the C₂ position in the stem palatalizes to [č], but when this segment is in the C₁ slot, it is immune. The failure of stem-initial segments to undergo palatalization is a classic example of the importance of the left boundary of the stem in Zulu. The left edge being stronger or more important than the right may be related to why perfect alignment on the left is necessary, but correspondence mismatches may be permitted on the right, or in the C₂ position of the reduplicant and the base.

8 The Macrostem vs. the Stem = Prosodic vs. Segmental Phonology?

We have seen that the domain of the Macrostem —to the extent that it is a valid and meaningful domain— is principally relevant for tonal spreading. For non-reduplicated constructions, where a high tone from a prefixal morpheme, like *-sá-* (in (20)), is not permitted to spread into the stem/Macrostem; a high originating *within* the Macrostem may spread to the penult or antepenult of the Macrostem, depending on the number of syllables. (22a) shows a verb complex where all morphemes, including the verb root, are low-toned; in (22b), a high-toned object marker is added. In both, the Macrostem is bracketed.

- (22) a. *u-ya-[bhobhoz-a]*
 ‘you are piercing’
 b. *u-ya-[zí-bhóbhoz-a]*
 ‘you are piercing them’

This example shows that a high tone from an object marker may spread through the verb stem, while highs from prefixal, non-Macrostem morphemes are blocked from doing so. Since the Macrostem appears to interact with the tonal properties of the language, the role it plays is concerned with the prosodic phonology of the language.

If the Macrostem was relevant for Zulu’s segmental phonology, we would predict that it would interact with the application of the palatalization rule that affects labials in the passive. Since stem-initial labials are not subject to palatalization, if the Macrostem interacted with processes in the segmental phonology, we could hypothesize that adding a labial object marker would then render this segment initial in the domain of palatalization, and a root-initial labial would then be subject to palatalization. However, this is not the case; root-/stem-initial labials may never palatalize, regardless of the features of the preceding object marker:

- (23) a. *-bamb-a* → *-banj-w-a*
 ‘catch’ ‘be caught’
 b. *-bamb-el-a* → *-banj-el-w-a*⁵
 ‘catch for’ ‘be caught for’
 c. *-mu-bamb-el-a* → i. *-mu-banj-el-w-a*
 ‘catch for him’ ‘be caught for him’
 ii.* *-mu-janj-el-w-a*

As (ii) in (23c) shows, having a labial object marker does not make a root-initial labial available for palatalization. The relevant domain for palatalization in the passive is that stem; the Macrostem is not relevant for the application of this phonological rule.

Preliminarily, it seems like the Macrostem is a meaningful constituent for processes that are more closely tied to prosodic, rather than segmental, aspects of Zulu’s phonology. It plays a role in H-tone spreading, and in reduplication (though arguably not any more meaningful a role than non-Macrostem prefixal morphemes) which is linked with a bare prosodic template [σσ]. It contrasts with the stem proper, a constituent that begins with the first segment of the root, and excludes any object marking. The stem is relevant for segmental processes, like the palatalization that takes place when the passive suffix attaches, but the stem is also part of the Macrostem domain for the spreading of H-tones from the object

⁵ It is not possible to add an object marker to a passive without also adding an extension suffix (causative *-is-* or applicative *-el-*) to introduce another argument.

marker. Rather than simply claim that one is the domain for tone spreading and the other for segmental processes, the distinction between the two may be that palatalization happens before the object marker is introduced, so it's not a question of overlapping domains, but of correctly ordering the processes at work.

9 Conclusion

Although the Macrostem is prioritized in reduplication in both Ndebele and Zulu, Ndebele reduplicants are permitted to pull material only from the Macrostem, while in Zulu, the unavailability of the augmentative morpheme *-yi-* verb-internally forces the reduplicant to go up to prefixal, non-Macrostem material in order to fill out the $[\sigma\sigma]$ template. For both Ndebele and Zulu, suffixal inflectional Macrostem material is barred from appearing in the reduplicant, but the prefixal morphemes Zulu permits are inflectional, so the constraint *INFLECTIONAL does not account for the full range of Zulu data.

The tonal behavior of Zulu reduplications compared with non-reduplicated forms shows that prefixal morphemes can lose their “prefixal” affiliation by virtue of being pulled into RED. The data and analysis presented here are a first attempt at addressing important questions regarding the derivational timing of reduplication, tone spreading, and the formation of domains within the Nguni verb.

References

- Beckman, Jill. 1993. Feature organization and the strong domain hypothesis in Zulu [labial] phonology. *UMass Occasional Papers in Linguistics* 16:1-26.
- Botne, Robert, and Tiffany Kershner. 2000. Time, Tense, and the Perfect in Zulu. *Afrika und Übersee* 83:161-180.
- Buell, Leston. 2007. Evaluating the immediate postverbal position as a focus position in Zulu. Ms., Leiden University.
- Doke, C.M. 1943. *Textbook of Zulu Grammar* (third edition). London: Longman.
- Downing, Laura. 1990. Local and metrical tone shift in Nguni. *Studies in African Linguistics* 21(3):261-317.
- Downing, Laura. 1997. Correspondence effects in Siswati reduplication. *Studies in the Linguistic Sciences* 25:81-95.
- Downing, Laura. 1998. On the prosodic misalignment of onsetless syllables. *Natural Language and Linguistic Theory* 16:1-52.

The Status of the Macrostem in Reduplication in Ndebele and Zulu

- Downing, Laura. 2001. Ungeneralizable minimality in Ndebele. *Studies in African Linguistics* 30(1):33-58.
- Downing, Laura. 2003. Compounding and tonal non-transfer in Bantu languages. *Phonology* 20:1-42.
- Downing, Laura. 2006. *Canonical Forms in Prosodic Morphology*. London: Oxford
- Downing, Laura. 2009. Linear disorder in Bantu reduplication. Ms., ZAS, Humboldt Universität.
- Embick, David. 2010. *Localism versus Globalism in Morphology and Phonology*. Cambridge: MIT Press.
- Hyman, Larry. 2008. Directional asymmetries in the morphology and phonology of words, with special reference to Bantu. *Linguistics* 46(2):309-350.
- Hyman, Larry. 2009. The natural history of verb-stem reduplication in Bantu. *Morphology* 19:177-206.
- Hyman, Larry, Sharon Inkelas, and Galen Sibanda. Morphosyntactic correspondence in Bantu reduplication. In K. Hanson and S. Inkelas, eds., *The Nature of the Word: Essays in Honor of Paul Kiparsky*, 273-310, Amsterdam: John Benjamins.
- Hyman, Larry and Al Mtenje. 1999. Prosodic morphology and tone: The case of Chichewa. In R. Kager, H. van der Hulst, and W. Zonneveld, eds., *The Prosody-Morphology Interface*, 90-133, Cambridge: Cambridge University Press.
- Inkelas, Sharon, and Cheryl Zoll. 2005. *Reduplication: Doubling in Morphology*. Cambridge: Cambridge University Press.
- Khumalo, J.S.M. 1987. An autosegmental account of Zulu phonology. Ph.D. thesis, University of the Witwatersrand.
- Kisseberth, Charles. 1984. Digo Tonology. In G.N. Clements and J. Goldsmith, eds., *Autosegmental Studies in Bantu Tone*, 105-182, Dordrecht: Foris.
- Meeussen, A.E. 1967. Bantu grammatical reconstructions. *Africana Linguistica* 3 79-121. Tervuren: Musée Royal de l'Afrique Centrale.

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Mutaka, Ngessimo and Larry Hyman. 1993. Syllables and morpheme integrity in Kinande reduplication. *Phonology* 7:73-120.

Myers, Scott. 1987. Tone and the structure of words in Shona. Ph.D. thesis, University of Massachusetts, Amherst.

Odden, David. 1996. Patterns of reduplication in Kikerewe. *OSU Working Papers in Linguistics* 48:111-149.

Sibanda, Galen. 2004. Verbal phonology and morphology of Ndebele. Ph.D. thesis, University of California, Berkeley.

van der Spuy, Andrew. 1993. Dislocated noun phrases in Nguni. *Lingua* 90:335-355.

Toni Cook
University of Pennsylvania
Department of Linguistics
619 Williams Hall
Philadelphia, PA 19104-6305

toncook@ling.upenn.edu

Vowel Harmony and Vowel Reduction: The Case of Swiss Italian Dialects

RACHELE DELUCCHI¹

University of Zurich, Switzerland / University of California, Berkeley

Introduction

Several Swiss Italian dialects² display vowel harmony processes (henceforth VH) involving the etymologically final unstressed vowel *-a/* as well as other unstressed vowels in pre-tonic and post-tonic position. This paper proposes a diachronic hypothesis for the development of VH in this area, investigating if and how vowel reduction (henceforth VR) is involved.

Following some general remarks about the relation between VR and VH (§1), I introduce the VH processes exhibited by Swiss Italian dialects (§2). In §3 I consider the prosodic structure of these varieties and its interaction at the segmental level with harmony and reduction processes. In §§4-5 I advance a diachronic hypothesis for the development of VH in this area, also considering very recent VR processes. I conclude and summarize my results in §6.³

1 Vowel Harmony and Vowel Reduction

Some at least apparently “paradoxical” claims have been made about the interaction between VH and VR: on one hand, VR has been said to *feed* VH (§1.1); on the other, it is presented as an *alternative* to VH, i.e., languages with reduction tend *not* to have VH (§1.2).

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² All data were collected first-hand through personal fieldwork between 2007 and 2010 in 28 Swiss and 10 Italian villages right across the border (Italian villages will be indicated as (I)).

³ Though mainly concerned with the role of VR here, we don’t want to rule out the possible contribution of other more abstract mechanisms in the genesis of VH (see Delucchi 2012:324-327, 355-379, 388-390).

1.1 Does Vowel Reduction Feed Vowel Harmony?

A widespread conception about the development of VH maintains that harmony arises diachronically – and, for some scholars, synchronically as well – through phonologization of vowel-to-vowel coarticulation (Ohala 1994; Flemming 1997). However, recent studies have shown that these effects appear to be more robustly anticipatory, even in languages with left-to-right VH (cf. Inkelas et al. 2001 for Turkish; Manuel and Krakow 1984 for Shona and Swahili).

With regard to this point, Hyman (2002) hypothesizes that left-to-right harmony should be related to reduction, as reduction is greater in post-tonic than in pre-tonic position, whereas “[a]ll VH that does not owe its existence to reduction is anticipatory, i.e. articulatory, perceptual, and/or conceptual ‘pre-planning’” (Hyman 2002:24). How would reduction feed VH? And, more fundamentally, how should we interpret “reduction” here?

Hyman refers to VH in Punu as an example, which targets the schwa realization of post-radical */a/* but not unreduced pre-radical */a/* (Hyman 2002:12). Whether or not this process is concomitant with a significant reduction of phonetic duration in Punu (see Barnes 2006:202), we can assume that this happens in many similar cases of vowel raising and/or centralization, especially in duration-cued stress systems. If weak positions already licensed fewer contrasts and now host vowels with “significantly diminished duration,” they could be “more susceptible to coarticulatory effects from neighboring strong vowels” (Barnes 2006:193) – coarticulatory effects which are considered in this case the first step toward VH. In particular, as argued by Majors (1998, 2006), stress-dependent VH systems with stressed vowels as triggers could arise from stress asymmetries in vowel-to-vowel coarticulation, the degree of this coarticulation being greater from stressed to unstressed vowels than in the opposite direction.

On the other side, contrast neutralizations in specific structural positions – phonetically driven or not, synchronically or diachronically – could lead to a reduction of the vowel inventory, representing a favorable starting point for the development of harmonic alternations as far as more abstract mechanisms are at work. In these cases, vowel frequency or analogical mechanisms, for example, might play a central role (see Delucchi 2012:330ff, 355-379, 385-389; fn. 11 in this paper).

1.2 Vowel Harmony as Alternative to Vowel Reduction

Although many of the arguments for the “reduction-then-assimilation” hypothesis are in some way crucially linked to stress-duration asymmetries between unstressed and stressed vowels, there could be a limit as to how much this asymmetry is favorable to the development of VH: overly reduced segments could be disadvantaged, both perceptually and articulatory. Coarticulation effects might be

perceptually too weak to be phonologized on a short, reduced vowel, and at the same time, the vocalic slot too weak to host a full vowel. More specifically, coarticulation processes could arise even in these situations, but they would not result in categorical, full-blown VH systems. In this sense, when pointing at many cases of low-level, gradient assimilations affecting reduced vowels as supporting the “reduction-then-assimilation hypothesis,” Barnes (2006:193-194) has to specify that they are “not in fact instances of the development of full-blown word-domain vowel harmony systems from earlier non-harmonizing reduction systems.”

It is perhaps from this perspective that we could interpret the results of typological surveys like the one of Schiering (2007): “in languages which have both vowel reduction and vowel harmony..., processes of the latter kind are only sporadic...or restricted to certain morphemes.” Languages in which harmony spans the phonological word “have weak stress and lack segmental effects in the form of vowel reduction” (Schiering 2007:346).

Among similar lines, Auer (1993:8) concludes that “the spreading of vowel features across syllables is at odds with vowel reduction and centralization in non-accented syllables”; this was mirrored typologically by the fact that “no language with an overall reduction of the vocalic system in non-accented syllables...has even a marginal system of vowel harmony or tone. No language with even a marginal system of tone or vowel harmony shows more than peripheral accent-dependent reduction” (71).

2 Vowel Harmony in Swiss Italian Dialects

Swiss Italian dialects (henceforth SI dialects) belong to the northern Italo-Romance varieties and are spoken in the southern part of Switzerland. In some of these, Latin final unstressed -A – the only etymological final unstressed vowel preserved in these dialects (cf. §3.2) – underwent assimilation processes triggered mostly by the preceding stressed vowel (Delucchi 2010, 2012).

Moreover, in some dialects, anticipatory assimilation can affect pre-tonic vowels. Cases are attested where this regressive process applies across word boundaries, up to the post-tonic vowels of a preceding word (cf. §4).

For many reasons SI dialects offer an excellent laboratory for studying both the genesis of VH and its relation to VR. First of all, a great variety of VH systems can be found in this area. For example, the dialect of Claro displays total progressive VH triggered by all 7 stressed vowels /i e ε a ɔ o u/ and affecting the unstressed final vowel -a < Lat. -A ((1))⁴. The following examples show VH in words with penultimate stress:

⁴ SI dialects and nearby Italian dialects display a number of different vowel systems, both in number of phonemes (6-, 7- or 8-vowel systems, with several cases of a limited 5- or 6-vowel system for unstressed syllables) and in vowel quality (e.g. presence/lack of front rounded vowels).

- (1) a. /i/ 'limi (< LĪMA(M)) 'file' e. /ɔ/ 'rɔdɔ (< RŌTA(M)) 'wheel'
 b. /e/ 'tere (< TĒLA(M)) 'cloth' f. /o/ 'goro (< GŪLA(M)) 'throat'
 c. /ɛ/ 'tɛɛ (< TĒRRA(M)) 'earth' g. /u/ 'lunu (< LŪNA(M)) 'moon'
 d. /a/ 'lana (< LANA(M)) 'wool' (dialect of Claro)

In the dialect of Sementina, this final vowel is realized as -[ɛ] after front vowels ((2a)) and as a mid-low back vowel after /ɔ/ ((2b)), whereas the original -a remains unchanged after stressed /o/ and /a/ ((2c)):

- (2) a. /i, e, ɛ, y, ø/ 'limɛ 'file' 'terɛ 'cloth' 'tɛɛ 'earth'
 'lynɛ 'moon' 'kɔʃtɛ 'cooked.FSG.'
 b. /ɔ/ 'kɔʃtɔ 'rib'
 c. /a, o/ 'lana 'wool' 'gora 'throat' (dialect of Sementina)

Two dialects showing a very similar VH system for paroxytones can treat antepenultimate stressed words differently (cf. Delucchi 2012:324-327 for details). For instance, the post-tonic vowel -[i]- is transparent in the dialect of Claro, so we have a copy of the stressed vowel on the final one ((3)), whereas in the dialect of Gorduno, -[i]- is acting as a new harmony trigger ((4)):

- (3) a. 'kodigo (< *CUTICA(M)) 'pigskin'
 b. 'pertigɛ (< PERTICA(M)) 'pole' (dialect of Claro)
- (4) a. 'myziki (< MUSICA(M)) 'music'
 b. 'pertigi (< PERTICA(M)) 'pole' (dialect of Gorduno)

Furthermore, in varieties spoken near those displaying VH, we find dialects where -a has been involved in other changes, such as peripheralization or centralization processes: the variety of Malesco (I) has a generalized final vowel -[ɛ] ((5a), but see also (8) concerning assimilation processes), and similarly in Prosito we consistently have a final -[æ] ((5b), cf. Delucchi 2012:254-255 for experimental evidence)):

- (5) a. CVCɛ (dialect of Malesco (I))
 'pip:ɛ 'pipe', 'terɛ 'cloth', 'tɛstɛ 'head', 'sap:ɛ 'hoe', 'pɔrtɛ 'door',
 'tsjul:ɛ 'onion'
 b. CVCæ (dialect of Prosito)
 'fīmæ 'peak', 'teræ 'cloth', 'ʃtrɛdæ 'street', 'ʃpalæ 'shoulder', 'pɔrtæ
 'door', 'fjɔræ 'cream', 'vɔjæ 'desire', 'lynæ 'moon'

In other varieties, as in the dialect of Spriana (I) or Braggio, a central vowel occurs in final position without regard to the quality of the preceding vowels (cf. Delucchi 2012:269-272):

- (6) a. CVCə (dialect of Braggio)
fa'rinə 'flour', 'terə 'cloth', 'terə 'earth', 'lanə 'wool', 'rɔdə 'wheel',
'ondʒə 'nail', 'lynə 'moon', pa'gørə 'fear'
b. CVCi (dialect of Spriana (I))
'limi 'file', 'sedi 'silk', 'teri 'earth', 'lani 'wool', 'tɔli 'can', 'guti 'drop',
'lyni 'moon', 'rɔdi 'wheel'

Differences in realizations in prepausal vs. utterance-medial position are also attested, as in the dialect of Augio, which displays a final low central segment prepausally, but a full vowel assimilated to the first vowel⁵ of the *following* word in utterance-internal position (phrasal regressive assimilation, cf. Delucchi 2012:129-130).

- (7) a. ¹ftʃam:ɐ
‘flame’
b. la ¹ftʃam:ɔ ¹ros:ɐ / la ¹ftʃam:ɛ ¹bɛl:ɐ / la ¹ftʃam:a ¹kalɔ
‘the red/nice/hot flame’ (dialect of Augio)

The dialect of Malesco (I) also displays some regressive phrasal assimilation processes: whereas we systematically have final [-ɛ] in prepausal position ((5a)), in several environments an alternation between [-ɛ]/-[-a] has been established, depending on the initial vowel of the following word ((8), with examples for the article f.sg. from Lat. ILLA(M) and the adj. ‘much’ from Lat. TANTA(M)) (cf. Delucchi 2012:221, 343-351 for details).

- (8) + CV_[-ant]CV vs. + CV_[+ant]CV
- | | |
|--------------|-----------------|
| la 'lane | 'the wool' |
| la 'pom:ε | 'the apple' |
| 'tanta 'lane | 'a lot of wool' |
- | | |
|----------------|------------------|
| le 'terε | 'the earth' |
| le 'lime | 'the file' |
| 'tante fe'rine | 'a lot of flour' |
- (dialect of Malesco (I))

Important data for the diachronic analysis of VH are provided by some dialects where we can observe the first stages of harmony and/or the results of recent reduction processes. Whereas for the dialect of Spriana (I) Merlo (1951) still transcribes a final low vowel *-[a]*, we now observe a central high vowel *-[i]* (cf. here (6b)). The dialect of Augio, in which we see a prepausal *-[ə]*, has recently developed the phrasal regressive assimilative processes we observe in (7b), not reported in older sources like Urech (1946). These last examples are particularly significant, as they show that VR and assimilatory processes can be found either in the same dialect or among dialects spoken in neighboring towns in the (Swiss) Italian area. In the next chapter I am concerned with describing this interaction, both synchronically and diachronically.

Unstressed vowels can also act as a trigger in the initial syllable, as shown by examples like ['keʃta ma'riɐ̃] 'this Maria'. We can hypothesize that the phrasal harmony in Augio represents the generalization of an originary word-internal process across word boundaries, cf. §4.

3 Prosodic Organization and Vowel Harmony in the Swiss Italian Area

3.1 Vowel Harmony, Vowel Reduction, and Rhythm

The studies of Auer (1993) and Schiering (2007), already mentioned in §1, belong to the vast bibliography on rhythm classification. In both studies, VH is listed among the significant parameters for a typological study of rhythm. According to Auer (1993:8), VH “is a phonological process relating to the morphological word in syllable-timed languages, whereas vowel reduction is a phonological process relating to the phonological word in stress-timed languages.” From a diachronic perspective, Auer (1993:30-32) mentions the case of Uzbek and Khalkha, where loss or reduction of VH has concurred with the increase of reduction/centralization processes for unstressed vowels and of syllabic complexity. According to Schiering’s typological survey, VH does not display a principled incompatibility with VR, but the strong stress and concomitant VR of a stress-timed rhythmical prototype are incompatible with the development of a full-blown VH system.

On the other hand, the findings of Gavalda-Ferré (2007) on Catalan seem to provide evidence of syllable-timed languages displaying VR: Gavalda-Ferré’s study indicates that there is no significant rhythmical difference between Eastern Catalan (Barceloní) and Western Catalan (Tortosí), despite their different degrees in VR.

If there are syllable-timed languages displaying VR, the question is how VH behaves in these cases: do we expect VH spanning the phonological word in syllable-timed languages with a reduction degree similar to Barceloní?⁶ Moreover, are there two different kinds of VR, as hypothesized by Gavalda-Ferré (2007): one affecting speech rhythm, such as the one found in English or German, and one that does not, as in Western Catalan? And if so, how do they differ? What can SI dialects tell us about this and, more generally, about the relation between VR, VH and rhythm?

No study on rhythm has yet been performed on SI dialects, but some recent literature on Italian varieties closest to the SI ones (like Milanese) places them close to the stress-timed pole (Schmid 2004), although specifying that this pole is best represented by other northern varieties like Piemontese, Romagnolo and Emiliano. If we consider Schmid’s classification and Auer’s and Schiering’s synchronic remarks together, the existence of full total VH systems in the SI area seems at least unexpected. As we will see in the next chapter, a possible solution for motivating this situation could be provided by a diachronic analysis of the languages’ prosodic organization.⁷

⁶ See Jiménez and Lloret (2011) on VH in Catalan varieties.

⁷ Cf. Filipponio and Delucchi (in prep.); see also the suggestions of Schiering (2007).

3.2 Defining Conditions for the Development of VH: Prosodic Changes and Segmental Processes in the Northern Italo-Romance Area

In a recent paper, Filipponio (2011) proposes a diachronic analysis of Northern Italo-Romance rhythmical structure, with a particular focus on Bolognese. The analysis was performed in the Control/Compensation (CC) model, a recent phonologically-driven approach to rhythm modeling, currently explored in particular by Bertinetto and colleagues (Bertinetto and Bertini 2008). Under the CC hypothesis, languages are situated along a continuum: on one extreme, we have an ideally compensating language, characterized by segmental overlap (coarticulation), with compression of unstressed syllables, and of vowels in particular. On the other extreme, we find an ideally controlling language in which all segments receive the same amount of articulatory effort, with syllable's length depending only on the number of its segments and not on its stressed/unstressed status.

Filipponio discusses two different rhythmical paths, one chosen by Bolognese, and the other by Western Lombard dialects like Milanese in their development from Proto-Romance: whereas Bolognese shows great compensatory tendencies, with the stressed syllable acting like a “gravity center” in the word structure, other Gallo-Italo-Romance varieties have developed toward a more controlling structure and presently display a prosodic structure with a considerable balance between stressed and unstressed syllables.

Our general intuition about the relation between harmony and rhythm is that VH in the SI area could develop on this more recent *controlling* type of word structure, which (crucially) was shaped by a prior *compensation* stage (see also Filipponio and Delucchi, in prep.).

During this first compensation drift, we must identify processes leading to the reduction and loss of unstressed vowels, in particular the loss of all unstressed final vowels except *-a*. In fact, in all Northern Italo-Romance dialects (with the exception of Ligurian as well as Central and Southern Venetian), Proto-Romance final unstressed vowels /i e o u/ are supposed to have passed through an initial stage of centralization in a pre-documentary phase, followed by vowel deletion (Loporcaro 2006-7): ['kaŋ] ‘dog’ (< CANE(M)), ['ram] (sg. and pl.) ‘branch, -es’ (< RAMUM, RAMI) but ['lana] ‘wool’ (< LANA(M)) (dialect of Claro). We have also some examples of deletion in initial position, as in ['gudzu] (< AGUCULA(M)) ‘needle’ or ['ʃpartʃ] (< ASPARAGU(M)) ‘asparagus’ (dialect of Claro).

Syncope processes are much more difficult to date but, especially in the way they apply, can be important clues for detecting compensation or controlling strategies. While in some varieties syncope affected unstressed positions pervasively, SI dialects are more conservative. Whereas in other northern varieties, such as in Bolognese, syncope can apply whenever the consonantal strength of the new originated consonantic sequence *does not fall* (Filipponio 2011, data in (11a)

from Lepri and Vitali 2007), in SI dialects either the consonantal strength must *increase* (except for [mn], which is tolerated in some varieties, e.g. ['fem.ne] ‘woman’, dialect of Claro; see Delucchi 2012:319 for details), or *resyllabification* in V.C+/r, l/ (where C is an obstruent) must be possible ((11b)). This is another environment where we observe the stressed syllable acting not like a “gravity center,” but rather as a pivot element retaining a balanced relation with the rest of the word, which in turn can be restructured as long as phonotactic constraints leading to strong favorable syllable contacts are observed (cf. Vennemann 1988). It is important to underline that, given these constraints, the punctual application of syncope in favorable environments varies from dialect to dialect (cf. the latter two forms in (11b)):

- | | | | | |
|------|------------|----------|-------------------------|-----------------------|
| (11) | PERTICA(M) | ANIMA(M) | DOMINICA(M) | *SCATOLA(M) |
| | ‘pole’ | ‘soul’ | ‘Sunday’ | ‘box’ |
| a. | [ˈpe:rdga] | [ˈa:nma] | [ˈdma:ndga] | [ˈʃka:tla] |
| b. | [ˈpɛrtige] | [ˈanima] | [duˈmenige]/[duˈmɛŋ.ɡɛ] | [ˈʃkatala]/[ˈʃka.tra] |

Syncope processes gave rise to penultimate stressed words with either an initial open syllable, or a closed syllable for which the inventory of admissible codas is reduced to liquids, sibilants and homorganic nasals.

Whereas unstressed vowels were reduced and ultimately lost in many environments, stressed vowels underwent an important change in vowel quantity (VQ) (see Loporcaro 2010). After the demise of Latin VQ contrasts, Northern Romance varieties developed a new VQ opposition by lexicalizing the output (with an allophonically lengthened vowel) of the Proto-Romance Open Syllable Lengthening rule: $V \rightarrow V: / _ [+stress]]_{\sigma}$ where $[_{\sigma}] \neq [_{pw}]$. This process gave rise to (sub)minimal pairs of the type [ˈpa:la] ‘shovel’ (< PALA(M)) ~ [ˈspala] ‘shoulder’ (< SPAT(U)LA(M)) for penultimate stressed words (<CV.CV ~ CVC.CV), and [ˈpa:n] ‘bread’ (< PANE(M)) ~ [ˈpan] ‘cloth’ (< PANNU(M)) for monosyllabic stressed words (CV.C(V) ~ CVC.C(V) (Cremonese, data from Oneda 1965, Rossini 1975).

In the following drift towards reduction of the structural space for vowel length, VQ contrasts still occur in some dialects, both in monosyllabic and penultimate stressed words (as in Cremonese), whereas in other dialects, such as those in the SI area, we find VQ contrasts only in monosyllabic stressed words ([ˈpala] ‘shovel’ = [ˈʃpala] ‘shoulder’, but still [ˈpe:s] ‘weight’ (< PE(N)SU(M) ~ [ˈpes] ‘fish’ (< PISCE(M), dialect of Arogno). Or, eventually, the contrast is completely lost in every prosodic environment, as in the dialect of Sobrio: [ˈpala] = [ˈʃpala] and also [ˈkar] ‘dear’ (< CARU(M)) = [ˈkar] ‘cart’ (< CARRU(M)).

I now briefly summarize the main results of these changes, which can be clustered around two crucial conditions favorable for the development of VH:

A. Reduction and ultimate loss in final unstressed position of [-low] vowels provided a *single, final unstressed vowel*, morphologically relevant and pho-

netically free to develop (by assimilation, fronting, etc.).⁸ In many cases this final vowel is the only carrier of a morphological number (and/or gender) distinction, i.e. feminine singular, and, as it contrasts only with zero,⁹ *-a* is ideally without any functional-driven constraint on quality changes. For example: [ʃpala] ~ [ʃpal] ‘shoulder/-s’, [bɛl] ~ [bela] ‘nice.M./FSG.’ (dialect of Arogno).

B. A *rhythmic controlling strategy* was established, in which unstressed vowels – and in particular final segments – play a significant role and have a balanced relation with stressed vowels in a generally simple phonotactic structure. Several clues point to this prosodic organization, in particular the conditions for the application of *syncope* (which, together with degemination, determines a strong prevalence of open syllables in internal position synchronically, while heterosyllabic clusters correspond to good syllable contacts), and the tendency to *lose VQ contrasts*, with the asymmetry between unstressed and stressed segments, in a certain way, diminished. If a prototypical stress system is characterized by positional prominence effects on the stressed syllable (strengthening, phonological oppositions; see Hyman 2010), the drift toward the loss of VQ contrast seems to characterize a less prototypical one, a system with “weaker stress” and, we would expect, few “segmental effects in terms of reduction” (see Schiering 2007); a system whose prosodic organization, in the CC model, we would classify as a more *controlling* one.

Condition **A** was reached at the end of a “compensatory drift” by reduction processes. Condition **B** has been fulfilled only in dialects where this compensatory drift *had stopped* (see for further details Filipponio and Delucchi, in prep.). Reduction fed VH as far as it provided a single final unstressed vowel, but reduction failed to be a deterrent for VH insofar as it did not go *too far*.

4 Hypotheses for the Development of VH in the Swiss Italian Area

I would like to advance here a sketch of a developmental path that might have led to the different outcomes of final *-a* in the SI area presented in §2 (for a systematic analysis of alternative hypotheses, see Delucchi 2012:355-379).

As a plausible last step of the compensation tendency discussed in §3.2, we can imagine that Proto-Romance final *-a* was slightly centralized to *-[ɐ]*, a realization now attested in the nearby Rhaeto-Romance-speaking area of Canton Graubünden (Haiman and Benincà 1992). Whereas in some varieties, like the one of Mesocco, the final vowel was involved in a prosodically conditioned alternation between a more peripheral *-[ɒ]* (in some cases raised to *-[ɔ]*) in prepausal position versus a more central *-[ɐ]* utterance-internally, in other varieties this final vowel might have been involved (also) in peripheralization processes in the

⁸ Of course, not all CV₁CV₂ words have V₁=V₂. For instance, in verbal paradigms we have forms like [ʔtoki] ‘I touch’, with a non-etymological final vowel.

⁹ Exceptions occur in varieties displaying a final *-i* as a f.pl. mark, as in many Valtellinese varieties: [urʔtigi] / [urʔtigi] ‘nettle, -s’ (dialect of Lanzada (I)).

frontward direction.¹⁰ Different developments could have led then to:

(i) systems with a generalized final $[-\text{æ}]$, which in some varieties has raised to $[-\text{ɛ}]$ in utterance-internal position, e.g. Caspoggio (I): $[\text{la}^{\text{'}}\text{fryt}\text{ɛ} \text{ l } \text{ɛ} \text{ ma}^{\text{'}}\text{ry}\text{ðae} \text{ \# \#}]$ ‘the fruits are ripe’;

(ii) systems that have developed different degrees of harmony, with the more peripheral variants of $[-\text{v}]$ being reanalyzed as a copy of the mid-low stressed vowels $[\text{ɛ}]$ and $[\text{ɔ}]$ – as can be predicted by listener misperception mechanisms (see Ohala 1994) – and with an alternation between $[-\text{æ}]/[-\text{v}]$ being established depending on the feature $[\pm\text{front}]$ of the preceding stressed vowel.

These different steps – harmony for the mid-low vowels, and fronting after all front vowels – are identifiable in systems like the one of Sementina (see §2 (2), here in Fig. 1, from $*\text{CVCa}$).

Fig. 1 VH Sementina

CiCɛ	CyCɛ	
CeCɛ	CøCɛ	CoCa
CɛCɛ		CɔCɔ
	CaCa	

Fig. 2 VH Lanzada (I)

CiCɛ	CyCɛ	
CeCɛ	CøCø	CoCa
CɛCɛ		CɔCɔ
	CaCa	

Fig. 3 VH Gorduno

CiCi	CyCy	
CeCe	CøCø	CoCo
CɛCɛ		CɔCɔ
	CaCa	

Several clues for a stage of fronting, either generalized or restricted to the final position after stressed front vowels, can be found in this area (Delucchi 2012) – for example, the surfacing of final front vowels in blocking environments (Loporcaro 2002, Delucchi 2010), in loanwords, in antepenultimate stressed words, and in older documentation of varieties now displaying a full system of VH (cf. for Claro – here §2, (1) – the slightly fronted final low vowel reported by Salvioni 1892-94).

From an intermediate stage like the one of Sementina, further developments toward a total left-to-right VH system are possible, as attested in the variety of Lanzada (I) (Fig. 2) and, finally, of Gorduno (Fig. 3) (see also Claro, §2, (1)).

Some SI dialects also display anticipatory assimilation processes in pre-tonic position, either between pre-tonic vowels or between a stressed trigger and a pretonic target (Delucchi 2012:333-335). For example, in the dialect of Augio we have a copy of a following stressed or unstressed vowel on the etymological pretonic $-\text{e}-$, as in $[\text{pyr}^{\text{'}}\text{dy}]$ (cf. *PERDERE*) ‘lost.MSG’, $[\text{vor}^{\text{'}}\text{gɔɲ:v}]$ (< *VERECUNDIA(M)*) ‘shame’, $[\text{siti}^{\text{'}}\text{mana}]$ (cf. *SEPTIMU(M)*) ‘week’. Anticipatory assimilation of this kind seems to be limited to varieties with preservation or context-independent centralization/peripheralization of final $-\text{a}/$ (as in Augio, or in Malesco (I), cf. §2, (8)), or to the few varieties with progressive VH where post-tonic, originally internal vowels $\neq /a/$ undergo VH (such as in $[\text{'pert}\text{ɛ}g\text{ɛ}]$ ‘pool’,

¹⁰ In support of this point, it is perhaps worth mentioning the particular functional load that the stressed palatal vowel system could exert in these varieties after the occurrence of several fronting processes, with different chronologies and under different conditions, involving $/u/$, $/ɔ/$ and $/a/$: $/u/ > /y/ (>/i/, /u/)$; $/ɔ/ > /ø/ (</ɛ/)$; $/a/ > /æ/ (>/ɛ/)$ (see Delucchi 2012:376-377).

[ˈʃkatala] ‘box’, dialect of Monteviasco (I)). This restriction is obviously related to the strictly local nature of anticipatory assimilation, which does not allow the presence of transparent vowels, as opposed to most left-to-right VH systems (cf. §2, (3)).¹¹ Moreover, pretonic vowels can also act as triggers on preceding unstressed segments (cf. the previous example of [sitiˈmana]): duration asymmetries between trigger and target are not crucial, except for the restriction that stressed vowels cannot be targets. Finally, in some varieties this assimilation applies also postlexically across word boundaries (see §2, (7)). We are not dealing here with harmony processes marking word boundaries – as the left-to-right VH previously analyzed, which is typical of syllable-timed languages (Auer 1993:7-8) – but with a more recent, local, purely prosody-driven assimilation that blurs these boundaries, targeting pre-tonic vowels across words.

The different assimilation patterns we detected in the SI area seem to fit into Hyman’s distinction between left-to-right and right-to-left processes (Hyman 2002:17, 24, cf. here §1.1). The data point clearly to their different natures: on the one hand, an older, more phonologically-morphologically conditioned process, a strictly word-related lexical left-to-right VH, connected to reduction in post-tonic position (which led to a single final vowel, then slightly centralized), characterized by transparency phenomena and blocking contexts; on the other hand, a more natural, anticipatory type of assimilation, a strictly local “articulatory and/or conceptual ‘pre-planning’” process (Hyman 2002:24), with postlexical application within and, in some cases, even across word boundaries (see Delucchi 2012:343-351, 384-385).

5 Recent Developments: Between Reduction and Vowel Harmony

Besides reduction processes that affected these varieties in the past (see §3.2), Swiss Italian and nearby Italian dialects display recent reduction processes as well, both in dialects with (i) and without (ii) progressive VH:

(i) in the dialect of Monteviasco (I), VH is endangered by VR, with the centralization and neutralization of oppositions between final unstressed vowels, especially in utterance-internal position (see Delucchi 2012:263-266 for experimental evidence):

(13)	__ ##		__] _{PW} [...] _{PW} .	
a.	[ˈviti]	‘life’	[a ˈvitə l ɛ ˈdyry]	‘the life is hard’
b.	[ˈsələ]	‘sole’	[a ˈsələ di ˈʃkarp]	‘the sole of the shoes’
c.	[ˈlyny]	‘moon’	[a ˈlynə ˈpjɛnɛ]	‘the full moon’

¹¹ It is possible that, compared with a more phonetic, coarticulatory-based development of VH in ‘CVCV’ words, a more abstract, analogical-driven process must be hypothesized for the harmonization of /a/ in ‘CVCVCV’. This is a further evidence of the more phonological-morphological nature of left-to-right VH compared to regressive VH (see further in this section).

(ii) in Sprianese (I) (cf. §2, (6b)), *-a* reduced to *-[i]*; in other dialects we have weakening of the peripheral vowel (cf. Prosito, (5b)). These varieties do not display any kind of assimilatory process: weakening shortened unstressed vowels consistently so that VR, in a way, went too far, leading to a prosodic shape that, as predicted in §3.3, is not compatible with VH.

Preliminary acoustic analyses performed on our data provide initial indications regarding the durational properties of stressed (SV) and final unstressed vowels (UV) in prepausal vs. utterance-internal position¹² (cf. Delucchi 2012:347-348):

- There is a gradual increase in the durational ratio between UV and SV in utterance-internal position from varieties with recent strong VR processes (e.g. Spriana, §2, (6b)) to varieties with stable progressive VH (e.g. Claro, §2, (1)): from 54% (Spriana), to 62% (Monteviasco), up to 86% (Claro). (The duration of stressed vowels does not show a significant difference between varieties.)

- There is a similar gradual increase in the durational compression ratio of UV from prepausal to utterance-internal position (UV utterance-internal/UV prepausal): from 51% (Spriana) to 67% (Monteviasco), up to 82% (Claro).

For Monteviasco, qualitative and durational reduction pattern together, endangering the old left-to-right VH. Similar reduction tendencies are affecting dialects like Sprianese, where durational pressures in particular seem to prevent any development of assimilation processes.

Finally, we have to consider the case of Augio: it is plausible that the prepausal realization of *-[v]* – already attested for Augio in older sources and definitely longer than the final central *-[i]* of Sprianese – corresponds to the vowel we can postulate before peripheralization or VH applied (cf. the current Rhaeto-Romance outcome). Now these further developments seem to be prevented because of recent compensatory tendencies – such as those affecting Sprianese, Monteviaschese etc. – which, when limited, are still compatible with the overapplication (across word boundaries) of anticipatory processes.

6 Conclusion

In this paper I considered the interaction of VH and VR in the SI area. Through a synchronic and diachronic analysis of the interplay between prosodic structure and VR processes, we identified two favorable conditions for the development of VH in this area. VR has fed VH insofar as it provided a single final vowel *-a*, probably slightly centralized, at the end of a compensatory phase (Condition A); the following shift to a more controlling prosodic strategy provided the necessary balanced relation between stressed and unstressed vowels for the development of

¹² Analyses were performed with Praat on CVCV words, 2 speakers for each variety. For each vowel (7- or 8-vowel system) we analyzed stressed and unstressed segments of 20 words (10 words in isolation, 10 words in utterance-medial position). For details, see Delucchi (2012:347).

stable VH systems (Condition B) (§3).

After pointing out the possible role of peripheralization processes in the development of VH, we described the different nature of progressive and regressive assimilation processes presently attested in the SI area, especially with respect to locality, domain of application and relation with VR (§4).

Finally, we observed recent reduction processes, possibly effects of new compensatory tendencies, that seem to affect unstressed vowels by centralizing and, crucially, by severely weakening and shortening them (§5). At this point, peripheralization of the final vowel and development of left-to-right VH is prevented, old systems of VH can be “endangered,” and the only new assimilatory processes attested belong to the more natural, anticipatory tendencies.

References

- Auer, Peter. 1993. Is a Rhythm-Based Typology Possible? A Study of the Role of Prosody in Phonological Typology. *KonTRI Working Papers*, University of Konstanz.
- Barnes, Jonathan. 2006. *Strength and Weakness at the Interface. Positional Neutralization in Phonetics and Phonology*. Berlin-New York: Mouton de Gruyter.
- Bertinetto, Pier Marco, and Chiara Bertini. 2008. On Modeling the Rhythm of Natural Languages. *Speech Prosody 2008*, Campinas, Brazil.
- Delucchi, Rachele. 2010. Outcomes of Lat. -A in Swiss Italian Dialects. Paper presented at UC Berkeley Phonology Lab Phorum, September 26, 2010.
- Delucchi, Rachele. 2012. Esiti di -A finale e armonia vocalica. I dialetti della Svizzera italiana in prospettiva romanza e generale. Ph.D. Thesis, University of Zurich.
- Filipponio, Lorenzo, and Rachele Delucchi. In preparation. On a Possible Origin of Vowel Harmony in Formerly Stressed-Timed Languages. Ms., University of Zurich.
- Filipponio, Lorenzo. 2011. Rhythmus als Auslöser eines phonologischen Wandels: das Beispiel der Mundart von Bologna. Paper presented at Deutscher Italianistentag, Regensburg, March 4-6, 2010.
- Flemming, Edward S. 1997. Phonetic Detail in Phonology: Towards a Unified Account of Assimilation and Coarticulation. In K. Suzuki and D. Elzinga, eds., *Proceedings of the 1995 Southwestern Workshop in Optimality Theory*

- (*SWOT*), University of Arizona.
- Gavaldà-Ferré, Nuria. 2007. Vowel Reduction and Catalan Speech Rhythm. M.A. Thesis, University College London.
- Haiman, John, and Paola Benincà. 1992. *The Rhaeto-Romance Languages*. London: Routledge.
- Hyman, Larry M. 2002. Is There a Right-to-Left Bias in Vowel Harmony? Paper presented at the IX International Phonology Meeting, Wien, November 1, 2002.
- Hyman, Larry M. 2010. Do All Languages Have Word Accent? Or: What's so Great about Being Universal? UC Berkeley Phonology Lab Annual Report, 297-315.
- Inkelas, S., J. Barnes, J. Godd, D. Kavitskaya, O. Orgun, R. Sprouse and A. Yu. 2001. Stress and Vowel-to-Vowel Coarticulation in Turkish. Paper presented at the annual meeting of LSA, Washington D.C., January 2001.
- Jiménez, Jesús, and Maria-Rosa Lloret. 2011. Harmonia vocàlica: parametres y variació. *Estudis Romànics* 33:53-80.
- Lepri, Luigi, and Daniele Vitali. 2007. *Dizionario bolognese-italiano, italiano-bolognese*. Bologna: Pendragon.
- Loporcaro, Michele. 2002. Unveiling a Masked Change: Behind Vowel Harmony in the Dialect of Claro. In D. Restle and D. Zaefferer, eds., *Sounds and Systems. Studies in Structure and Change. A Festschrift for Theo Vennemann*, 75-90, Berlin-New York: Mouton de Gruyter.
- Loporcaro, Michele. 2006-7. I dialetti dell'Appennino tosco-emiliano e il destino delle atone finali nell'(italo)romanzo settentrionale. *L'Italia dialettale* 66-67: 69-122.
- Loporcaro, Michele. 2010. Syllable, Segment and Prosody. In M. Maiden, J.C. Smith and A. Ledgeway, eds., *The Cambridge History of the Romance Languages*, vol. 1, *Structures*, 50-108, Cambridge: CUP.
- Majors, Tivoli. 1998. Stress Dependent Harmony: Phonetic Origin and Phonological Analysis. Ph.D. Thesis, University of Texas, Austin.
- Majors, Tivoli. 2006. The Development of Stress-Dependent Harmony. *Southwest Journal of Linguistics* 25:61-83.

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- Manuel, Sharon Y., and Rena A. Krakow. 1984. Universal and Language Particular Aspects of Vowel-to-Vowel Coarticulation. *Status Report on Speech Research*, SR-77/78, Haskins Laboratory, 69-78.
- Merlo, Clemente. 1951. Profilo fonetico dei dialetti della Valtellina. *Akademie der Wissenschaften und Literatur – Abhandlungen der Geistes- und Sozialwissenschaftlichen Klasse* 15:1369-98.
- Ohala, John. 1994. Towards a Universal, Phonetically-Based, Theory of Vowel Harmony. *ICSLP 94*, Yokohama, Japan, 491-494.
- Oneda, Romano. 1965. L'opposizione di quantità vocalica e il dialetto cremonese. *Strenna dell'ADAFa*, Cremona, 23-34.
- Rossini, Giorgio. 1975. *Capitoli di morfologia e sintassi del dialetto cremonese*. Firenze: La Nuova Italia.
- Salvioni, Carlo. 1892-94. L'influenza della tonica nella determinazione dell'atona finale in qualche parlata della valle del Ticino. *Archivio glottologico italiano* 13:355-360.
- Schiering, René. 2007. The Phonological Basis of Linguistic Rhythm: Cross-linguistic Data and Diachronic Interpretation. *Sprachtypol. Univ. Forsch. (STUF)* 60(4):337-359.
- Schmid, Stephan. 2004. Une approche phonétique de l'isochronie dans quelques dialects italo-romans. In T. Meisenburg and M. Selig, eds., *Nouveaux departs en phonologie: les conceptions sub- et suprasegmentales*, 109-124 Tübingen: Narr.
- Urech, Jakob. 1946. *Beitrag zur Kenntnis der Mundart der Val Calanca*. Biel: Schüler.
- Vennemann, Theo. 1988. *Preference Laws for Syllable Structure and the Explanation of Sound Change*. Berlin: Mouton de Gruyter.

Rachele Delucchi
Universität Zürich, Romanisches Seminar
Zürichbergstrasse 8
CH-8032 Zürich, Switzerland

racheledelucchi@gmail.com

Reconsidering the “Isolating Protolanguage Hypothesis” in the Evolution of Morphology¹

JAÏMÉ DUBÉ

Université de Montréal

1 Introduction

Much recent work on the evolution of language assumes explicitly or implicitly that the original language was without morphology. Under this assumption, morphology is merely a consequence of language use: affixal morphology is the result of the agglutination of free words, and morphophonemic (MP) alternations arise through the morphologization of once regular phonological processes.

This hypothesis is based on at least two questionable assumptions: first, that the methods and results of historical linguistics can provide a “window” on the evolution of language, and second, based on the claim that some languages have no morphology (the so-called isolating languages), that morphology is not a necessary part of language.

The aim of this paper is to suggest that there is in fact no basis for what I will call the “Isolating Proto-Language Hypothesis” (henceforth IPH), either on historical or typological grounds, and that the evolution of morphology remains an interesting question.

2 The Hypothesis

The hypothesis that the first language was isolating (leaving aside the question of mono- vs. polygenesis) is not new and is not specific to any theoretical framework (see for example Sapir 1921:67, and Fitch 2010:401-433 and references therein). The IPH seems reasonably uncontroversial because it builds on conventional knowledge about linguistic change and morphological typology, and because it cuts across theoretical divides in linguistics. It is also presupposed by non lin-

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guists investigating the origin of language. An explicit formulation of it can be found in Comrie (1992), who acknowledges that it is not unproblematic but still finds it plausible.

The diachronic part of the argument rests on two well attested types of linguistic change: grammaticalization and morphologization. These respectively give rise to new morphemes and MP alternations. A classic example of grammaticalization is the development of adverbs in *-ment(e)* in Romance languages from an NP in the ablative case of the form [ADJ + *mente* ‘mind’]_{NP} in Latin. Another classic example is used to illustrate morphologization: plural marking by umlaut in Germanic (e.g. German *Mutter* ‘mother’ ~ *Mütter* ‘mothers’). Here, the loss of a plural affix *-i*, that was first reduced to *-ə*, made the fronting of the stem vowel opaque and was reanalyzed as the morphological exponent of the plural.

Because there are so many instances of these two types of change, it is only good scientific practice to suppose, as uniformitarianism dictates, that these processes have been operating since the beginning of human language. The next step in the elaboration of the IPH is to generalize from countless occurrences of change to general principles that may have guided the development of language from its first appearance until the present day. This yields the following:

- (1) Affixal morphology comes from independent words through grammaticalization.
- (2) MP alternations (and all stem modification)² come from regular phonological alternations through morphologization.

It follows from these principles that the origin of morphology is not liable to an evolutionary explanation but is the result of normal historical development. In other words, the origin of morphology is the result of *change* as opposed to *evolution*, just like the transition from Latin to French is described in terms of change while the transition from ape to man is described in terms of evolution.

In order for the IPH to be a good explanation of the origin of morphology, principles (1) and (2) must fully characterize the general (long-term) direction of morphological change, and a purely isolating language must be a possible human language.

² The latter term should be used because it covers more ground. If the IPH is to be an explanation of the emergence of morphology, it must account for all cases of stem modification (cf. Wurzel’s 1989 “non affixal morphology”) that are not traditionally referred to as *morphophonemic* (e.g. reduplication, root-and-pattern morphology, infixation, and morphological metathesis)

3 Historical Bases

3.1 The Comparative Method and Internal Reconstruction

Although a better understanding of phonetics helped the Neo-Grammarians obtain impressive generalizations in the form of sound-laws, the Comparative Method has always been about sound *and* meaning (Kiparsky 1982), which is to say that it is about morphology.

The debate about long-range comparison and macro-groupings (Nostratic, Amerind, Proto-World, etc.) has led historical linguists to reaffirm what makes the method a proven tool to guard against similarities that are due to chance, phono-symbolism, borrowing, etc. Put negatively, this can be summarized in the form of a slogan: “Lexical comparison is not enough.”

Relying heavily on Meillet (1913), Nichols (1995: 41-58) stresses the positive side of this, which she calls the “requirement of paradigmaticity:” the Comparative Method is based on the establishment of regular sound correspondences between *paradigmatic* sets of words; that is, morphological subsystems such as pronouns, declensions, and conjugations.

This method depends so much on morphology that questions can be raised about its applicability to so-called isolating languages. According to Nichols, we cannot reach as far back into a language’s history if it is morphologically poor. For such a language, genetic grouping may be possible (and valid according to the standard Comparative Method):

[W]here the family is sufficiently shallow that relatedness is self-evident (e.g. Tai, Chinese). [...] Sometimes an isolating group fits into a deeper family that has more morphology and whose relatedness has been established in part on the evidence of that morphology (e.g. Chinese in Sino-Tibetan, Vietnamese in Austro-Asiatic, Kwa in Niger-Congo). (Nichols 1995:63)

The method is also dependent on morphological irregularities of the kind shown in (3) which are in principle absent from purely agglutinative languages.

“Languages of the isolating type, and to a lesser extent languages with agglutinative morphology, lack the intersecting arbitrary classifications and grammatical accidentance that make subsystems like the Indo-European gender system diagnostic of genetic relatedness.” (Nichols 1995:63)

(3) Paradigmatic irregularities in Indo-European languages

	(Old) French	Latin	German	Old Slavic	Sanskrit
3sg ‘is’	<i>est</i>	<i>est</i>	<i>ist</i>	<i>yestu</i>	<i>ásti</i>
3pl ‘are’	<i>sont</i>	<i>sunt</i>	<i>sind</i>	<i>sātu</i>	<i>sánti</i>

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This is not to say that the history of these languages cannot be investigated rigorously or that genetic relationships among them cannot be established. The point is that the usefulness of the Comparative Method, *qua method*, is in a sense proportional to the amount of morphology (and, to a lesser degree, of allomorphy) present in a putative language family.

Another important tool in historical linguistics is the method of Internal Reconstruction which is in effect the procedure used to undo the effects of principle (2): MP alternations are presumed to come from originally automatic phonological alternations (Trask 1996:248). This technique raises a methodological problem formulated by Lass (1975): are there known human languages that are phonologically completely regular? As Comrie puts it:

Such protolanguages are different typologically from most, probably all, attested languages, most or all of which have at least some morphophonemic alternation. [...This] violates the constraint of typological congruity between reconstructed and attested languages. (Comrie 1992: 204-205)

Putting this problem aside, it could still be said that there is a general trend towards more stem modification (MP alternations), but this overlooks a major source of morphological change that regularly counteracts and obscures the effects of morphologization, namely analogical levelling (see Trask 1996:108 on Sturtevant's paradox: "sound change is regular, but produces irregularity; analogy is irregular, but produces regularity.").

Principle (2) of the IPH predicts that, if we work back in time, we should find less stem modification. But, even though reconstruction has been applied extensively to Proto-Indo-European (PIE) itself, it still has a considerable amount of stem modification (see Fortson 2004) such as ablaut (roots, derivational affixes, and flexional affixes are subject to gradation), and stress shift (cf. "internal derivation"). These have not been successfully reduced to previous regular phonological processes.³

What is worse is that stem modification, assumed to be an irregularity in mostly affixing IE languages, cannot be viewed as irregular in the same sense when it is the preferred morphological process of a language, which is apparently the case for Semitic languages under the traditional analysis.

With regard to Semitic the orthodox view is that proto-Semitic was templatic, i.e. that "roots" and "patterns" were always there from the beginning. [...] most people who have thought about this problem at all assume that the Semitic system is conservative and essentially identical to Proto-Afroasiatic. [...] I don't think that there is any evidence for the development of stem-changing morphology (ablaut, infixation) out of stem-external af-

³ It has even been suggested, although this is a marginal position, that ablaut in PIE reflects a Semitic-like root-and-pattern morphology in (pre)PIE (Pooth 2009).

fixation in all of Afroasiatic, even though the proto-language must go back some 10,000 years. (Ratcliffe p.c.)

3.2 Grammaticalization, Boundedness, and Lexicalization

If we follow Heine (2003:583) (see also Sapir (1921:114), and Bréal's (1897) *Loi de spécialité*), we must recognize that grammaticalization is primarily a semantic phenomenon: the bleaching of content words into more and more grammatical or functional items (either free or bound).

As such, it is not in itself a source of morphology. It can only be construed as such a source if it is supplemented with loss of phonological autonomy and with phonological erosion. Unfortunately, bleaching and phonological erosion are apparently independent processes. For example, while bleaching explains the transition of the French word *pas* 'step' from a noun to a negative particle, it cannot explain why it did not become a suffix attaching to verbs.

Heine and Kuteva (2011) actually demonstrate that grammaticalization is apparent even in a so-called isolating language like Mandarin that has not developed prototypical inflectional morphology but instead uses function words to mark grammatical relations.

[T]he lack of boundedness of form does not mean lack of grammaticalization. Grammatical categories can be expressed by non-bound forms; in fact, this is the general tendency in earlier stages of grammaticalization. This work views phonological erosion - which leads to cliticization and ultimately to affixation - as a possible (but certainly not necessary) phenomenon accompanying grammaticalization. (Heine & Kuteva 2011:522)

The inclusion of phonological erosion in the "cycle of grammaticalization" by Heine (2003) and also Croft (1990), among many others, is thus misleading because it suggests that grammaticalization is a constant trend toward more morphology. As a matter of fact, grammaticalization also plays a role in the development of analytical exponents.

The transition from French *je mangeai* to *j'ai mangé* (both meaning 'I ate') is an example of the rise of a periphrastic construction where a synthetic one used to be available. In this case, grammaticalization may be responsible for a *loss* of morphology: the periphrastic punctual past tense has replaced the synthetic "simple past," which also expresses punctuality, in many dialects of spoken French. It is clear that grammaticalization is and has been at play throughout the history of English and French even though on the whole they are largely moving toward a more isolating type.

Principle (1) of the IPH predicts that if we go back in time we should find less and less polymorphemic words, but this cannot be true because of another general trend that creates monomorphemic words out of polymorphemic words (com-

pounds, derived and inflected forms) through lexicalization and phonological change (erosion).

There are local but very numerous examples of this trend: for example, the origin of the English word *window* as an Old Norse compound *vindauga* ‘wind-eye’ or the origin of the French verb *arriver* ‘arrive’ from the Latin *ar-rīpāre* ‘to touch the shore.’ There are also systemic examples: in French, as in most Romance languages, nouns inherited from Latin have their source in a case marked form (nominative or accusative usually) which, according to most standard theories of morphology, were composed of at least a stem and a case suffix. This last case also shows that monomorphemic words can be created without lexicalization: the loss of the case system in Romance languages is the result of regular phonetic change.

3.3 The Opacity of Linguistic Change

After this brief examination of the historical bases of the IPH, it seems that it is possible to argue for the mirror-image hypothesis: a morphologically rich protolanguage could be posited on the basis of two types of morphological change (lexicalization and levelling) that are as well established as (1) and (2) and that we have to assume have been active throughout the history of human language. But this new hypothesis would suffer from the same defects as the IPH.

Instead, we have to recognize that we are faced with complementary types of change that reflect competing pressures towards complexity *and* simplicity.⁴ A more complete portrayal of morphological change brings into sharp focus the potential *opacity* of historical developments.

(4) The “Cycle of Complexity”

Complexification mechanism	Result	Result	Simplification mechanism
Grammaticalization	more morphology	less morphology	Lexicalization
Morphologization	more stem modification	less stem modification	Levelling

4 Typological Bases

In order to validate the IPH it is important that the term “isolating” refer to a purely isolating language (with *no* morphology), otherwise the hypothesis cannot

⁴ It is not surprising that these mechanisms act in opposing directions, but this calls into question Comrie’s (1992) notion of complexity. It is to be expected that human language is the resolution of conflicting pressures towards simplicity (e.g., in the phonological domain, perceptual clarity and ease of articulation). Languages (including the original language described by the IPH) cannot be unilaterally simple if they are to be useful means of communication.

be an account of the first appearance of morphology in human language.

The 19th century classification of languages according to their morphological characteristics is a holistic scheme which was hoped to be predictive of other features of the grammars of the classified languages as well as to reflect phylogenetic relationships among them as it encapsulated a presumably universal path of change (Morpurgo-Davies 1975, Croft 1990).

In fact, the IPH can be traced back to Bopp's ideas about the disintegration of the original "Indo-Germanic" language into the attested classical languages and then the modern European languages. According to this view, morphological types are also historical stages through which languages "evolve" from a state of perfection to a final stage of decay (cf. Lehmann 1967:39). The modern version of this teleological conception takes advantage of the cyclical nature of change and supposes a path from the simple (isolating) to the complex (fusional). The parallelism is striking.

(5) Developmental path

Bopp:		<i>agglutinating</i>	>	<i>fusional</i>	>	<i>isolating</i>
IPH:	<i>isolating</i>	>	<i>agglutinating</i>	>	<i>fusional</i>	>

Processes: Grammaticalization Morphologization

Bopp's hypothesis was abandoned during the 19th century:

By this demonstration Grassmann also undermined the notion that language developed from an analytic to a synthetic structure through an agglutinative. With it he did away with the close relationship that had been observed previously between genealogical and typological classification. After the publication of his article we find fewer and fewer references to the typological structure of a language in comparative treatments; and when typology is taken up by Finck in the definitive treatment of the nineteenth-century approach there is no reference to genealogical classification. The appealing notion of a straightforward development of language had been abandoned. (Lehmann 1967:109-110)

Modern accounts (cf. Comrie 1981, Croft 1990) only refer to the typology for historical reasons and to point out that it is not only disconnected from the facts of language change, but it is also of little use as a strictly synchronic tool in modern typology because of two main problems.

1) The languages are classified according to at least two independent parameters: the index of fusion (degree of divergence from the ideal morpheme as a biunique unit of form and meaning) and the index of agglutination (number of morphemes per word) (Haspelmath 2009 has three parameters, Plank 1999 has eight logically independent parameters). This yields not one but two perhaps unrelated continuous scales of morphological complexity.

2) The classification has apparently no predictive value as to the presence or absence of other properties outside of the morphology. Even the fact that a language has fusional nominal morphology for example does not predict the same for verbs (Haspelmath 2009).

Despite the fact that the morphological classification on which the IPH partly rests is of little use either for historical or synchronic analysis, we can ask the following questions: is there a correlation between time-depth and morphological complexity, and is a purely isolating language possible?

4.1 Languages Without Morphology?

Since everybody agrees that there are no purely isolating languages, this is admittedly a redundant exercise, but it seems nevertheless necessary in order to show to what extent they diverge from the ideal type. Some of the most cited examples of “almost-isolating” languages include Vietnamese, Indonesian, and Chinese.

Vietnamese, according to Nguyễn (1997) who devotes 40 pages to its morphology, has productive reduplication and compounding as well as derivational prefixes and suffixes. As for Indonesian, Mueller (2007) devotes 22 pages to the description of patterns of compounding, reduplication, derivation (around 25 affixes), and inflexion (3 affixes). According to Packard (2006), Mandarin is “moderately isolating”. The issue for him is whether Mandarin is analytic, not whether it is isolating.

As it turns out, many (if not most) Chinese words are in fact dimorphemic, consisting of either (1) two free content morphemes (compound word), (2) one free and one bound content morpheme or two bound content morphemes (bound root word), (3) a free or bound content morpheme plus a word-forming affix (derived word), or (4) a free content morpheme plus an inflectional affix. (Packard 2006: 356)

The label “isolating language” is thus a somewhat misleading simplification, but most importantly, as suggested by Packard (2006), it must be recognized that while there are arguably purely analytic languages (marking grammatical relations with “independent” words and having no “obligatory” morphology), there are no languages without morphology, and that it is surely a mistake to conflate analyticity and monomorphemicity. This conflation is probably to blame for the continued use of the term “isolating”.

Because it seems that no modern language with extant history is actually isolating, we may turn to reconstructed protolanguages to see if the typological basis for the IPH can be substantiated.

Closely reflecting the earliest recorded IE languages, PIE is expectedly a highly fusional language. This is well illustrated by one of countless examples of

distributed and cumulative exponence:

(6) PIE perfect marking (Fortson 2004: 93-94):

<i>*me-</i>	<i>món-</i>	<i>h₂e</i>
RED.PERF-	think.PERF-	1sg.PERF

Here, the perfect is marked, in the singular, by 1) reduplication with *-e-* insertion, 2) stressed o-grade stem, and 3) a specific 1sg marker. (6) also demonstrates the pervasiveness of cumulative exponence in PIE: every morph realizes at least 2 semantic units (morphosyntactic features or lexical meaning). The fusional character of PIE is not limited to verbs as it is also characteristic of nominal inflection.

To be sure, it is not only in the IE domain that the protolanguage reflects the morphological type of the daughter languages. Hetzron (1976) uses a morphological pattern of the root and pattern kind precisely to establish the major subdivisions of Proto-Semitic. This pattern involves the formation of tense/aspect specific stems and is found throughout the Semitic languages (just as is the so-called broken plural). Reconstructed languages are, by definition, “prototypical model[s] of the daughter languages” (Haas 1966:24).

(7) Root-and-pattern morphology in Proto-Semitic (Hetzron 1976:103)

	Akkadian	South-Semitic	Central Semitic
Non-past	<i>-qattVl</i>	<i>-qät(t)əl</i>	<i>-qtVl(u)</i>
Past	<i>-qtVl</i>	<i>qätVl</i>	<i>qatVl-</i>
Jussive	<i>-qtVl</i>	<i>-qtVl</i>	<i>-qtVl</i>
Permansive	<i>qatVl-</i>	—	—
Root <i>q-t-l</i> ‘kill’; V=thematic vowel; prefixes and suffixes not indicated.			

Under the unilateral view of complexity that is behind the IPH, we would expect, all things being equal, younger languages to be simpler than older ones. This is surely an overly simplistic idealization (this is what the *ceteris paribus* clause is for), but it seems to be the only way to find empirical confirmation for the hypothesis. One kind of confirmation would be to see that the developmental path implied by the IPH is reflected in young versus old languages *and* that the differences in morphological complexity are greater between these than between, say, English and Latin.

The presence of morphology in relatively young languages has been termed a paradox (Aronoff et al. 2005)⁵ because it seems to go against conventional knowledge about the development of morphology (principles (1) and (2) of the

⁵ Aronoff et al. attribute the unexpected presence of non-affixal morphology in sign languages to a different modality, a questionable hypothesis, but do not offer an explanation for the presence of affixal morphology.

IPH). Aronoff et al. describe affixal and non-affixal morphology in American and Israeli Sign Language. Non affixal morphology is notably found in verbal agreement, aspect (durational, intensive), classifier constructions, characteristic adjectives, and deverbal nouns. Sign languages also exhibit extensive use of reduplication, and productive compounding.

Regarding Creoles and Pidgins, there seems to be a growing consensus that they are not simpler than older languages in any meaningful way. For morphological complexity, it is safe to say that all pidgins and creoles have morphology (Plag 2006 and references therein): “It is a myth that creoles [...] do not have inflexional or derivational morphology” (Bakker 2002:24).

Furthermore, even if we were to assume that inflectional morphology is by some measure more complex than derivational morphology, we could not support the traditional view of pidgins being simpler than creoles in view of Bakker’s (2002) finding that pidgins display *more* inflectional morphology than creoles. As for the presence of non-affixal morphology, the papers in Kouwenberg (2003) demonstrate that reduplication is an almost universal feature of pidgin/creoles.

Any number of carefully chosen examples could not do justice to the morphological complexity of young/simple languages, but consider the case reported by Aronoff et al. (2005:337) of a most atypical simple language which uses not one but two “levels” of non-affixal morphology (reduplication and morphological stress) to independently mark two grammatical categories: “In Mauritian Creole, for example, the stress pattern distinguishes augmentative from attenuative, both of which involve reduplication”.

4.2 The Logical Possibility of a Pure Isolating Language

If we are not prepared to state the obvious – that all languages have morphology – before all putative cases of isolating languages have been examined, then we should at least consider what a purely isolating language would look like.

Comrie (1981:45) imagines the case of a pure synthetic-fusional language where each word is a sentence that is only related suppletively to other sentences, a clearly impossible language. In a purely isolating language, all words are phonologically distinct (they share no recurrent sub-part) although they may be semantically related. This means that when speakers need to coin new words for new realities (things or events) that are sufficiently salient to deserve a *name* rather than a description they have to create them *ex nihilo* (on derivation and compounding as naming devices see Koefeld and Van Marle 2000). On the other hand, when speakers of that hypothetical language encounter a new word, they have no way of knowing its meaning except by asking for a definition.

This is a highly unlikely human language. These awkward situations are not typical in human languages precisely because of the role played by morphology: in Saussurean terms, the partial motivation of complex word forms.

5 Discussion: The Perils of the Method

The investigation of evolutionary origins is by necessity indirect and speculative. The IPH is an extrapolation back in time, to maybe 100,000 years (appearance of *homo sapiens*), of processes that we know have been at play during the 10,000 years or so of linguistic history that are accessible *given the methods that we have*. There is no data for the intervening 90,000 years.

If we look at the attested cases of change that are used to support principles (1) and (2) of the IPH, it is clear that, in evolutionary time, they happen almost instantaneously: the creation of adverbs in *-mente* took place during the period between Vulgar Latin and Old French (*bellement* ‘beautifully’ is attested in the 11th century), while the morphologization of umlaut took place in the period of Old High German (roughly 500-1000 A.D.). It is also clear that (1) and (2) do not reflect the overall path of change of Romance and Germanic which has been towards a dramatic simplification of the inherited IE morphological system.

It thus seems that grammaticalization and morphologization are short-term changes, not general trends, and that they do not affect the general character of languages (their morphological type, intended in a holistic sense). Why does the IPH continue to be viewed as a truism despite these facts? Because it is inherent to the methods of Comparative Grammar and morphological typology.

Comparative Grammar and Internal Reconstruction seem to point towards an isolating protolanguage without MP alternations because such a language represents the limiting case of these techniques: they *require* paradigms and MP alternations. As for the metric of complexity found in morphological typology, it is based on the Item and Arrangement model of morphological analysis. Here, simplicity is defined as the strict observance of the principle of biuniqueness (“one meaning equals one form”) and complexity can be measured either by the number of morphemes per word *or* by the segmentability of the morphemes (Bazell 1966). Thus, isolating is simple; agglutinating is complex in the first sense; fusional is complex in the second sense; and languages are classified according to the types of problems they pose for this particular kind of analysis:

For one can classify languages precisely according to the problems of analysis which each one presents. (Bazell 1966:37)

In other words, we ask *not* in what *determinate* way morphological segmentation and classification apply to this and that language. We ask more primitive questions: *whether* segmentation or classification apply in a determinate way [...]. (Bazell 1966:40, emphasis in the original)

On the historical side and on the typological side, it seems that we “attribute to the object of study what is only a requirement of the method[s] of inquiry”

(Coseriu 1973:14). For the evolution of language (and morphology), these methodological biases cannot be ignored precisely because we cannot rely on actual data.

6 Concluding Remarks

To appeal to a random genetic mutation or to a stroke of lightning in order to explain the evolutionary origins of language, or of one of its components, is clearly not an explanation, but it is equally unhelpful to keep a demonstrably wrong hypothesis because it may be the only available alternative to date to the argument from ignorance. Both of these views risk having the effect of preventing interesting investigations of the *problem* (not the *mystery*) of the evolution of morphology.

Some of the questions that are raised by a critical examination of the IPH and that bear on the problem are: 1) should non-affixal morphology continue to be treated as non-prototypical in light of the fact that it can't be explained away by the IPH (cf. Ratcliffe 2008); 2) could derivational morphology as a mechanism for lexical creation—and organization (Bybee 1988)—make a crucial difference in going from the limited size of lexicons in non-human communication systems to the vastness of human lexicons; and 3) what can linguistic change contribute in a different evolutionary scenario for the origin of morphology?

Regarding this last question, I would like to suggest that (1) and (2) do give us a “window” into the evolution of language, not by undoing their effects all the way back to the beginning, but by considering their directionality: phonological alternations morphologize and syntactic combinations morphologize, but there are virtually no examples of change in the opposite direction. Thus, grammatical patterns seem to follow a unidirectional path of change that leads to morphological patterns (Joseph and Janda 1988).

When a (gradual) change from one grammatical modality to another (from one “module” to another) is in progress there is a point where both analyses are equally possible, and, rather surprisingly, speakers choose a morphological one. According to Joseph and Janda (1988; see also Joseph 2003), the unidirectional path to morphology reflects the fact that the brain prefers, all things being equal, a morphological analysis when it is possible. They claim that this is because grammar is, synchronically, “morphocentric,” but it could also be an indication that, in the evolution of language, morphology was here first.

References

Aronoff, Mark, Irit Meir, and Wendy Sandler. 2005. The Paradox of Sign Language Morphology. *Language* 81:301-344.

- Bakker, Peter. 2003. Pidgin Inflectional Morphology and its Implications for Creole Morphology. *Yearbook of Morphology* 2002:3-33.
- Bazell, Charles E. 1966. Linguistic Typology. In P. Stevens and W.S. Allen, eds., *Five Inaugural Lectures*, 29-49. London: OUP.
- Bréal, Michel. 1897 [2005]. *Essai de Sémantique*. Limoges: Lambert-Lucas.
- Bybee, Joan. 1988. Morphology as Lexical Organization. In M.T. Hammond and M.P. Noonan, eds., *Theoretical Morphology*, 119-141. San Diego: Academic Press.
- Comrie, Bernard. 1981. *Language Universals and Linguistic Typology*. Oxford: Blackwell.
- Comrie, Bernard. 1992. Before Complexity. In J.A. Hawkins and M. Gell-Mann, eds., *The Evolution of Human Languages*, 193-211. Redwood City, Calif.: Addison-Wesley.
- Coseriu, Eugenio. 1973. *Sincronía, Diacronía e Historia: El Problema del Cambio Lingüístico*. Madrid: Gredos.
- Croft, William. 1990. *Typology and Universals*. Cambridge: CUP.
- Fitch, W. Tecumseh. 2010. *The Evolution of Language*. Cambridge: CUP.
- Fortson, Benjamin W. 2004. *Indo-European Language and Culture*. Malden, MA: Blackwell.
- Haas, Mary R. 1966. Historical Linguistics and the Genetic Relationship of Languages. In T.A. Sebeok, ed., *Current Trends in Linguistics 3: Theoretical Foundations*, 113-153. The Hague: Mouton.
- Haspelmath, Martin. 2009. An Empirical Test of the Agglutination Hypothesis. In S. Scalise, E. Magni and A. Bisetto, eds., *Universals of Language Today*, 13-29. Dordrecht: Springer.
- Heine, Bernd, and Tania Kuteva. 2011. Grammaticalization Theory as a Tool for Reconstructing Language Evolution. In M. Tallerman and K. Gibson, eds., *The Oxford Handbook of Language Evolution*, eds., 512-527. Oxford: OUP.

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- Heine, Bernd. 2003. Grammaticalization. In B.D. Joseph and R.D. Janda, eds., *The Handbook of Historical Linguistics*, 575-601. Malden, MA: Blackwell.
- Hetzron, Robert. 1976. Two Principles of Genetic Reconstruction. *Lingua* 38:89-108.
- Joseph, Brian D., and Richard Janda. 1988. The How and Why of Diachronic Morphologization and Demorphologization. In M. Hammond and M. Noonan, eds., *Theoretical Morphology*, 193-210. San Diego: Academic Press.
- Joseph, Brian D. 2003. Morphologization from Syntax. In B.D. Joseph and R.D. Janda, eds., *The Handbook of Historical Linguistics*, 472-492. Malden, MA: Blackwell.
- Kiparsky, Paul. 1982. From Paleogrammarians to Neogrammarians. In *Explanation in Phonology*, 175-188. Dordrecht: Foris.
- Koefoed, Geert, and Jaap Van Marle. 2000. Productivity. In G.E. Booij et al., eds., *Morphology: An International Handbook on Inflection and Word-Formation v.I*, 303-311. Berlin: Walter de Gruyter.
- Kouwenberg, Silvia, ed. 2003. *Twice as Meaningful: Reduplication in Pidgins, Creoles and Other Contact Languages*. London: Battlebridge.
- Lass, Roger. 1975. Internal Reconstruction and Generative Phonology. *Transactions of the Philological Society* 74:1-26.
- Lehmann, Winfred P. 1967. *A Reader in Nineteenth-Century Historical Indo-European Linguistics*. Bloomington: Indiana University Press.
- Meillet, Antoine. 1913 [1965]. Méthode de la Grammaire Comparée. In *Linguistique Historique et Linguistique Générale*, 19-35. Paris: Champion.
- Morpurgo-Davies, Anna. 1975. Language Classification in the 19th Century. In T.A. Sebeok, ed., *Current Trends in Linguistics 13: Historiography of Linguistics*, 607-716. The Hague: Mouton.
- Mueller, Frans. 2007. Indonesian Morphology. In Alan S. Kaye, ed., *Morphologies of Asia and Africa*, 1207-1229. Winona Lake, Indiana: Eisenbrauns.
- Nguyễn, Đình-Hoà. 1997. *Vietnamese*. Amsterdam: Benjamins.

- Nichols, Johanna. 1995. The Comparative Method as Heuristic. In M. Durie and M. Ross, eds., *The Comparative Method Reviewed*, 39-71. New York: OUP.
- Packard, Jerome L. 2006. Chinese as an Isolating Language. In K. Brown, ed., *Encyclopedia of Language & Linguistics*, 355-358. Oxford: Elsevier.
- Plag, Ingo. 2006. Morphology in Pidgins and Creoles. In K. Brown, ed., *Encyclopedia of Language & Linguistics*, 304-308. Oxford: Elsevier.
- Plank, Frans. 1999. Split Morphology: How Agglutination and Flexion Mix. *Linguistic Typology* 3:279-340.
- Pooth, Roland A. 2009. Proto-Indo-European Ablaut and Root Inflection. In J.E. Rasmussen and T. Olander, eds., *Internal Reconstruction in Indo-European*, 229-254. Copenhagen: Museum Tusculanum Press.
- Ratcliffe, Robert. 2008. Why Do Languages Develop and Maintain Non-Concatenative Morphology? In A. Ralli et al., eds., *Morphology and Dialectology: Proceedings of the 6th Mediterranean Morphology Meeting*, 99-115. Patras, Greece: University of Patras.
- Sapir, Edward. 1921. *Language*. New York: Harcourt, Brace & World.
- Trask, Robert L. 1996. *Historical Linguistics*. London: Arnold.
- Wurzel, Wolfgang U. 1989. *Inflectional Morphology and Naturalness*. Dordrecht: Kluwer.

Jaïmé Dubé
Université de Montréal
Department of Linguistics and Translation
C.P. 6128, Succ. Centre-Ville
Montreal (Qc.), Canada, H3C 3J7

jaime.dube@gmail.com

Linguistic Relativity and Numeric Cognition: New Light on a Prominent Test Case

CALEB EVERETT¹

University of Miami

Introduction

The past two decades have seen both a resurgence and transformation of research on linguistic relativity. This is due in large part to the influential work of researchers such as Lucy (1992a, 1992b) and Levinson (1997, 2003, *inter alia*). Research on linguistic relativity has morphed from the Whorfian (1956), often anecdotally based enterprise, into one that is oriented around experiments of various sorts conducted among speakers of different languages. These languages are frequently the topic of inquiry because of some specific grammatical features they contain, features that potentially affect speakers' cognitive orientations vis-à-vis a given semantic domain. Research of this type has resulted in evidence for language-mediated or influenced thought in a wide array of nonlinguistic tasks related to numeric cognition (De Cruz and Pica 2008, Pica et al. 2004), gender perception (Konishi 1993, Flaherty 2001), spatial and directional construal (Levinson 2003), substance classification (Lucy and Gaskins 2001, Imai and Mazuka 2007), the perception of time (Boroditsky et al. 2011, Boroditsky 2001), and even the perception of colors (Gilbert et al. 2006, Drivonikou et al. 2007).

In their review of recent work on linguistic relativity, Wolff and Holmes (2010:1) make the following observation:

While we do not find support for the idea that language determines the basic categories of thought or that it overwrites preexisting conceptual distinctions, we do find support for the proposal that language can make some distinctions difficult to avoid, as well as for the proposal that language can augment certain types of thinking.

¹ The author wishes to thank those Pirahã who participated in this study. He is particularly grateful as well to Keren Madora, who translated for him during research among the people, and who discussed many of the ideas presented in this work.

In this paper I will focus on a particular cognitive domain, namely numeric representation. For the data considered, pertaining to an indigenous Amazonian language well known to most linguists (see e.g. D. Everett 2009), we will see that there is considerable support for the notion that language can augment certain kinds of thinking. In particular, a certain linguistic feature, viz. number terminology, can serve as a ‘conceptual tool’ (Wolff and Holmes 2010) that augments a certain kind of thinking, numeric cognition. The data suggest that when speakers lack number terminology they struggle with basic quantity recognition tasks, and therefore that number terminology augments in a critical fashion numeric thinking.

1 Linguistic Effects on Numeric Cognition: Potential Test Cases

Work related to numeric cognition and the linguistic relativity hypothesis has generally focused on languages with very modest, or completely absent, systems for expressing cardinal numerosities (De Cruz and Pica 2008). For example, the results in Pica et al. (2004) suggest that speakers of Mundurukú tend to struggle with tasks that require precise representation of numerosities greater than three, a fact that is most plausibly motivated by the paucity of number terms in that language.

As Hammarström (2010) notes, there is only a handful of languages that can truly be considered anumeric. Perhaps the most well-documented case is that of Pirahã, a language spoken in southwest Amazonia that lacks any precise number words (D. Everett 2005). In that language, *hói* signifies “small size or amount,” *hoí* indicates “somewhat larger size or amount,” and *baágiso* means to “cause to come together” or “many.” The imprecision of these terms is demonstrated experimentally in Frank et al. (2008). In other less well-documented cases anumericity has been claimed, though experimental work is still required to buttress such claims. For example Xilixana is another South American language that is said to lack all number words, including ‘one’ (Hammarström 2010). Another Amazonian language that is claimed to lack native number words altogether is Jarawara (Dixon 2004), a member of the small Arawá family. However, follow-up work has suggested conclusively that native number words do exist in Jarawara (C. Everett, under review), and in all well-documented Arawá languages.

Given that the absence of numerals in Pirahã is now so clearly documented, this case is arguably crucial to our understanding of the potential effects of anumeric language on numeric cognition. To date, three extensive experimental studies have been undertaken in an attempt to better understand the role of number terms on the basic recognition, recall, and manipulation of quantities. Below I synthesize some of the major findings from these studies, including my own. I also present new data on very recent work among the people. I will claim that the results so far obtained among these people are consistent with the notion that number terminology can serve as a ‘conceptual tool,’ and that the data present

a clear example in which language serves a fundamental role in augmenting certain cognitive abilities, in this case the ability to exactly recognize quantities exceeding three. To that extent, these data can be added to the growing literature providing evidence for linguistic effects on facets of non-linguistic cognition.

2 A Summary of Results Across Three Studies

Frank et al. (2008) conducted two word-elicitation tasks that corroborated D. Everett's (2005) claims that the three aforementioned number-like terms cannot actually be considered number words, at least not ones denoting precise numerosities. In one task, Pirahã speakers were presented first with one spool of thread, and asked to provide a number term for the quantity provided. In every case they used the word *hoí*. The researchers then added spools of thread to the presented array iteratively, and after each spool was added asked the participants to identify the new quantity. This task was termed the 'increasing quantity' elicitation task. For this task the speakers did use *hoí* in all cases in which two spools of thread were presented. However, they also used this term to refer to as many as seven spools of thread. They employed *baágiso* to refer to quantities ranging from three to ten spools. In the second task, Pirahã speakers were presented first with ten spools of thread, and asked to name this quantity. In most cases they provided *baágiso*, though they also used *hoí* in some cases. The researchers then subtracted spools of thread iteratively, and after each spool was subtracted asked the participants to identify the new quantity. *Baágiso* was used for quantities ranging from seven to ten spools, *hoí* was used for four to ten spools, while *hói* was utilized for one to six items. These findings support Everett's (2005) claim that these words are not precise number terms, and suggest that Pirahã may be the most anumeric language documented in the literature.

Gordon (2004) performed a series of quantity recognition tasks among the speakers of two villages. These tasks included a basic one-to-one recognition task, an orthogonal matching task, and a brief-presentation/hidden matching task. For the one-to-one matching task, the Pirahã were individually presented with an evenly-spaced line of objects and asked to produce a matching line of objects of a different type parallel to the presented line. For the hidden matching task, stimuli were presented and shortly thereafter concealed. For the orthogonal matching task, a line of stimuli was placed in front of each participant, perpendicular to the line then produced by the participants. The coefficient of variation (standard deviation of responses divided by mean for each set size) of the Pirahã responses generally hovered at 0.15 for all tasks. This figure is generally suggestive of analog-estimation strategies on the part of the Pirahã matching the quantities (Weber's law).

Frank et al. (2008) replicated Gordon's one-to-one matching, orthogonal matching, and hidden matching experiments among the Pirahã. They employed

the same general methods used by Gordon (2004). For each of the tasks, they presented the Pirahã with an array of spools of thread, and the participants were asked to match the array with a line of empty rubber balloons. The Pirahã were tested individually, and in all cases the tasks were modeled for them by the researchers prior to individual trials. In general, their results were consistent with Gordon's (2004)—the people's performance generally deteriorated as the quantity in question was increased. Crucially, however, the authors failed to replicate the most extreme finding in Gordon (2004), specifically that the Pirahã struggle with the mere recognition of exact quantities greater than three. In fact, the Pirahã they tested were generally quite adept at matching a presented array of spools with an equal array of balloons when no spatial re-orientation or mental recollection of the stimuli was required.

Given the importance of the Pirahã case to the discussion of linguistic effects on numeric cognition, and given the crucial difference between the previous sets of results, I helped perform a series of tasks among a group of speakers not tested in either previous study. Three of these tasks were exact methodological replications of the tasks described in Frank et al. (2008), based as well on the three tasks from Gordon (2004) described above. A few of the tasks were quite different in that they employed cross-modal stimuli. The latter tasks were relatively modest in scope, and are described in 3. The former were more extensive, and the results obtained for them are described in detail in C. Everett and Madora (in press). Next I summarize the relevant data for these three replication tasks.

For all three tasks, the speakers were presented with uniformly-spaced lines of spools of thread, and asked to match those lines with equal lines of rubber balloons. These objects are familiar to the people, having been used as trade goods previously. Most crucially these objects were chosen since they were utilized in Frank et al. (2008) and C. Everett and Madora (in press) sought to replicate exactly the findings of that study. Just as in Gordon (2004), for the basic matching task the stimuli were presented on a table in front of the seated participants, parallel to the edge of the table. In the case of the orthogonal matching task, the spools were placed orthogonally to the edge of the table (in line with the participants' sagittal plane), and the speakers were asked to match the quantity of spools in a straight line parallel to the edge. For the hidden matching task, a line of spools of thread was presented parallel to the edge of the table, and after several seconds the line was covered by a sheet of cardboard. The participants were asked to place a matching line of balloons on the opposite side of the cardboard, parallel to the presented line of spools.

For the sake of greater methodological clarity, in (1) I provide a picture of a correctly-matched line of stimuli. This picture represents one of 56 documented trials for this task.

- (1) Example of basic one-to-one matching task. Correct response for a trial with eight target stimuli.



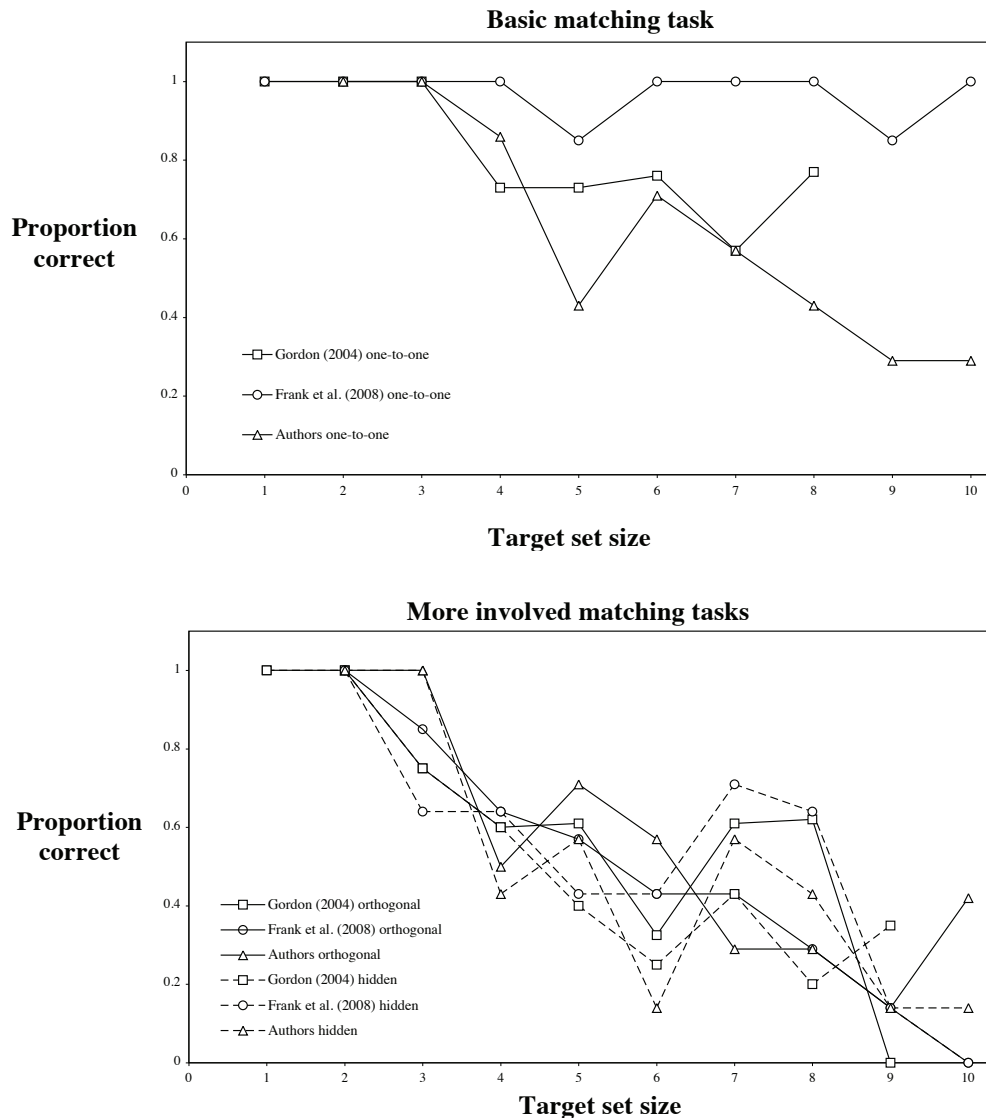
Seven Pirahã adults participated in Gordon (2004). A total of fourteen adults participated in Frank et al. (2008), and fourteen different speakers participated in C. Everett and Madora (in press). For the orthogonal matching task, 24/56 trials in C. Everett and Madora (in press) contained correct responses in which the Pirahã matched the presented stimuli with an array equal in number. This is the identical ratio of correct responses for that task in Frank et al. (2008). For the hidden matching task, 24/56 trials in C. Everett and Madora (in press) and Frank et al. (2008) contained correct responses. For the one-to-one matching task, however, 54/56 trials in Frank et al. (2008) contained correct responses, while only 32/56 did in C. Everett and Madora (in press). When individuals' proportions of correct responses were contrasted, the difference between the results of the two studies were found to be highly significant in the case of the one-to-one matching task ($t(13)$, $p = 0.000$). When this metric was used to contrast the Pirahãs' responses across the two other tasks, the differences across studies were not found to be significant ($p > 0.05$ in each case).

The coefficient of variation for all the tasks in Gordon (2004), C. Everett and Madora (in press) hovered around 0.15, consistent with the use of analog estimation by the people (rather than task incomprehension). This coefficient was also obtained in Frank et al. (2008), with the exception of the basic matching task.

In short, the results in C. Everett and Madora (in press) for the orthogonal-matching and hidden-matching tasks are very similar to those in Frank et al. (2008). They are also similar to those in Gordon (2004), as evidenced by similar proportions of correct responses calculated according to set size. This is apparent in the second box of Figure (2). The results in C. Everett and Madora (in press) for the basic matching task, which did not involve recall or spatial manipulation, are similar to those in Gordon (2004), but not Frank et al. (2008) as is apparent in

the first box of Figure (2). In general, the results for all three studies suggest that the speakers of this anumeric language struggle with the recognition of exact correspondences between numerosities over three. In 4 we offer an explanation of the disparate results in Frank et al. (2008) vis-à-vis the basic matching task. First, though, we provide additional findings recently gathered among the people.

- (2) Proportions of correct responses for various matching tasks. (Taken from C. Everett and Madora, in press.)



3 New Cross-modal Data

One criticism that could be made of the previous studies of Pirahã numeric cognition, including C. Everett and Madora (in press), is that they rely exclusively on data of a specific kind. For all studies the Pirahã speakers were asked to perform a visual-tactile task that does not appeal to the auditory modality. While the results of the studies are consistent with the implementation of analog estimation during the tasks, rather than task-comprehension failure, one wonders whether the Pirahãs' performance might benefit from a greater array of cross-modal tasks. To begin exploring this issue, I conducted two brief tasks with ten Pirahã speakers. Only a modest number of trials were conducted for each of these tasks, due to a limited window for research with the Pirahã in question.² Nevertheless, the results of these tasks are worth discussing here since they yield further support for the suggestions in C. Everett and Madora (in press) and Gordon (2004) that the Pirahã struggle with simple quantity recognition.

The two tasks I conducted involved physical actions, and in one case auditory stimuli. The tasks were: (a) stomping-with-log repetition and (b) rowing action repetition. In the case of both tasks, the Pirahã participants were asked to repeat as closely as possible the actions performed by myself. For the stomping-with-log repetition task, I created a series of booming noises by simultaneously stomping my right foot and smashing a narrow log on the ground. The participant was then asked to repeat the action. The task was first modeled between myself and another non-Pirahã, in an attempt to make it clear that the objective of the task was to imitate the number of stomping actions. While this task may seem somewhat esoteric, it was chosen because it employs auditory and kinesthetic information and relates to a behavior common to Pirahã culture. During the 'dance' that takes place throughout the night during full moons, the people have often been observed to stomp out a series of noises, with their foot and with a narrow log simultaneously, while walking in a circle. Given their familiarity with this motion, and given the somewhat rhythmic nature of the stomping that occurs during the 'dance,' it seemed natural to utilize this motion experimentally.

The second task also involved a behavior that is familiar to all Pirahã, rowing with a paddle. For this task, I created a series of rowing motions with a paddle, alternating from side-to-side. The participant was then asked to mimic my actions. The entire task was once again modeled by myself and another non-Pirahã, until it seemed clear that the number of rowing actions was of interest. A pause was made between each rowing action, ostensibly so that the actions would be perceived as discrete units. This task was also selected because it represents a behavior that is common to Pirahã culture. The Pirahã, who are uniformly excellent rowers, are often observed paddling with a series of symmetrical motions. Given

² Access to the speakers of this language is generally quite limited for a variety of reasons. In the case of these cross-modal tasks, I was limited to one day for the experiments.

this fact, I imagined that the frequently symmetrical nature of canoe rowing might facilitate their ability to recall and store the number of actions witnessed.

I suspected that, because these two tasks involved behaviors that were comparatively common to Pirahã culture, when contrasted to those in C. Everett and Madora (in press), Gordon (2004), and Frank et al. (2008), and because they involved actions of a different modality, their number recall for the tasks might show improvement. Based on the few dozen trials I have so far conducted, these suspicions are far from confirmed. In fact, the performance of the Pirahã on these trials suggests that they face even greater difficulties with these sorts of tasks, perhaps since they involve some recollection or perhaps because the request made of them is so unfamiliar (despite the familiarity of the action).

For both tasks, all ten speakers tested presented the correct number of actions only in the case of the number one. That is, if one stomping or rowing action was produced by myself, one stomping or rowing action was then produced by the participant. For numbers greater than two, however, incorrect responses outnumbered correct responses in all cases. The responses for the rowing-action task contained enough errors to suggest task incomprehension, but only for numerosities greater than two.

For the stomping-action task, I tested numbers from 1-5. The means of the answers, according to each target size (number of stomping-actions produced by experimenter), were as follows: 1:1, 2:3.75, 3:4.25, 4:4.75, and 5:6.5. In other words, the magnitude of errors was generally quite high for numbers 2-5. For instance, when five stomping actions were produced by myself, the average number of response actions was 6.5. As the number of target actions increased, however, so did the number of participant actions. This suggests that the participants did recognize an increase in the quantity of actions and attempted to match the quantity, albeit imprecisely.

These cross-modal data, while modest in scope, suggest strongly that speakers of Pirahã struggle with recognizing or recalling the exact number of actions witnessed. It is worth mentioning that I have also utilized other tasks involving a variety of other actions (e.g. clapping) with a smaller set of speakers, and have yet to observe anything that would lead me to suspect that some other cross-modal task might exist for which the Pirahã would demonstrate heightened quantity recognition.³ In short, the data so far collected among the speakers of this anumeric language suggest that they struggle with exact quantity recognition. The only exception to this trend in the experimental data is the finding in Frank et al. (2008) vis-à-vis simple one-to-one matching. We are naturally left to wonder what might account for the disparate findings in that study.

One possibility is that the findings in Frank et al. (2008) were due to greater clarity on the part of the experimenters, i.e. that the Pirahã tested in the remaining studies were confused by the tasks in a way that those tested in Frank et al. (2008)

³ Such observations are consistent with the fact that many previous attempts at teaching math skills among the people have failed. (D. Everett 2005)

were not. However, given that the other studies relied on a fluent translator, given that their results were characterized by relatively constant coefficients of variation (inconsistent with task incomprehension), and given that the results across control tasks for all studies are so similar, this possibility is highly improbable. One plausible account of this disparity requires some elaboration of the setting of the research conducted for Frank et al. (2008), which is provided next.

4 Variation Across Villages?

The approximately 700 Pirahã are dispersed over numerous villages along the Maicí. These villages are typically small, most often with a dozen or so adults. The territory of the people stretches south from the mouth of the river to the point at which the river is crossed by a federal highway (BR 230), which is actually a dirt road through the jungle. There are several villages within 20 km of this road. Two of these were used as locations for the research in Gordon (2004) and a third was used in our own research. The latter village is located at 7°48' S, 62°20' W, and is nearly adjacent to a bridge crossing the Maici river.⁴ The data presented in Frank et al. (2008) were based on research in another location, the Xagiopai village. Xagiopai is located about 50 km from BR 230, at 7°21' S, 62°16' W.

All of the Pirahã remain almost exclusively monolingual despite contact with Brazilians for over two centuries. (See D. Everett 2005.) In the case of the Pirahã living near BR 230, this contact is primarily with transient Brazilians. The case at Xagiopai is much different, however. FUNAI (the Brazilian indigenous agency) and FUNASA (the Brazilian health organization) have maintained relatively extensive operations in the village for over a decade. The Xagiopai village is the only Pirahã village with such prominent government presence, and is also the village in which an SIL linguist, Keren Madora, resided during the early-to-mid 2000's. Unbeknownst to the authors of Frank et al. (2008), one of the primary foci of Madora was to teach the Pirahã how to count. To that end, she employed numerous quantity recognition tasks, of the sort she helped develop for Gordon (2004:496). Crucially, she also introduced various numeric neologisms into the language. This was the first time this had been done in the language. According to Madora, the performance of the Pirahã improved if they learned these neologisms.

Given these facts, it is less surprising that the Pirahã at Xagiopai did much better on the one-to-one match documented in Frank et al. (2008), when contrasted with those documented in the other relevant studies. Admittedly I cannot be certain that the disparate performance in Frank et al. (2008) was due to the neologisms coined by Madora. Nevertheless, at present I believe that this is the most plausible interpretation of the data (see C. Everett and Madora in press).

⁴ The experiments took place in a Brazilian-owned house dozens of meters off the reservation.

5 Discussion and Conclusion

Studies such as Wynn (1992), Lipton and Spelke (2003), and Xu and Spelke (2000) suggest that pre-linguistic infants are capable of exactly recognizing exact quantities less than three, and are also capable of approximating larger quantities. These abilities appear to be based on two distinct neurophysiological systems, as evidenced in Dehaene et al. (1999) and Lemer et al. (2003), *inter alia*. Carey (2001) and others have suggested that number words serve a crucial ontogenetic purpose, namely to conjoin these two core systems. The Pirahã data are consistent with these results from the developmental literature.

The absence of number words in Pirahã is, according to D. Everett (2005, 2009), the result of general cultural constraints that result in a series of other typologically-remarkable features in this language. Were the Pirahã familiarized with such words as children they would undoubtedly excel at the tasks described here. The people have clearly been reluctant to borrow such words or systematically incorporate numeric neologisms. This reluctance stands in stark contrast to other cultures with modest number systems, which have typically adopted number terms from other languages. It is important to stress that the Pirahã excel in their environment, and that they show relatively little interest in the very acquisition the ‘tool’ of number terminology, much as they have little interest in most tools and artifacts offered by outsiders for which, according to them, they would have little use (D. Everett 2005). In short, while I believe the data discussed here are consistent with relativistic effects, it is important to recognize that these effects could arguably be due, ultimately, to a more general cultural factor, namely the opposition to the incorporation of number words into their language.

The data discussed here are consistent with the notion that speakers of an anumeric language lack a ‘conceptual tool,’ a series of number words, which is nearly universal to all cultures. The lack of this linguistic/conceptual tool apparently results in strong cognitive effects when the quantity-recognition abilities of speakers of such a language are contrasted with the abilities of the speakers of a numeric language. More generally, since a particular feature of the Pirahã language, namely anumericity, apparently has demonstrable effects on non-linguistic cognition, namely number recognition, the data discussed above add to the growing literature on the linguistic relativity hypothesis.

References

- Boroditsky, Lera. 2001. Does language shape thought? English and Mandarin speakers’ conceptions of time. *Cognitive Psychology* 43:1-22.
- Boroditsky, Lera, Fuhrman, Orly, and McCormick, Kelly. 2011. Do English and Mandarin speakers think differently about time? *Cognition* 118:123-129.

Linguistic Relativity and Numeric Cognition

- Carey, Susan. 2001. Cognitive foundations of arithmetic: Evolution and ontogenesis. *Mind and Language* 16(5):37-55.
- De Cruz, Helen, and Pica, Pierre. 2008. Knowledge of number and knowledge of grammar: Number as a test case for the role of language in cognition. *Philosophical Psychology* 21:437-441.
- Dehaene, Stanislas, Spelke, Elizabeth, Pinel, Phillipe, Stanescu, Ruxandra, and Sanna Tsivkin. 1999. Sources of mathematical thinking: Behavioral and brain-imaging evidence. *Science* 284:970-974.
- Dixon, R.M.W. 2004. *The Jarawara language of southern Amazonia*. Oxford University Press.
- Drivonikou, Gilda Vasiliki, Kay, Paul, Regier, Terry, Ivry, Richard B., Gilbert, Audrey L., Franklin, Anna, and Ian R. L. Davies. 2007. Further evidence that Whorfian effects are stronger in the right hemisphere than the left. *Proceedings of the National Academy of Sciences* 104:1097-1102.
- Everett, Caleb. Under review. A closer look at a supposedly anumeric language. Everett, Caleb and Keren Madora. In press. Quantity recognition among speakers of an anumeric language. *Cognitive Science*.
- Everett, Dan. L. 2005. Cultural constraints on grammar and cognition in Pirahã. *Current Anthropology* 4:621-646.
- Everett, Dan.L. 2009. Pirahã culture and grammar: A response to some criticisms. *Language* 85:405-442.
- Feigenson, Lisa, Dehaene Stanislas, and Elizabeth Spelke. 2004. Core systems of number. *Trends in Cognitive Sciences* 8:307-314.
- Flaherty, Mary. 2001. How a language gender system creeps in perception. *Journal of Cross-cultural Psychology* 32:18-31.
- Frank, Michael, Everett, Dan, Fedorenko, Evelina, and Edward Gibson. 2008. Number as a cognitive technology: Evidence from Pirahã language and cognition. *Cognition* 108:819-824.
- Gilbert, Audrey, Regier, Terry, Kay, Paul, and Richard B. Ivry. 2006. Whorf hypothesis is supported in the right visual field but not the left. *Proceedings of the National Academy of Sciences* 103:489-494.

- Gordon, Peter. 2004. Numeric cognition without words: Evidence from Amazonia. *Science* 306:496-499.
- Hammarström, Harald. 2010. Rarities in numeral systems. In Wohlgemuth, Jan, and Michael Cysouw eds., *Rethinking universals: How rarities affect linguistic theory* 11-60. Berlin: De Gruyter Mouton.
- Imai, Mutsumi and Reiko Mazuka. 2007. Language-relative construal of individuation constrained by universal ontology: Revisiting language universals and linguistic relativity. *Cognitive Science* 31:385-413.
- Konishi, Toshi. 1993. The semantics of grammatical gender: A cross-cultural study. *Journal of Psycholinguistic Research* 22:519-534.
- Lemer, Cathy, Dehaene, Stanislas, Spelke, Elizabeth, and Laurent Cohen. 2003. Approximate quantities and exact number words: Dissociable systems. *Neuropsychologia* 41:1942-1958.
- Levinson, Stephen. 1997. Language and cognition: The cognitive consequences of spatial description in Guugu Yimithirr. *Journal of Linguistic Anthropology* 7:98-131.
- Levinson, Stephen. 2003. *Space in language and cognition*. Cambridge: Cambridge University Press.
- Lipton, Jennifer S., and Elizabeth Spelke. 2003. Origins of number sense: Large-number discrimination in human infants. *Psychological Science* 14:396-401.
- Lucy, J. 1992a. *Language diversity and thought*. Cambridge: Cambridge University Press.
- Lucy, John. 1992b. *Grammatical categories and cognition: A case study of the linguistic relativity hypothesis*. Cambridge: Cambridge University Press.
- Lucy, John and Suzanne Gaskins. 2001. Grammatical categories and classification preferences. In Bowerman, Melissa and Stephen Levinson eds., *Language Acquisition and Conceptual Development*, 257-283. Cambridge: Cambridge University Press.
- Pica, Pierre, Lemer, Cathy, Izard, Véronique, and Stanislas Dehaene. 2004. Exact and approximate arithmetic in an Amazonian indigene group. *Science* 306:499-503.
- Whorf, Benjamin. 1956. *Language, Thought, and Reality: Selected Writings*. Carroll, John, ed. Cambridge, Massachusetts: MIT Press.

Linguistic Relativity and Numeric Cognition

Wolff, Phillip and Kevin Holmes. 2010. Linguistic relativity. *WIREs Cognitive Science*.

Wynn, Karen. 1992. Addition and subtraction by human infants. *Nature* 358:749-750.

Xu, Fei and Elizabeth Spelke. 2000. Large number discrimination in 6-month-old infants. *Cognition* 74:B1-B11.

Caleb Everett
University of Miami
Department of Anthropology
PO Box 248106
Coral Gables, Florida 33124-2005

caleb@miami.edu

Anti-Markedness Patterns in French Epenthesis: An Information-theoretic Approach¹

ELIZABETH HUME^a, KATHLEEN CURRIE HALL^b, ANDREW WEDEL^c,
ADAM USSISHKIN^c, MARTINE ADDA-DECKER^{d,e}, and CÉDRIC GENDROT^d
^a*The Ohio State University*; ^b*City University of New York-College of Staten Island & The Graduate Center*; ^c*University of Arizona*; ^d*Laboratoire d'Informatique pour la Mécanique et les Sciences—Centre national de la recherche scientifique, Université Paris-Sud 11*; ^e*Laboratoire de Phonétique et Phonologie—Centre national de la recherche scientifique, Université Paris 3*

Introduction

Cross-linguistically, certain vowel types tend to be used to break up otherwise ill-formed consonant clusters in a given language: they are generally non-low, non-round and either front or central. Such epenthetic vowels are commonly referred to the language's *default* vowel. For example, the default vowel in Maltese is [i], in Spanish it is [e], in Korean it is [i], in German, Dutch and Finnish it is [ə], and [ə] or [ɪ] in English. One might assume, then, that these vowels have certain properties that make them particularly good candidates for being the epenthetic vowel. One commonly used means of predicting the quality of the epenthetic vowel has been to draw on markedness. In this approach, default vowels are considered unmarked either universally or on a language-specific basis (e.g. Archangeli 1984; Pulleyblank 1988; Rice 1999, 2000). Indeed, Rice (2000) points to epenthesis as a diagnostic for identifying the unmarked member of an opposition, proposing that the unmarked member is more likely to be inserted (though cf. Rice 2007). While such approaches are successful in predicting the most common patterns involving front or central unrounded vowels, they are less successful when the vowel involved is not obviously unmarked, as in the case of French. The default vowel in French, while commonly referred to as schwa, is a front or centralized *rounded* vowel, realized phonetically as similar or identical to the mid-front rounded vowels [ø] or [œ], depending on speaker and variety. The

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French pattern is anomalous given the assumption that roundness is typologically marked in non-back vowels (e.g. Chomsky & Halle 1968, de Lacy 2006). In this view, one of the front unrounded vowels such as [i, e, ε], also present in the French vowel inventory, would be expected to serve as the default vowel as they are arguably less marked.

The observation that not all vowel epenthesis patterns involve traditional unmarked vowels has led some researchers to exclude vowel epenthesis as a criterion for determining the markedness value of a sound (de Lacy 2006, Rice 2007). De Lacy (2006), for example, proposes that vowel epenthesis belongs to “performance-based markedness,” predicted by performance factors, e.g. frequency and phonetics. On the other hand, vowel deletion belongs to “competence-based markedness,” and would thus be predicted by the grammar. Interestingly, in many languages including English, Dutch, French, and Brazilian Portuguese, the vowel that epenthesis has the same quality as the vowel that deletes, suggesting the need for a unified account.

Regardless of whether or not vowel epenthesis fits neatly into a markedness account, the above studies share a common approach: they start from the assumption of a prior distinction between marked and unmarked segments and their associated patterns, and then ask what properties distinguish them. In this paper we turn the causal arrow around. Taking as a starting point the well-established assumption that the properties of segments in a system influence their patterning, we ask what properties are typically associated with unmarked versus marked segments (see also, among others, Lass 1975; Comrie 1983; Menn 1983; Blevins 2004; Hume 2004, 2008; Bybee, to appear). Knowing what properties are associated with unmarked segments can then allow us to re-examine the French data, looking to see which vowels in the French system also share the *properties* of default vowels, regardless of whether or not they are generally assumed to be unmarked.

More specifically, we think that “marked” and “unmarked” are simply labels and do not provide much insight into phonological patterns. Further, in order to fully understand the factors that influence phonological systems, one cannot divorce the phonological component from the larger system in which it occurs, including the system’s larger role in communication. Along these lines, identifying the *function* of epenthesis should be the first step in attempting to determine what properties would make a vowel a good candidate for being involved in such a process. Those properties, then, are what we should look for in identifying likely epenthetic vowels in a particular language. These vowels will tend to fit the profile of being “unmarked” vowels, but we claim that this is an artifact of sharing similar properties *vis à vis* the system in question, rather than being an explanatory characteristic itself.

Identifying the desirable characteristics of default epenthetic vowels and looking for those characteristics among French vowels reveals that the front

rounded vowels do in fact emerge as being vowels that would be good candidates for epenthesis. While there is no one property that seems to uniquely determine which vowel would make the “best” candidate to break up an ill-formed consonant sequence, it is clear that the front rounded vowels are not as anomalous as they might otherwise seem from a universalist markedness perspective.

This paper has three objectives. The first is to situate the properties associated with French default vowels with more typologically common epenthesis patterns. The second is to make use of an approach to predicting the quality of the default vowel that uses the function of epenthesis within a system of communication as a starting point. Finally, we address the issue of how to quantify the properties associated with epenthetic vowels, for which we use the Generalized Context Model (Nosofsky 1988) and tools from Information Theory (Shannon 1948), in particular, entropy and information content.

1 Epenthesis

1.1 The Function of Vowel Epenthesis

As noted above, vowel epenthesis is typically used to break up sequences of multiple consonants (see Hall 2011 for relevant discussion). This may be a response to difficult or unfamiliar consonant sequences, with one result of epenthesis being that such sequences can be produced and processed faster and more accurately (e.g. Kuipers et al. 1996; Davidson 2006). The epenthetic vowel, then, should be one that is easy to produce and process, so as to make difficult sequences easier, and it should be one that is expected to occur in the system, so as to facilitate production and perception. Furthermore, in languages where there is a single epenthetic vowel in the system, that vowel should be flexible enough to co-occur with a wide range of consonants. Finally, it should furthermore be one that is not likely to create new words in the language when added, as the purpose of epenthesis is to somehow clarify the intended message, and creating a new word could counteract that function.

These desiderata, not surprisingly, lead to characteristics that are commonly associated with unmarked vowels. Note that these are made up of phonological, phonetic, and usage-based factors.

- *High frequency (low information content/surprisal)*: A segment that occurs with high frequency and thus is highly practiced and expected in the language (e.g. Greenberg 1966; Eddington 2001; Hume & Bromberg 2006; Cristófar-Silva and Almeida 2008; Bybee, to appear).
- *Weak perceptual contrast*: A segment with weak phonetic cues due to inherent nature and/or contextual factors (e.g. Steriade 2009, Riggs, to appear).

- *Weak lexical contrast (low functional load)*: A segment that does not distinguish a large number of lexical items in the language (see e.g. Lass 1975).
- *Wide phonological distribution*: A segment that can co-occur with many different consonants (e.g. Trubetzkoy 1939; Hockett 1955; Greenberg 1966).

We will consider each of these qualities in turn, evaluating the (oral) vowels in the French system along the various dimensions. As will be seen, each quality in isolation would pick out a different set of vowels as being the best choices for epenthesis. The mid front rounded vowels, however, consistently emerge in almost all cases as being among the best candidates, and no other vowels do so. Thus, the quality of the French epenthetic vowel does not appear as anomalous when one considers the function of epenthetic vowels and what qualities would characterize a “good” epenthetic vowel in any language.

1.2 French Epenthesis

The vowel system of Continental French, the variety examined in this paper, is comprised of a series of nasal vowels, [ɔ̃ œ̃ ẽ ã] (for most speakers [œ̃] has been merged with [ẽ]) and ten oral vowels, [i e ε y ø œ a² u ɔ o]. The French “schwa”, not shown in (1), can vary between the closed, tense [ø] and more open, lax [œ], based on speaker and dialectal factors. Adda-Decker et al. (1999) found it to be “between the open /œ/ and the closed /ø/...the pronunciation /œ/ appears to be preferred.” Fougerson et al. (2007), on the other hand, compared it to non-alternating [ø] and [œ], and found it tended toward [ø]. Despite the phonetic variability associated with the default vowel, we will for simplicity consistently transcribe it as [œ] throughout this paper.

A French default vowel typically occurs, as in (1), to avoid a three-consonant sequence, or word-finally following a consonant. Note there are restrictions on the types of consonants involved that we do not go into here (see, e.g. Grammont 1914, Carton 1999).

- (1) Default vowel occurrence:
- a. [œ̃kɔ̃takt(œ)penibl(œ)] *un contact pénible* ‘a painful contact’ (Noske 1993)
 - b. [bjẽ syR(œ)] *bien sûr!* ‘certainly’ (Carton 1999)

Given the French vowel inventory, we might expect one of the front unrounded vowels, [i, e, ε], to be used as the default vowel. However, as noted above, the default vowel is a mid front or centralized *rounded* vowel, even though it is often

² Some speakers distinguish [a] from a more back vowel [ɑ].

transcribed as an unrounded schwa (Jenkins 1971; Adda-Decker et al. 1999; Côté & Morrison 2004; Fougeron et al. 2007). It should be noted that the vowel is rounded is not uncontroversial. Indeed, Féry (2003) notes that speakers of French can have clear intuitions that the vowel that epenthesizes (referred to as French “schwa”) differs in quality from the mid rounded vowels, particularly in not being rounded. She considers this, however, to be mostly “a consequence of the orthography and the distributional facts” (Féry 2003: 253-4): the symbol *e* is used to write French “schwa” (*je* ‘I’), while [ø] is written as *eu* (*jeux* ‘game’), and [œ] as *oe* (*soeur* ‘sister’) or *eu* (*abreuvoir* ‘trough’). Similarly, Landick (1995: 125) states that “what is called schwa is...realized as /œ/ (or as /ø/, depending on the dialect)....[W]hen the reflex of schwa is /œ/ or /ø/, the schwa is, of course, not distinguishable phonetically from the /œ/ of *seul* or the /ø/ of *deux*....”

We now evaluate the French oral vowels against properties commonly associated with default vowels: high frequency/low information content, weak perceptual contrast, weak lexical contrast, broad distribution.

2 High Frequency, Low Information Content

It has been claimed that the epenthetic, or default, vowel in a language (the “unmarked” vowel) is one that tends to have a high frequency of occurrence (e.g. Greenberg 1966; Eddington 2001; Bybee, to appear), or, in information-theoretic terms, low information content or surprisal (Hume and Bromberg 2006; Cristófar-Silva and Almeida, 2008; Hume and Mailhot, to appear). This makes sense from the perspective of the function of epenthesis if we consider its communicative purpose. As noted above, vowels that are highly frequent will be more practiced in terms of production and more expected from both production and processing perspectives. Given that the epenthetic vowel should be one that makes processing the intended message easier, without interrupting the lexical content of the message, a highly frequent vowel would be desirable.

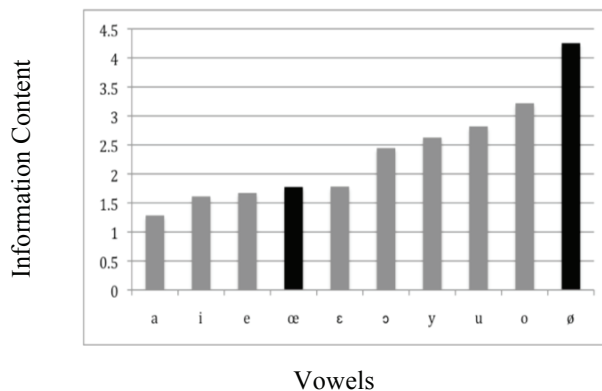
Measurements were calculated from a subset of the ESTER (Évaluation des Systèmes de Transcription Enrichie d’Émissions Radiophoniques) corpus which consisted of 24 hours of radio-broadcasted news produced by a total of 574 speakers (Galliano et al., 2005). Articulation remains quite distinct so that speech can be understood by a broad audience. Such speech cannot therefore be described as fully spontaneous, but rather as prepared speech: only a few hesitations, repetitions, and word fragments are observed and syntactic structures often remain close to written language. It also has to be noted that some phoneme frequencies might be dependent on this choice of corpus since differences in lexical items’ frequencies can be found (e.g. the use of “tu”, used in informal speech, is replaced by “vous” in broadcast speech). At the time of writing, a similar corpus in size with spontaneous speech was not available in the speech community.

The IRISA speech transcription system (Institut de Recherche en Informatique et Systèmes Aléatoires) was used for corpus alignment. Orthographical transcriptions were used by the alignment system to locate phoneme boundaries, to choose among potential pronunciation alternatives, and to discard silences and other noise segments (see Buerki, Gendrot, Gravier, Linares and Fougeron 2008 for further details). The resultant labelling is thus best considered phonemic rather than phonetic. One further note about transcriptions is that French "schwa", i.e. orthographic 'e', is transcribed as [œ] in the corpus.

Using measurements from the above-mentioned corpus, the information content of vowels is measured using Shannon information (or surprisal; Shannon 1948), which more directly reflects the communicative function of being highly frequent than raw frequency counts would. Information content is the negative log probability of frequency, so high frequency corresponds to low information content.

The figure in (2) shows the information content for French vowels with the two phonetic realizations of the default vowel, [œ, ø] indicated by dark bars. Is it noteworthy that [œ], one of the mid front rounded vowels, is indeed of fairly low information content in French, and thus emerges as being a good candidate for epenthesis. Interestingly, [ɛ, e, i], all of which are common "unmarked" epenthetic vowels cross-linguistically, appear alongside [œ] as having relatively low information content. Yet, as these results show, information content alone, when based on unigram token frequency, is not sufficient to predict the default vowel in French given that [ɛ], [e], [i], [a] also have low information content. Indeed, were token frequency the sole factor relevant in predicting the quality of a language's default vowel, we might expect [a] to be the default vowel in French. However, as discussed above, frequency is only one of several factors surmised to be relevant to being a good epenthetic vowel. We now consider contrastiveness.

(2) Unigram information content for French vowels (negative log probability)



3 Weak Contrastiveness

Another property commonly associated with epenthetic vowels is that of weak contrastiveness. With respect to phonological contrastiveness, it has been proposed that default (unmarked) segments lack distinctive feature structure underlyingly (Abaglo and Archangeli 1989; Rice and Avery 1993; Rice & Causley 1998; Causley 1999). In some approaches, phonological contrast is used to determine whether or not feature structure is present (e.g. Rice and Avery 1993, Clements 1988), such that only features that serve to minimally distinguish other sounds in the inventory are specified. An unmarked segment, i.e. one lacking structure, would thus not need to be distinguished from another sound in the inventory by a single feature. However, as later pointed out by Rice (1999), using minimal contrast as a diagnostic for markedness does not work for all languages. French is one such language because [œ, ø] can minimally contrast in roundness, backness, and height with other vowels in the language.

Nonetheless, since weak contrastiveness seems to characterize epenthetic vowels in some languages, it is worth considering what it is about contrastiveness that could make a vowel be susceptible to epenthesis. As mentioned above, we suggest that there are actually two points that are relevant. First is the concept of phonological contrastiveness, and second, *minimality* of contrast, interpreted here as a measure of perceptual similarity.

3.1 Contrastiveness

First, consider the role that phonological contrast plays in language: it serves as a way to keep words distinct in the lexicon. A vowel that does a lot of work in distinguishing words might, therefore, be a poor candidate for being an epenthetic vowel since it could be detrimental to communicating a message if added material caused a listener to think that a new word had been made. We might then expect that an epenthetic vowel is one that is less contrastive in the system, i.e. it does less work in distinguishing words than other vowels.

A common way of measuring the work that a particular contrast does in distinguishing words in a language is *functional load* (e.g. Martinet 1955; Hockett 1955, 1966; Surendran and Niyogi 2003; Wedel and Branchaw 2011). This measure, however, indicates how much work a *pair* of sounds does; what is more relevant for predicting the quality of an epenthetic vowel is how much work an *individual* sound does. This is a measure we dub the *relative contrastiveness* of a particular sound, and is essentially equivalent to the average functional load of a segment across all the possible pairs of segments it could occur in.

To measure relative contrastiveness, we draw on a tool of information theory, *entropy*. Entropy is a measure of the uncertainty associated with selecting among possible outcomes, each occurring with a particular probability. Suppose, for example, that you had to make a guess about which vowel out of all the vowels in

an inventory would occur in a particular word. Entropy provides a measure of how much uncertainty you would have about your guess: the higher the entropy value, the greater the uncertainty about the guess. As shown in (3), entropy is measured as the sum over all possible outcomes of the negative log probability of a given outcome, weighted by the probability of that outcome's occurring. The base of the log is generally taken to be 2 and so entropy is measured in *bits*.

$$(3) \text{ Entropy: } H = - \sum p_i \log_2 p_i$$

We use the term *entropic contribution* to refer to the contribution that any one outcome makes to the total uncertainty, as shown in (4). It can also be calculated by computing the total entropy of a system with and without a particular outcome present in the system, and subtracting the latter from the former.

$$(4) \text{ Entropic contribution: } H_c = - p_i \log_2 p_i$$

To calculate relative contrastiveness, we begin by calculating the entropy of our French corpus, based on the type frequencies of words, with all vowels included. The amount of uncertainty in the system is x bits, meaning that it takes an average of x bits of information, or binary choices, to guess the identity of a particular vowel occurring in a word. With this as a basis, we merge two vowels in the corpus, e.g. [i] and [e], and recalculate the entropy. Note that the overall frequency counts of the corpus stay the same, but the type frequencies of each word will change since the frequencies of any words contrasting for the two vowels will be summed. The entropy of the new system is then subtracted from the entropy of the original system. To give the proportional change in entropy, we divide by the entropy of the old system. This gives the functional load of that particular pair of sounds. These calculations are done for all possible mergers for a given vowel and averaged to get the relative contrastiveness of that vowel. The equation for relative contrastiveness (RC) is given in (5), where H_1 is the entropy of the system with no merger, H_2 is the entropy of the system with a merger, M is the set of all possible mergers, m , involving a particular vowel, and $|M|$ is the cardinality of M . Similar calculations are done for each vowel in the inventory. Vowels that do little work in distinguishing word meaning will have a low relative contrastiveness.

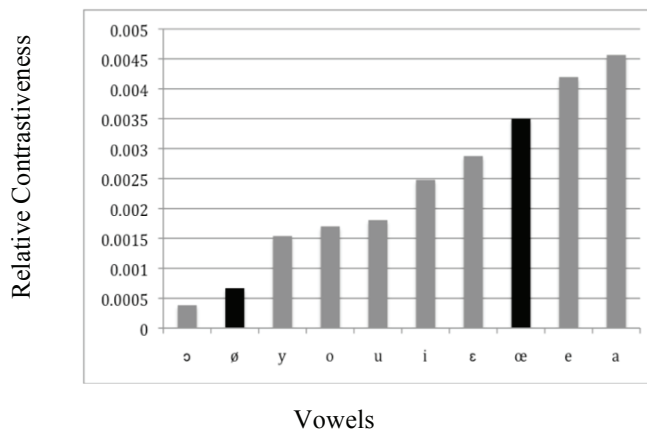
$$(5) \text{ Relative contrastiveness}$$

$$RC = \frac{\sum_{m \in M} \frac{H_1 - H_2}{H_1}}{|M|}$$

The average relative contrastiveness of a given vowel given its possible vocalic contrasts is shown in (6) below where it can be seen that [ø] has low

relative contrastiveness. Purely from the perspective of relative contrastiveness, then, it is clear that rounded vowels in general and the front rounded vowel [ø] in particular, would be good candidates for being the epenthetic vowel, as they contribute relatively less to making lexical distinctions in French. In particular, both front rounded vowels contribute less than any of the typologically less marked vowels [i, e, ɛ] in CVC sequences, and [ø] contributes less than the unmarked vowels in the word calculations.³

(6) Average relative contrastiveness of French vowels



3.2 Perceptual similarity

The other aspect of weak contrastiveness that may be relevant is that of perceptual similarity. Pairs of sounds that are “minimally” contrastive are those that differ by exactly one feature and are thus relatively similar. Sounds that are similar to many other sounds in the system would make good candidates for epenthesis because they are less “noticeable” (see, e.g. Battistella 1990, Dupoux et al., 1999, 2011; Rice 2000; Steriade 2009; Riggs, to appear).

We modeled the acoustic distinctiveness of French vowels as a function of miscategorization probability. For this, we make use of the Generalized Context Model (GCM, Nosofsky 1988), a method for assessing categorization patterns, taking into account both acoustic similarity and frequency of occurrence. The assumption is that the more overlap there is in a vowel’s acoustic space with those of other vowels in the system, the higher the probability that the vowel will be miscategorized. That is, a high degree of overlap is correlated with poor perceptual distinctiveness. The GCM assumes that categories are mentally represented as

³ It is worth noting that French ‘schwa’, occurring in common function words such as *je* ‘I’, *le* ‘the, masc.sg.’, *que* ‘that’, is transcribed as [œ] in the corpus and thus the higher relative contrastiveness of this vowel is not surprising.

labeled exemplar tokens—in other words, every exemplar consists of a mapping between a category label (e.g. /i/) and a position in a perceptual map (e.g. formant values). In deciding how to map a new percept to a category, the perceptual similarity (π) between that percept and all exemplars in memory is calculated as in (7b), and these similarities are summed for each category. Categories with higher similarity scores are more likely to be identified with the percept. The probability that a percept will be identified with a particular category, $P(C_m|x_i)$, shown in (7c), is then the total similarity score of the percept for that category divided by its total similarity to every category; this general decision algorithm is known as the Luce Choice Rule. The similarity between a percept and an exemplar is calculated from the Euclidean distance (D) in some space, shown in (9a).

(7) Applying the GCM

a. Distance (x_i, x_j) = $D = \sqrt{(F1(x_i) - F1(x_j))^2 + (F2(x_i) - F2(x_j))^2 + \dots}$

b. Similarity (x_i, x_j) = $\pi = e^{(-s \times D)}$

NB: s is an empirically determined scaling factor that defines the effective range over which similarity contributes to the outcome; D is the distance measure from (7a).

c. Probability of Correct Categorization = $P(C_m|x_i) = \frac{\sum_{x_j \in C_m} \pi(x_i, x_j)}{\sum_{x_k} \pi(x_i, x_k)}$

NB: C_m is a category labelled m ; x_i is the percept at hand, x_j are all exemplars stored in category m ; x_k are all exemplars stored in any category, including category m . $\pi(x_i, x_j)$ is the similarity measure from (7b).

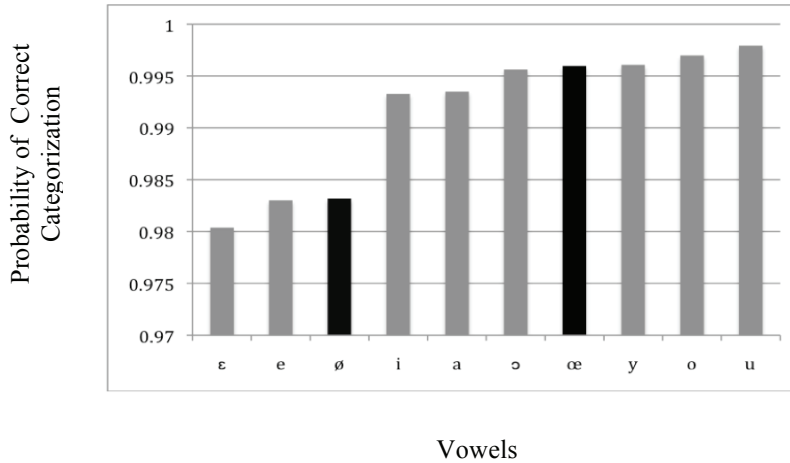
Acoustic similarity used as input to the GCM was measured using the first three formant values of the ten oral vowels of 17 native speakers of Continental French from the ESTER corpus. As a starting point (lacking any evidence to do otherwise), we assume an equivalent weighting to information from each formant. Given that each subject has a different vocal tract size and therefore a different set of absolute formant values, probabilities of correct categorizations (PCCs) were calculated separately for each person in the database.

Token frequencies of the ten vowels were also taken from the corpus. To populate the exemplar-based categories that the GCM uses, each person's data was randomly sampled (with replacement) for each vowel a number of times proportional to the frequency of the vowel in the database. The final number of exemplars in each category ranged from ~665 (for [ø]) to ~1290 (for [a]). This represents a near exhaustive sampling from each person's data, as this is several times the number of actual data points for each vowel. The final PCCs are averages over the PCCs from each person's data; the relative PCCs for each person are quite similar to the average.

The figure in (8) shows the results of the GCM (scaling factor = 50). The most confusable oral vowels in the corpus are [ɛ], [e] and [ø]. This indicates that again, [ø] appears among the set of vowels that would be good choices for epenthesis, being a vowel that is relatively similar to other vowels in the system.

We reiterate that it is not the case that this one characteristic by itself uniquely determines the epenthetic vowel in French; rather, we can use it in combination with the other measures to see a trend appearing. In terms of relative contrastiveness, [ø] was a good candidate along with other round vowels; typologically unmarked vowels [e, ɛ, i] were not good candidates. In terms of acoustic similarity, [ø] is again a good candidate, this time along with [e] and [ɛ]. On average, then, [ø] is emerging as a top candidate looking across the different possible desirable characteristics. Further, in terms of frequency, [œ], the other epenthetic vowel, emerged as a good candidate for epenthesis along with [a, i, e, ɛ] (for more on why [ø] and [œ] might be patterning together, see §5.)

(8) Correct categorization probability of French vowels



4 Distribution

In this section, we consider the distribution of vowels across the lexicon as a means of predicting the quality of the epenthetic vowel. It has been proposed that the unmarked segment (or feature) in a language is more widely distributed than its marked counterpart (see, e.g., Trubetzkoy 1939; Hockett 1955; Greenberg 1966; Battistella 1990; Stemberger 1992; for related discussion, see Rice 1999). Being widely distributed would be a desirable property for an epenthetic vowel when we consider the function of epenthesis; it is important for the selected vowel to be able to break up a broad range of phonotactically illicit sequences. Conversely, a vowel with a narrow distribution in the language would be relatively unexpected in certain contexts and potentially hinder processing or be difficult to

produce in the context (note the similarity between distribution and frequency in this regard).

In traditional phonological accounts, a sound's distribution is assessed by identifying all the different environments in which the sound may occur, with each context having the same weight as all others. Information theory provides a tool that allows for a more nuanced approach to discovering the distribution of sounds, again using the concept of entropy. Recall from the discussion of relative contrastiveness that entropy is a measure of the uncertainty associated with the selection of one out of a set of possible candidates. We can conceptualize the phonological distribution of a particular vowel as the degree of uncertainty about which other segments that vowel can co-occur with. For example, a vowel with a very limited distribution—occurring, say, next to only one or two consonants—will be associated with a very low uncertainty about which consonant it occurs with in any particular word, while a vowel with a wide distribution, occurring next to many consonants, will be associated with a higher uncertainty. Thus, we can measure the entropy of the set of consonants that each vowel occurs adjacent to (which we term that vowel's *distribution entropy*) in order to get a measure of the width of that vowel's distribution. With respect to epenthesis, then, a vowel with a high relative entropy value is one that can occur in a wide distribution and thus would be better as a candidate for epenthesis than a vowel with a low relative entropy value.

The distribution entropy of a vowel can be calculated for both the set of consonants that precedes it (CV) and the set of consonants that follows it (VC) and then averaged to get the overall relative entropy measure for that vowel. The distribution entropy for CV is calculated as in (9), where V is the vowel in question and C is the set of consonants that precedes that vowel; $p(c)$ is the probability of a particular consonant occurring in a CV context, relative to the other possible consonants that could appear in that context. The distribution entropy of VC is calculated similarly.

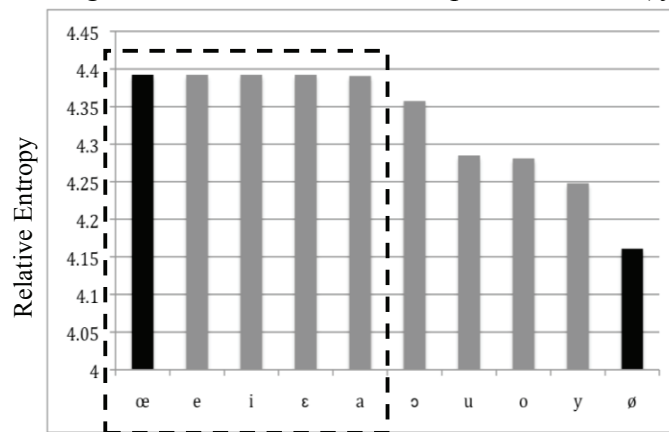
(9) Distribution Entropy

$$H_V = - \sum_{c \in C|CV} p(c) \log_2(p(c))$$

Note that this measure is based on the probability of occurrence of each particular consonant. These probabilities can be calculated in several different ways. One way, which is most similar to the standard phonological interpretation of distribution, would be to assign each consonant that can occur in the relevant position in at least one word of the language the same probability as every other consonant that can appear in that position. We term this calculation the *type occurrence* of each consonant, and it is essentially a categorical measure of the distribution of the consonants adjacent to each vowel across the lexicon of the language. (10) shows the average CV and VC distribution entropy values for French vowels based on type occurrence.

From a distribution perspective, vowels at the left end have a broader distribution and thus a higher degree of uncertainty than those at the right end. Five vowels appear to the right end of the scale: the typologically unmarked front unrounded vowels, [i, e, ε], the low vowel [a], and the mid front rounded vowel [œ]. Insofar as distribution is a relevant factor in predicting the quality of the epenthetic vowel, any of these five vowels would make good candidates. Of particular relevance for this study is the observation that the mid front rounded vowel [œ] is included in this group.

(10) Average CV/VC distribution entropies in French (type occurrences)



5 Why both [ø] and [œ]?

One point that we have not yet addressed concerns the observation that the quality of the epenthetic vowel is variable between the closed, tense [ø] and more open, lax [œ]. In the criteria used above, [ø] often appears as the best or one of the best candidates for epenthesis, but in the cases of frequency and relative entropy, [œ] was a better candidate than [ø]. Why these specific vowels are variable with each other is an interesting question that most likely relates to their phonetic similarity.

In addition to the inherent nature of the sounds, however, the phonological relationship between sounds can also impact their similarity: two sounds that are allophonic in a language are in many cases perceived as being more similar than two sounds that are contrastive (e.g. Jaeger 1980; Ohala 1982; Dupoux et al. 1997; Harnsberger 2001; Peperkamp et al. 2003; Kazanina et al. 2006; Pruitt et al. 2006; Boomersshine et al. 2008). It has been hypothesized that the reason for this difference in perception is linked to the predictability of the distribution of such sounds (Hall 2009, 2011). Specifically, sounds that are more predictably distributed (e.g. in complementary distribution, as is the case for allophony) are perceived as more similar than ones that are less predictably distributed (perhaps because being predictably distributed would mean that the acoustic cues to differentiating the sounds are less important for their identification). Interestingly, this analysis extends to pairs of sounds that are somewhere between perfectly

predictable distribution and perfectly unpredictable distribution. For example, a pair of sounds that is generally contrastive (unpredictably distributed) but neutralized in some context (predictable in that context) tends to be perceived as being more similar than a pair of sounds that is contrastive in all contexts (e.g. Trubetzkoy 1969 [1939]; Hume & Johnson 2003).

The precise predictability of distribution of two sounds can be measured using information-theoretic tools (Hall 2009). This can be conceptualized as a measure of entropy; here, the system whose uncertainty is being measured consists of two sounds, A and B, and so entropy will range from 0 to 1. An entropy of 0 indicates that there is no uncertainty about the choice between the two sounds (they are perfectly predictably distributed), while an entropy of 1 indicates that there is maximal uncertainty about the choice (they are perfectly contrastively distributed). The entropy is calculated as a function of either the type or the token frequency of occurrence of each of the two sounds in question in all of the environments that at least one of the two can occur in, weighted by the frequency of occurrence of those environments.

In the case of [ø] and [œ], this measure shows that there is an entropy of 0.5 (type-based) or 0.59 (token-based) between these sounds in the French system. This means that these two vowels are squarely in the middle of the continuum between predictably and unpredictably distributed. These numbers reflect the observation that they are generally in complementary distribution with the tense [ø] occurring in open syllables, e.g. *peu* [pø] ‘few’, and lax [œ] occurring in closed syllables, e.g. *peur* [pœʁ] ‘fear’, though there are some exceptions to this otherwise regular distribution where the vowels contrast, *jeûne/jeune* [jøn]/[jœn] ‘fasting/young’, *veûle/veulent* [vøl]/[vœl] ‘spineless/they want’. Further, word-internally, there is a great deal of variability, much of which may be dictated by vowel-harmonic assimilation, such that non-word-final mid vowels assimilate in tenseness to the stressed (final) vowel of the word (Fagyal et al. (2006), e.g. *abreuvoir* [abʁœvwaʁ] ‘trough’ vs. *abreuée* [abʁœv] ‘watered’. Given their distribution patterns, we might therefore expect that they would be perceived as being similar to one another, and thus prone to confusability and variability.

6 Conclusion

In this paper we have attempted to situate the properties associated with French epenthetic vowels with more typologically common epenthesis patterns, by considering the role of epenthesis in a system of communication. We have presented a number of arguments for thinking that the front rounded vowels in French make good candidates for being the epenthetic vowel in that language, given (a) the desiderata of any epenthetic vowel in any language, and (b) the ways in which the front rounded vowels line up with those desiderata in French. Specifically, at least one of the mid front rounded vowels in French was shown to be among the most frequent, the least lexically contrastive, the most perceptually

similar, and the most widely distributed vowels in French, all characteristics that make such vowels good choices for being epenthesized. No single characteristic points to the front rounded vowels as being the best, but these vowels do consistently emerge as good candidates, while other possible candidates are good matches for one criterion but poor matches for another. Thus, despite being typologically marked, [ø] and [œ] seem to be exactly the vowels we should *expect* to see as the epenthetic vowels in French, given the ways in which they pattern in the system. Furthermore, the fact that there is variability between the two vowels is to be expected given both their phonetic similarity and their relatively predictable phonological patterning with respect to one another.

In addition to examining the predictors of epenthesis, we have explored ways of measuring these diagnostics. We find tools from Information Theory, especially information content and entropy, to be particularly promising for quantifying properties that are well established in the phonological literature.

References

- Abaglo, Poovi, and Diana Archangeli. 1989. Language-Particular Underspecification: Gengbe /e/ and Yoruba /i/. *Linguistic Inquiry* 20 (3):457-480.
- Adda-Decker, Martine, Philippe Boula de Mareuil, and Lori Lamel. 1999. Pronunciation Variants in French: Schwa and Liaison. *Proceedings of ICPHS*. 2239-2242.
- Archangeli, Diana. 1984. Underspecification in Yawelmani phonology and morphology. Ph.D. dissertation, MIT.
- Battistella, Edwin L. 1990. *The Evaluative Superstructure of Language*. Albany: State University of New York Press.
- Battistella, Edwin L. 1996. *The Logic of Markedness*. Oxford: Oxford University Press.
- Blevins, Juliette. 2004. *Evolutionary Phonology: The Emergence of Sound Patterns*. Cambridge: Cambridge University Press.
- Boomershine, Amanda, Kathleen Currie Hall, Elizabeth Hume, and Keith Johnson. 2008. The Influence of Allophony vs. Contrast on Perception: The Case of Spanish and English. In P. Avery, B. E. Dresher and K. Rice, eds., *Contrast in Phonology: Perception and Acquisition*, 145-171. Berlin: Mouton.

- Buerki, A., Gendrot, C., Gravier, G., Linares, G., & Fougeron, C. (2008). Alignement automatique et analyse phonétique: Comparaison de différents systèmes pour l'analyse du schwa. *Traitement Automatique des Langues* 49:165–197.
- Bybee, Joan. To appear. Markedness: Iconicity, Economy, and Frequency. In J. J. Song, ed., *The Oxford Handbook of Language Typology*. Oxford: Oxford University Press.
- Causley, Trisha. 1999. *Complexity and Markedness in Optimality Theory*. PhD thesis, University of Toronto.
- Chomsky, Noam, and Morris Halle. 1968. *The Sound Pattern of English*. New York: Harper & Row.
- Clements, G. Nick. 1988. Towards a substantive theory of feature specification. In J. Blevins and J. Carter, eds., *Proceedings of NELS 18*, 79-93. Amherst, MA: GSLA.
- Côté, Marie-Hélène, and Geoffrey Stewart Morrison. 2007. The Nature of the Schwa/Zero Alternation in French Clitics: Experimental and Non-Experimental Evidence. *French Language Studies* 17:159-186.
- de Lacy, Paul. 2006. *Markedness: Reduction and Preservation in Phonology*. Cambridge: Cambridge University Press.
- Dupoux, Emmanuel, Christophe Pallier, N. Sebastian, and J. Mehler. 1997. A Destressing 'Deafness' in French? *Journal of Memory and Language* 36 (3): 406-421.
- Dupoux, Emmanuel, Erika Parlato, Sonia Frota, Yuki Hirose, and Sharon Peperkamp. 2011. Where Do Illusory Vowels Come From? *Journal of Memory and Language* 64:199-210.
- Eddington, David. 2001. Spanish epenthesis: Formal and performance perspectives. *Studies in the Linguistic Sciences* 31: 33-53.
- Fagyal, Zsuzsanna, Douglas Kibbee, and Fred Jenkins. 2006. *French: A Linguistic Introduction*. Cambridge: Cambridge University Press.
- Féry, Caroline. 2003. Markedness, Faithfulness, Vowel Quality, and Syllable Structure in French. *Journal of French Language Studies* 13 (2):247-280.

- Fougeron, Cecile, Cedric Gendrot, and A. Bürki. 2007. On the Phonetic Identity of French Schwa Compared to /ø/ and /oe/. Paper read at 5emes Journees d'Etudes Linguistiques (JEL), at Nantes, France.
- Galliano, S., Geoffrois, E., Mostefa, D., Choukri, K., Bonastre, J. -F., & Gravier, G.(2005). ESTER Phase II evaluation campaign for the rich transcription of French Broadcast News. In *Proceedings of Interspeech*. Lisbon, Portugal: 1149–1152.
- Grammont, Maurice. 1913. *Le Vers Français, Ses Moyens D'expression, Son Harmonie*. Paris: H. Champion.
- Hall, Kathleen Currie. 2009. *A Probabilistic Model of Phonological Relationships from Contrast to Allophony*. PhD thesis, The Ohio State University, Columbus, OH.
- Hall, Kathleen Currie. 2011. Cognitive Reflexes of Linguistic Sound Patterns. University of Canterbury, Christchurch, NZ.
- Hall, Nancy. 2011. Vowel Epenthesis. In Marc van Oostendorp, Colin Ewen, Elizabeth Hume and Keren Rice, *Companion to Phonology*. Oxford: Wiley-Blackwell 1576-1596.
- Harnsberger, James. 2001. The Perception of Malayalam Nasal Consonants by Marathi, Punjabi, Tamil, Oriya, Bengali, and American English Listeners: A Multidimensional Scaling Analysis. *Journal of Phonetics* 29 (3):303-327.
- Hockett, Charles F. 1955. A Manual of Phonology. *International Journal of American Linguistics* 21 (4).
- Hockett, Charles F. 1966. The Quantification of Functional Load: A Linguistic Problem. *U.S. Air Force Memorandum RM-5168-PR*.
- Hume, Elizabeth. 2004. Deconstructing Markedness: A Predictability-Based Approach. *Proceedings of the Annual Meeting of the Berkeley Linguistics Society* 13:182-198.
- Hume, Elizabeth. 2008. Markedness and the Language User. *Phonological Studies* 11:295-310.
- Hume, Elizabeth, and Ilana Bromberg. 2005. Predicting Epenthesis: An Information-Theoretic Account. Paper read at 7th Annual Meeting of the French Network of Phonology, at Aix-en-Provence.

- Hume, Elizabeth, and Keith Johnson. 2003. The Impact of Partial Phonological Contrast on Speech Perception. *Proceedings of the Fifteenth International Congress of Phonetic Sciences*.
- Hume, Elizabeth, and Frédéric Mailhot. To appear. The role of entropy and surprisal in phonologization and language change. In A. Yu (ed.), *Origins of Sound Patterns: Approaches to Phonologization*. Oxford University Press.
- Jaeger, Jeri J. 1980. Testing the Psychological Reality of Phonemes. *Language and Speech* 23:233-253.
- Jenkins, Fred. 1971. The Phonetic Value of Mute-e. *The French Review* 45 (1):82-87.
- Kazanina, Nina, Colin Phillips, and William J. Idsardi. 2006. The Influence of Meaning on the Perception of Speech Sounds. *Proceedings of the National Academy of Sciences of the United States of America* 103 (30):11381-11386.
- Kuipers, Cecile, Wilma van Donselaar, and Anne Cutler. 1996. Phonological Variation: Epenthesis and Deletion of Schwa in Dutch. *Proceedings of the Fourth International Conference on Spoken Language Processing* 1:94-97.
- Landick, Marie. 1995. The Mid-Vowels in Figures: Hard Facts. *French Review* 68 (1):88-102.
- Lass, Roger. 1975. How Intrinsic Is Content? Markedness, Sound Change, and 'Family Universals'. In D. Goyvaerts and G. Pullum, eds., *Essays on the Sound Pattern of English*, 465-504. Ghent: E. Story-Scientia.
- Martinet, André. 1955. *Économie Des Changements Phonétiques* Bern: Francke.
- Noske, Roland. 1993. *A Theory of Syllabification and Segmental Alternation. With Studies on the Phonology of French, German, Tonkawa and Yawelmani*. Tübingen: Max Niemeyer.
- Nosofsky, Robert M. 1988. Similarity, Frequency, and Category Representations. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 14 (1):54-65.
- Ohala, John J. 1982. The Phonological End Justifies Any Means. *Proceedings of the 13th International Congress of Linguistics*:232-243.

- Peperkamp, Sharon, Michèle Pettinato, and Emmanuel Dupoux. 2003. Allophonic Variation and the Acquisition of Phoneme Categories. In M. Kehoe et al. eds., *Proceedings of the 27th Annual Boston University Conference on Language Development*, 650-661. Somerville, MA: Cascadilla Press.
- Pruitt, John S., James J. Jenkins, and Winifred Strange. 2006. Training the Perception of Hindi Dental and Retroflex Stops by Native Speakers of American English and Japanese. *Journal of the Acoustical Society of America* 119 (3):1684-1696.
- Pulleyblank, Douglas. 1988. Underspecification, the Feature Hierarchy, and Tiv Vowels. *Phonology* 5:299-326.
- Rice, Keren. 1999/2000. Featural Markedness in Phonology: Variation. *GLOT International* 4.7, 4.8:3-6, 3-7.
- Rice, Keren. 2007. Markedness in Phonology. In P. de Lacy, ed., *The Cambridge Handbook of Phonology*, 79-97. Cambridge: Cambridge University Press.
- Rice, Keren, and Peter Avery. 1993. Segmental Complexity and the Structure of Inventories. *Toronto Working Papers in Linguistics* 12:131-153.
- Rice, Keren, and Trisha Causley. 1998. Asymmetries in Featural Markedness: Place of Articulation. In *21st Generative Linguistics in the Old World Conference*. Tilburg University.
- Riggs, Daylen. To appear. Minimal Salience and the Quality of Epenthetic Vowels in Loanwords. *Proceedings of the 41st Meeting of the North East Linguistic Society*.
- Stemberger, Joseph Paul. 1992. A Connectionist View of Child Phonology: Phonological Processing without Phonological Processes. In C. A. Ferguson, L. Menn and C. Stoel-Gammon, eds., *Phonological Development: Models, Research, Implications*, 165-189. Parkton, MD: York Press.
- Steriade, Donca. 2009. The Phonology of Perceptibility Effects: The P-map and Its Consequences for Constraint Organization. In K. Hanson and S. Inkelas, eds., *The Nature of the Word: Studies in Honor of Paul Kiparsky*, 151-180. Cambridge, MA: MIT Press.
- Surendran, Dinoj, and Partha Niyogi. 2003. Measuring the Functional Load of Phonological Contrasts. Available: <http://arxiv.org/pdf/cs.CL/0311036>.

Anti-Markedness Patterns in French

Trubetzkoy, Nikolai Sergeevich. 1969. *Principles of Phonology*. Translated by C. A. M. Baltaxe. Berkeley: University of California Press. Original edition, 1939.

Wedel, Andrew, and Sherrylyn Branchaw. 2011. Detection of Statistical Relationships between Measures of Functional Load and Probability of Phoneme Merger. Paper read at Linguistic Society of America Annual Meeting, at Pittsburgh, PA.

Elizabeth Hume
The Ohio State University
Department of Linguistics
1712 Neil Ave.
Columbus, OH 43202

evhume@gmail.com

Kathleen Currie Hall
College of Staten Island
Department of English, 2S-218
2800 Victory Blvd.
Staten Island, NY 10314

kathleen.hall@csi.cuny.edu

Andrew Wedel
University of Arizona
Department of Linguistics
P.O. Box 210028
Tucson, AZ 85721

wedel@u.Arizona.edu

Adam Ussishkin
University of Arizona
Department of Linguistics
P.O. Box 210028
Tucson, AZ 85721

ussishki@u.Arizona.edu

Martine Adda-Decker
LIMSI - CNRS
B.P. 133
91403 ORSAY CEDEX
FRANCE

madda@limsi.fr

Cédric Gendrot
LIMSI - CNRS
B.P. 133
91403 ORSAY CEDEX
FRANCE

cgendrot@univ-paris3.fr

Demonstrative Adjectives in Spoken Finnish: Informational Sufficiency and the Speaker-Addressee Dynamic

ELSI KAISER

University of Southern California

1. Introduction

This paper explores the referential properties of a class of specific indefinites in colloquial Finnish, namely nouns modified by the adjectives *sellainen* ‘such’, *tällainen* ‘this kind of’ and *tuollainen* ‘that kind of.’ These adjectives are derived from the proximal, distal and neutral demonstratives in Finnish, and can be optionally used to modify nouns, as shown in ex.(1a, b). Because Finnish has no grammaticalized system of definite or indefinite articles, the default option is for nouns to be bare, like ‘rock’ in ex.(1b).¹ This brings up the question of when do speakers choose to modify a noun with a demonstrative adjective, instead of just using a bare noun?

- (1a) se pöllö ajoi Peten [**semmosen ison kiven**] päälle... *Sellainen + NP*
‘the/that owl drove Pete on top of [**SEMMONEN big rock**] ...’
[example from Frog Story corpus]
- (1b) se pöllö ajoi Peten [**ison kiven**] päälle... *Bare NP*
‘the/that owl drove Pete on top of [**big rock**] ...’
[modified from corpus example]

Using data from elicited narration and other naturally-occurring examples, I explore the contexts in which demonstrative adjectives are used. I show that seemingly conflicting uses of *sellainen/tällainen/tuollainen* share a fundamental commonality related to upcoming/future information. More specifically, I suggest that when introducing a new entity into the discourse, a speaker uses a demonstrative adjective to modify the noun when s/he is aware that further information

¹ *Se* is used for the third person pronoun ‘it’, but in some contexts it functions like English ‘that’ (Laury 1997). Laury notes that *se* is developing into a kind of definite article in spoken Finnish, as can be seen with ‘owl’ in ex.(1)).

about the entity (beyond the information provided by the NP) is necessary for the addressee to arrive at the intended/correct denotation of the NP or to locate the intended referent (see also Ionin 2006). Thus, this construction signals a need for more elaboration in the immediately subsequent discourse.

In addition to providing insights into the interplay between referring expressions and the speaker-addressee dynamic, this work relates to the notion of referential persistence (Givón 1983, Chiriacescu and von Heusinger 2009, 2010), as it suggests that a referent's immediate persistence – how likely it is to be mentioned in the immediately subsequent discourse – is inversely correlated with the informational sufficiency of the form used to introduce it into the discourse.

The structure of the paper is as follows. In the rest of this section, I review existing work on the English demonstrative *this* used in indefinite contexts, which provides a foundation that will help us to understand the Finnish data. In Section 2, I discuss existing work on Finnish demonstrative adjectives. Section 3 presents the corpus study that I conducted on the referential properties of the Finnish demonstrative adjectives. In Section 4, I discuss a potential contradiction that arises when we try to reconcile the findings of the corpus study with other observations regarding the use of the demonstrative adjectives, and show that this contradiction can be resolved by using the notion of 'informational insufficiency.' Conclusions are given in Section 5.

1.1 Background: Indefinite 'this' in English

In English, demonstrative *this* normally functions as a proximal demonstrative. However, in colloquial usage it can also be used to modify indefinites, as in ex.(2) with existential-*there* constructions (see Maclaran 1982, Prince 1981).

- (2a) There is **this** man who lives upstairs from me who is driving me mad because he jumps rope at 2 a.m. every night. (Maclaran 1982: 85)
- (2b) . . . A few years ago, there was **this** hippie, long-haired, slovenly. He confronted me. . .” (Terkel, 1974:756, cited by Prince 1981:233)

The observation that *this* can function as an indefinite article brings up the question of what guides the choice of indefinite *a* vs. *this*. In one of the first papers on this topic, Maclaran (1982:90) suggests that use of *this* “draws attention to the fact that the speaker has a particular referent in mind, about which further information may be given.” As can be seen in ex(2a-b), in both cases the speaker does indeed go on to provide further information about the referent.

In more recent work, Ionin (2006) proposes that use of indefinite *this* is guided by the intuitive notion of 'noteworthiness.' More specifically, she argues that “the use of a *this*-indefinite requires the statement of something noteworthy about the individual denoted by the indefinite” (Ionin 2006:181). This is illustrated by

the examples in (3). Use of *this* to modify the new referent *pen* is felicitous in (3b) but not in (3a), because in (3b) the pen turns out to be noteworthy because it explodes and spills ink. A similar point is made by the examples in (4), where indefinite *this* can be used felicitously when the stamp turns out to be noteworthy due to its value.

- (3a) Becky wrote some thank-you notes using {**a** / # **this**} purple pen; then she mailed the notes to her friends.
- (3b) Becky wrote some thank-you notes using {**a** / **this**} purple pen, which suddenly exploded, spilling purple ink all over Becky's clothes and furniture! (examples from Ionin 2006: 181)
- (4a) He put on {**a** / #**this**} 31 cent stamp on the envelope, so he must want it to go airmail.
- (4b) He put on {**a** / **this**} 31 cent stamp on the envelope, and only realized later that it was worth a fortune because it was unperforated. (examples from Maclaran 1982:88)

Ionin (2006) also provides a detailed semantic analysis of indefinite *this*, and related issues have been explored in the crosslinguistic domain by Chiriacescu & von Heusinger (2009), (2010) for Romanian and Deichsel (2011) for German. With this background in mind, let us now turn to Finnish. In the next sections, I consider the referential properties of demonstrative modifiers in Finnish. I return to the concept of 'noteworthiness' in Section 4, when analyzing the corpus data that I obtained by means of an elicitation study.

2. Demonstrative Adjectives in Finnish

Finnish is a case-marked, flexible word order language. The canonical word order is subject-verb-object (SVO), but all six possible word orders are grammatical in the appropriate contexts (e.g., Vilkuna 1995). Finnish has no grammaticalized definite or indefinite articles; bare nouns can be used for both specific and non-specific, new and previously mentioned referents. However, the adjectives *sellainen* 'such', *tällainen* 'this kind of' and *tuollainen* 'that kind of' can be optionally used in prenominal position.

These adjectives are derived from the demonstratives *se*¹ 'it, that', *tämä* 'this', *tuo* 'that' by addition of the suffix *-lainen* (Table 1; only nominative case shown). Traditionally, *tämä* 'this' is regarded as proximal, *tuo* 'that' as distal, and *se* 'it, that' as neutral or proximal from the perspective of the addressee (Larjavaara 1990, Juvonen 2000). According to Laury (1997)'s work on the Finnish demonstratives, *tämä* 'this' is used to refer to referents in the speaker's own sphere, *se* 'it, that' for referents in the addressee's sphere, and *tuo* 'that' for referents outside the speaker's sphere (Laury 1997:89). The *-lainen* suffix adds the meaning 'like NP, similar to NP, resembling NP' (Ikola 1986:91). The suffix has its origins in

the noun *laji* ‘kind, sort, type’ and the adjectival suffix *-inen* (Vesikansa 1977:76).

It is worth noting that Finnish also has the versions *semmoinen*, *tämmöinen* and *tuommoinen*. According to Vesikansa (1977) and Ikola (1986), these versions are derived from *se*, *tämä* and *tuo* by means of the suffix *-moinen* (also Juvonen 2000). This suffix comes from word *moinen*, meaning ‘such.’ Vesikansa and Ikola note that words derived with *-moinen* are often synonymous with words derived with *-lainen*. Dasinger (1995) takes a slightly different view and treats forms like *semmoinen* as dialectal variants of forms like *sellainen*. In this paper, I treat *sellainen*, *tällainen* and *tuollainen* and *semmoinen*, *tämmöinen* and *tuommoinen* respectively, as synonyms of each other.²

The derived forms in Table (1) can occur as independent pronouns (ex.5b) or as prenominal modifiers (ex.5a). When used prenominally, they agree in case with the head noun. In this paper, I focus on the prenominal use.³

Table 1: Finnish demonstratives and derived demonstrative adjectives

Root	Suffix	Resulting word
<i>se</i> ‘it, that’	<i>-lainen</i>	<i>sellainen</i> ‘such’
<i>tämä</i> ‘this’	<i>-lainen</i>	<i>tällainen</i> ‘this kind of’
<i>tuo</i> ‘that’	<i>-lainen</i>	<i>tuollainen</i> ‘that kind of’

- (5a) En ole syönyt [**sellaista** ruokaa].
 ‘I have not eaten [**SELLAINEN** food]’ ≈ ‘I have not eaten that kind of food/such food’ (from Karlsson 1999:139)
- (5b) Mikään navigaationkurssi ei korvaa vastuunsa tuntevaa päällikköä. [**Sellainen**] on veneessä aina oltava.
 ‘No navigation course can replace a responsible captain. [**SELLAINEN**] must always be on a boat.’ (Hakulinen & Karlsson 1988:321, transl. EK)

2.1 Referential Properties of Demonstrative Adjectives

Let us now review prior work that investigated the contexts in which *sellainen*, *tällainen* and *tuollainen* are used as prenominal modifiers in spoken Finnish (Our primary focus in this paper is on Colloquial (spoken) Finnish. Standard Finnish is a more formal register that is primarily used in writing and formal/official statements. Daily communication and everyday interactions take place in Colloquial Finnish. Similar to English, where indefinite *this* is mostly a colloquial phenomenon, the uses we are investigating in Finnish also seem to be more prevalent in the

² In addition to these forms, the examples from naturally-occurring narratives also contain phonetically reduced forms, e.g. *tommonen* for *tuommoinen*, *semmonen* for *semmoinen*.

³ Because the Finnish demonstrative articles cannot be translated straightforwardly into English, in the translations, I will use the Finnish form (in small caps, in nominative case).

spoken language than in the written/Standard language.).

Out of the three demonstrative adjectives, *sellainen* ‘such’ has received the most attention in prior work, including detailed analyses of naturally-occurring examples. According to Vilkuna (1992), in Colloquial Finnish *sellainen* + NP can be used when introducing entities or concepts whose characteristics (or the characteristics of the class they belong to) are unknown or unfamiliar to the listener. As Dasinger (1995) notes, speakers’ use of *sellainen* depends on “whether the listener is expected to know the characteristics of items in a certain class” (Dasinger 1995:115). I will refer to this as the ‘unfamiliar entity’ use: The speaker uses *sellainen* when introducing entities whose properties s/he suspects the addressee does not know or is unfamiliar with.

The ‘unfamiliar entity’ use is exemplified in the naturally-occurring examples below. In ex.(6a), use of the modifier *semmonen* signals that the clerk assumes that the customer is not familiar with the characteristics of (the class of things that are) Tiroli bread. Moreover, Vilkuna notes that use of *semmonen* in the clerk’s answer indicates that s/he realizes the customer would also like to know other information about the bread (such as the characteristics of the class it belongs to), in addition to its name – in other words, the clerk knows that his answer, which simply tells the hearer what class of things the bread belongs to, is not sufficient. In ex. (6b), use of *semmonen* in front of the noun phrase indicates that the speaker assumes that the listener is not familiar with the concept ‘school garden thing.’

(6a) An exchange in a bakery (from Vilkuna 1992):

Customer: ‘What is that?’
Bakery employee: Se on [**semmonen** Tirolin leipä]
‘It’s [**SEMMONEN** Tiroli bread]’

(6b) (Helasvuo 1988:92-93, cited by Vilkuna 1992)

Me osallistuttiin [**semmoseen** koulupuutarhahommaan], sielä, m, ... Käpylän liepeillä kuin on se, se [**semmone** siirtolapuutarha-alue]...
‘We participated in [**SEMMONEN** school-garden-thing], there, um...near Käpylä there is that, that [**SEMMONEN** allotment garden area]....’

Before moving on to the other forms, it is worth noting that not all uses of *sellainen* in prenominal position involve this type of ‘unfamiliar entity’ situation. For example, *sellainen* can also be used in situations where the listener is familiar with the characteristics or properties of a particular entity, and the speaker wants to make reference to those properties. This is illustrated in (5a) as well as (6c), where *sellainen* could be translated into English as ‘that kind of (car).’

(6c) (context: talking about special cars that have built-in speed restrictors)

[**Sellaisella** autolla] ei yksinkertaisesti pysty ajamaan ylinopeutta.
‘With [**SELLAINEN** car] it is simply not possible to exceed the speed limit.’

(www.aikakauslehdet.fi/al_koulussa/artikkelipankki/luonne_nakyy.htm)

The other two forms, *tällainen* ‘this kind of’ and *tuollainen* ‘that kind of’ have not been discussed much in prior work, and have not been investigated in depth in naturally-occurring speech. On the basis of constructed examples, Dasinger observes that they signal “class membership without requiring exact equivalence between the items located in the class” (Dasinger 1995:188, see also Hakulinen et al. 2004). This is illustrated in (7a,b,c). Thus, if we imagine a person looking at a car and uttering ex.(7a), then what she means is that driving a car similar to the one she is looking at – or the one she is looking at – is not possible. Thus, she is making a statement about cars belonging to a certain class. Note that in these examples, similar to (6c), *tällainen/tuollainen* have an antecedent either in the linguistic or in the visual context (a car, or a piece of clothing that has a certain color).

- (7a) [Tällaisella autolla] ei voi ajaa.
‘One cannot drive in [**this kind of** car].’ (Karlsson 1999:139)
- (7b) Paljonko[**tuollainen** auto] maksaa?
‘How much does [**that kind of** car] cost?’ (Karlsson 1999:139)
- (7c) [Tuollainen väri] ei sovi sinulle.
‘[**That kind of** color] does not suit you.’ (Dasinger 1995:188)

These patterns form an interesting contrast when compared with the ‘unfamiliar entity’ uses observed with *sellainen*. Ex.(7a,b,c) suggest that with *tällainen/tuollainen*, the speaker is making reference to the properties of a certain class of entities in situations where the addressee either knows those properties or can perceive them in some way, whereas with *sellainen*, the speaker can signal that the hearer may not be familiar with the properties of a particular entity. However, because the behavior of *tällainen/tuollainen* in naturalistic speech has not been analyzed in detail in prior work, it is not yet known whether *tällainen/tuollainen* also allow for such ‘unfamiliar’ contexts.

3. Corpus Study

To gain a better sense of the referential properties of *sellainen/tällainen/tuollainen* when used as prenominal modifiers in naturally-occurring speech, I conducted an elicitation-based corpus study with 29 native Finnish speakers. As we will see in this section, the results suggest that the ‘unfamiliar entity’ use, which has received considerable attention in the prior work on Finnish, is not sufficient to capture the ways in which the demonstrative articles are used in natural speech.

3.1 Elicitation

In the elicitation phase, participants narrated the story of a wordless children's picture book (Mercer Mayer's *Frog, where are you?*) to a listener who could not see the pictures. This was done to avoid deictic uses of demonstratives. (As a result, due to the lack of a shared visual context between speaker and addressee, we also do not find any examples of *tällainen/tuollainen* akin to those shown in ex.(7a,b,c).) Twenty-nine Finnish adults between the ages of 18 and 58 participated. Each person had the chance to look through the book beforehand, and could also look at the book while telling the story. Thus, the corpus consists of 29 versions of the same story, which allows for detailed comparisons across speakers. This book has been used in many elicitation studies with children and adults (see CHILDES database). The story is about a boy, his dog and a pet frog who escapes. A summary is in the Appendix of this paper. Pictures are online at <http://childes.psy.cmu.edu/manuals/frog.pdf>

3.2 Results

3.2.1 Distribution and Frequency

Overall, slightly more than half of the participants (15/29, 52%) use the demonstrative adjectives *sellainen*, *tällainen*, or *tuollainen* (or their phonological variants) to introduce new referents into their narratives, and the most frequent users tend to be the younger speakers. *Sellainen* was the most frequently used demonstrative adjective, both in terms of how many people use it and how many occurrences of *sellainen* there are in the corpus.

There are 83 occurrences of demonstrative adjectives in the entire corpus, all of which were used when introducing new entities into the discourse, and 45 of these (54.2%) are cases of *sellainen*. There are 24/83 (28.9%) occurrences of *tällainen* and only 14/83 (16.9%) occurrences of *tuollainen*. If we look at what kinds of demonstrative adjectives each person uses, we see a similar pattern. Out of the 15 people who use the adjectives, 14 (93.3%) use *sellainen* at least once, and for 7 of these 14, it is the only one out of the three adjectives that they use. *Tällainen* and *tuollainen* are used less frequently: 6 people use *tällainen* and 5 use *tuollainen* in their narratives. Only three people use all three modifiers. Thus, overall, *sellainen* is the most commonly used demonstrative adjective, followed by *tällainen* and then *tuollainen*.

Interestingly, we find that the same referents are modified by different adjectives by different speakers, as illustrated by ex. (8a,b) for *puunrunko* 'tree trunk' and (8c,d) for *jyrkänne* 'precipice, cliff.'

- (8a) siellä lammikon vieressä oli [**tämmönen** ontto puunrunko]...
 'Next to the pond there was [TÄMMÖINEN hollow tree trunk]'

- (8b) ja sitten se poikaa huomaa että on [**semmonen** ontto puunrunko]...
‘and then the boy notices that there’s [SEMMONEN hollow tree trunk]...’
- (8c) tää peura juoksee [**tommosen** jyrkänteen] reunalle
‘this deer runs to the edge of [TOMMONEN cliff]’
- (8d) ja hirvi lähtee menemään eteenpäin, tulee [**semmosen** valtavan jyrkänteen] juurelle
‘and the moose starts to go forward, comes to the edge of [SEMMONEN huge cliff]’

Given this apparent interchangeability, combined with the relatively small numbers of *tällainen* and *tuollainen*, in this paper I group the three demonstratives together. However, I want to emphasize that to assess the validity of this grouping, future research should be conducted with larger numbers of tokens. It may be that the different demonstratives that form the roots of the demonstrative adjectives contribute to differences in meaning, but the current corpus patterns (Section 3.2.2) suggest that potential differences along these lines are not crucial to our current claims.

3.2.2 What Kinds of Referents are Marked with Demonstrative Adjectives?

Let us now consider what guides the use of demonstrative adjectives. As mentioned above, all occurrences of demonstrative adjectives in my corpus involved reference to entities being mentioned for the first time. However, not all new entities are introduced with demonstrative adjectives.

When we look at how new entities are introduced, it becomes clear that all three forms are used in this context (ex.9,10, see also Vilkuna (1992) and Dasigner (1995) on *sellainen*). In ex. (9), the narrator mentions, for the first time, a rock that the boy climbs onto, and ex.(10) introduced the cliff into the narrative (see ex.8a for *tällainen*).

- (9) se ... kiipes [**semmoselle** korkeelle kivelle]
‘he ... climbed onto [SEMMONEN high rock]’
- (10) tää peura juoksee [**tommosen** jyrkänteen] reunalle
‘this deer runs to the edge of [TOMMONEN cliff]’

However, not all new entities are marked with *sellainen*, *tällainen* or *tuollainen*. A comparison of the narratives across the 29 participants reveals that some referents, when introduced for the first time, are not marked with a demonstrative adjective. As illustrated below, entities such as *koira* ‘dog’ (ex.11) *ikkuna* ‘window’ (ex.12) and *metsä* ‘forest’ (ex.13) are introduced without the adjectives (absence of adjective is denoted by \emptyset).

- (11a) ja sit siellä on myös **koira**
 ‘and then there’s ø **dog** too.’
- (11b) pikkupoika ja **koira** sanovat hyvää yötä sammakolle
 ‘little boy and ø **dog** say good night to frog’
- (12a) sitten Pekka katseli **ikkunasta** ulos
 ‘then Pekka looked out of ø **window**’
- (12b) sit ne kurkistaa **ikkunasta**
 ‘then they peek out of ø **window**.’
- (13a) siellä näkyy **metsä**
 ‘ø **forest** is visible there’
- (13b) sitten sitä lähtee kumminkin molemmat lähtevät sitten **metsään**
 ‘then both still go to ø **forest**’

On the other hand, there is a limited group of referents that, across speakers, often get marked with *sellainen*, *tällainen* or *tuollainen* when they are first introduced. In the following discussion, when considering how often a certain entity is introduced with or without a demonstrative adjective, I only consider the 15 participants who use the demonstrative adjectives at least once. In other words, I only look at cases where the speaker is making a choice between using a demonstrative adjective and not using one. Examples of often-modified nouns include ‘rock’ (14a), ‘cliff’ (14b,c) and ‘tree trunk/log’ (14d,e), as exemplified below. Other referents are also frequently modified, such as a pond that the boy and dog fall into, a mole hole that the boy peeks into, a deer that they encounter in the course of their adventures, and a glass jar that the frog sits in.

- (14a) se pöllö ajoi Peten [**semmosen** ison kiven] päälle ja...jossa sitten Pete rupes taas huutelemaan Samppia
 ‘the owl drove Pete on top of [**SEMMONEN** big rock] and...from where Pete started again to call for Samppi [frog]’
- (14b) ja sit siihen tulikin [**semmoinen** kieleke] ja se peura pysähty yhtäkkiä ja sitten pete ja hauva tippu alas sieltä kielekkeeltä
 ‘and then there appeared [**SEMMOINEN** cliff] and the deer stopped suddenly and then pete and doggie fell down from the cliff’
- (14c) tää peura juoksee [**tommosen** jyrkänteen] reunalle
 ‘this deer runs to the edge of [**TOMMONEN** cliff]’
- (14d) ja se oli [**semmosen** vanhan puunrungon] takana ja siel ne yritti sitten kurkkia
 ‘And it (a noise) was behind [**SEMMONEN** old tree trunk] and there they tried to peek’
- (14e) Sitten siinä on [**semmonen** puunrunko] vieressä
 ‘then there is [**SEMMONEN** tree trunk] nearby.’

A closer look at the modification patterns reveals strikingly high rates of modifier usage, especially for some of the referents. For example, with ‘tree trunk,’ out of the people who use modifiers and who mention the tree trunk, 79% modify it with a demonstrative adjective when mentioning it for the first time. This number rises to 92% if we focus only on those people who use demonstrative adjectives more than twice in their narratives, i.e., speakers who are ‘active’ users of the demonstrative adjectives. Similarly, with the cliff, out of the people who use modifiers and who mention the cliff, 75% modify it with a demonstrative adjective when mentioning it for the first time. This number rises to 100% if we focus only on those people who use demonstrative modifiers more than twice in their narratives. In the next section, we consider why some entities are more susceptible to being modified by *sellainen/tällainen/tuollainen* than others.

4. What Do Demonstrative Adjectives Signal to the Addressee?

In light of the patterns mentioned in the preceding section, let us now return to the question of why some referents are prone to modification with *sellainen*, *tällainen* or *tuollainen*, whereas others are not. In Section 2, I mentioned the ‘unfamiliar entity’ use, according to which speakers use these modifiers when introducing entities whose properties s/he suspects the addressee does not know or is unfamiliar with. However, at least at first glance, nouns like ‘rock’, ‘cliff’ and ‘tree trunk’ (ex.14d,e) are unlike ‘Tiroli bread’ (ex.6a) or ‘school garden’ (ex.6b), because they are familiar entities whose characteristics the addressee presumably is familiar with. Thus, the ‘unfamiliar entity’ use does not appear to be sufficient to characterize the use of these modifiers.

What about the noteworthiness idea proposed by Ionin (2006), on the basis of earlier observations by Maclaren (1982) and Prince (1981)? Ionin suggests that in English, indefinite *this* is used when the referent has some noteworthy property and that further information about the referent will be provided.

This idea seems applicable to the Finnish data as well. An analysis of the narratives suggests that the nouns that speakers choose to modify with a demonstrative adjective tend to be atypical, difficult to name, or have something ‘odd’ or significant about them. For example, the rock is unusual and significant for the plot of the book because it turns out that the tree branches which the boy uses for balance when standing on it are in fact the antlers of a deer hidden behind the rock.⁴ The boy gets caught in the antlers and is carried by the deer to the edge of a cliff, at which point the boy falls out of the antlers and over the cliff’s edge.

⁴ The size of the rock is also difficult to convey linguistically in Finnish. The rock is bigger than the boy, but in Finnish *kivi* is used for both rocks and stones, regardless of size. Interestingly, English speakers mostly used ‘rock’ (11/12 people used ‘rock’, data from the Slobin corpus, CHILDES database). Thus, in Finnish, the size of the rock may be another reason why speakers use a demonstrative adjective (to signal that the noun is not sufficiently informative about size).

The cliff which the boy and the dog fall off of – mostly referred to as *jyrkänne* ‘precipice’ or *kieleke* ‘promontory’ – is another illustrative example. In the story, it is a grassy area within a forest that suddenly ends in a steep slope, but it is not very high. A word such as *jyrkänne* tends to evoke images of high cliffs; usually, if one falls off a cliff, one does not escape unscathed. However, the boy and his dog tumble only a meter or two to the pond beneath the cliff. Thus, by using the modified phrase *sellainen/tällainen/tuollainen jyrkänne*, the narrator is able to signal to the hearer that the precipice in the story does not match the typical image of what a precipice looks like. The tree trunk which the boy and the dog encounter towards the end of the story is also frequently modified. It plays a significant role in the plot after its initial introduction, because it turns out that the frog that they are searching for is hidden behind the tree trunk.

As a whole, these patterns fit well with the general idea of ‘noteworthiness’, proposed by Ionin (2006) for English. However, it is important to emphasize that these observations are only preliminary and still somewhat speculative in nature. Larger-scale corpus work or experiments are needed to assess the validity of these claims. Nevertheless, the patterns that can be observed in my data contribute both to our understanding of when Finnish speakers use demonstrative adjectives and to the notion of ‘noteworthiness.’ More specifically, the Frog Story data offer new insights from actual language use into what can count as noteworthy: Entities that are atypical/odd exemplars of their class as well as entities that have something else significant about them (see also footnote 4).

4.1 Unifying Two Seemingly Disparate Uses

If we combine the insights from prior research with the patterns observed in the Frog Story corpus, we see that the demonstrative adjectives are used in two seemingly disparate ways, namely (i) the *unfamiliar entity use* and (ii) the *noteworthy use*. At first glance, these two contexts may seem rather unrelated and perhaps even contradictory. However, I propose they share a crucial commonality: In both cases, use of the demonstrative modifier signals the *speaker’s awareness that the addressee needs further information*. More specifically, use of a demonstrative adjective signals that the noun itself is not sufficient for the addressee to arrive at the intended denotation, because (i) the addressee is not familiar with the meaning of the noun (e.g. *Tiroler bread*, ex.6a), (ii) the noun is an atypical/odd exemplar of its class (e.g. *cliff*, ex.14b,c), or (iii) the noun has some other important /significant property that cannot be directly inferred from its semantics (e.g. *rock* with hidden deer, ex.14a). I would argue that situations (ii) and (iii) are sub-types of the ‘noteworthy’ use, whereas situation (i) embodies the ‘unfamiliar entity’ use.

The idea that use of a demonstrative adjective signals this kind of *informational insufficiency* is further supported by the observation that quite often, the

speaker follows up the *sellainen/tällainen/tuollainen* + NP combination with further information about the intended referent. This suggests that the speaker realizes the addressee needs more information before speaker can accomplish his/her communicative goals, and resembles findings for English indefinite *this* (see Prince 1981, Ionin 2006).

4.1.1 Behavior of ‘Placeholders’ and Names

The idea that the demonstrative adjectives signal speakers’ awareness of addressees needing further information is supported by their frequent occurrence in contexts where speakers cannot retrieve the right word and use a ‘filler’/placeholder word (e.g. *thingy*, *whatchamacallit*). For example, in ex.(15a) the speaker used *sellainen* to modify the under-informative noun *juttu* ‘thing’, and then goes on to provide more details about the object. Another type of context where *sellainen* is used is in (15b), where the speaker uses it to modify a proper name that s/he suspects may not be familiar to the addressee. Again, more information about the referent is provided immediately afterwards:

- (15a) [*talking about an ice-cream shaped luggage tag*] Sille mä annoin ...
laukkuun kiinnetettävän [**semmosen** jutun] mihin voi kirjottaa nimen ja
osotteen ja se oli jätskin muotonen. (from a blog at www.novita.fi)
‘To her [my friend] I gave [**SEMMONEN** thing] that attaches to a bag where
you can write your name and address and it is shaped like an ice-cream’
- (15b) Kun meillä on ollu [**semmonen** Arja Jokine] joka on ollu täällä meillä täs
tämmösessä oikeakielisyydestä puhumas mä en tiä tunnek sä [**semmost**
tyttöö] (corpus example from Hakulinen et al 2005)
‘as we’ve had [**SEMMONEN** Arja Jokine] who has been here with us talking
about correct language usage I don’t know if you know [**SEMMONEN** girl]’

4.2. Types of Information Insufficiency

So far, we have focused mostly on cases that could be termed ‘denotational insufficiency’. We have seen examples where the information provided by the NP was insufficient for the addressee because: (i) s/he does not know the full meaning of the noun (*unfamiliar entity use*), (ii) the default representation triggered by the noun is potentially misleading or does not convey the full significance of the referent (*noteworthy uses*) or (iii) the noun itself is underspecified (‘thing’ in ex.15a). Generally speaking, these are cases where the addressee lacks information to construct an accurate denotation of the noun. However, we also find evidence for *sellainen* signaling referential insufficiency – i.e., being used in situations where the denotation of the NP is unproblematic, but the addressee needs more info about the referent. In ex.(16), the addressee can presumably

construct an appropriate semantic representation of the NP ‘man’. However, s/he also needs to know that the man may be his/her father – i.e., the referent of *sellainen* + NP is what matters (cf. ex.14b,c with *cliff*). Thus, it seems that speakers can use *sellainen* to signal not only denotational insufficiency but also referential insufficiency to addressees. (Further research is needed to see how well these patterns extend to *tällainen/tuollainen*.)

- (16) Kun meillä on tuolla kyydissä [**semmoinen** mies] – se on suoraan sanoen kyllä höperö, dementti. Mutta kun se väittää olevansa sinun isäs. (corpus example from Hakulinen et al 2005)
‘Well we have in the car [**SEMMOINEN** man] – honestly speaking, he is out of it, has dementia. But he claims to be your father.’

5. Conclusions

Based on naturally-occurring corpus data and elicited narratives, I suggest that seemingly contradictory/unrelated uses of the demonstrative adjective+NP (*sellainen/tuollainen/tällainen*+NP) structure in Finnish, used to introduce specific indefinites, are unified by a common property. In particular, the idea is that a speaker uses the demonstrative adjectives to introduce a new referent when s/he is realizes that more information than what is provided by the NP is necessary for the addressee to arrive at the intended/correct denotation of the NP or to locate the intended referent.

In addition to furthering our knowledge of referent introduction in Finnish and relating to existing work on indefinites in English (e.g. Ionin 2006), the phenomena discussed here suggest that a referent’s immediate persistence – i.e., how likely it is to be brought up again in the immediately subsequence discourse – is sensitive to the ‘informational sufficiency’ of the form initially used to introduce it into the discourse. The less informative the initial form is, the more likely the referent is to be mentioned again in subsequent discourse (see also Chiriacescu and von Heusinger 2009, 2010 on topic-shift patterns in Romanian).

In closing, it is worth re-iterating that these findings are still preliminary, and a larger-scale corpus study or elicitation experiment is needed to assess the validity of these claims and also to shed light on potential differences between the different kinds of demonstratives (proximal, distal, neutral).

References

- Chiriacescu, Sofiana and von Heusinger, Klaus. 2009. *Pe*-marking and referential persistence in Romanian. *Working Papers of SFB 732*. Universität Stuttgart.
- Chiriacescu, Sofiana and von Heusinger, Klaus. 2010. Discourse prominence and *pe*-marking in Romanian. *International Review of Pragmatics* 2(2): 298- 332.
- Dasinger, Lisa. 1995. *Development of Discourse Competence in Finnish Children*. Ph.D. dissertation, UC Berkeley.
- Deichsel, Annika. 2011. *Demonstratives Reloaded*. Talk presented at the 19th ConSOLE conference, University of Groningen.
- Givón, Talmy. 1983. *Topic Continuity in Discourse*. Philadelphia: John Benjamins.
- Hakulinen, Auli and Karlsson, Fred. 1988. *Nykysuomen lauseoppi*. Helsinki: Suomalaisen Kirjallisuuden Seura (SKS).
- Hakulinen, Auli et al. 2004. *Iso suomen kielioppi*. Helsinki: SKS.
- Ikola, O. 1986. *Nykysuomen käsikirja*. Espoo: Weilin+Göös.
- Ionin, Tania. 2006. This is definitely specific: specificity & definiteness in article systems. *Natural Language Semantics* 14, 175-234
- Juvonen, Päivi. 2000. *Grammaticalizing the Definite Article. A study of definite adnominal determiners in a genre of spoken Finnish*. Ph.D., Stockholm.
- Karlsson, Fred. 1999. *Finnish*. New York: Routledge.
- Larjavaara, Matti. 1990. *Suomen deiksis*. Helsinki: SKS.
- Laury, Ritva. 1997. *Demonstratives in Interaction*. Philadelphia: John Benjamins.
- Maclaran, R. 1982. *The Semantics and Pragmatics of the English Demonstratives*, Ph.D. Dissertation, Cornell.
- Mayer, Mercer. 1969. *Frog, where are you?* New York: Dial Press.

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Prince, Ellen F. 1981. On the Interfacing of Indefinite-*This* NPs, In Aravind.K. Joshi, Bonnie L. Webber, and Ivan A. Sag (eds.), *Elements Of Discourse Understanding*, 231–250. Cambridge: Cambridge University Press.

Vesikansa, Jouko. 1977. *Johdokset*. Porvoo: WSOY

Vilkuna, Maria. 1992. *Referenssi ja määräisyys suomenkielisten tekstien tulkinassa*. Helsinki: SKS.

Vilkuna, Maria. 1995. Discourse configurationality in Finnish. In K. Kiss (ed.), *Discourse Configurational Languages*, 244-268. New York: Oxford University.

Elsi Kaiser
Department of Linguistics
University of Southern California
3601 Watt Way, GFS 301
Los Angeles, CA 90089-1693

emkaiser@usc.edu

Appendix: Summary of “Frog, where are you?”. This a shortened version of the summary in the CHILDES manual at: <http://chilDES.psy.cmu.edu/manuals>. The pictures are available at <http://chilDES.psy.cmu.edu/manuals/frog.pdf>

p.1: A boy and his dog are in the boy’s bedroom admiring a smiling frog in a glass jar. **p.2:** The boy and the dog are asleep in the boy’s bed. The frog is climbing out of the jar. **p.3:** The boy and the dog are awake and have observed that the frog is missing. **p.4:** The boy is looking in one of his boots for the frog while the dog has stuck his head in the frog’s jar. **p.5:** The boy and the dog are looking out the window. **p.6:** The dog is falling out the window and the boy looks puzzled. **p.7:** The boy has come outside and is holding the dog. The jar has broken and pieces are lying on the ground. **p.8-9:** The boy is calling and the dog is sniffing with his nose in the air. In the distance is a forest. A beehive is hanging in a tree by the edge of the forest. **p.10:** The boy is calling down a hole in the ground while the dog is jumping up toward the beehive. **p.11:** A small ground rodent has popped out of the hole. The boy is holding his nose and looking unhappy. **p.12-13:** The beehive has fallen out of the tree and angry bees are swarming. The boy is sitting on a branch of a large tree exploring a hole in the tree. **p.14-15:** An owl, has come out of the hole and the boy has fallen on the ground. The bees are chasing the dog. **p.16:** The boy is running away from the owl. In the background is a large boulder. Branches of trees can be seen behind it. **p.17:** The boy has climbed to the top of the boulder and is calling. He is holding a branch. The dog can be seen slinking toward the boulder. **p.18:** What appeared to be branches are, in fact, the antlers of a deer. The boy can be seen draped over the deer’s head. **p.19:** The deer is walking, with the boy on his head, toward a cliff. **p.20:** The deer has tipped the boy over the edge of the cliff and the dog has apparently fallen off the cliff. Both the boy and the dog are in the midst of falling into a marshy pond. **p.21:** The boy and the dog have fallen head first into the water. **p.22:** The boy is sitting in the water and the dog is sitting on the boy’s shoulder. The boy is holding his hand to his ear and smiling, as if he has heard something. **p.23:** The boy is kneeling beside a large log. The dog is swimming toward him. **p.24:** The boy and the dog are looking over the log. **p.25:** The boy and the dog are sitting on the log and are looking at a mother and father frog. **p.26:** The frogs’ children emerge from tall grasses on the right. The boy and the dog are sitting on the log. **p.27-28:** The boy and the dog are leaving. The boy has a small frog in his hand and is waving at the frog family, which is sitting on the big log.

Resumption and Gaps in English Relative Clauses: Relative Acceptability Creates an Illusion of ‘Saving’¹

BETHANY KEFFALA

University of California, San Diego

Introduction

Some languages, such as Hebrew, Arabic (multiple dialects) and Swedish, among others, employ resumptive pronouns (pronominal elements used in place of subject or object gaps) as an alternative to gaps in certain syntactic structures. Though resumptive pronouns are generally considered to be marginal in English, corpus studies (Prince 1990, 1997; Cann et al. 2004) have found that native speakers of English use resumptives in unguarded speech. The literature on resumptive pronouns has long asserted that they are capable of ‘saving’ island violations, meaning that an island structure that uses a resumptive in place of an illicit gap should be found more acceptable than the corresponding structure containing the gap instead of the resumptive (Ross 1986, Chomsky 1977, Sells 1984). Resumption has also been characterized as a ‘last resort’ strategy, used when movement violates a grammatical constraint (Rizzi 1990, Shlonsky 1992). This characterization suggests that resumptive pronouns should be acceptable only in environments where traces due to movement are ungrammatical.

Recent experimental findings have called into question the validity of the claim that resumptives improve the acceptability of island constructions at all (Alexopoulou and Keller 2007), though they may ameliorate the acceptability of structures where gaps cause ECP effects (McDaniel and Cowart 1999).² Through experimental examination of the interactions between structure type (islands,

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² In this paper, ECP effects refer to the generalization that, for the most part, it appears to be more difficult to extract from subject position than it is to extract from object position (see Rizzi 1990).

ECP-effects, both, and neither), resumption (resumptive pronoun or gap), and position (subject or object), I show that, rather than ameliorating island violations or ECP effects, resumptive pronouns in relative clauses (regardless of the presence or absence of embedded islands or ‘that’-clauses) have a steady, though marginal, level of acceptability whereas gaps in these different environments have varying levels of acceptability. Cases in which gaps create ECP effects and violate island constraints are found to be less acceptable than the corresponding structures containing resumptive pronouns, creating the illusion that a resumptive ‘saves’ a sentence in which a gap would be ungrammatical.

1 Resumptive Pronouns: Past Work

A resumptive pronoun is a pronoun used in place of a subject or object gap, as in the following corpus sentences:

- (1) a. “She got a couch at Sears that it was on sale.” (Cann et al. 2004:1554)
b. “He seems to agree with the claim that Chomsky made and which I think Labov was the one who disputed it.” (Prince 1997:6)

The analog of (1a) containing a gap is grammatical, and it is expected that speakers of English should find it to be acceptable, whereas the analog of (1b) contains an object gap within a relative clause island and is predicted to be unacceptable:

- (2) a. She got a couch at Sears that ___ was on sale.
b. *He seems to agree with the claim that Chomsky made and which I think Labov was the one who disputed ___.

Past literature on resumptive pronouns in English claims that resumptive pronouns save island violations or function as a last resort for grammatical violations, suggesting that speakers should judge sentences like (1b) to be more acceptable than sentences like (2b).

English does not use resumption as extensively as do other languages. Sells (1984) notes that some languages, such as Hebrew, freely allow resumptive pronouns inside relative clauses while others, such as English, seem to allow resumptive pronouns in relative clauses only within syntactic islands (Sells 1984:6-11). Consider the following data:

- (3) a. *ze* *ha’iš* *še* *oto* *ra’iti* *etmol*
 this-is the man that him I-saw yesterday
 ‘This is the man that I saw yesterday’

b. *ra'iti et ha'iš še natati li et*
 I-saw the man that you-gave to-me the

ha sefer še hu katav oto
 book that he wrote it
 'I saw the man that you gave me the book that he wrote.'

- (4) a. *This is the man that I saw him yesterday.
 b. I'd like to meet the linguist that Mary couldn't remember if she had seen ___/him before.

In both Hebrew and English, resumptive pronouns are allowed in syntactic islands within relative clauses, as in (3b) and 4(b). However, (3a) and (4a) show that, while Hebrew plain relative clauses allow resumptive pronouns, English plain relatives do not generally seem to allow resumption.

Sells presents data from English in which resumptives and gaps are assumed to be equally acceptable, as for the weak island in (4b). He also addresses, however, the idea that resumption can save an ungrammatical sentence by replacing an illicit gap. Previous literature (Ross 1986) has focused on these apparent differences in acceptability between English sentences that (in at least some dialects) may contain resumptive pronouns and their illicit, gap-containing analogs, as in (5a-d) below:

- (5) a. I just saw that girl who Long John's claim that she was a Venusian made all the headlines. (Ross 1986:260)
 b. All the students who the papers which they submitted were lousy I'm not going to allow to register next term. (Ross 1986:260)
 c. I just saw that girl who Long John's claim that ___ was a Venusian made all the headlines.
 d. All the students who the papers which ___ submitted were lousy I'm not going to allow to register next term.

The sentences with resumptive pronouns (5a-b) are claimed to be more acceptable than corresponding structures (5c-d). This phenomenon can be explained by attributing resumptive pronouns with a saving function for islands (Chomsky 1977, Sells 1984) or a last resort function for movement that violates a constraint on grammaticality (Rizzi 1990, Shlonsky 1992).

Rizzi (1990) and Shlonsky (1992) considered sentences in which a gap creates an ECP effect while its resumptive counterpart is more acceptable. Rizzi (1990:61) demonstrates that, in Swedish, subject resumptives are commonly (and grammatically) used in structures where a gap would incur an ECP effect (as in (6) below). Resumptives in other positions are either marginal or completely

unacceptable (as in (7) below).

- (6) *Vilket ord visste ingen hur det/*__ staves?*
Which word knew no one how it/__ is-spelled?
- (7) *Kalle kan jag slå vad om __/*han kommer att klara sig*
Kalle can I bet about __/he is-going-to succeed.

Rizzi claims that subject resumptives in Swedish behave like syntactic variables. Similarly, Shlonksy (1992) claims that resumptive pronouns are used as a last resort, meaning that they are only sanctioned in cases where wh-movement is prevented from forming an A'-chain by a constraint in the syntax and when the language allows them to be used resumptively (as variables). He argues that this occurs even in languages like Hebrew and Palestinian Arabic, for which resumptive structures are used productively and have a high level of acceptability.

As shown above, much of the existing literature on resumptive pronouns has relied on informal techniques of gathering acceptability judgments. This literature has claimed that resumptive pronouns can save island violations as well as other ungrammatical structures. Some more recent investigations have employed corpora or experimental techniques to examine the resumptive structures that native speakers actually produce and the intuitions of native speakers regarding the acceptability of resumptive structures, respectively. Corpus studies (Prince 1990, 1997; Cann et al. 2004) have shown that native speakers of English do employ resumptive pronouns in production, as demonstrated above by sentences in (1), and by further utterances in (8):

- (8) a. "...those little potato things that you put 'em in the oven..." (Cann et al. 2004:1565)
b. "I had some other point which I can't remember what it is." (Cann et al. 2004:1554)
c. "That asshole X, who I loathe and despise the ground he walks on, pointed out that..." (Prince 1990:2)

If we compare the data in (8b-c) to the corresponding sentences with illicit gaps, our intuitions are that resumptives do indeed seem to improve acceptability:

- (9) a. *I had some other point which I can't remember what __ is.
b. *That asshole X, who I loathe and despise the ground __ walks on, pointed out that...

The sentence in (9a) exhibits subject extraction out of a wh-island, creating an ECP effect and violating an island constraint, while (9b) exhibits subject

extraction out of a relative clause island. However, the sentence in (10) with grammatical object extraction from a plain relative clause does not seem any less acceptable than its resumptive-containing counterpart in (8a), and may even be judged as more acceptable (Cann et al. 2004:1554):

- (10) ‘...those little potato things that you put ___ in the oven...’

These intuitions conform to the claim in the literature that resumptives have a saving or last-resort function, and should only be found more acceptable than gaps when those gaps would be illicit, as in (9).

Regardless of the grammaticality of (1a), (8a) or other, similar structures, the fact that English speakers produce structures with resumptive pronouns in place of illicit gaps might lead us to expect that, in a formal acceptability judgment task, these speakers should judge such resumptive structures to be more acceptable than the corresponding gap-containing structures. However, it is not necessarily the case that speakers judge structures they produce to be acceptable in a comprehension-centered task. Ross (1986:261) points out that, though speakers produce structures with resumptive pronouns, these are often considered to be marginal.³ Thus, it is important to collect the judgments of linguistically naïve native speakers of English in order to determine the acceptability of structures with resumptive pronouns relative to corresponding structures with gaps.

Surprisingly, the expectation that English speakers should find resumptive pronouns to be more acceptable than island-violating gaps was not met in Alexopoulou and Keller (2007), which tested the acceptability of resumptive pronouns and gaps in English, German, and Greek. Using Magnitude Estimation, Alexopoulou and Keller tested sentences with *wh*-extraction out of object position in non-islands (bare clauses and ‘that’-clauses), weak islands (‘whether’-clauses), and strong islands (relative clauses) (Alexopoulou and Keller 2007:117):

- (11) Non-island condition (bare clause)
a. Who will we fire \emptyset /him?
b. Who does Mary claim we will fire \emptyset /him?
c. Who does Jane think Mary claims we will fire \emptyset /him?
- (12) Non-island condition (‘that’-clause)
a. Who does Mary claim that we will fire \emptyset /him?
b. Who does Jane think that Mary claims that we will fire \emptyset /him?

³ See also Ferreira and Swets (2005) for discussion of a study on the production and comprehension of resumptive pronouns. Though subjects produced structures with resumptive pronouns, these were judged to have relatively low acceptability in the sentence judgment component of the study.

- (13) Weak island condition ('whether'-clause)
 - a. Who does Mary wonder whether we will fire \emptyset /him?
 - b. Who does Jane think that Mary wonders whether we will fire \emptyset /him?
- (14) Strong island condition (relative clause island)
 - a. Who does Mary meet the people that will fire \emptyset /him?
 - b. Who does Jane think that Mary meets the people that will fire \emptyset /him?

For all conditions, Alexopoulou and Keller found that resumptives were at most as acceptable as the corresponding gaps, but, critically, were never more acceptable. Resumptive pronouns and gaps were equally acceptable in the strong island condition for structures with single and double embedding (as in (14a) and (14b), respectively). In all other structures, gaps were judged to be more acceptable than resumptive pronouns. Through the use of formal, experimental methods designed to systematically and objectively test the acceptability of resumptives and gaps in wh-islands, this study was able to show that the general statement found in the literature, that resumptives 'save' island violations, incorrectly predicts acceptability judgments in the case of wh-object extraction.

A slightly different story is presented in McDaniel and Cowart (1999), which examined the acceptability of resumptive pronouns or gaps in both subject and object position in wh-islands embedded within declarative relative clauses, as in the following examples (McDaniel and Cowart 1999:B16-B18):

- (15) a. That's the girl that I wonder when __ met you.
b. That's the girl that I wonder when she met you.
- (16) a. That's the girl that I wonder when you met __.
b. That's the girl that I wonder when you met her.

Their Magnitude Estimation acceptability judgment study found that, for declaratives of this type, resumptives were more acceptable than gaps in subject position (15a < b), while resumptives and gaps were equally acceptable in object position (16a = b). While the gap structures in both (15) and (16) violate a constraint on movement, the gap in (15a) also creates an ECP effect. This finding, especially in conjunction with past theoretical speculation (Rizzi 1990, Shlonsky 1992) regarding the interaction between resumption and the ECP, suggests that more structures in which a gap would violate the ECP should be tested. Because McDaniel and Cowart (1999) tested only structures in which a gap simultaneously creates an ECP effect and violates a wh-island, structures in which a gap would create an ECP effect but not violate an island constraint should be tested. Additionally, as noted in Alexopoulou and Keller (2007), future experiments should test resumptives and gaps in relative clause structures.

2 Experiment: Acceptability of Resumptives and Gaps in English Relative Clauses

2.1 Experiment Design

The goal of the present experiment is to examine the interaction of three factors: sentence type (plain relative, ‘that’-clause, wh-island, relative clause island), resumption (gap or resumptive), and position (object or subject). Each of these factors was manipulated using a factorial design to create the set of conditions in (17) and (18) below:

(17) Object Gap/Resumptive

	Gap	Predicted Relative Acceptability	Resumptive Pronoun
Plain Relative Clause	These are the potatoes that Ted prepared ____.	>	These are the potatoes that Ted prepared them.
‘That’-Clause	These are the potatoes that Ted realized that the chef prepared ____.	>	These are the potatoes that Ted realized that the chef prepared them.
WH-Island	These are the potatoes that Ted inquired how the chef prepared ____.	=	These are the potatoes that Ted inquired how the chef prepared them.
Relative Clause Island	These are the potatoes that Ted flirted with the chef that prepared ____.	=	These are the potatoes that Ted flirted with the chef that prepared them.

(18) Subject Gap/Resumptive

	Gap	Predicted Relative Acceptability	Resumptive Pronoun
Plain Relative Clause	This is the chef that ____ prepared the potatoes.	>	This is the chef that she prepared the potatoes.
‘That’-Clause	This is the chef that Ted realized that ____ prepared the potatoes.	<	This is the chef that Ted realized that she prepared the potatoes.
WH-Island	This is the chef that Ted inquired how ____ prepared the potatoes.	<	This is the chef that Ted inquired how she prepared the potatoes.
Relative Clause Island	This is the chef that Ted devoured the potatoes that ____ prepared.	<	This is the chef that Ted devoured the potatoes that she prepared.

Examining the acceptability of structures in which gaps violate only the ECP (subject ‘that’-clause condition) in comparison to structures in which gaps violate both the ECP and an island constraint (subject wh-island and subject relative clause island conditions), and to structures in which gaps violate only island constraints (object wh- and object relative clause island conditions) should provide further insight regarding interactions between resumption and ECP-effects, specifically whether resumptives ameliorate ECP-effects, or certain island violations, or both. Previous work in which resumption has appeared to ameliorate ECP-effects tested only cases where a gap would violate both the ECP and a wh-island constraint (McDaniel and Cowart 1999). Testing the acceptability of resumptive and gapped subject and object plain relative clauses (i.e. structures in which a gap is licit) provides a further point of comparison for sentences in which a gap would violate the ECP or an island constraint. If it is the case that resumptive pronouns ameliorate ECP effects, then resumptive structures should be found more acceptable than gaps for all subject conditions with the exception of the plain relative clause.

2.2 Subjects and Materials

Subjects were 121 undergraduate students at the University of California, San Diego, participating in exchange for course credit. 74 participants were female, 47 were male. All participants were native speakers of English. Using an 11-point scale, each participant judged exactly two tokens from each of 16 token sets developed in a 4x2x2 factorial design (4 sentence types x 2 levels of resumption — gap or resumptive pronoun x 2 positions — subject or object — see (17) and (18) above, with a lexicalized example for each condition). Sentences were displayed one at a time by computer, above the 11-point scale. Each condition was lexicalized 32 times, yielding a total of 512 experimental items (16 conditions x 32 lexicalizations) split using a Latin square method into 16 semi-randomized, counterbalanced lists, each containing 32 experimental sentences. This process ensured that participants saw exactly two sentences of each condition, and that no experimental items judged by any one participant came from the same lexicalization group.

Each subject judged the acceptability of 96 sentences total, 32 of which were experimental stimuli (2:1 filler to experimental ratio). Half of the filler sentences were experimental items from a study on phrasal verbs, and the final 32 sentences were fillers constructed to have a range of acceptability. Additionally, one of several fillers predicted to have a very low level of acceptability was manually placed towards the beginning of each list to counteract possible floor-effects that might arise from the predicted low level of acceptability for several of the experimental conditions.

Participants completed the acceptability judgment task by computer after

completing a brief N-back task.⁴ Before starting the acceptability judgment task, subjects read a written description of the task and instructions for how to complete it. They were asked to indicate on a scale from 1 to 11 how bad or good they thought each sentence was, where lower numbers represent worse judgments, higher numbers represent more favorable judgments, and where numbers in the middle of the scale represent sentences that are in between. Participants were asked to read the sentence and quickly choose an appropriate number from the scale to represent their reaction to the sentence, judging three practice sentences before completing the actual acceptability judgment task.

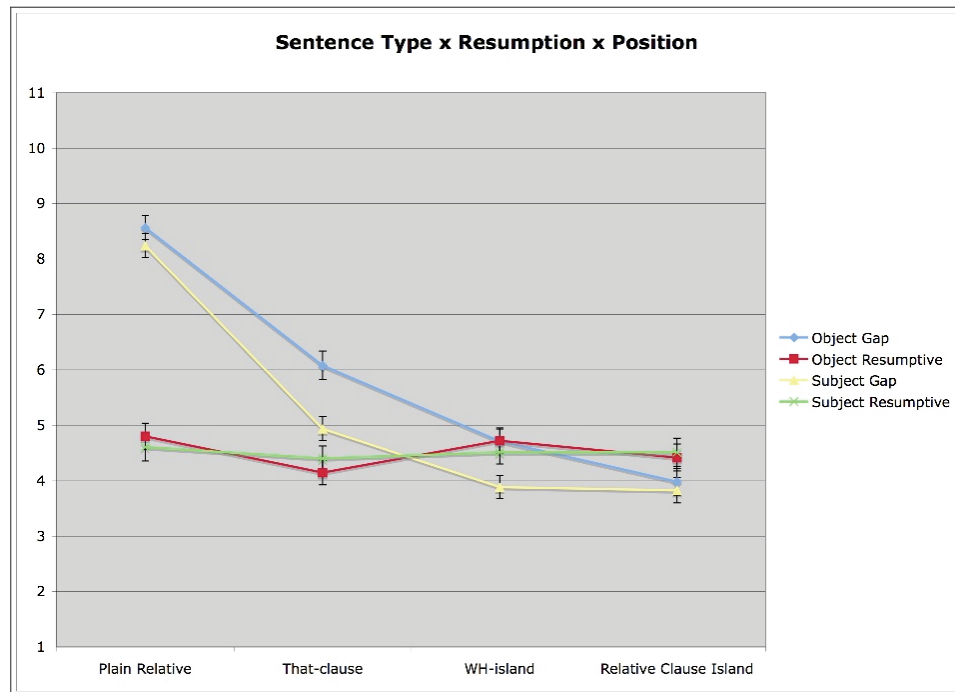
3 Results

A 3-way by-subjects ANOVA with sentence type (4 levels), position (2 levels), and resumption (2 levels) yielded main effects of sentence type ($F = 93.75$, $p < 0.001$), resumption ($F=177.2$, $p < 0.001$), and position ($F=12.46$, $p < 0.001$), as well as interactions between sentence type and resumption ($F=102.82$, $p < 0.001$), between sentence type and position ($F=3.47$, $p < 0.05$), and between sentence type, resumption and position ($F=4.13$, $p < 0.01$). The interaction between resumption and position was marginal ($F=3.63$, $p=0.057$). By-items analysis found significance for all main effects found in the by-subjects analysis, but interactions between sentence type and position, as well as between sentence type, resumption, and position did not reach significance. Other interactions that reached significance by-subjects also reached significance by-items. General results are summarized in (19) below:

⁴ An N-back task is a task in which participants must remember N items back in order to match previous items to current items. For example, in a 1-back task, if a participant sees the letter A, and the next item is another letter A, the task is to recognize that these items match. Data from this task can be used to separate subjects into high and low working memory groups. This may be useful for the purposes of looking at data from stimuli with long-distances dependencies, as in the current study.

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(19) General results



Post-hoc t-tests were conducted to further investigate interactions. T-test results for significant differences found for position with gaps are summarized in (20):

(20) Post-hoc tests

Sentence Type + Resumption Type	Subject	Object	<i>p</i> (two-tailed)
'That'-clause + Gap	4.9	6.1	< .001
Wh-island + Gap	3.9	4.7	< .01

(20) Shows subject-object asymmetries found for 'that'-clauses and wh-islands. Subjects preferred 'that'-clauses with object gaps to 'that'-clauses with subject gaps, showing that they exhibit the 'that'-trace effect. This means that, if resumptives do ameliorate structures in which a gap would cause an ECP effect, we should be able to see this effect in the data for 'that'-clauses with subject gaps and resumptives. Subjects also preferred wh-islands with object gaps over wh-islands with subject gaps, which should be unsurprising as the subject gap both violates an island and creates an ECP effect whereas the object gap only violates an island constraint.

T-test results for significant differences found between resumptives and gaps

by sentence type and position are summarized in (21):

(21) T-tests for Resumption Factor Levels

Sentence Type + Position	Gap	Resumptive	<i>p</i> (two-tailed)
Plain Relative + Subject	8.2	4.6	< 0.001
Plain Relative + Object	8.6	4.8	< 0.001
‘That’-clause + Subject	4.9	4.4	= 0.087 (NS)
‘That’-clause + Object	6.1	4.1	< 0.001
Wh-island + Subject	3.9	4.5	< 0.05
Relative Clause Island + Subject	3.8	4.5	< 0.05

(19) and (21) show that subjects preferred object and subject gaps to object and subject resumptives, respectively, in the plain relative clause condition. They also preferred object gaps to object resumptives in the ‘that’-clause condition. A slight preference for subject gaps over subject resumptives in the ‘that’-clause condition was marginal, but not significant. Subject resumptive pronouns were preferred over subject gaps in the wh-island conditions and relative clause island conditions.

4 Discussion

The prediction that resumptive pronouns ameliorate ECP effects was only partially confirmed by the results presented in section 4. While resumptive pronouns were more acceptable than gaps in both wh- and relative clause island + subject conditions, there was no significant difference between resumptives and gaps in the ‘that’-clause + subject condition. In fact, there was a marginal effect in the opposite direction of what was expected; subjects seemed to prefer gaps to resumptives in subject position of a ‘that’-clause embedded in a relative clause.

It seems, then, that resumptive pronouns do not generally save ECP effects any more than they save island effects. The question remains, however, of why resumptives seem to be more acceptable than gaps that simultaneously violate island constraints and create ECP effects. Any analysis of resumptive pronouns in English must account for the following findings from section 4 above:

- (22) a. Resumptive pronouns in English relative clauses seem to have a relatively stable level of acceptability.
- b. Subject and object gaps in plain relative clauses are much more acceptable than subject and object resumptives in plain relative clauses.
- c. Object gaps in ‘that’-clauses embedded in relative clauses are more acceptable than object resumptives in ‘that’-clauses embedded in relative clauses.

- d. Object gaps and resumptives in both *wh*- and relative clause islands are equally acceptable.
- e. Subject gaps in ‘that’-clauses are as acceptable (if not slightly more acceptable) than subject resumptives in ‘that’-clauses. ((18) above)
- f. Subject resumptives in *wh*- and relative clause islands are more acceptable than subject gaps in *wh*- and relative clause islands.

If past analyses based on experimental findings from McDaniel and Cowart (1999) or Alexopoulou and Keller (2007) do not account for these facts, an alternative solution must be sought.

McDaniel and Cowart (1999) proposed (as did Kayne 1981) that resumptive pronouns in English are spellouts of traces. This predicts that the derivations of corresponding gap and resumptive sentences such as those in (17) and (18) are the same until movement occurs. After this point, the resumptive sentences are derived from an extra step in which the trace is spelled out. Principles of economy predict that, for sentences in which a trace is licit, the versions of the sentences where the trace is spelled out should fail whereas for sentences in which the trace is illicit, the versions where the trace is not spelled out should fail. This hypothesis was supported by their data, which found that sentences with a resumptive pronoun in subject position of an embedded *wh*-island were more acceptable than their gapped counterparts, whereas sentences with resumptive pronouns or gaps in object position of an embedded *wh*-island were found to be equally acceptable. If we are to accept, however, that the gap in subject position of an embedded *that*-clause is illicit, this analysis is no longer possible, due to the fact that subjects in the current study found sentences with subject gaps in embedded *that*-clauses to be as or more acceptable than sentences with subject resumptives in embedded *that*-clauses. While McDaniel and Cowart’s (1999) analysis accounts for (22b-d, f), it does not account for the difference between (22e) and (22f).

Alexopoulou and Keller (2007) propose that the reason their resumptive sentences were never found to be more acceptable than their gapped sentences is that the processing costs incurred by carrying the filler up until the point where the gap/resumptive occurs cannot be undone by the appearance of the resumptive pronoun. This changes the way the sentence is interpreted (anaphorically rather than syntactically/cyclically), but carrying the filler has already taken its toll on the sentence’s acceptability, therefore we should not expect resumption to improve acceptability in cases where there are only island violations. If, however, resumption prevents an ECP effect, as it should if it replaces an illicit subject gap, this could mean that, even if carrying the filler up to the point of the resumptive or gap incurs a processing cost, resumption could still be preferable to gaps that create ECP effects. This analysis appears to work for both *wh*- and relative clause island conditions; resumption creates no apparent benefit for object position,

while subject resumptives are more acceptable than subject gaps. However, this analysis again fails to account for the lack of difference between subject gaps and resumptives in ‘that’-clauses. While Alexopoulou and Keller’s (2007) analysis accounts for (22b-d, f), it does not account for the difference between (22e) and (22f).

A possible analysis, which may be compatible with Alexopoulou and Keller’s explanation, arises from further consideration of the point in (22a) which underlines the result (depicted in (19) above) that subjects seemed to find resumptive pronouns, regardless of the structure or position in which they occurred among the experimental conditions, to have a relatively steady level of acceptability. Keeping in mind the observation in (22a), (22b-f) are reducible to differences in the acceptability level of gaps in different structures and positions.

Compared to a relatively wide range of acceptability found between gapped sentences, the acceptability of resumptive pronouns, regardless of structure or position, did not seem to fluctuate greatly. The gapped conditions fluctuated in generally expected ways; subject gaps in embedded ‘that’-clauses, wh-islands, and relative clause islands were severely degraded when compared to subject gaps in plain relative clauses, while object gaps in wh-islands were severely degraded when compared to those in plain relative clauses, and those in relative clause islands were found to be even less acceptable than in wh-islands. Subject gaps that created ECP effects and violated island constraints happened to weigh in at a lower level of acceptability than the acceptability level for resumptive pronouns in relative clauses, which creates the illusion that resumptives ‘save’ such structures. Resumptive pronouns certainly did not improve the acceptability of these sentences a great deal, as can be seen in the differences between the means in (27). It could be that, because English has not grammaticized the use of pronouns as ‘true’ resumptives (Sells 1984), structures that contain resumptive pronouns are just consistently rated as marginal, and receive some sort of uniform penalty.

5 Conclusions

Past literature on resumptive pronouns has long assumed that resumption is capable of ‘saving’ island violations, while corpus studies show that English speakers employ resumptive pronouns in various structures, including some in which analogous gaps are licit, such as in plain relative clauses. The present study adds to the body of information accumulating from experimental investigation of the acceptability of resumptive pronouns. It shows that resumptive pronouns do not improve ECP effects or island violations alone. However, resumptive pronouns in English relative clauses in general are more acceptable than island-violating subject gaps, creating an illusion of saving for ECP effects within islands. Further comprehension-centered investigation of resumptive pronouns in

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English should focus on testing the acceptability of resumptives in additional environments to determine whether they do indeed have a steady level of acceptability regardless of embedded structure, and regardless of number of embeddings, possibly using context or auditory stimuli to encourage an informal register. Finally, the connection between the use of resumptive pronouns in production and their acceptability in comprehension should be further explored. It seems unlikely that a structure that is so apparently unacceptable in comprehension should be used in production with any notable level of frequency. Even if future research shows that resumptive pronouns presented aurally or with context are more acceptable than those presented in written form without context, it is curious that when attention is drawn to resumptive pronouns speakers of English find them to be so marginal.

References

- Alexopoulou, Theodora and Frank Keller. 2007. Locality, cyclicity and resumption: At the interface between the grammar and the human sentence processor. *Language* 83:110-160.
- Cann, Ronnie; Tami Kaplan; and Ruth Kempson. 2004. Data at the grammar-pragmatics interface: The case of resumptive pronouns in English. *Lingua* 115:1551–1578.
- Chomsky, Noam. 1977. On Wh-Movement. In Peter W. Culicover, Thomas Wasow, and Adrian Akmajian, eds., *Formal Syntax*. Academic Press, New York, 71-132.
- Ferreira, Fernanda and Benjamin Swets. 2005. The production and comprehension of resumptive pronouns in relative clause “island” contexts. In Anne Cutler, ed., *Twenty-first Century Psycholinguistics: Four Cornerstones*. Mahway, NJ: Lawrence Erlbaum Associates, 263-278.
- Kayne, Richard. 1981. ECP extensions. *Linguistic Inquiry* 12:93-133.
- McDaniel, Dana and Wayne Cowart. 1999. Experimental Evidence for a Minimalist Account of English Resumptive Pronouns. *Cognition* 70:B15-B24.
- Prince, Ellen F. 1990. Syntax and discourse: A look at resumptive pronouns. *Berkeley Linguistics Society* 16:482-497.

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Prince, Ellen F. 1997. On kind-sentences, resumptive pronouns, and relative clauses. In Gregory R. Guy, John G. Baugh, Deborah Schiffrin, and Crawford Feagin, eds., *Towards a social science of language: Papers in honor of William Labov*, Cambridge: Cambridge University Press, 223-235.

Ross, John R. 1986. *Infinite syntax!*. Norwood, NJ: ALEX.

Sells, Peter. 1984. Syntax and semantics of resumptive pronouns. Doctoral dissertation, University of Massachusetts, Amherst, MA.

Sobin, Nicholas. 1987. The Variable Status of Comp-Trace Phenomena. *Natural Language & Linguistic Theory* 5:1, Springer, 33-60.

Shlonsky, Uri. 1992. Resumptive pronouns as a last resort. *Linguistic Inquiry* 23:443-468.

Sprouse, Jon. 2009. Revisiting Satiation: Evidence for an Equalization Response Strategy. *Linguistic Inquiry* 40(2). Massachusetts Institute of Technology, 329-341.

Bethany Keffala
University of California, San Diego
Department of Linguistics
9500 Gilman Dr
La Jolla, CA 92093-0108

bkeffala@ucsd.edu

Modeling the Emergence of a Typological Anomaly: Vowel Nasalization in French

KRISTEN KENNEDY TERRY and ERIC RUSSELL WEBB

University of California, Davis

1 Introduction

The present work has as its primary goal the advancement of a theory of sound change incorporating token frequency and language use in a gradual learning algorithm (adapted from Boersma and Hayes 2001). To this end, we reexamine changes occurring in tautosyllabic vowel-nasal consonant sequences in the history of French, providing a sociolinguistic understanding of the ‘salience’ of nasalized vowels and demonstrating the emergence of typological anomalies through the expression of speaker preferences in language use.

2 Nasalization in the History of French

The evolution of nasal vowel phonemes in French constitutes a well-known and well-studied example of regressive assimilation and consonant elision. Summarily, this is the process by which an oral vowel acquires the feature [+nasal] from a following nasal coda consonant, and subsequently undergoes elision (Sampson 1999), which we abbreviate as $VN > \tilde{V}N > \tilde{V}$ (where V indicates an oral vowel, \tilde{V} a nasal vowel, and N a nasal consonant).

To give a brief historical overview, textual evidence indicates that during the Old French period (ca. 900-1300) oral vowels followed by nasal consonants were regressively nasalized and nasal consonants were realized ($VN > \tilde{V}N$). The Middle French period (ca. 1300-1600) presents a period of variability in the quality of the vowel and the realization of the nasal consonant ($VN > \tilde{V}(N)$). In Standard Modern French (SMF, ca. 1600-present) coda nasal consonants are no longer realized in positions diachronically corresponding to syllabic codas: $\tilde{V}N > \tilde{V}$. For the purposes of this paper, SMF refers to varieties such as those used by the national and international media and that are typically the object of second language acquisition.

Four unconditioned nasalized vowels are attested in SMF: [ẽ, ă, ỹ, œ̃] (at present, the contrast between [ẽ] and [œ̃] is neutralized for most speakers). In Table (1) below, we provide some sample data from the relevant time periods.

(1) Sample data from the history of French (Sampson 1999)

		ca. 13 th C	ca. 14 th -16 th C	ca. 17 th -18 th C
(a)	<i>vend</i> ‘sell-3SG’	[vẽnt vânt]	[vẵ(n)t]	[vẵ]
(b)	<i>vin</i> ‘wine’	[vĩn vễ̃(n)]	[vĩ̃(n) vễ̃(n) vễ̃(n)]	[vễ̃]
(c)	<i>maison</i> ‘house’	[mæj.zõn mε.zũ̃(n)]	[mε.zõ̃(n) mε.zũ̃(n)]	[mε.zõ̃ mε.zõ̃]
(d)	<i>humble</i> ‘humble’	[ỹm.blə]	[ỹ̃(m).blə œ̃̃(m).blə]	[œ̃̃bl]

Examples in Table (1) present the beginning and end points of the attested sound changes, as well as synchronic variability recorded in historical texts. Looking to (b) as an example, it is noted that the high nasal vowel begins lowering as early as the 13th century and the nasal consonant is generally realized. In the middle French period, the high nasal vowel continues to lower and the realization of the nasal consonant becomes variable. Finally, in the 17th century, a mid-nasal vowel emerges as the norm and the nasal consonant is no longer realized by the majority of speakers. Importantly, this is an atypical outcome. Ruhlen (1974) shows that languages with a full spectrum of nasal vowels (high-mid-low) are cross-linguistically prevalent (37 of 55 surveyed), followed by languages with high and low nasal vowels only (8 of 55 surveyed). Languages with only mid and low nasal vowels, as in French, are rare (3 of 55 surveyed).

3 Sound Change as a Speaker-Listener Conspiracy

This section briefly reviews a novel approach to explain the facts of nasalization, i.e. the instantiation of change, in an Optimality Theoretic (OT; Prince and Smolensky 1993) framework. Given space limitations, this discussion is necessarily parsimonious; readers desiring full coverage of these issues are referred to Russell Webb and Kennedy Terry (MS/*in press*).

A number of analyses incorporating phonetic phenomena explain the existence of synchronic variation. The most notable of these incorporate notions of articulatory complexity into constraints targeting relative effort minimization, see e.g. Flemming (2002), Boersma (1998), and Kirchner (1998). In this analysis, we distinguish articulation from perception in a formal grammatical stratum,

capturing the instantiation of productive variation and setting the stage for perceptual influences. For the case at hand, we hypothesize a constraint promoting the anticipatory opening of the velum in V-C sequences, e.g. $*VN]σ$ (the velum should be lowered during the production of a vowel prior to a nasal segment, i.e. no oral vowels preceding tautosyllabic nasals in the output), and a constraint promoting non-tense nasal vowels in the output, which we abbreviate $*TENSEV_{nas}$ (Ahn 2001; Bell-Berti and Krakow 1990; Cohn 1990; Delvaux 1999; Delvaux et al. 2002; Homer 1998; see also Houlihan and Iverson 1979).

The interaction of productive constraints is depicted in Table (2). For a given input /en/ and with the constraints thus ranked, the grammar predicts that $[ẽn]$ will be selected, i.e. that speakers will produce a nasal vowel in certain contexts, even for inputs containing non-nasal vowels. Importantly, the production grammar is blind to the effects of this output on subsequent perception.

(2) Sample Productive evaluation of input /en/

en	$*VN]σ$	MAX(C)	$*TENSEV_{nas}$	IDENTV
en	*!		*	
ɛn	*!			*
ẽn			*!	*
$\tilde{\epsilon}n$				*
ẽ		*!	*	*
$\tilde{\epsilon}$		*!		*

Clearly, production cannot be the only source of language change or phonological patterns, as speakers of many languages produce nasal vowels in similar phonotactic environments without such variant production leading to the emergence of contrastive nasalization. To explain how a variant productive output may be selected as underlying by listeners (i.e. as a corresponding perceptual output), we rely on approaches grounded in the reception and processing of speech as the source of change (see e.g. Gess 2003; Jun 1995a; 1995b; Russell Webb and Bradley 2009). This is especially important as it concerns the effect of positional prominence (Beckman 1998; Steriade 2001; Wright 2001, 2004).

Previous attempts to explain the unusual outcome of nasalization in French have relied on distinction (Padgett 1997; see also Flemming 2002; Lindblom 1986) or on constraints targeted to specific segments, notably high vowels (Ahn 2001). We argue that constraints should be motivated by theory-external facts, preferably those related to the production, reception, and psychological

processing of speech. As noted above, the case for a constraint militating against high nasal vowels is not well-supported. If languages with only mid and low nasal vowels represent the exception rather than the rule (viz. Ruhlen 1974), then it is difficult to see how or why a high nasal vowel should be more marked in a particular language than a non-high nasal vowel in the same language based on articulatory considerations alone (see e.g. Delvaux et al. 2002).

Nasal vowels present unique and complex acoustic profiles, among these relatively more or less distinct spectral peaks and valleys corresponding to vocoid frequencies, nasal formants, and antiformants (see Beddor 1993; Chen 1997; Maeda 1993; Wright 1986). The tendency to conflate closely related spectral peaks among listeners, also known as the Center of Gravity effect (COG), is known to operate on vowel formants that are separated by less than 3.5 Bark (Beddor 1993:180-182; Beddor and Hawkins 1990; Padgett 1997:73). We propose that unique perceptual factors come into play in the perception of nasalized vowels and that these factors can be formalized as constraints operating in a unique evaluative matrix.

Knowledge concerning parsing of auditory stimuli is expressed as *PARSE(F)*, promoting the faithful parsing of input spectral prominences in the output. For the discussion here, we assign a violation for every unfaithful mapping of auditory properties to abstract feature value, assuming the values $[\pm\text{high}]$ and $[\pm\text{low}]$, where F1 of 300-400Hz maps to $[\text{+high}]$, F1 above 700Hz to $[\text{+low}]$, and F1 of 400-600Hz to $[\text{-high}, \text{-low}]$. Knowledge pertaining to the categorization of indeterminate auditory information is embodied in **CATEGF1(FN)*, “do not categorize a spectral peak F1 as corresponding to an output feature if F1 is proximate to FN.” Assuming that F1-FN proximity is defined as within 3.5 Bark, or approximately 200Hz, **CATEGF1(FN)* penalizes the parsing of F1 for all but low vowels. A third constraint captures the perceptual COG which provides that for all inputs with overlapping or closely adjacent spectral peaks, the output should parse the average of these. Thus, in the case of an input F1 of 300Hz accompanied by FN (400-500Hz), the output should be interpreted as corresponding to the specification of a mid vowel. Output candidates which do not present a value corresponding to the weighted average of F1 and FN violate COG.

Examples of perceptual evaluation are provided in Tables (3) and (4) for which presumed F1 and F2 are indicated in parentheses. The perceptual grammar formalized in Tables (3) and (4) succeeds in capturing a number of important generalizations, namely the concurrent effects of nasalization on the parsing and categorization of lower formant frequencies.

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- (3) Perceptual evaluation of input [ĩ](F1 = 300, F2 = 2500Hz)

[ĩN]	COG	*CATEG F1(FN)	PARSE(F)
ĩN	*!	*	
ẽN		*	*
ãN	*!		*
ÿN		*	**!

- (4) Perceptual evaluation of input [ẽ](F1 = 500, F2 = 1300Hz)

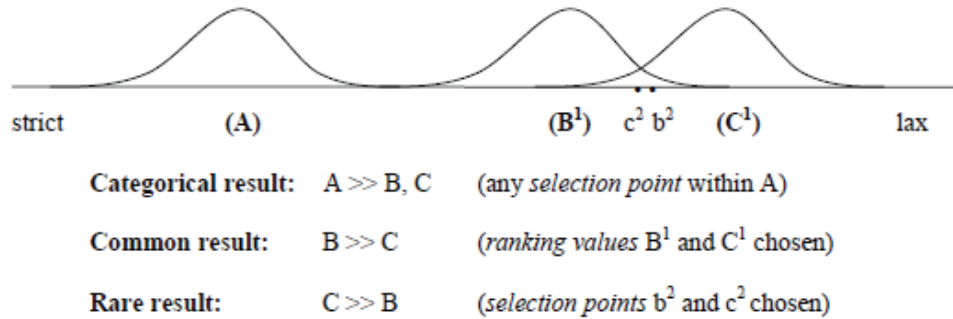
[ẽN]	COG	*CATEG F1(FN)	PARSE(F)
ẽN		*!	
ĩN	*!	*	*
ãN			*
œN			**!

4 The Gradual Learning Algorithm (GLA)

4.1 Variable Constraint Ranking and Synchronic Variation

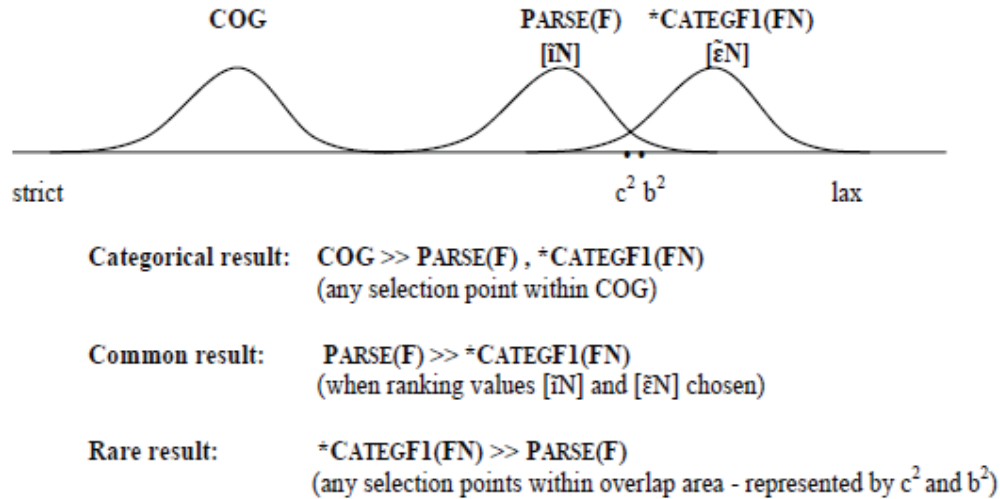
We demonstrate above how misperception of vowel nasalization might lead to novel output. Here, we propose to model the emergence of such novel output through an adaption of the Gradual Learning Algorithm (GLA) proposed by Boersma and Hayes (2001). In the GLA, shown in Figure (5) below, constraints are conceived as ranges of values represented by probability distributions (e.g. Gaussian) from which a value (the *selection point*) is chosen during the speech event (the *evaluation time*). The selection point most often associated with the constraint (based on probability of occurrence) is known as the *ranking value* and occupies the center of the range for the constraint. While the ranking value represents the most common realization for the phonological variable governed by the constraint, any selection point within the normal distribution curve is possible.

(5) Variable Constraint Ranking According to the GLA



Constraint ranking may be categorical if constraints lie very far apart on the linear scale (constraint A). On the other hand, constraints lying close together on the linear scale may partially overlap, such as B and C. In most cases, constraint B outranks constraint C, but the overlap area allows for synchronic variation in the grammar and for an atypical constraint ranking to occur every so often (e.g. C >> B), thereby planting the seeds of sound change.

The GLA models synchronic variation in the linguistic environment by incorporating the frequency of surface values occurring in free variation into a constraint ranking which is not categorical, but based on the probability of occurrence of surface forms. By recording every occurrence of a particular value (e.g. each selection point chosen at each evaluation time) and subsequently making minor adjustments to the ranking values of constraints, “the algorithm will produce a grammar that mimics the relative frequency of free variants (Boersma and Hayes 2001:53).” For the case at hand, we propose using the GLA and the same constraints as those presented in OT tableaux (3) and (4) to postulate a variable constraint ranking for an adult French speaker in the 13th century (Figure (6)).

(6) Initial Constraint Ranking at (t₀) – 13th Century Speaker

Given a high nasal vowel input, the constraint ranking in Figure (6) predicts the realization of a high nasal vowel output in the majority of cases. However, the overlap area between these constraints allows for the reverse ranking to occasionally hold: for a mid vowel output to be occasionally realized.

4.2 Using the GLA to Model Acquisition and Transmission

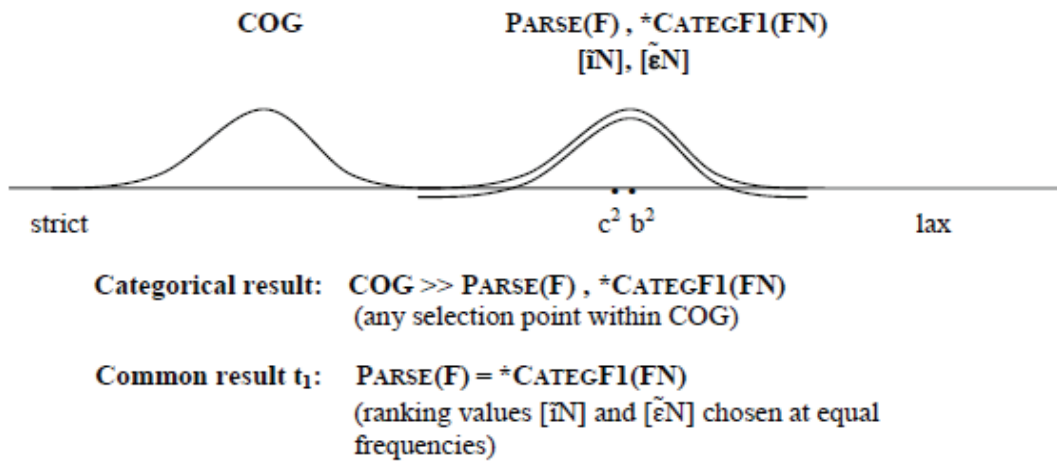
The GLA models the language acquisition process by means of a series of adjustments to constraint ranking values based on the probability of occurrence of adult surface forms until the target grammar is generated. Over the long term, when exposed to a full range of representative surface forms, the GLA will adjust constraint ranking values and “will ultimately achieve the right grammar” (Boersma and Hayes 2001:52).

Multiple iterations of the GLA may be conceived of as the establishment of a constraint ranking by each new generation of speakers within a speech community. By adjusting constraint ranking values to mimic the relative frequency of free variants in the environment, the GLA ‘records’ the linguistic preferences of each generation of speakers and transmits these to the next generation during the language acquisition process.

For example, if the frequency of occurrence of a particular surface form increases from one generation to the next (e.g. from t_0 to t_1) the probabilistic constraint ranking established by the GLA at t_1 will be slightly different from that established at t_0 . That is to say, the constraint ranking of each new generation of speakers will be set to match the frequencies of surface forms extrapolated from their linguistic experience. The output data at t_1 then becomes the input data for the next generation at t_2 and so on.

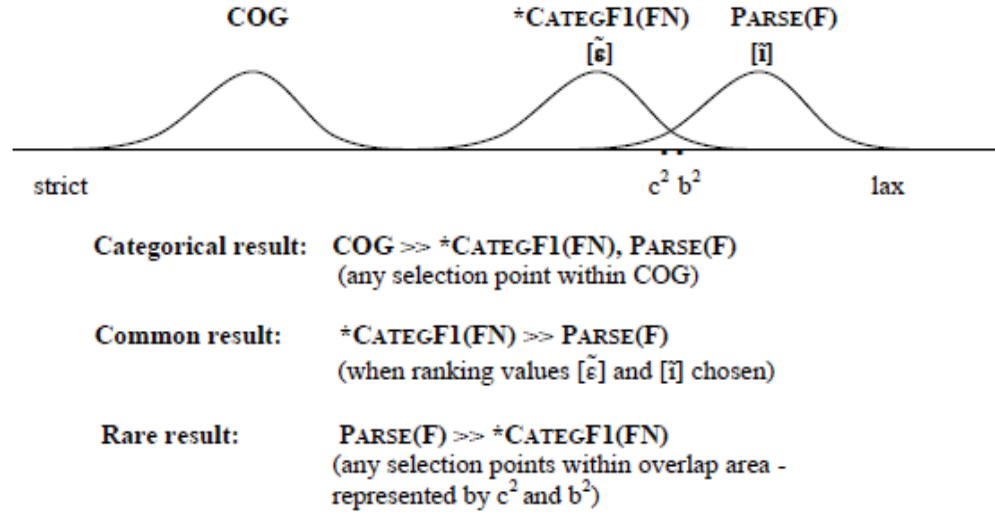
Using the same constraints as Figure (6), we propose Figure (7) to depict the changing linguistic preferences (as they relate to vowel nasalization) for French speakers between the 13th and 15th centuries. In Figure (7), we see that the probabilities of occurrence or ranking values, for these constraints have shifted over time: for a high nasal vowel input, a mid nasal vowel output has become as frequent as a high nasal vowel output. This change is depicted in the GLA by fully overlapping constraints as shown in Figure (7) below.

(7) Partial Constraint Reranking at t_1 : 15th Century Speaker



Finally, Figure (8) represents a further shift in the linguistic preference of French speakers between the 15th and 18th centuries and depicts the near-end state of the sound change in question: the elimination of high nasal vowels in favor of mid-nasal vowels. We emphasize that this sound change occurs due to changing frequencies in the variants selected during the speech event – frequencies which represent the shifting linguistic preferences of each time period. Figure (8) also shows the elision of the nasal consonant which had become the linguistic norm for the majority of speakers at this time; however, we do not show the constraints or variable rankings related to this change.

(8) Full Constraint Reranking at t_2 : 18th Century Speaker



5 Evidence from Sociolinguistics

In the above sections, we show how changes in token frequency and language use may be incorporated into successive grammars; we also show how the process of vowel nasalization in the history of French, including the instantiation and transmission of change, may be modeled using multiple iterations of the GLA. To complement the grammatical analysis, we now turn to evidence from sociolinguistics to provide support for the sound changes modeled in previous sections.

5.1 Social and Stylistic Variation in the History of French

Labov (1966) was one of the first to demonstrate the existence and systematic nature of the social stratification of language variables within a speech community. While social groups differ in the extent to which they realize a particular linguistic variable, all follow a similar pattern of style shifting. Members of all social groups are said to exhibit consensus as to which linguistic variables represent prestige or vernacular forms. In the most casual style of speech, vernacular forms are realized more frequently by the lower social groups and prestige forms by higher social groups. Importantly, however, a range of forms exist in synchronic and stylistic variation at any given time within a language (defined as both as a communal performance and an individual competence).

The task of the historical linguist, then, may be conceived as the inverse of that of the sociolinguist who has identified the linguistic variables of change in progress, but does not yet know their effect on the language system. The historical

linguist, having a specific endpoint in mind, has already identified the effect on the system, but must reconstruct the variables (sociolinguistic and other) which came into play during the period of change.

The role of social factors in the establishment of linguistic norms is apparent in the textual evidence available from the late Middle to the early Modern French periods (ca. 16th - 17th centuries). Much of the evidence of the linguistic variables representing ‘vernacular French’ of the 17th century has been reconstructed from the metalinguistic commentary in the works of the *remarqueurs* (authors expressly concerned with the subject of grammatical precision and style in French) in addition to other forms of prescriptive grammars (dictionaries, systematic grammars). According to Ayers-Bennett (2004:4), while French grammarians writing in the 16th century acknowledged, but remained tolerant of linguistic variation, the explicit division of linguistic forms into categories such as *populaire*, *familier*, *vulgaire*, and *bas* in the 17th century reflects the stigmatization of non-standard forms and the heightened sensitivity to their usage moving from the Middle French to the Modern French periods.

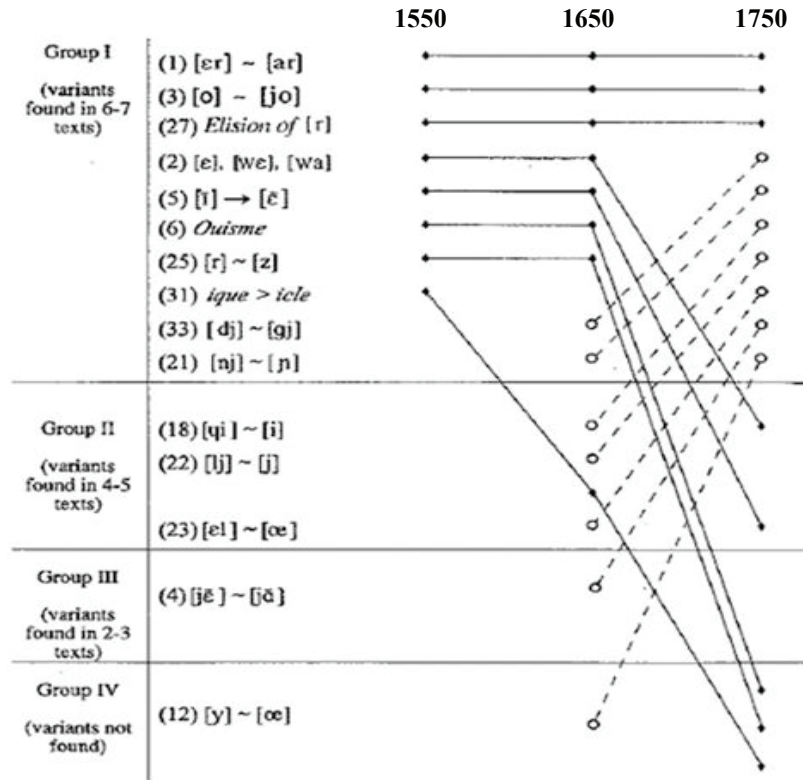
5.2 Salience, Reallocation, Consensus

The concept of salience as developed by Trudgill (1986) and discussed by Lodge (2004) is helpful in identifying the sociolinguistic variables at the origin of high nasal vowel loss in Modern French. Trudgill defines salience, or the level of awareness associated with particular variants, in terms of various factors such as overt stigmatization, linguistic change, phonetic distance, and phonological contrast (1986:11). He proposes that the level of salience of a particular linguistic feature is especially important in contact situations because speakers are more likely to modify the features of which they are most aware.

Labov further explains that when a highly salient feature becomes a symbol of an “overt opposition of social values” and rises above the level of social consciousness, it will likely become a marker or a stereotype (1994:300-1). Once this occurs, one of the two forms may win out and lead to the elimination of the other form over time. At the same time, a feature may remain below the level of social consciousness and become an unconscious socio-stylistic indicator. Following Lodge (2004), lower levels of salience will lead to a process of reallocation from which a new social consensus will evolve.

According to Lodge, one possible measure of a variable’s salience is “its capacity to engender metalinguistic comment.” In order to measure the salience of a number of linguistic variables in the history of French, Lodge (2004:188) proposes a graphical representation of the most salient features in Parisian French from the 16th to the 18th centuries which is shown in Figure (9).

(9) Changes in Saliency 1550-1750 (Lodge 2004:188)



Lodge identifies a number of salient phonological variables (based upon non-standard spelling conventions), calculates the incidence of each variable across a corpus of texts, and plots this graphically in order to create a salience trajectory for each variable. One of these is of critical interest to the current analysis: the lowering of [i] to [ɛ] (#5 in Figure (9)) in vernacular Parisian French.

In Figure (9), we see that the alternation between the high and mid nasal vowels remains highly salient until the mid-17th century and then declines steadily through the middle of the 18th century. Following Labov and Lodge, we may deduce that when this alternation lost its social stigmatization and became a socio-stylistic indicator operating below the level of consciousness for 18th century speakers, the process of reallocation towards a new social consensus, the preference of a mid vowel over a high vowel, was initiated. The establishment of this new consensus is what we propose to have modeled, using the GLA, in figures (6) – (8).

6 Discussion and Conclusions

The preceding analysis asserts that an explanation of change must make reference to both internal and external factors, and that formal models should motivate their conceptual units with theory external evidence. The basic units of this analysis echo theories of transmissibility, such as Evolutionary Phonology (Blevins 2004; cf. de Lacy 2006), situating the source of initial variation among speakers and ascribing a critical role to listeners, as well as incorporating the intergenerational involvement of both. The proposal integrates changes to linguistic norms motivated by social factors, namely sociolinguistic preference expressed through token frequency, thereby capturing the influence of these on the grammar. Additionally, and no less importantly, the proposal ascribes a central role to synchronic variation in the instantiation of change and an equally important role to sociolinguistic preference in the transmission of such change through the intergenerational transfer of grammatical knowledge.

Any reader familiar with recent literature will note that many challenges to our approach may be leveled. Those approaching the question from a sociolinguistic perspective may question the need for a grammatical account in the first place, whereas those OT practitioners may be ill at ease with the inclusion of categorical constraints to capture perceptual knowledge and argue against the application of the GLA to diachrony. Still others, regardless of disciplinary background, might argue that the present analysis is highly idealized, involving abstracted linguistic competence encapsulated in grammars constructed against a relatively rigid blueprint. Rather than ignore these issues, we prefer to acknowledge them and the challenge they represent. By advocating the inclusion of knowledge based on social preference and frequency, the present proposal expands the scope of forces which might inform the grammar and reinvigorates the debate as to how formal models can best account for language change.

References

- Ahn, Sang-Cheol. 2001. An optimality approach to chain shifts: nasal vowel lowering in French. *Language Research* 37:359–375.
- Ayers-Bennett, Wendy. 2004. *Sociolinguistic Variation in Seventeenth-Century France*. Cambridge: Cambridge University Press.
- Beckman, Jill. 1998. Positional Faithfulness. Ph.D. thesis, University of Massachusetts, Amherst, MA.
- Beddor, Patrice Speeter. 1993. The Perception of Nasal Vowels. In M. K. Huffman and R. A. Krakow, eds., *Nasals, Nasalization, and the Velum* (Phonetics

Modeling the Emergence of a Typological Anomaly

- and Phonology 5), 171-196, Orlando: Academic Press.
- Beddor, Patrice Speeter and Sarah Hawkins. 1990. The influence of spectral prominence of perceived vowel quality. *Journal of the Acoustical Society of America* 87: 2684-2704.
- Bell-Berti, Fredericka, and Rena A. Krakow. 1990. Anticipatory Velar Lowering: A Coproduction Account. *Haskins Laboratories Status Report on Speech Research*: 103-104.
- Blevins, Juliette. 2004. *Evolutionary Phonology*. Cambridge: Cambridge University Press.
- Boersma, Paul. 1998. *Functional Phonology: Formalizing the interactions between articulatory and perceptual drives*. Leiden: Holland Academic.
- Boersma, Paul, and Bruce Hayes. 2001. Empirical Tests of the Gradual Learning Algorithm. *Linguistic Inquiry* 32 (1): 45-86.
- Chen, Marilyn Y. 1997. Acoustic correlates of English and French nasalized vowels. *Journal of the Acoustical Society of America* 102: 2360.
- Cohn, Abigail. 1990. The Dual Status of Anticipatory Nasalization in English. *Papers from the Regional Meetings, Chicago Linguistic Society* 1: 111-124.
- de Lacy, Paul. 2006. Transmissibility and the role of the phonological component. *Theoretical Linguistics* 32.2: 185-196.
- Delvaux, Véronique. 1999. A propos des voyelles nasales du français. *La linguistique* 35: 3-23.
- Delvaux, Véronique, Thierry Metens, and Alain Soquet. 2002. French nasal vowels: Acoustic and articulatory properties. *Proceedings of the 7th International Conference on Spoken Language Processing*: 53-56.
- Flemming, Edward. 2002. *Auditory representations in phonology*. London: Routledge.
- Gess, Randall. 2003. On re-ranking and explanatory adequacy in a constraint-based theory of phonological change. In D. E. Holt, ed., *Optimality Theory and Language Change*, 67-90. Dordrecht: Kluwer.

- Homer, Molly. 1998. Conditioning Factors for Progressive and Regressive Nasal Harmony. *Studies in the Linguistic Sciences* 28: 27-39.
- Houlihan, Kathleen, and Gregory K. Iverson. 1979. Functionally Constrained Phonology. In D. Dinnsen, ed., *Current Approaches to Phonological Theory*, 50–73. Bloomington: Indiana University Press.
- Jun, Jongho. 1995a. Perceptual and articulatory factors in place assimilation: An Optimality Theoretic approach. Ph.D. thesis, University of California, Los Angeles, Los Angeles, CA.
- Jun, Jongho. 1995b. Place assimilation as the result of conflicting perceptual and articulatory constraints. *West Coast Conference on Formal Linguistics* 14: 221-237.
- Kirchner, Robert. 1998. *An Effort Based Approach to Consonant Lenition*. Ph.D. thesis, University of California, Los Angeles, Los Angeles, CA.
- Labov, William. 1966. *The Social Stratification of English in New York City*. Washington, D.C.: Center for Applied Linguistics.
- Labov, William. 1994. *Principles of Linguistic Change*, vol. 1. Oxford: Blackwell.
- Lindblom, Bjorn. 1986. Phonetic Universals in Vowels Systems. In J. J. Ohala and J. J. Jaeger, eds., *Experimental Phonology*, 13-44. Orlando: Academic Press.
- Lodge, R. Anthony. 2004. *A Sociolinguistic History of Parisian French*. Cambridge: Cambridge University Press.
- Maeda, Shinji. 1993. Acoustics of Vowel Nasalization and Articulatory Shifts in French Nasal Vowels. In M. K. Huffman and R. A. Krakow, eds., *Nasals, Nasalization, and the Velum* (Phonetics and Phonology 5), 147-169. Orlando: Academic Press.
- Padgett, Jaye. 1997. Perceptual Distance of Contrast: Vowel Height and Nasality. *Phonology at Santa Cruz* 5 : 63-78.
- Prince, Alan, and Paul Smolensky. 1993. Optimality Theory: constraint interaction in generative grammar. *Technical Report 2 of the Rutgers Center for Cognitive Sciences*. Cambridge, MA: MIT Press.

Modeling the Emergence of a Typological Anomaly

- Ruhlen, Merritt. 1974. Some comments on vowel nasalization in French. *Journal of Linguistics* 10: 271-275.
- Russell Webb, Eric, and Travis Bradley. 2009. Sound Change in Stratal Optimality Theory: Articulation, Perception and Rhotic Metathesis. In P. J. Masullo, E. O'Rourke and C. Huang, eds., *Romance Languages. Structure, interfaces, and microparametric variation. Selected papers from the 37th Linguistic Symposium on Romance Languages*, 321-337. Amsterdam: Benjamins.
- Russell Webb, Eric, and Kristen Kennedy Terry. When Sound Change Goes Awry: Accounting for Historical Nasalization in French. Ms., University of California, Davis.
- Sampson, Rodney. 1999. *Nasal Vowel Evolution in Romance*. Oxford: Oxford University Press.
- Steriade, Donca. 2001. *The Phonology of Perceptibility Effects: the P-map and its consequences for constraint organization*. MS, UCLA.
- Trudgill, Peter. 1986. *Dialects in Contact*. Oxford: Blackwell.
- Wright, James T. 1986. The Behavior of Nasal Vowels in the Perceptual Vowel Space. In J. J. Ohala and J. J. Jaeger, eds., *Experimental Phonology*, 45-67. Orlando: Academic Press.
- Wright, Richard. 2001. Perceptual cues in contrast maintenance. In E. Hume and K. Johnson, eds., *The role of speech perception phenomena in phonology*, 251-277. San Diego: Academic Press.
- Wright, Richard. 2004. A review of perceptual cues and cue robustness. In B. Hayes, R. Kirchner and D. Steriade, eds., *Phonetically Based Phonology*, 34-57. Cambridge: Cambridge University Press.

Kristen Kennedy Terry
Eric Russell Webb
Department of French and Italian
University of California Davis
One Shields Avenue
Davis, CA 95616

kmtkennedy@ucdavis.edu
erussell@ucdavis.edu

Myth of the Wug Test: Japanese Speakers Can't Pass it and English-Speaking Children Can't Pass it Either

TERRY KLAFEHN

University of Hawai'i at Mānoa

Introduction

How do Japanese speakers learn and produce inflected verbs? With her classic *wug* test, Berko (1958) concluded that young English-speaking children were able to make productive use of linguistic rules. Since Berko's experimental findings are so widely cited as evidence that regular verbal inflection is accomplished by the use of combinatory rules (stem + affix), it is important to recognize that similar experimental findings have not been demonstrated for languages with different typologies.

Japanese, for example, has an agglutinative (*tabe-sase-rare-na-kat-ta* 'eat-causative-passive-negative-adjective-past') rather than a fusional (*walk + ed*) typology and lacks the binary contrast between regular (*walk/walk-ed*) and irregular (*run/ran, sing/sang, hit/hit*) that characterizes English verbal inflection. Rather, Japanese manifests several (allomorphic) patterns of predictable regularity: vowel-final root versus consonant-final root, with several sub-paradigms, but no bare stems (more precisely roots in Japanese) (Vance 1987). These typological characteristics are problematic for rule-based approaches (RBAs), which generally allow only one productive rule (the default) per inflectional suffix (Prasada and Pinker 1993, Pinker 1999, Pinker and Ullman 2002).

The fact that there are no bare roots in Japanese would require any RBA to provide an additional mechanism allowing Japanese speakers to identify and segment roots for use in combinatory rules. Although there are occasional references in the literature to 'affix stripping,' no detailed account of how this mechanism might apply to Japanese has appeared. In this paper I will make an important distinction between a rule (combination of root and suffix) and analogy (use of a novel item in an existing pattern based on stored exemplars) (Bybee 2010:57). I will suggest that Japanese speakers do not, and most likely cannot, segment Japanese verbs into the necessary roots required in an RBA. Moreover, it appears

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that the productivity of the English-speaking children in Berko's experiment was limited in a very similar way. Taylor (2003), and Berko herself in the original 1958 paper, both concluded that the children analyzed the novel noun *tass* as a plural form because it ended with the final sibilant /s/. When asked to produce the plural form of *tass*, 62% of them confidently replied 'two **tass*' (Berko 1958:163).

Taylor refers to conclusions about productivity based on the *wug* test as "The Great *wug* Hoax". He points out that only 28% of the 4- and 5-year-olds that Berko tested and only 38% of the older children (5 1/2 to 7) could produce the appropriate plural form of the nonce noun *gutch*. Berko's data also show that, although the children knew the past form *melted*, they did not extend the rule to new forms such as *mott*. Only 31% produced *motted*. The widely held belief that combinatory rules are fully productive for young English-speaking children is not consistent with this gradient performance. An RBA offers no explanation for why some regular (but allomorphic) forms of the English plural and past are more productive than others. In the first section of this paper, I reexamine these original Berko findings and RBA assumptions about rule productivity.

In the second section, I consider Bybee's (2001, 2006, 2010) alternative Usage-Based Approach (UBA) to verbal inflection. This UBA is an exemplar model and assumes representation of fully inflected regular forms in memory. New forms are produced by analogical reference to previously experienced utterances (and hence the name Usage-Based). Productivity, the ability to produce novel forms, is determined by the interaction of schematicity (Clausner and Croft 1997, Bybee 2010:67), the degree of dissimilarity of forms in a category, and type-frequency.

In the third section, I outline the details of Japanese verbal allomorphy and examine the only two productive paradigms in modern Japanese. The first paradigm is the irregular verb *suru* 'do' with the extremely low type-frequency of one. *Suru* is highly schematic and imposes no semantic, categorical, or phonological restrictions on novel creations and is therefore highly productive. On the other hand, the only regular Japanese paradigm that shows any current productivity is the consonant-final /r/ root paradigm (*geror-u* 'vomit'). An RBA does not offer any principled explanation for why this one single regular paradigm should emerge as the privileged default (productive) paradigm. In the UBA presented in this paper I will suggest how this productivity can be explained by high type-frequency, and schematicity (openness of the pattern).

The fourth section describes an experimental study. Native speakers of Japanese (57 children and adults) were tested for the ability to produce novel inflected verb forms. Participants were first trained to respond to questions about video cartoons using actual Japanese verbs. In the following test task, they were asked to produce inflected nonce forms. The productivity predicted by a RBA was not observed. Only about 8% of responses from the 21 young children (ages 5 and

6) and about 30% of responses from the 36 older participants (ages 8 to 71) were correct.

The youngest participants avoided novel conjugation by combining the nonce verb provided and inflected forms of the two Japanese ‘do’ verbs, irregular *suru* and regular *yaru*. Given the nonce verb *mururu*, they tended to produce **mururu shita* ‘did *mururu*’ or **mururu yatta* ‘did *mururu*’, rather than the predictable regular form *mut-ta*. Some older participants also followed this strategy, but others clearly made use of different strategies as well. As predicted by a UBA, production was gradient with best performance on high type-frequency verbs (root-final /r/).

This result is of particular interest because regular root-final /r/ verbs show a distinctive root allomorphy *kaer-u* ‘return’/*kaet-ta* ‘returned’, and are sometimes referred to as Japanese ‘strong verbs’, suggesting that they are somehow ‘irregular.’ They are not irregular. On the other hand, root-final vowel verbs /i/ and /e/ show no root-allomorphy: *mi-ru* ‘watch’/*mi-ta* ‘watched’ and *tabe-ru* ‘eat’/*tabe-ta* ‘ate.’ Contrary to what one might expect from an RBA, the more ‘irregular’ verb types (root-final /r/) were actually much more productive than the ‘more regular’ (root-final /e/ and /i/) verb types. The older participants (ages 8-71) showed a consistent tendency to conjugate root-final vowel verbs (*me-ru* and *ri-ru*) as root-final consonant verbs (*mer-u* and *rir-u*).

Another important finding was participant use of already inflected nonce forms as roots. Participants were provided with, and asked to repeat illustrated sentence examples of the inflected non-past form *mur-u*, and the inflected desiderative form *mur-itai* ‘want to *mururu*’, giving clear evidence that the root was *mur*. However, 18 of the 36 older participants (ages 8 to 71) produced some incorrect doubly inflected forms such as **mur-u-tta* ‘past.’ Just as Berko’s English-speaking children appear to have analyzed the word *tass* as a plural form, these Japanese speakers appear to have analyzed *mururu* as a root. Furthermore, it is clear from other productions that many Japanese speakers tend to analyze the word-final sequence *-tta* as a marker of the past. This speaker analysis contrasts with both descriptivist and generativist analyses of Japanese. Both groups of linguists identify the first /t/ in the /tta/ sequence (more precisely /Qta/) as an allomorphic part of the root, for example *kaer-u* ‘return’ and *kaet-ta* ‘returned.’ These experimental results are not unexpected if one accepts the UBA position that the analyzability of linguistic forms (Langacker 1987:292, Bybee 2010:45) is gradient.

These findings, along with a critical reexamination of the original English *wug* test results suggest that a UBA, which includes consideration of schematicity and type-frequency, more adequately accounts for how speakers from two very different language typologies actually represent and produce verbal inflection.

1 Myth of the Wug Test

Pinker (1991:191) citing results from Berko (1958) writes: “When children are old enough to sit still in an experiment, they pass the *wug*-test: After hearing that a man knows how to *rick* or *bing*, they say that yesterday he *ricked* or *binged*.” However, *rick* and *bing* were not the only verbs tested. Berko’s children were also tested on the nonce verbs *gling*, *spow*, *mott* and *bod*. Table 1 gives the complete results on all verbs tested in Berko’s experiment and shows that none of the allomorphic forms of the past were nearly as productive as Pinker suggests.

Table 1. Children’s Performance on the Creation of Novel Past Forms

Present	‘Correct’ Past	Pre-School (n=19)	First-Grade (n=61)
bing [biŋ]	binged/bang [biŋd]/[bæŋ]*	60	85
gling [gliŋ]	glinged/glang [gliŋd]/[glæŋ]*	63	80
rick [rik]	ricked [rikt]	73	73
melt	melted	72	74
spow [spow]	spowed [spowd]	36	59
mot [mat]	motted [matəd]	32	33
bod [bod]	bodded [bodəd]	28	39
ring	rang	0	25

*Both [biŋd]/[bæŋ] and [gliŋd]/[glæŋ] were accepted.

Figures in the columns show the percentages of correct forms produced.

Source: Data derived from Berko (1958:159, 161).

While most of the first-graders did produce *binged/bang* (85%) and *ricked*, (73%), pre-schooler performance on *binged/bang* (only 60%) was much less impressive. Production of *spowed* was only 36% and 59%. And, even though both groups produced the past form *melted* at around 70%, production of this allomorphic pattern with [əd] was generally not extended to *mott/motted* and *bod/bodded*. Even the first-graders scored less than 40% on these two items.

Ingram (1989:440) has proposed that children may need to acquire three different rules, one for each plural allomorph, [s], [z], and [əz]. A similar proposal might be made for the three English past allomorphs [t], [d], and [əd]. However, if there are three separate rules for both the English plural and the English past, it would be disingenuous to claim that English speaking children pass a *wug* test for the past when only two of the three rules for the past, namely [t] and [d], are clearly only partially productive.

Consistent with his RBA claim for the productivity of rules, which apply only to regular verb forms, Pinker (1991:16) is quick to make the following observation: “And the freewheeling children in Berko Gleason’s study were downright

stodgy when it came to irregular forms: Only one of eighty-six turned *bing* into *bang* and only one other turned *gling* into *glang*.”

Inspection of Table 1 shows why the children did not extend the irregular *ring/rang* pattern to the novel verb *bing*. Only 25% of the first-graders and none of the preschoolers produced the irregular past form *rang*. These children could not extend an irregular pattern that they did not have.

There are a number of other details that Pinker and other RBA proponents seem to have missed. Taylor refers to the *wug* myth.

The *wug* test continues to be cited as evidence that even young children are fully able to apply ‘source oriented’ rules to input forms that they have never before encountered. A careful reading of Berko’s 1958 article shows that this conclusion is not warranted. Even Berko herself, it seems, fell prey to this *wug* myth. Writing forty years later, she could state that a pre-school child ‘can produce the plural nonsense word *gutch*, which she has never heard before’ (Gleason and Ratner 1998:380) even though her own research had shown that over 70 per cent of the four- and five-year-olds that she studied could not produce the plural form, and those aged five and a half to seven did not perform much better. (Taylor 2003:315)

Berko tested for productivity of two of the English plural allomorphs, [z] and [əz]. As with the allomorphs of the past, the results show a distinct difference in productivity.

Again, it would be disingenuous to claim that children ‘pass’ a *wug* test if they only produce one of the two allomorphic plural forms tested. The conclusion in the present paper is that both the English past and plural ‘rules’ are not fully productive. Even when children are old enough to sit still in an experiment, they do not “pass” a *wug* test. There is an alternative explanation that does not require combinatory rules of the type proposed in an RBA.

2 Usage-Based Approach to Verbal Inflection

The Bybee UBA model assumed here treats inflected verbs as constructions (Fillmore et al. 1988, Croft 2001, Goldberg 1995, 2006). Constructions result from generalizations over stored exemplars at various levels of abstraction. Constructions do not require segmentation of inflected verbs into roots and suffixes and do not attribute any symbolic status to structural units. Furthermore, unlike the RBA proposed by Pinker, no distinction is made between regular and irregular forms.

Important concepts in this UBA are schema and schematicity. I have bolded the terms in the Bybee references that follow.

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Organizational patterns, **schemas** or categories arise in the lexicon or what has been called the ‘constructicon’ (a lexicon with an inventory of constructions and have no existence independent of the lexical units from which they emerge. (Bybee 2010:73)

Schematicity refers to the degree of dissimilarity of the members of a class. Highly schematic classes cover a wide range of instantiations. A good example is the regular English Past Tense schema that can apply to a verb of any phonological shape. When high schematicity is combined with high type frequency, a maximally productive construction results. A morphological class with a high degree of phonological similarity will be more constrained. Low schematicity will limit productivity, since it limits the candidate items that extension could apply to. (Bybee 2010:67)

Therefore, while the regular English plural and past schemas are much more productive than the irregular schemas for the past and plural, there are also regular sub-schemas that account for the higher observed productivity of some regular categories.

For example, the past allomorph [t] has higher schematicity. It is a more open pattern and can follow [p k tʃ f ʃ]. It also exhibits high type-frequency (many verbs in this category) and results in higher *wug* test productivity (*ricked* 73%).

On the other hand, the past allomorph [əd] has a much lower schematicity. It follows only [t d], has a lower type-frequency (fewer verbs in this category), and results in lower *wug* test productivity (*bodded* less than 40% for both pre-schoolers and first-graders).

3 Japanese Verbal Inflection

Standard linguistic analyses of Japanese verbs (Bloch 1946, Martin 1952, Macawley 1968, Vance 1987) recognize both regular and irregular verb classes. Due to unpredictable root vowel alternations, only two verbs, *kuru* ‘come’ and *suru* ‘do’ are considered to be irregular. Table 3 contrasts irregular *suru* and *kuru* with the regular verb *taberu* ‘eat.’

Table 2. Irregular *kuru* and *suru* and Regular *taberu*

	Nonpast	Past	Negative
‘come’	ku-ru	ki-ta	ko-nai
‘do’	su-ru	si-ta	si-nai
‘eat’	tabe-ru	tabe-ta	tabe-nai

Note: Verbs right-aligned to highlight root alternation.

However, the irregular ‘do’ verb *suru* is highly productive in so-called light verb constructions (Kageyama 1976, 1977) where a noun and *suru* are combined. In these constructions *suru* is used mainly to contribute its inflectional meaning. For example, the sudden and unanticipated resignation of Prime Minister Abe in

2007 led to the coining of the term *Abe-suru* with the meaning ‘to abandon one’s responsibility.’

Regular root-final vowel paradigms like *tabe-ru* (with neither root nor suffix allomorphy) would best fit the *root + suffix* model of an RBA. However, there are no *new* verbs in modern Japanese that exhibit this pattern. This pattern has no productivity.

The only regular verbal paradigm that shows any productivity is the root-final /ɾ/ paradigm. Well attested examples are *sabor-u* ‘cut class,’ *dabur-u* ‘double,’ and *gugur-u* ‘do a Google search.’ While it has been suggested that these root-final /ɾ/ paradigms are limited to loan words, the very recent *geror-u* ‘vomit, hurl’ appears to be a native creation. Another recent native example, attributed to the *Asahi* newspaper, is the verb *Asahir-u* ‘to fabricate or invent something, or to bully.’

The question of why this one regular paradigm should be the only productive paradigm in modern Japanese is addressed in the next section.

3.1 Japanese Verb Type-Frequency

In addition to regular and irregular, the linguistic analyses previously cited agree that there are two types (sub-schemas) of Japanese regular verbs: root-final vowel and root-final consonant verbs. Table 3 and Table 4 give type-frequency counts from the 1995 edition (233,000 entries) of the *Daijirin* dictionary as it appeared at the *Asahi Shinbun* website until around 2006. Note again that there are no bare roots. Japanese dictionary entries appear under the inflected nonpast form. The four inflected forms provided in the tables illustrate root and suffix allomorphy.

Table 3. Summary of Root-Final Vowel Verbs Counted in *Daijirin* Dictionary

Final	Example	Nonpast	Negative	Volitional	Past	Number	%
/e/	‘eat’	tabe-ru	tabe-nai	tabe-yoo	tabe-ta	2,054	31.1
/i/	‘watch’	mi-ru	mi-nai	mi-yoo	mi-ta	260	3.9
irregular	‘do’	su-ru	si-nai	si-yoo	si-ta	1	0.015
irregular	‘come’	ku-ru	ko-nai	ko-yoo	ki-ta	1	0.015
Total						2,316	35

While there were 453 actual entries for *suru*, each *suru* entry can be considered to be a compound consisting of another member and the same *suru* inflection. Therefore *suru* is counted only once in the summary above.

There were also 4 actual entries for root-final /n/ verbs. However, the only /n/ verb in modern Tokyo Japanese is *sin-u* ‘die,’ and it is counted only once in the summary in Table 4.

There are about twice as many root-final consonant verbs (65%) as root-final vowel (35%) verbs. If productivity can be predicted on the basis of (dictionary) verb type-frequency, we would expect the general consonant-final root paradigm with suffixes /u/ ‘nonpast,’ /anai/ ‘negative,’ /ta/ ‘past,’ and /oo/ ‘volitional’ to be

more productive.

Table 4. Summary of Root-Final Consonant Verbs Counted in *Daijirin* Dictionary

Final	Example	Nonpast	Negative	Volitional	Past	Number	%
/r/	‘cut’	kir-u	kir-anai	kir-oo	kit-ta	1,368	20.7
/s/	‘lend’	kas-u	kas-anai	kas-oo	kasi-ta	1,230	18.6
/k/	‘draw’	yom-u	kak-anai	kak-oo	kai-ta	552	8.4
/m/	‘read’	yom-u	yom-anai	yom-oo	yon-da	447	6.8
/w/	‘meet’	a-u	aw-anai	a-oo	at-ta	401	6.1
/t/	‘win’	kat-u	kat-anai	kat-oo	kat-ta	143	2.2
/g/	‘sniff’	kag-u	kag-anai	kag-oo	kai-da	90	1.4
/b/	‘call’	yob-u	yob-anai	yob-oo	yon-da	53	0.8
/n/	‘die’	sin-u	sin-anai	sin-oo	sin-da	1	0.015
Total						4,285	65

There is also a type-frequency explanation for why the root-final /r/ paradigm is the single paradigm that shows any productivity. About 56% of all verbs (root-final vowel 35% and root-final /r/ 21%) appear in the nonpast with the final sequence /ru/. Regardless of whether /r/ is part of the root, as in *kir-u* ‘cut,’ or part of the suffix as in *tabe-ru* ‘eat,’ the final sequence is /ru/. The next highest root-final consonant verb type is root-final /s/ with only about 19% of all verbs.

Another reason why the root-final /r/ paradigm appears to be the prototypical verbal paradigm is explained by the schematicity of the past form. A generativist analysis of Japanese (MacCawley 1968) finds one underlying past form //ta/. A structuralist analysis (Bloch 1970, Martin 1952) finds two allomorphs, /ta/ and /da/. However, both native speakers and learners appear to find three ‘endings’ for the past, /ta/, /da/, and /Qta/.

For example, in a verb like *kir-u* ‘cut’ with the past form *kit-ta*, the segmentation performed by speakers results in the past ‘ending’ -tta. For native speakers this segmentation (analysis) is consistent with Hale’s constraint (Hale 1973), which claims that speakers do not segment words into forms that they cannot pronounce. With the exception of the mora nasal and the second part of a geminate consonant, Japanese does not allow syllable final consonants. Consonant-final roots are unpronounceable. Moreover, the /Qta/ ‘ending’ for the ‘past’ has much greater schematicity. A review of the inflected forms shown in Table 3 and Table 4 shows that the past marker /da/ follows only /n/. The past marker /ta/ follows only vowels /i/ and /e/. But, the ‘ending’ /Qta/ may follow all five Japanese vowels /i e u o a/.

4 Japanese Experimental Study

Monolingual speakers of Japanese were individually tested for the ability to produce inflected forms of novel Japanese verbs (a Japanese *wug* test). The 21 five- and six-year-olds were all attending the same day care center in Daitoku, Tokyo. A native Japanese speaker with linguistic training and previous experience with small children tested them. A second research assistant recruited 34 older children and adults from her neighborhood in Shinurayasu, outside Tokyo. Two additional undergraduate university students were recruited at the Komaba campus of Tokyo University.

4.1 The Training Task

The investigator read an incomplete sentence that appeared under an animated or stationary cartoon figure that appeared on a computer screen. The participant was asked to provide the verb form that would appropriately complete the sentence. The training task was used to confirm that participants knew the correct forms of the exemplar verbs and understood instructions. The investigator supplied a form when a prompt response was not given. At first, the youngest children sometimes supplied possible alternative verbs or noun forms. For example, a few offered the nominal form *gohonyomi* ‘reading of a book’ instead of *yonde iru* ‘reading.’ When prompted, they responded with the appropriate *yonde iru*. Table 5 gives the complete list of exemplar (actual) Japanese verbs used in the training task.

Table 5. Exemplar Verb Forms Elicited in Training Task

Animated Cue	Continuative	Past	Negative	Volitional
girl ‘reading’ book	yon-de iru	yon-da	yom-anai	yom-oo
children ‘watching’ TV	mi-te iru	mi-ta	mi-nai	mi-yoo
girl ‘cutting’ paper	kit-te iru	kit-ta	kir-anai	kir-oo
dog ‘sleeping’	ne-te iru	ne-ta	ne-nai	ne-yoo
boy karate ‘kicking’	ket-te iru	ket-ta	ker-anai	ker-oo
girl ‘wearing’ raincoat	ki-te iru	ki-ta	ki-nai	ki-yoo
girl ‘drawing’ picture	kai-te iru	kai-ta	kak-anai	kak-oo

These exemplar verbs were chosen because they provide a representative sampling of root-final vowel and root-final consonant verbs that appeared in the test task. The youngest children clearly knew all the inflected forms of the exemplar verbs and did not produce any error forms.

4.2 The Test Task

In the test task, a series of additional sentences and repetitions introduced each nonce verb. A translation of the series for the first nonce verb *murū* and the test frame for the continuative form *mutte iru* follows in example (1).

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- (1) This woman is good at *muru*.
 Please say “*muru*.”
 The woman says ‘I want to *muru*.’
 Please say “want to *muru*.”
 Now this woman is going to *muru*.
 What is the woman doing now?
 Oh! She stopped.
 Now, this woman will *muru* again.
 Please say “*muru*” again.
 Now this woman is...



Table 6 gives the nonce verb forms tested in the test task.

Table 6. Nonce Verb Forms Tested in Test Task

Animated Cue	Continuative	Past	Negative	Volitional
woman bouncing on ball	hon-de iru	hon-da	hom-anai	hom-oo
girl spinning hula hoop	ri-te iru	ri-ta	ri-nai	ri-yoo
woman crab walking	mut-te iru	mut-ta	mur-anai	mur-oo
girl doing walkover	me-te iru	me-ta	me-nai	me-yoo
girl doing walkover	met-te iru	met-ta	mer-anai	mer-oo
girl spinning hula hoop	rit-te iru	rit-ta	rir-anai	rir-oo
boy spinning on scooter	hoi-te iru*	hoi-ta**	hok-anai	hok-oo

* *hoite iru* is analogically consistent with both *kaku* ‘draw’/*kaite iru* ‘drawing’ and *iku* ‘go’/*itte iru* ‘is gone.’ Both *hoite iru* and *hotte iru* were accepted.

***hoi-ta* is analogically consistent with *kaita* ‘drew’ and with *itta* ‘went.’ Both *hoita* and *hotta* were accepted.

4.3 Results

Table 7 gives test task results. Best performance was on root-final /r/ verbs *mur-u*, *mer-u*, and *rir-u*. All participants were tested on the verb *muru*. Five- and six-year olds were tested on *muru* and one other verb (8 productions). Older participants were tested on *muru* and four other verbs (20 productions).

Table 7. Correct Nonce Forms Produced by All Participants

Verb	Age 5-6 (n = 21)	Age 8-11 (n = 11)	Age 15-71 (n = 25)
mur-u	7/84 = .08	21/44 = .48	51/100 = .51
mer-u	0/16 = .00	10/20 = .50	20/40 = .50
rir-u	0/8 = .00	6/24 = .25	21/60 = .35
hok-u	4/12 = .33	9/44 = .20	29/100 = .29
hom-u	1/16 = .06	12/44 = .27	27/100 = .27
me-ru	1/24 = .04	0/24 = .00	12/60 = .20
ri-ru	0/8 = .00	0/20 = .00	0/40 = .00
Total	13/168 = 8%	58/220 = 26%	160/500 = 32%

Table 8 gives the mean number of correct responses for all age groups. All 21

of the youngest children produced only 13 correct forms.

Table 8. Mean Number of Correct Nonce Responses

	Age 5-6 (n = 21)	Age 8-11 (n = 11)	Age 15-71 (n = 25)
Mean	13/21 = .62	58/11 = 5.27	160/25 = 6.40

Children (ages 5 and 6) were tested on production of 8 different forms.

Older children and adults were tested on production of 20 different forms.

Table 9 gives all responses by the 7 youngest children, who produced the 13 correct responses. Note that production is not consistent across the paradigm. Children who correctly produced negative *muranai* did not produce the correct past *mutta*. The children were very conservative, often preferring to use known vocabulary rather than novel verbs. For example, rather than inflect the verb *murū*, they described the action they saw with *asi o ugokasite iru* '(She) is moving (her) legs.'

Table 9. 13 Correct Responses by Children Ages 5 and 6 (n = 21)
Only These 7 Children Produced Any Correct Forms

Verb	Continuative	Past	Negative	Volitional
Child 01 Age 6				
mur-u	*asi o ugokasite iru	*muru o site ita	muranai	*yaru
hom-u	*homu o site iru	*yatte ita	homanai	*yaru
Child 03 Age 5				
mur-u	*muru	*muru	muranai	*muru
me-ru	*meru	*meru	*yaranai	*meru
Child 09 Age 6				
mur-u	*aruite iru	*muru	muranai	*yaru
hok-u	*mawatte iru	*mawatte iru	hokanai	no response
Child 14 Age 5				
mur-u	mutte iru	*mutte iru	*muru sinai	muroo
hok-u	hoite iru	*hoku	hokanai	hokoo
Child 17 Age 5				
mur-u	*asi o ugokasite iru	*muru	muranai	*muru
ri-ru	*wakka o mawasite iru	*mawasita	*riranai	*mawasū
Child 20 Age 5				
mur-u	*hasitte iru	*hasitte iru	*sinai	no response
me-ru	mete iru	*yatta	*yaranai	*yaroo
Child 21 Age 5				
mur-u	*muru	*muru	muranai	*muru
me-ru	*meru	*meru	*yaranai	*meru

Correct responses appear in **bold**. Incorrect responses are marked with *.

Table 10 shows that over half of all the responses by the youngest children avoided inflection of the nonce verb by using some form of one of the two Japanese 'do' verbs, irregular *suru*, or regular *yaru*. Examples are **muru sinai* or **sinai* in place of *muranai*. Even many older participants responded this way and several produced only or mostly responses with *suru* or *yaru*.

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Table 10. Responses Using ‘do’ Verbs *suru* or *yaru*.

Age 5-6 (n = 21)	Age 8-11 (n = 11)	Age 15-71 (n = 25)
81/163 = 52%	85/217 = 39%	128/497 = 26%
5 ‘no response’	3 ‘no response’	3 ‘no response’

Table 11 and Table 12 give all responses from two older children and two adults. The older children begin to make use of another pattern that also used by the adults. Some of these children and adults use already inflected nonpast forms as roots. For example, they produce **hom-u-tte iru* rather than *hon-de iru*. In Table 11 and 12 these forms appear in bold.

Table 11. Sample Responses Showing Use of Inflected Nonce Form as a Root by Children Ages 8 to 11

Verb	Continuative	Past	Negative	Volitional
Child 08 Age 9				
mur-u	*notte iru	*notte ita	murandai	*noroo
hom-u	*homutte iru	*homutte ita	homanai	homoo
hok-u	*hokutte iru	*hokutte ita	*hoku sinai	*hoku siyoo
me-ru	*meru o site iru	*meru o site ita	*meru o sinai	*meroo
rir-u	*riru o yatte iru	*riru o yatte ita	*riru o sinai	riroo
Child 10 Age 10				
mur-u	mutte iru	mutta	murandai	muroo
hom-u	*homutte iru	*homutta	*homuranai	*homuroo
hok-u	hotte iru	hotta	*hokuranai	*hokuroo
mer-u	mette iru	metta	mette inai	meroo
ri-ru	*ritte iru	*ritta	*ritte inai	*riroo

These tables also illustrate the very strong tendency for older participants to inflect vowel-final *ri-ru* and *me-ru* as the consonant-final verbs *rir-u* and *mer-u*.

Table 12. Sample Responses Showing Use of Inflected Nonce Form as a Root by Adults (Age 14 to 71)

Verb	Continuative	Past	Negative	Volitional
Adult 01 Age 46				
mur-u	*murutte iru	*murutta	murandai	muroo
hom-u	*homutte iru	*homuttta	*homuranai	*homuroo
hok-u	*hokutte iru	*hokutta	*hokuranai	*hokuroo
me-ru	*mette iru	*metta	*meranai	*meroo
rir-u	*riritte iru	*ririta	rirandai	riroo
Adult 02 Age 42				
mur-u	mutte iru	mutte ita	murandai	muroo
hom-u	*homutte iru	*homutte ita	*homuranai	*homuroo
hok-u	*hokutte iru	*hokutte ita	*hokuranai	*hokuroo
mer-u	mette ire	mette ita	merandai	meroo
ri-ru	*ritte iru	*ritte ita	*rirandai	*riroo

Table 13 shows the tendency of older participants to use the nonpast form as a root. For example, 4 of the older children produced 24 forms of this type.

Table 13. Responses Using Inflected Nonce Form as Root

Age 5-6 (n = 21)	Age 8-11 (n = 11)	Age 15-71 (n = 25)
0/163 = 0%	24/217 = 11%	76/497 = 15%
0 participants	4 participants	14 participants

5 Conclusions

This paper presents experimental evidence demonstrating that native speakers of Japanese do not produce the inflected forms of novel verbs in a way that is consistent with a rule-based approach to verbal inflection. When presented with one form of a novel verb, they did not produce other inflected forms consistent with the existing paradigms of actual Japanese verbs. Assuming that the meaning of the word ‘pass’ is a 60% or better score, the Japanese speakers did not pass the verbal *wug* test. The 5- and 6-year-olds tested clearly understood the task, but produced correct forms only about 8% of the time. Over 50% of their responses made use of the ‘prefab’ ‘do’ verbs *yaru* and *suru*, suggesting that young children are much more conservative in their productions than previously believed. The older children and adults (ages 8 to 71) performed somewhat better but produced ‘correct’ forms only about 30% of the time. If the inflection of verbs already known to Japanese speakers is accomplished by the use of combinatory rules that combine roots and suffixes, there is no reason that those same rules could not be easily extended to novel verbs. This was the basic assumption of the original English *wug* test.

However, a review of the original verb responses from Berko (1958) showed that English-speaking children produced the appropriate [əd] past allomorph less than 40% of the time and produced the appropriate [d] past allomorph, with the test item *spow*, less than 60% of the time. In the analysis of the present paper, the English-speaking children did not pass the test either. And, the notion of fully productive rules is a myth, as suggested by Taylor (2003).

Performance by speakers of both languages was gradient and consistent with the predictions of a usage-based approach. Both English and Japanese productions showed evidence that speaker analysis of word forms differs from formal linguistic analysis. English-speaking children appear to have analyzed *bod* as a past form because it ended with the [d] past allomorph. Japanese speakers appear to have analyzed /Qta/ (rather than /ta/) as a marker of ‘past.’

Rather than rules, this type of speaker analysis is consistent with the use of analogy, the use of a novel item in an existing pattern based on stored exemplars (Bybee 2010:57).

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References

- Berko, Jean. 1958. The child's learning of English morphology. *Word* 14:150-177.
- Bloch, Bernard. 1946. Studies in Colloquial Japanese I: Inflection. *Journal of the American Oriental Society* 66:97-109.
- Bybee, Joan. 2001. *Phonology and Language Use*. Cambridge: Cambridge University Press.
- Bybee, Joan. 2006. The Mind's Response to Repetition. *Language* 82:711-733.
- Bybee, Joan. 2010. *Language, Usage and Cognition*. New York, NY: Cambridge University Press.
- Clausner, Timothy, and William Croft. 1997. The Productivity and Schematicity of Metaphor. *Cognitive Science* 21:278-82.
- Croft, William. 2001. *Radical Construction Grammar: Syntactic Theory in Typological Perspective*. Oxford: Oxford University Press.
- Daijirin. 1995. 2nd edition. Matsumura Akira, ed. Sanseido: Tokyo.
- Fillmore, Charles J., Paul Kay, and Mary C. O'Connor. 1988. Regularity and Idiomaticity in Grammatical Constructions. *Language* 75(1):1-33.
- Gleason, Jean Berko, and Nan Ratner 1998. Language Acquisition. In Jean Berko Gleason and Nan Ratner, eds., *Psycholinguistics*, 347-407. Fort Worth: Harcourt Brace Jaovanovich.
- Goldberg, Adele E. 1995. *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago: University of Chicago Press.
- Goldberg, Adele E. 2006. *Constructions at Work: The Nature of generalization in Language*. Oxford: Oxford University Press.
- Hale, Kenneth 1973. Deep-surface canonical disparities in relation to analysis and change: an Australian example. In T. Sebeok ed., *Current Trends in Linguistics* 11. The Hague: Mouton.

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Ingram, David. 1989. *First Language Acquisition: Method, Description, and Explanation*. Cambridge: Cambridge University Press.

Kageyama, Taro. 1976-1977. Incorporation and Sino-Japanese Verbs. *Papers in Japanese Linguistics* 5, 117-155.

Langacker, Ronald. 1987. *Foundations of Cognitive Grammar: Theoretical Prerequisites*, Vol.I. Stanford, CA: Stanford University Press.

Martin, Samuel, E. 1952. Morphophonemics of Standard Colloquial Japanese. *Supplement to Language, Language Dissertation No. 47*.

McCawley, James. D., 1968. *The Phonological Component of a Grammar of Japanese*. The Hague: Mouton.

Pinker, Stephen. 1991. Regular and Irregular Morphology and the Psychological Status of Rules of Grammar. *Berkeley Linguistics Society* 17:230-51.

Pinker, Stephen. 1999. *Words and Rules: The Ingredients of Language*. New York, NY: Basic Books.

Pinker, Stephen, and Michael Ullman. 2002. The Past and Future of the Past Tense. *Trends in Cognitive Sciences* 6:456-462.

Prasada, Sandeep and Stephen Pinker. 1993. Generalization of Regular and Irregular Morphological Patterns. *Language and Cognitive Processes* 8:1-56.

Taylor, John. 2003. *Cognitive Grammar*. New York, NY: Oxford University Press.

Vance, Timothy. 1987. *An Introduction to Japanese Phonology*. Albany: SUNY Press.

Terry Klafehn
University of Hawai'i at Mānoa
Department of East Asian Languages and Literatures
Moore Hall 363
1890 East-West Road
Honolulu HI 96822

tklafehn@hawaii.edu

A Contrastive Hierarchy Approach to Tungusic and Mongolic Labial Harmony

SEONGYEON KO

Cornell University

1 Introduction

As observed in van der Hulst and Smith (1988), there is a minimal-pair-like contrast between Tungusic and Mongolic languages with respect to labial harmony: Tungusic /i/ is opaque, whereas Mongolic /i/ is transparent to labial harmony. This is illustrated in (1) with ‘Standard’ Ewenki (Tungusic) and Khalkha/Buriat (Mongolic) examples.

- (1) a. Ewenki
 ɔɔɔɔ- ɔɔɔɔ-ɔ (*-a) ‘deer-ABLATIVE’
 ɔɔɔɔ-igla (*-igla) ‘deer-DESTINATIVE’
 b. Khalkha/Buriat
 mɔɔɔɔin- mɔɔɔɔin-ɔɔɔɔ (*-aas) ‘horse-ABLATIVE’

This is a contrast, not just between these two particular languages, but between the two language families, since exactly the same pattern is found in all Tungusic and Mongolic languages known to have labial harmony (see Ko 2012 and references therein for further detail). Thus, a desirable analysis must be able to explain this ‘microvariation’ between the two closely-related language families.

The proposal in this paper is that the minimal contrast between Tungusic and Mongolic languages can be captured in terms of the minimal difference in the contrastive feature hierarchy (Dresher 2009): Tungusic [low] > [coronal] > [labial] > [RTR] (Zhang 1996) vs. Mongolic [coronal] > [low] > [labial] > [RTR]. Under these different hierarchies, Tungusic and Mongolic /i/ receive different feature specifications, which explains their different behaviors.

The organization of this paper is as follows: Section 2 introduces the previous analysis (van der Hulst and Smith 1988) and addresses the problems it faces. Section 3 introduces the frameworks adopted here. Section 4 presents the contras-

tive hierarchy analysis of Oroqen and Khalkha followed by explanation on the labial harmony patterns in these languages. Section 5 concludes the paper.

2 Previous Analysis: van der Hulst and Smith (1988)

The vowel systems of Ewenki and Khalkha are given below in the notation of a version of Dependency Phonology.¹

(2) Ewenki and Khalkha vowels (van der Hulst and Smith 1988)

a. Ewenki

/i/ = Iⁱ /u/ = Uⁱ

/ə/ = Aⁱ

/ɛ/ = AI /a/ = A /ɔ/ = A^u

b. Khalkha

/i/ = Iⁱ /u/ = Uⁱ

/ʊ/ = U

/e/ = AIⁱ /o/ = A^{i u}

/a/ = A /ɔ/ = A^u

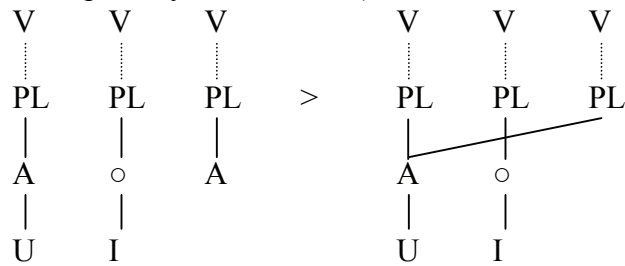
To capture the minimal difference between the two languages, van der Hulst and Smith (1988) relies on the presence and the absence of a governing specification for [I] in Tungusic /i/ and Mongolic /i/ respectively. What is to be noted here is the different phonetic qualities of the ATR counterpart to /a/, i.e., /ə/ in Ewenki and /e/ in Khalkha. Unlike Ewenki /ə/, Khalkha /e/ is realized as a front vowel. Thus it differs from /a/ with respect not only to dependent feature [I] (ATR) but also to governing feature [I] (palatal constriction). Since Khalkha /e/ is the [+ATR] counterpart to /a/ (= |A|), its underlying representation must be |Aⁱ| and the feature [I] is introduced by a redundancy rule which derives governing [I] from dependent [I]. A consequence of this is that, since a [I]-introducing redundancy rule is already available, /i/ can also be represented simply as |.ⁱ|, not |Iⁱ|, underlyingly. Then, as illustrated below, the empty node of Khalkha /i/ does not count as a barrier to the ‘fusional harmony’ (Mester 1986).

¹ The dual interpretation of vocalic features is as follows (van der Hulst and Smith 1988:82):

	<i>Governing Feature</i>	<i>Dependent Feature</i>
[I]	palatal constriction	expanded pharyngeal cavity (i.e., ATR)
[U]	velar constriction	expanded labial cavity (i.e., rounded)
[A]	pharyngeal constriction	expanded oral cavity (i.e., lowered jaw)

Governing values are indicated by upper-case letters while dependent values by lower-case superscripts.

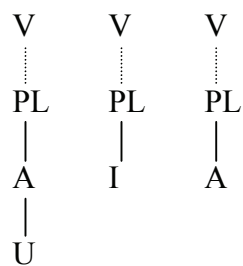
(3) Transparency: Khalkha /i/ (van der Hulst and Smith 1988:84)



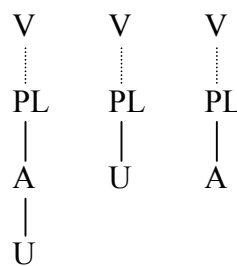
To the contrary, /i/ in Ewenki and /u, ʊ/ in both languages are all opaque to labial harmony, as they have either [I] or [U] as a governing feature which obstructs the fusion of another governing feature [A].

(4) Opacity (van der Hulst and Smith 1988:84-5)

a. Ewenki /i/



b. Ewenki/Khalkha /u, ʊ/



However, this analysis faces several problems. First, it offers a bipartite analysis on the blocking effect of the opaque vowels, assuming two different blocking features: [I] for /i/ and [U] for /u, ʊ/. Second, these proposed blocking features seem to lack phonetic and typological plausibility. To my best knowledge, there is no known phonetic principles as to why frontness or roundness would block the spreading of roundness. Rather, as Kaun (2004) concludes from a typological survey over thirty-three languages, height plays a crucial role in labial harmony as summarized below:

(5) The effects of height on labial harmony (Kaun 2004:88)

- a. The trigger must be nonhigh.
- b. The target must be high.
- c. The trigger and target must agree in height.

Of particular interest is the third principle in (5c), since it has recently been regarded as the cause of the blocking effect in labial harmony by Kaun (1995) and Nevins (2010). Also, it is phonetically grounded: cross-height harmony is avoided “because the lip rounding gesture is not equivalent for high and nonhigh rounded vowels” (Kaun 2004:98ff).

Third, van der Hulst and Smith's analysis cannot properly handle the palatalizing effect of Mongolic /i/ evidenced by palatalized consonants and vowel umlaut. Since the palatalizing feature [I] of /i/ is not specified underlyingly but introduced later by a redundancy rule, we must assume that a redundant value can operate in phonology proper, which is undesirable.

Finally, but more than anything else, the analysis cannot be applied to other Mongolian varieties such as Shuluun Höh Chakhar, a Southern Mongolian, with a richer inventory but the same harmony patterns.

(6) Chakhar vowel inventory (Svantesson et al. 2005:144)

i	y		u
ɪ	ʏ		ʊ
e	ø	ə	o
ɛ	œ	a	ɔ

Unlike Khalkha but rather like Ewenki, Chakhar has /ə/ instead of /e/ as the ATR counterpart to /a/. This means that there is no redundancy rule which would later introduce governing feature [I] to /i/. Without this redundancy rule, the underlying representation of /i/ must bear the specification for [I]. Then, the prediction is that /i/ (as well as its RTR counterpart /ɪ/) would be opaque, not transparent, to labial harmony. However, this prediction is not borne out: Chakhar /i/ is just as transparent as Khalkha /i/.

3 Framework

The present study is based on *contrastive hierarchy* (Dresher 2009) as a theory of feature specification and *fusional harmony* (Mester 1986) as a model of “height-stratified” vowel harmony.

3.1 Contrastive Hierarchy Theory (Dresher 2009)

Under the contrastive hierarchy theory, the contrastive specifications of phonemes are considered to be governed by language-particular feature hierarchies. Instead of traditional feature matrices (7a), we will use hierarchically ordered feature specifications (7b).

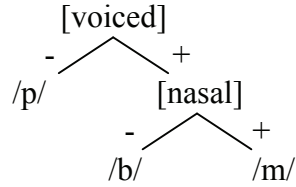
(7) Feature matrix vs. feature hierarchy

a. feature matrix

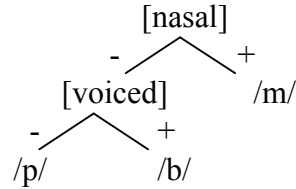
	/p/	/b/	/m/
[voiced]	-	+	+
[nasal]	-	-	+

b. feature hierarchy (Dresher 2009:15-6)

i. [voiced] > [nasal]



ii. [nasal] > [voiced]



As seen in (7b), the same inventories with the same set of features can have different feature hierarchies, allowing for variability (Avery et al. 2008:1). This characteristic of contrastive hierarchy approach is crucial in my analysis, since I will show that the microvariation between Tungusic and Mongolic can be captured in terms of the minimal difference in feature hierarchy.

In Dresher's contrastive hierarchy theory, it is hypothesized that only contrastive features are active in the phonology. The corollary of this with respect to vowel harmony is that a harmony trigger must bear a contrastive specification for the harmonic feature. The Successive Division Algorithm (SDA hereafter) given below is proposed as an algorithm that assigns all and only contrastive features to phonemes.

(8) The Successive Division Algorithm (Dresher 2009:16)

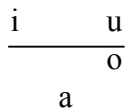
- a. Begin with no feature specifications: assume all sounds are allophones of a single undifferentiated phoneme.
- b. If the set is found to consist of more than one contrasting member, select a feature and divide the set into as many subsets as the feature allows for.
- c. Repeat step (b) in each subset: keep dividing up the inventory into sets, applying successive features in turn, until every set has only one member.

3.2 Fusional Harmony (Mester 1986)

Fusional harmony (Mester 1986) is proposed as a model of 'height-stratified' labial harmony found in, e.g., Yawelmani Yokuts, whereby labial harmony applies only when the trigger and the target share the same height as shown below:

(9) Yawelmani Yokuts (Mester 1986)

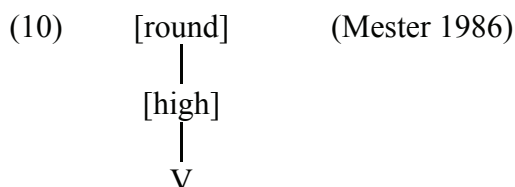
- a. vowel inventory



b. vowel harmony

- | | |
|---|--------------------------------|
| i. /u/ rounds a following /i/ | $u C_0 i \rightarrow u C_0 u$ |
| ii. /o/ rounds a following /a/ | $o C_0 a \rightarrow o C_0 o$ |
| iii. /u/ does not round a following /a/ | $u C_0 a \nrightarrow u C_0 o$ |
| iv. /o/ does not round a following /i/ | $o C_0 i \nrightarrow o C_0 u$ |

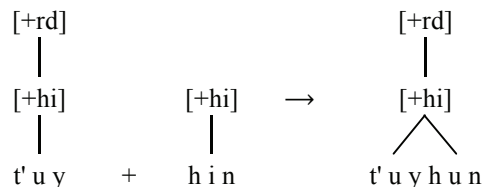
Mester assumes that the [round] tier is dependent on the [high] tier as follows:



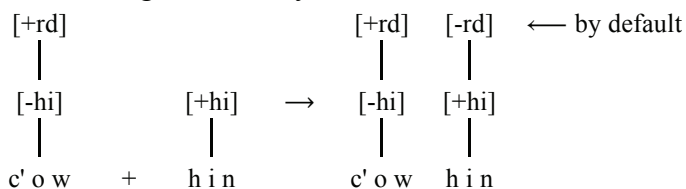
In this model, the effect of [round] spreading is achieved by the fusion of the [high] tier. If the trigger and the target vowels share the same height, fusional harmony applies. If the vowels have a different height, then fusional harmony fails to apply and a default value for [round] is assigned.

(11) Fusional harmony in Yawelmani Yokuts (Mester 1986)

a. same height: harmony applies.



b. different height: harmony fails and a default value is assigned.



4 Analysis

In this section, I present a contrastive hierarchy analysis of Oroqen (a Tungusic) and Khalkha (a Mongolic). Oroqen is selected in place of Ewenki, because Ewenki vowel inventory is rather controversial (de Boer 1996). In contrast, Oroqen has already been analyzed within the framework of contrastive hierarchy (Zhang 1996). Furthermore, Oroqen has almost the same vowel inventory as Khalkha as follows:

(12) Vowel inventory

a. Oroqen

i u
 ʊ
ə o
a ɔ

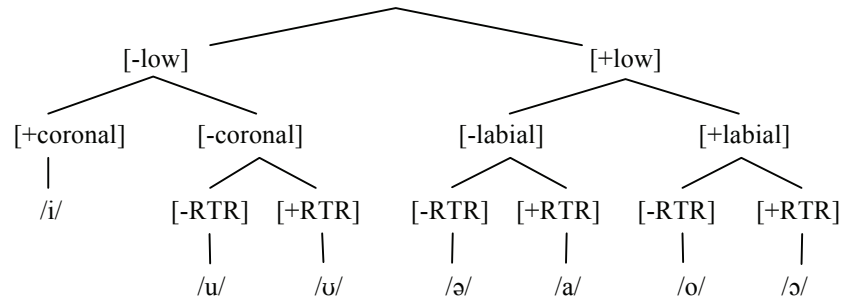
b. Khalkha

i u
 ʊ
e o
a ɔ

The contrastive hierarchies I propose for Oroqen and Khalkha are given in (13) and (14) below, respectively.

(13) Contrastive hierarchy for Oroqen (Zhang 1996)

a. SDA: [low] > [coronal] > [labial] > [RTR]



b. Output specifications

/i/ = [-low, +cor]

/u/ = [-low, -cor, -RTR]

/ʊ/ = [-low, -cor, +RTR]

/ə/ = [+low, -cor, -lab, -RTR]

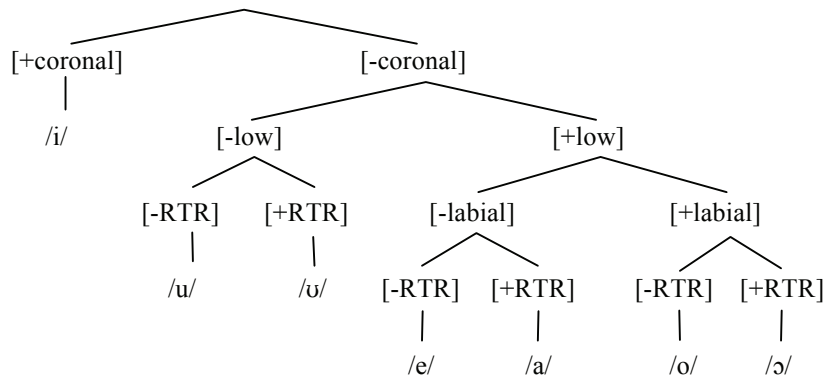
/o/ = [+low, -cor, +lab, -RTR]

/a/ = [+low, -cor, -lab, +RTR]

/ɔ/ = [+low, -cor, +lab, +RTR]

(14) Contrastive hierarchy for Khalkha (Ko 2011)

a. SDA: [coronal] > [low] > [labial] > [RTR]



b. Output specifications

/i/ = [+cor]	/u/ = [-cor, -low, -RTR]
	/ʊ/ = [-cor, -low, +RTR]
/e/ = [-cor, +low, -lab, -RTR]	/o/ = [-cor, +low, +lab, -RTR]
/a/ = [-cor, +low, -lab, +RTR]	/ɔ/ = [-cor, +low, +lab, +RTR]

The only difference between the two contrastive hierarchies lies in the relative ordering between [low] and [coronal]: [low] > [coronal] in Oroqen vs. [coronal] > [low] in Khalkha. As a result, /i/ receives different feature specifications in the two languages: [-low, +cor] in Oroqen vs. simply [+cor] in Mongolic. Since the latter lacks a height specification, it is invisible to the ‘height-stratified’ harmony process.

The evidence for the contrastive status of the proposed features [coronal], [RTR], [labial], and [low] can be summarized as follows:

- (15) Summary of evidence for the contrastive status of features
- | feature | evidence |
|--------------|---|
| a. [coronal] | consonant palatalization, vowel umlaut
Oroqen [j]-formation |
| b. [RTR] | RTR harmony |
| c. [labial] | labial harmony, Oroqen [w]-formation |
| d. [low] | height restriction on the trigger/target of labial harmony
trigger restriction in Oroqen [w]-formation |

First, the contrastive status of [coronal] is evidenced by palatalization in both languages. In Oroqen, /i/ palatalizes preceding /s/, resulting in [ç]. In Khalkha, consonant palatalization is more pervasive. These are illustrated in (16) below.

- (16) Evidence for [coronal]
- a. Oroqen: palatalization of /s/ by /i/ (Zhang 1996:171)
- | | |
|---------------------------------|------------------------------|
| i. [s] before a non-front vowel | ii. [ç] before a front vowel |
| sukə [suxə] ‘axe’ | asi [açi] ‘now’ |
| səkə- [səxə] ‘fill’ | |
| sarbu [sarbu] ‘chopsticks’ | |
- b. Khalkha: palatalized consonants (Svantesson et al 2005:26ff)
- | | |
|-----------------------------|----------------------------|
| i. non-palatalized Cs | ii. palatalized Cs |
| p ^h aɭ ‘splash!’ | p ^h aɭ ‘plate’ |
| ag ‘tight’ | ag ^j ‘wormwood’ |
| cam ‘road’ | čam ‘law’ |
| am ‘mouth’ | am ^j ‘life’ |

The palatalizing effect of /i/ indicates that /i/ is specified for [+cor].

The contrastive status of [RTR], [labial], and [low] is evidenced by the vowel harmony patterns presented below. [RTR] and [labial] are identified by RTR and labial harmony given in (17a) and (17d), respectively. The fact in (17c) and (17d) that only low rounded vowels trigger labial harmony suggests that /u/ and /ʊ/, albeit phonetically rounded, lack specification for [±labial].² [low] is evident from the fact that the allomorphic alternations of both the definite object particle (/wə, -wa, -wo, -wə/) in Oroqen and the instrumental case marker (/eer, -aar, -oor, -oor/) in Khalkha are confined only to low vowels.

- (17) Vowel harmony in Oroqen and Khalkha
- | | Oroqen (Zhang 1996) | Khalkha (Ko 2011) | |
|----|---|-------------------|-----------------|
| a. | RTR harmony | | |
| | bəjun-mə ‘moose-DEF.OBJ’ | et-eer | ‘item-INST’ |
| | ɬaaka-wa ‘thing-DEF.OBJ’ | at-aar | ‘devil-INST’ |
| b. | If /i/ is the only stem vowel, non-RTR suffix is selected | | |
| | irgi-wə ‘tail-DEF.OBJ’ | it-eer | ‘strength-INST’ |
| c. | high rounded Vs: RTR harmony, but no labial harmony | | |
| | kuwun-mə ‘cotton-DEF.OBJ’ | ut-eer | ‘day-INST’ |
| | ʊruun-ma ‘hoof-DEF.OBJ’ | ʊt-aar | ‘willow-INST’ |
| d. | low rounded Vs: labial harmony | | |
| | təŋko-wo ‘window-DEF.OBJ’ | ot-oor | ‘feathers-INST’ |
| | ɔɔ-wə ‘fish-DEF.OBJ’ | ɔt-oor | ‘star-INST’ |

/i/ is transparent to RTR harmony in both languages, which indicates that /i/, albeit phonetically advanced, lacks specification for [±RTR].

- (18) /i/ is transparent to RTR harmony
- | | | |
|----|--|---|
| a. | Oroqen (Zhang 1996) | |
| | nəkin-nə ‘sweat-PAST’ | tari-wa ‘that-DEF.OBJ’ |
| | ulin-mə ‘betrothal gift-DEF.OBJ’ | murin-ma ‘horse-DEF.OBJ’ |
| b. | Khalkha (data from Svantesson et al. 2005) | |
| | te:ɣ-ig-e: ‘gown-ACC-REFL’ | c ^h a:s-ig-a: ‘paper-ACC-REFL’ |
| | su:ɣ-ig-e: ‘tail-ACC-REFL’ | mʊ:r-ig-a: ‘cat-ACC-REFL’ |

With these four contrastive features, we have twenty four logically possible feature orderings. Recall, however, that a legitimate ordering must satisfy all the

² [w]-formation in Oroqen (Zhang 1996:163ff) shows the same contrast between high and low rounded vowels: it is triggered by /oo/ and /ɔɔ/ (i), but not by /uu/ and /ʊʊ/ (ii).

i. oorin [ʷoorin] ‘all’	ii. uu- [uu]/*[ʷuu] ‘blow’
ɔɔ- [ʷɔɔ] ‘do’	ʊʊ- [ʊʊ]/*[ʷʊʊ] ‘saw’

following desiderata given in (19).³

- (19) Desiderata for desired outcome for both Oroqen and Khalkha
- a. D1: /i/ must bear [+coronal] specification.
 - b. D2: /i/ must lack specification for [±RTR].
 - c. D3: /u, ʊ/ must lack specification for [±labial].
 - d. D4: /e(ə), a, o, ɔ/ must form a natural class⁴ (excluding /i, u, ʊ/) with respect to labial specification.

(20) shows a step-by-step procedure whereby SDA is being applied to all logically possible orderings.

- (20) Applying SDA to Oroqen and Khalkha
- a. If [±RTR] first: fails, since it assigns [-RTR] to /i/, contra D2.
 - b. If [±lab] first: fails, since it assigns [+lab] to /u, ʊ/, contra D3.
 - c. If [±low] first: assigns [+low] to /e(ə), a, o, ɔ/ and [-low] to /i, u, ʊ/.
 - i. If [±RTR] second: fails, since it assigns [-RTR] to /i/, contra D2.
 - ii. If [±lab] second: fails, since it assigns [+lab] to /u, ʊ/, contra D3.
 - iii. If [±cor] second: assigns [+cor] to /i/ and [-cor] to /u, ʊ/.
 - d. If [±cor] first: assigns [+cor] to /i/ and [-cor] to all other vowels.
 - i. If [±RTR] second: fails, since it assigns [+RTR] to /u, a, ɔ/ and [-RTR] to /u, e(ə), o/, contra D4.
 - ii. If [±lab] second: fails, since it assigns [+lab] to /u, ʊ/, contra D3.
 - iii. If [±low] second: assigns [+low] to /e(ə), a, o, ɔ/ and [-low] to /u, ʊ/.

Only (20c iii) and (20d iii) satisfy all the desiderata and generate four legitimate orderings which, assuming a fixed ordering [labial] > [RTR],⁵ will be reduced to the following two:

- (21) a. [low] > [coronal] > [labial] > [RTR]
 b. [coronal] > [low] > [labial] > [RTR]

³ The particular way of demonstration in (19) and (20) is borrowed from Nevins (2010:114-5), although Nevins uses it to show that any possible ordering fails to assign the right specifications for Oroch, a Tungusic language. In my view, Oroch vowel harmony can be explained under the contrastive hierarchy [low] > [coronal] > [RTR] > [labial] (cf. Tolskaya 2008). I will not go into further detail, since it would be a digression from the topic of the present paper.

⁴ A natural class is defined here as a set of daughters of the terminal nodes sharing the same node in a given contrastive hierarchy.

⁵ This fixed ordering is used only for an expository purpose, since the relative ordering between [labial] and [RTR] is irrelevant to the main topic, the contrast between Tungusic and Mongolic. However, it is not a trivial matter, since it can be viewed as a key to understand intra-Tungusic and/or intra-Mongolic variation (Ko 2012).

As of now, the above two orderings are equally plausible for both Oroqen and Khalkha. Zhang (1996) and Dresher and Zhang (2005) choose (21a) (at least for Tungusic languages) based on an observation that a two-height distinction is stable throughout the history of the Tungusic languages.

Now we consider the data showing the minimal contrast between Oroqen and Khalkha labial harmony.

(22) Oroqen: a Tungusic (Zhang 1996)

- a. /i/: opaque
 tɔŋɡorin-tɕərə (*-tɕoro) ‘round-DIM’
 tərɕki-wa (*-wɔ) ‘boar-DEF.OBJ’
- b. /u, ʊ/: opaque
 tɕoŋko-duləək (*-dulook) ‘window-PLACE.OF.ORIGIN’
 ɕɔlɔ-dulaak (*-dulɔək) ‘stone-PLACE.OF.ORIGIN’

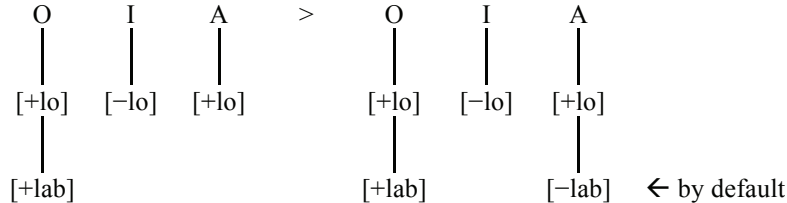
(23) Khalkha: a Mongolic (Svantesson et al. 2005)

- a. /i/: transparent
 poor-ig-o ‘kidney-ACC-REFL’
 xɔɔɭ-ig-ɔ ‘food-ACC-REFL’
- b. /u, ʊ/: opaque
 og-uɭ-ɣe (*-ɣo) ‘to give-CAUS-DIR.PAST’
 ɔr-uɭ-ɣa (*-ɣɔ) ‘to enter-CAUS-DIR.PAST’

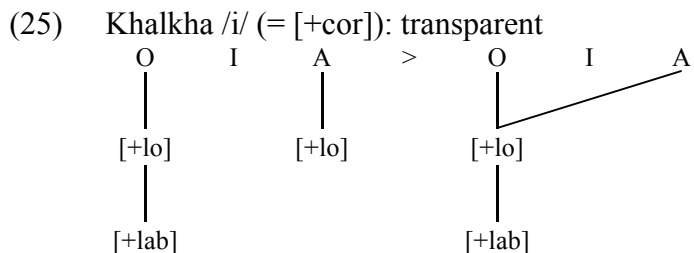
Once we assign the hierarchy in (21a) to Oroqen and that in (21b) to Khalkha, respectively, the difference between the two follows in a straightforward manner. Given the hierarchy [low] > [coronal] > [labial] > [RTR], Oroqen /i/ receives the specification [-low, +coronal]. On the contrary, given the hierarchy [coronal] > [low] > [labial] > [RTR], Khalkha /i/ receives the specification [+coronal]. (Recall the output specifications given in (13) and (14).)

Adopting Mester’s (1986) fusional harmony for a height-stratified harmony, the opacity and transparency of Oroqen and Khalkha /i/ can be represented as in (24) and (25), respectively.

(24) Oroqen /i/ (= [-low, +cor]): opaque⁶



⁶ The opacity of /u, ʊ/ in both languages can be explained in the same way.



The analysis presented in this paper provides better explanations than the previous analysis. First, it offers a unified explanation of the opaque vowels assuming difference in contrastive height specification as the sole cause of the blocking effect by both /i/ (in Oroqen) and /u, ʊ/. Second, the choice of [-low] as the blocking feature fits better for the phonetically and typologically based generalizations on labial harmony (Kaun 2004). Third, /i/ in both languages receives the right specifications with respect to its palatalizing effect. Finally, the same analysis can be applied to other Tungusic and Mongolic languages. For example, the Chakhar vowel system in (6), given the same phonological patterns, would be analyzed to have exactly the same contrastive hierarchy as that of Khalkha. Thus, the minimal difference in the relative ordering between [low] and [coronal] is not just a contrast between Oroqen and Khalkha, but one between Tungusic and Mongolic language families: thus, Tungusic [low] > [coronal] vs. Mongolic [coronal] > [low]. No counterexamples have been found in previous analyses on Tungusic and Mongolic languages (Zhang 1996, Dresher and Zhang 2005; Ko 2011).

5 Conclusion

This paper has shown that the microvariation between Tungusic and Mongolic labial harmony (van der Hulst and Smith 1988) can be modeled in terms of the minimal difference in the contrastive hierarchy (Dresher 2009), i.e., Tungusic [low] > [coronal] > [labial] > [RTR] (Zhang 1996) vs. Mongolic [coronal] > [low] > [labial] > [RTR] (Ko 2011). These hierarchies assign the right specifications for the Tungusic ‘opaque’ /i/ and the Mongolic ‘transparent’ /i/. Since Mongolic /i/ receives no contrastive height specification, it is invisible, thus transparent, to the ‘height-stratified’ labial harmony (cf. Mester 1986). The result is a strong piece of empirical support for the contrastive hierarchy approach, as well as a better solution to a well-known problem in the theory of harmony systems.

References

- Avery, Peter, B. Elan Dresher, and Keren Rice. 2008. Introduction. In Avery, Dresher, and Rice, eds., *Contrast in Phonology: Theory, Perception, Acquisition*, 1-8. Berlin: Mouton de Gruyter.
- De Boer, Elisabeth M. 1996. Present State of the Study of Evenki Vowel Harmony. *Proceedings of the 38th Permanent International Altaistic Conference (PIAC)*, 121-133, Wiesbaden, Germany: Harrassowitz.
- Dresher, B. Elan. 2009. *The Contrastive Hierarchy in Phonology*. New York: Cambridge University Press.
- Dresher, B. Elan and Xi Zhang. 2005. Contrast and Phonological Activity in Manchu Vowel Systems. *Canadian Journal of Linguistics* 50(1/2/3/4):45-82.
- Kaun, Abigail. 1995. *The Typology of Rounding Harmony: An Optimality Theoretic Approach*. Ph.D. dissertation, UCLA.
- Kaun, Abigail. 2004. The Typology of Rounding Harmony. In B. Hayes, R. M. Kirchner, and D. Steriade, eds., *Phonetically Based Phonology*, 87-116, Cambridge: Cambridge University Press.
- Ko, Seongyeon. 2011. Vowel Contrast and Vowel Harmony Shift in the Mongolic Languages. In A. Simpson, ed., *Proceedings of the Seventh Workshop on Altaic Formal Linguistics (WAFL 7)*, 187-202, Cambridge, MA: MITWPL.
- Ko, Seongyeon. 2012. *Tongue Root Harmony and Vowel Contrast in Northeast Asian languages*. Ph.D. dissertation, Cornell University.
- Mester, R. Armin. 1986. *Studies in Tier Structure*. Ph.D. dissertation, University of Massachusetts at Amherst.
- Nevins, Andrew. 2010. *Locality in Vowel Harmony*. Cambridge, MA: MIT Press.
- Svantesson, Jan-Olof, Anna Tsendina, Anastasia Karlsson, and Vivan Franzén. 2005. *The Phonology of Mongolian*. New York: Oxford University Press.
- Tolskaya, Inna. 2008. *Oroch Vowel Harmony*. M.A. thesis, University of Tromsø.
- Van der Hulst, Harry G. and Norval Smith. 1988. Tungusic and Mongolian Vowel Harmony: A Minimal Pair. *Linguistics in the Netherlands* 1988:79-88.

Seongyeon Ko

Zhang, Xi. 1996. *Vowel Systems of the Manchu-Tungus Languages of China*.
Ph.D. dissertation, University of Toronto.

Seongyeon Ko
Department of Linguistics
203 Morrill Hall
159 Central Avenue
Cornell University
Ithaca, NY 14853-4701

sk484@cornell.edu

Evidentials and Epistemic Modals in a Causal Event Structure

IKSOO KWON

University of California, Berkeley

Introduction

Human reasoning processes are necessarily based on some stimulus or information that enters human's cognition. Based on the given stimulus or the given information, they predict, for instance, what will come next, infer what has happened, and decide their course of action in the future. In this respect, it is not surprising that languages are equipped with functional devices which encode the experiencer's perception of the stimulus and human's active reasoning processes based on them. Such functional devices are evidentiality (EV, henceforth) and epistemic modality (EM, henceforth).

Chafe (1986) narrowly defines EV to be a linguistic device that indicates information source via which the origo obtains information in question. EM generally refers to a linguistic device that marks the speaker's commitment for validity of what the speaker believes to be true with regard to information in question. In spite of the seemingly transparent definitions of the two functional categories, the relationship between the two categories has been the target of a heated debate for decades and it still seems to be an ongoing issue: a debate on whether or not EVs and EMs should be conflated. For those who claim that the two categories are conflated (this paper names them 'conflationists') have seen EVs as means for qualifying the validity of a proposition (Boas 1911, Chafe and Nichols 1986, Palmer 1986, Willett 1988), whereas for 'non-conflationists,' they have argued that EV must be distinguished from EM (Aikhenvald 2004, De Haan 1999, 2001, Michael 2010).

Each of the approaches has their own strength: Conflationists' claim is supported by evidence that EM readings are usually conveyed by utterances that contain EVs in some languages; Non-conflationists' claim is also supported by evidence that EM reading is not necessarily encoded semantically by EVs in other languages. And it has been generally assumed that if one of the two approaches is taken, it will contradict and undermine the other.

This paper claims, as a third view, that **it is not a matter of separability of the two functional categories, but a matter of which portion of the causal event structure, which embeds both of the categories, is profiled and becomes salient in the construal**. That is, one schematic causal structure can account for the wide range of EV and EM semantics, assuming that specific forms and languages can differ in referring to different part of this schematic structure. In order to provide motivated accounts of the interdependence of EVs and EMs as a conceptual ‘package,’ this study looks into schematic structure of causality, EV, and EM via force dynamics accounts (Sweetser 1990) in depth.

Section 1 overviews the debate between conflationists and non-conflationists and the previous accounts of conceptual structure of epistemic modals, which will be a stepping stone for the discussion of the conceptual interdependence of EVs and EMs. In the following section, I argue that the causal structure underlying Sweetser’s accounts of EMs needs investigating further in depth, in order to accommodate both EVs and EMs in the causal structure. In section 3, based on the specified overall picture of EVs and EMs, this paper proposes a third view that we should consider the whole causal event structure in order to better grasp the interdependence, providing conceptual schematic model for EVs and EMs.

1 Background

This section explores two major issues before proposing another view on the debate: 1) the nature of the debate between conflationists and non-conflationists and 2) the previous accounts of conceptual structure of EMs (Sweetser 1990). The goal of this section is first, to show that both approaches are not fully satisfactory in that the debate is being made without agreement on whether EVs contribute meaning at the propositional level or the illocutionary force level (Speas 2008: 941) and in that the nature of the debate is solely due to the artificial and theoretical assumption that semantics and pragmatics should be separated (Section 1.1). Second, this section also aims to show that EVs and EMs need to be viewed in a broad conceptual picture (in a causal event structure), which has not been discussed thoroughly in the previous accounts (Section 1.2).

1.1 Conflationists vs. Non-conflationists

1.1.1 Conflationists

To begin with, the main claim of conflationists is that whatever the semantics of EV may be, their communicative purposes are epistemic in nature (Atkinson 2004. Chafe and Nichols 1986, Fox 2001, Ifantidou 2001, Kärkkäinen 2003, Palmer 1986, Sakita 2002, Willett 1988; see Michael 2010). The close link between EV and EM is also hinted in Dendale and Tasmowski’s (2002) statement, “[R]eferences to sources of information have been linked closely to attitudes

about the epistemic status of information, because the linguistic markers encoding these two semantic domains are often the same.” If an EV marker semantically encodes direct source of information, for instance, it is natural that the information conveyed by the utterance is more reliable than the one semantically encoded by an indirect EV. In short, EV naturally triggers the origo’s reasoning process, leads the speaker’s process of reasoning from the available premises to his or her conclusion, and eventually qualifies the utterance to be related more or less to EM functionally.

The Korean firsthand EV marker *-te-* makes a supporting example for the claim: when the marker is used, both EV and EM are semantically encoded and pragmatically indefeasible (Kwon 2009). The marker semantically encodes that information that is talked about is directly witnessed or experienced by the speaker:

- (1)* *chelswu-ka kong-ul cha-te-la, kulentey*
 Chelswu-Nom ball-Acc kick-te-ending but
chelswu-lul po-ci-mos-ha-ess-ta
 Chelswu-Acc see-Conn-Neg-do-Ant-Decl.ending
 *“(I directly experienced that) Chelswu kicked the ball, but I didn’t see C.”

Since the EV semantically encodes the firsthand source of information, we can see that the inference is indefeasible, considering that (1) is contradictory. In addition, the marker also indicates that the speaker is sure about the conveyed information:

- (2)* *amato chelswu-ka kong-ul cha-te-la*
 Probably Chelswu-Nom ball-Acc kick-te-ending
 *“(I directly experienced that) Probably, Chelswu kicked a ball.”

Since the focal event has been fully vouched by the speaker, a weak epistemic modal adverbial *amato* ‘probably’ is incompatible. Therefore, the Korean case is a supporting evidence for the conflationist approach, since both EV and EM semantics are semantically coded by the single morpheme. It shows that in some language, there is no need to separate one category from the other and thus, we can infer that the boundary between the two functional categories is far from being clear-cut.

Moreover, the fact that EVs and EMs in languages are reported to functionally overlap with each other cross-linguistically is another supporting generalization for conflationists, because cross-linguistic functional overlap indicates that the two categories are conceptually contiguous. In fact, the functional overlap is witnessed by more than a few linguists in various languages (Tibetan (Garrett

2001), Quechua (Faller 2002), St'át'imcets (Matthewson et al. 2006) inter alia). Thus, conflationists argue that the coupling of EVs and EMs is conceptually natural and unmarked.

The conflationist's argument is, however, vulnerable to the claim that 'to talk about inseparability of the two categories already takes an assumption that there exist two separate categories.' The next sub-section discusses the counterargument in detail.

1.1.2 Non-Conflationists

In section 1.1.1, we have seen that EVs and EMs are conceptually close to each other and that one of them naturally gives rise to sense of the other. However, there are some other languages where only one of the two is encoded and the other is pragmatically implicated. So to speak, some languages do not have the functional overlap necessarily. For instance, Michael (2010) argues that EVs and EMs should not be treated as a single conflated category, since the seemingly plausible overlap might not work in some language. His evidence is found in Nanti quotative: the EM evidenced by quotatives in Nanti is defeasible pragmatic implicature and thus, they can have the opposite effect of increasing responsibility, not necessarily diminishing (Michael 2010):

- (3) Ari nokaNti.
 ari *no=* *kaNt* *-i*
 truly 1S= say -REAL.I
 'Indeed I say.'

Although indirect EVs in general are likely to indicate that information of the focal event is less reliable than direct EVs (because the speaker obtains the information indirectly, i.e., via someone else's hearsay), some languages employ a quotative with the speaker's increased responsibility for the reliability of a proposition as shown in (3). In this respect, non-conflationists claim that EV does not principally play the role of a pragmatic proxy for EM in communicative interaction (Aikhenvald 2004, Davis et al. 2007, DeHaan 1999, 2001, DeLancey 1986, Fasola 2007, Hardman 1986, Lazard 2001, Michael 2010, Plungian 2001). According to them, EV only asserts the presence of evidence, but not evaluates it in any way; EM is evaluative in nature and based on the evaluation assigns a confidence measure to the speaker's utterance, but it does not necessarily encode the source (De Haan 2001). EV just encodes primarily the type of information source, and speaker certainty is either made explicit with a modal expression or determined pragmatically from what is known about that source (Speas 2008: 952).

The critical cue for this claim is, first of all, whether pragmatic implicature

involved in usages of EV is defeasible or not. Since there exists a case where only one of the categories (EV) is semantically encoded, EV and EM do not belong to the same functional category. Even the Korean case where EV and EM are both semantically encoded by a single morpheme is not a problem to them. That is because it is merely a language-specific case where two functional categories used to exist separately, and are grammatically united as such.

Secondly, they argue that the fact that EVs and EMs often have different historical origins in languages supports the claim (De Haan 1999). They stipulated that EM is simply one of the potential sources of EV, which involve deixis, tense/aspect systems, not to mention perception and mirativity (De Haan 2001). Since a diachronic connection between EM and the possible functional ranges is not necessary, they concluded that EVs and EMs do not have to belong to a single functional category. Thirdly, they claim that co-occurrence of EV and EM in some languages shows that they are not members of the same paradigmatic category.

The non-conflationist's claim is still, however, open to some conceptual challenges. Although it is true that the increased responsibility of quotative EV is normally unexpected, it involves more or less the speaker's assessment of the situation, which can still be regarded as EM. What Michael's Nanti example shows is that the EM semantics of the utterance relies on which pronominal reference is utilized, rather than that the quotative's EM sense is cancellable. If the source is the speaker herself, an utterance that contains the quotative marker will naturally qualify its strong epistemic stance. The motivation of the increased responsibility lies with the subjectivity with regard to the usages of the first person pronominal reference, rather than with the separability of the categories.

Moreover, the conflationist's historical claim is not impregnable. With regard to De Haan's claim that EM is only one of the possible routes via which EV can develop, other potential ranges such as deixis, tense, aspect, perception etc. actually involves EM sense more or less. When deictic elements, linguistic tense and aspect properties are coded, the speaker's (epistemic) evaluation will definitely be involved more or less. If it is the case, it would not be easy to argue that EVs are totally discrete from EMs. The third claim regarding the co-occurrence of EV and EM is not conclusive evidence as well for a distinct class of EVs, when considering that some languages allow multiple modals (Speas 2008: 951).

1.1.3 Implications

Both conflationists and non-conflationists do not seem to make impregnable arguments. To conflationists, although it is true that EVs and EMs are united, it is not easy to deny that their concepts do exist separately, before they form a single grammatical category. To non-conflationists, although it is plausible that either of EMs or EVs are not necessarily encoded or implicated in languages, it is an

irresistible fact that EVs and EMs interact very closely and thus, that their functions overlap cross-linguistically. These unsettled definitions of EVs and EMs can be hinted by Speas' (2008:953-954) characterization of the two categories.

Whether Evidentials 'are epistemic modals' depends on how the modal base is related to classification as a modal. If dependence on a modal base entails that an item is a modal, then Evidentials seem to be modals. However, if modals are more narrowly defined as items whose interpretation involves quantification over worlds (or situations), Evidentials do not seem to qualify (Speas 2008:953-954).

Notice that the participants in the debate take it for granted that there exists a clear-cut boundary between semantics (encodability) and pragmatics (implicature). The reason why the debate has been spinning the wheel might be that the debate stems from the theoretical assumption of the artificial demarcation of the two functional categories. When focusing only on defeasibility of a certain function, which is a theoretically loaded way, we might not be able to capture the nature of each category appropriately. This artificial distinction will face a problem to analyze the following data in Imbabura Quechua (Kwon 2010):

(4)a. *Juan shamu-rka-mi*
 Juan come-Perf-**mi**
 'Juan came.'

b. *nyuka mama-mi wacha-ri-rka Seoul-pi.*
 my mother-**mi** born-Ref-Perf Seoul-Loc
 'My mother was born in Seoul.'

-*Mi* in Imbabura Quechua is called a direct EV or validator (EM). It is interesting, however, that (4a) is vague in that it can mean either that the speaker witnessed the focal event (*Juan came, I saw*; direct EV) or that Juan told the speaker that he ran (*Juan came, I heard from him*; EM). In addition, (4b) is uttered, when the speaker was told from her grandfather that her mother was born Seoul. On the surface, it is a marker of inconsistency: the enclitic functions either as a direct EV, a strong EM, or an indirect EV. Faller (2003) draws a conclusion from the similar data that -*mi* should be defined as the best possible evidential marker. The best possible evidence is not always direct visual evidence and 'EV licensing condition' flexibly licenses EM and/or EV functions of the marker upon context.

With the naïve semantic/pragmatic distinction, it does not seem to handle the Imbabura Quechua case, because the characteristic of the marker cannot be defined either without the speaker's optimal assessment or without the speaker's direct experience. In this respect, this paper assumes that what matters should be how the utterance is **construed**, not what the utterance encodes and/or implicates.

So to speak, in order to characterize EVs and EMs, it will be crucial to consider how the experiential origo experiences, evaluates, and reasons within a conceptually serial causal structure.

This paper argues that in order to grasp EVs and EMs, we need to consider the overall causal event structure where semantics of EV and EM arises, instead of employing a theoretical cue of semantic encoding and pragmatic implicature. In fact, EVs and EMs are construed within the series of causal event structure: the speaker's event perception, the speaker's recounting event, and the speaker's reasoning process. What makes EVs or EMs relies on which portion of the causal structure is profiled and coded by linguistic construction. Since the two categories belong to a single causal structure, what the linguistic cues of EV and EM signal overlap with each other, and either of the categories will give rise to the other sense. Hence, to define either of the categories is not to be done independently of the other. In addition, by considering them as overlapping regions of a single causal structure, the fuzzy categories in Quechua can be handled. Based on this reasoning, now let us take a look at the causal event structure in detail.

1.2 Deontic Modals vs. Epistemic Modals

The causal event structure has received much attention by various linguists (Talmy 1981, 1988, Sweetser 1990 inter alias). Especially, the schematic causal structure of EM (and EV, implicitly) in English has been accounted for by Sweetser (1990) by means of Talmy's force dynamics approach (1981, 1988). I will argue that source of information implicitly takes part in the event structure and thus, that we need to analyze the event structure of EM in a more fine-grained sense so that we can account for the implicit EV function in the structure.

Originally, Sweetser (1990:50) observes that EMs are metaphorical extension of root-modal meanings, thanks to our tendency to use the language of the external world to apply to the internal mental world. Furthermore, the metaphorical extension of EMs can be schematized in terms of force and barriers (Talmy 1981, 1988). Examples of weak epistemic modal *may* can be exemplified as follows:

- (4) *John may go.*

“John is not barred by (my or some other) authority from going.”

- (5) *John may be there.*

“I am not barred by my premises from the conclusion that he is there.”

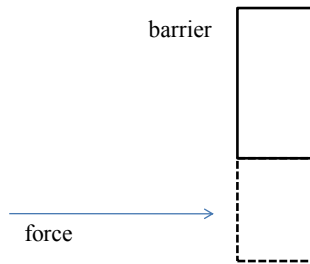


Figure 1. FD-Schema of *May*

As explained in (4) and (5), a physical trajector (John in (4)) or a mental trajector (the origo's reasoning in (5)) is not constrained by social authority in (4) or the given context in (5), which can be schematized as shown in Figure 1. The physical or conceptual trajector is represented to be a force vector in the figure, whereas the social authority or the physical/conceptual constraint to be a barrier. The interaction between the two frame elements determines the strength of EMs. In the similar vein, examples of *must* can be shown as follows:

- (6) You must come home by ten. (Mom said so.)
 "The direct force (of Mom's authority) compels you to come home by ten."
- (7) You must have been home last night.
 "The available (direct) evidence compels me to the conclusion that you were home."

Notice that in example of EM (7), the direct evidence forces the speaker to conclude that the addressee was home just as the direct force makes the speaker to come home by ten in (6). In other words, the direct force that compels the origo to conclude as such stems from the origo's direct perception of evidence. It becomes clearer that EMs involve the origo's direct perception of evidence, when we consider (8):

- (8) (looks at nametag) "You must be Seth Sweetser's sister" (Sweetser 1990: 57).

The evidence, a nametag, which is perceived directly by the speaker, causes the speaker to reason about the addressee's identity and to make an utterance such as (8). In this respect, a force vector in Sweetser's schematic picture needs to be broken down into smaller frame elements such as evidence, the origo's perception, the origo's reasoning, and the origo's inference.

2 Force Revisited: Evidentiality Embedded in Epistemic Modality

This section revisits frame element FORCE and casts a couple of questions: what triggers FORCE in Sweetser's schematic picture? Is it triggered by itself or by an external motive? Who exerts it and who gets influenced? It seems that the previous approaches to EMs are not enough to deal with the raised questions, since other frame elements underlying FORCE such as ORIGIN of the FORCE, causation of the FORCE, motive of the causation and so forth are implicitly represented by a single force vector as shown in figure 1 above. This section aims to break it down into smaller pieces of frame elements and to model it in a more fine-grained sense.

Let us turn our attention to the parallelism between deontic and epistemic modals, which is shown in (6) and (7) above. *Must* in (6) indicates a deontic modal sense, whereas one in (7) does an EM sense. What is interesting is that the two kinds of modals share a common causal structure. In (6), an implicit cause in the given context or an implicit social authority which is inferred from the cause compels the addressee to do some action and in (7), an implicit evidence forces the speaker to reason and thus, to conclude that the addressee was home. Putting it differently, every EM requires that there be evidence, on which in most cases, the speaker's reasoning is based, just as every deontic modality requires that there be cause, on which in most cases, the speaker's authority is based. In this respect, we can see that in order to better grasp the causal event structure shared by deontic and epistemic modal senses, we need frame elements such as a CAUSE, a CAUSEE or a CAUSED EVENT, and CAUSE'S EFFECT or CAUSEE'S intention, which can be schematized in Figure 2.

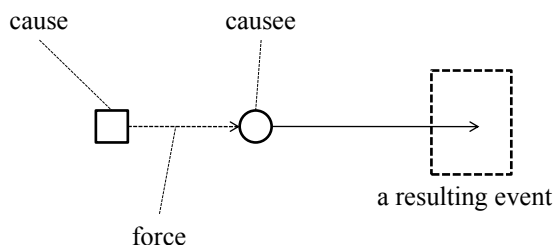


Figure 2. Schematic Structure of Causality

We need CAUSE, because with it, we could characterize motives of the FORCE, i.e. whether the FORCE is self-propelled or is triggered by an external factor. We need CAUSEE, because there must be a conceptual trajectory that the FORCE is exerted on and thus, that travels through conceptual space. The exertion of the FORCE should be represented so that CAUSE and CAUSEE can be linked in the event structure.

With all the detailed frame elements, we can reanalyze the English modal examples that were shown in the previous sections. In the table, CAUSEE is a subject that force is exerted on and CAUSE is represented to be a FORCE EXERTER

in the frame of force dynamics.

MAY	(4)	(5)
Subject that FORCE is exerted on	John	the origo's reasoning
FORCE EXERTER	cause of John's going	the speaker's perception of evidence
FORCE	John's will	the speaker's cognitive processes of inference
BARRIER	whatever reason in the given context, e.g., the speaker's authority	presupposed doubt, suspicion in the given context

Table 1. Frame Elements of *May*

As discussed previously regarding the parallel between deontic modal and epistemic modal, the mapping between frame elements of force dynamics and those of deontic/epistemic modal domains is coherent and systematic. The strong deontic/epistemic modal *must* can be reanalyzed as follows:

MUST	(6)	(7)
Subject that FORCE is exerted on	you	the origo's reasoning
FORCE EXERTER	whatever cause in the given context	the speaker's perception of evidence
FORCE	causee's will, the speaker's authority	the speaker's cognitive processes of inference
BARRIER	none	none

Table 2. Frame Elements of *Must*

In (6), notice that the FORCE can be either CAUSEE's will or the speaker's authority upon the context, since the action of coming home can be construed either to be executed by the subject (e.g., *I must go home because I have lots of things to do*) or to be forced by the speaker's authority (e.g., *I must go home because my mom told me to do so*).

For EMs, it is noted that the motivation of the FORCE (FORCE EXERTER) is the speaker's perception of evidence. Without evidence, whatever its mode of access might be- direct, firsthand, indirect, hearsay, report, inference, or anything, EMs cannot exist. Some can challenge the claim by saying that EMs do not have to semantically encode the speaker's perception of evidence, but as shown in English EM example (6), information of the speaker's perception should be included

in the common ground of the interlocutor's communicative acts.

If the reanalysis of EMs with the detailed frame elements is on the right track, we can schematize the causal event structure of the modals based on the identical schematic picture that is already shown in Figure 2. The representations of each modality can be illustrated as below:

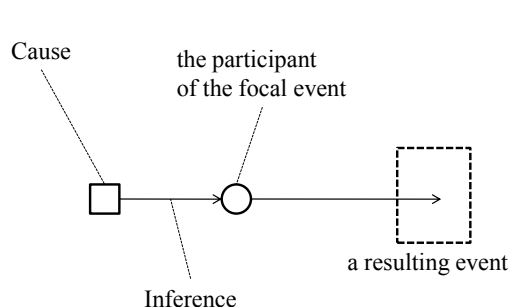


Figure 3. Deontic Modal

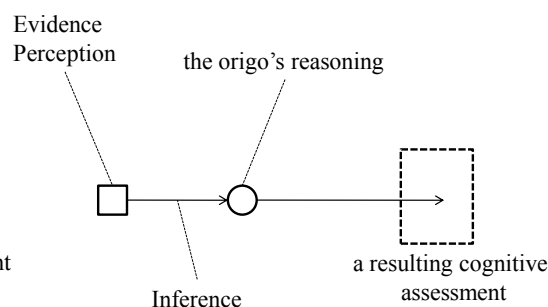


Figure 4. Epistemic Modal

In Figure 3, the deontic modal is very similar to the causal event structure represented in Figure 2 except that CAUSEE is mapped onto the participant of the focal event in the sociophysical world domain. In Figure 4, however, it is worthwhile to take a look at how the frame elements are mapped onto those in EM domain. First, CAUSE is corresponding to the speaker's perception of evidence. As mentioned earlier, without the implicit or explicit perception of evidence, EMs are not construed. CAUSEE corresponds to the origo's reasoning on the focal event. Since the origo has perceived directly/indirectly relevant evidence, he/she begins to reason on the focal event in the given context and thus, reaches the stage where he/she can draw a conclusion. The FORCE exertion portion which is represented by the left arrow in the figure is bound to the origo's inference. The degree of the strength of the origo's inference is closely related to the semantics of the speaker's assessment, which in turn, is closely related to EM meaning.

The image schema of causal event structure of EM has significant implications. In fact, I propose the third view based on them regarding the debate on whether the two functional categories, EVs and EMs, are conflated or not. First, EVs are crucial part for our understanding of EMs: without the speaker's perception of accessible evidence, the speaker would hardly employ EMs in utterance.

Second, EM semantics is a natural consequence which can be given rise to in the causal event chain: if the origo perceives some evidence, it will naturally lead the origo to reason about its implication. This is not saying that there should be conventionalized ways that a certain kind of EM is paired with a certain kind of EV, but saying that since EVs and EMs are contiguously located in the causal event chain, it is natural that their functions overlap with each other.

Third, the debate is an unfortunate consequence of concentrating only on each one of the functional categories within a certain theoretical assumption and of not

considering it within the causal event chain. I argue that the overall causal event chain provides a more comprehensive explication of meanings/ functions of EVs and EMs.

In the following section, this paper will elaborate the view that utilizes the causal event structure in characterizing EVs and EMs and further in providing motivation for typological variance of encodability of EVs and/or EMs.

3 The Third View: a Broader Picture

Not taking either conflationist's or non-conflationist's view, this section proposes another view that EVs and EMs are, in fact, concepts that are dependent of each other. Thus, in order to characterize the functional categories, we need to consider either of the categories within the causal event structure that embeds EVs and EMs. The assumption that this view takes lies in the same vein as those who argue that modal judgment is based on evidence:

“If one does not have any kind of evidence pertaining to a state of affairs, one cannot evaluate its probability” (Nuyts 2001).

“Modal judgments are generally made based on some type of evidence, and one can often infer the speaker's modal judgment from the type of information source indicated” (Roo-ryck 2001).

Furthermore, as discussed in the previous section, the variety of encoding patterns of EVs and/or EMs in languages will not be a problematic issue in this view. They merely result from various language-specific ways of profiling EVs and/or EMs. In a nutshell, what this paper proposes can be shown as follows:

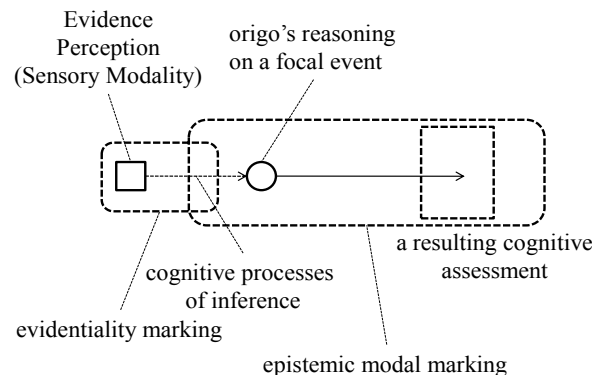


Figure 5. Overlap between EVs and EMs

As represented in Figure 5, EVs are licensed when the speaker tries to profile the portion of perception of evidence, for sure, and/or that of the origo's cognitive

processes of inference. In contrast, if EMs are in use, then the speaker tries to necessarily profile the portion of the origo's cognitive processes of inference and the origo's reasoning process, possibly with the speaker's perception of evidence implied. Putting it differently, among the various events involved in EV/EM constructions such as the speaker's evidence perception, the speaker's reasoning etc., evidence perception and inference are conceptually packaged and profiled by prototypical EVs. In contrast, what EMs signal is that inference and the speaker's reasoning or assessment of the evidence are profiled.

Once we acknowledge that which portion of the causal event structure is profiled and coded by linguistic cues of EVs and EMs varies upon languages, the various patterns of coding EVs-EMs in grammars can also be explained. In fact, within the causal structure, the three types of languages that have been discussed above (Korean, Nanti, and Imbabura Quechua) can be accounted for as shown below. First, the Korean example shows that EVs encode both the speaker's perception of the evidence and the origo's assessment, and it is represented in Figure 6. Semantics of EV and EM is not distinguished in the grammar and thus, the causal structure is profiled as a whole. The Nanti example where EV and EM are reflected separately into its grammar is represented in Figure 7. It shows that EVs only involve the speaker's perception of the evidence and only a part of the origo's belief is involved in the given context. Lastly, Figure 8 represents the case of Imbabura Quechua, where EV licensing condition is determined on context-by-context basis. The flexibility of condition is represented in terms of potential overlaps in the figure.

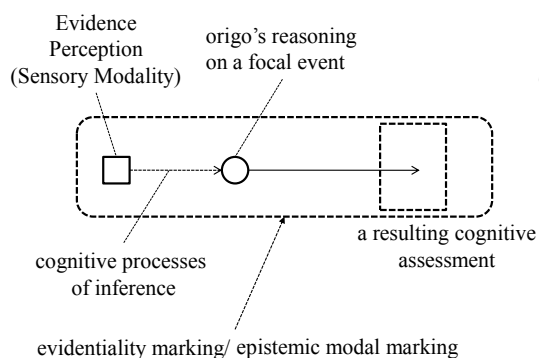


Figure 6. EV and EM in Korean

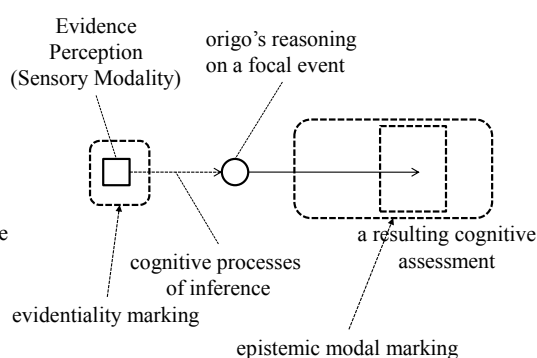


Figure 7. EV and EM in Nanti

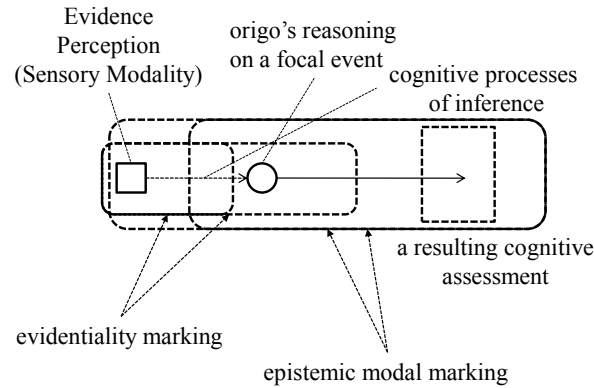


Figure 7. EV and EM in Imbabura Quechua

The fundamental motivation underlying this view is actually endorsed by more than a few researchers (Rooryck 2001a, b, Izvorski 1998, Speas 2008, Matthewson et al. 2006, *inter alia*). They observed that modal judgments are generally made based on some type of evidence, and one can often infer the speaker's modal judgment from the type of information source indicated (Speas 2008: 951). Furthermore, Speas (2008: 953) noted that EVs do not express epistemic necessity or possibility, but they do express information about the modal base, from which possibility or necessity can be inferred in conjunction with contextual information (Speas 2008: 953). What they have observed conforms to this paper's main claim: EVs and EMs are dependent of each other and without either of the two, the other cannot be properly construed.

Thus, on the one hand, conflationists are right in that the two functional categories are entangled and thus, it is never clear at which point the boundary should be demarcated, as we have seen the overlap in Figure 5. On the other hand, non-conflationists are also right from their perspective in that in some cases, EMs are not encoded, but rather be implicated in the context, represented as non-overlapped portions in Figure 6. However, from our view, the grammatical separability is an epiphenomenon of construal of EMs and/or EVs in the causal event structure.

4 Concluding Remarks

This paper explored the ongoing debate between so-called 'conflationists' and 'non-conflationists' with regard to whether EVs and EMs are to be conflated or not. I claimed that as a third view, the debate is not a matter of separability of the two functional categories, but a matter of which portion of the causal event structure, which embeds both of the categories, is profiled, and becomes salient in the construal. In order to prove that the third view is plausible, this paper discussed that either of the approaches is not satisfactory and that the debate is an unfortunate consequence of theoretical assumption of clear-cut distinction be-

tween semantics and pragmatics.

In order to better grasp the functional categories, we need to consider the whole event structure that necessarily embeds both EVs and EMs. In order to provide motivated accounts of the interdependence of EVs and EMs as a conceptual ‘package,’ this study revisited Sweetser’s (1990) schematic structure of EM and reanalyzed the causal event chain that embeds both EVs and EMs in a more fine-grained sense. Based on the broad picture of event structure where EVs and EMs are embedded, this paper proposed a third view that we should consider the whole causal event structure in order to better grasp the interdependence, providing conceptual schematic model for EVs and EMs.

The follow-up question should be an empirical question: which language profiles which portion of the overall causal structure, being influenced by its own way of entrenching and conventionalizing inferential patterns? This paper will leave the question to future research.

References

- Aikhenvald, Alexandra. 2004. *Evidentiality*. Cambridge: Cambridge University Press.
- Atkinson, Paul. 2004. The Discursive Construction of Competence and Responsibility in Medical Collegial Talk. *Communication and Medicine*, 1(1): 13-23.
- Boas, F. 1911. Introduction. Handbook of American Indian Languages, Part I. In Franz Boas, ed., *Smithsonian Institution Bureau of American Ethnology, Bulletin 40*: 1-83. Washington, DC: Government Printing Office.
- Chafe, Wallace. 1986. Evidentiality in English Conversation and Academic Writing. In Chafe, W. and Nichols, J., eds., *Evidentiality: The Linguistic Coding of Epistemology*. Norwood, N.J.: Ablex, 261-272.
- Chafe, W. and Nichols, J. eds. 1986. *Evidentiality: The Linguistic Coding of Epistemology*. Norwood, NJ: Ablex.
- Dandale, Patrick and Liliand Tasmowski. 2001. Introduction: Evidentiality and Related Notions. *Journal of Pragmatics*, 33(3):339-348.
- Davis, C., C. Potts, and P. Speas. 2007. *Evidential Marking, Interrogatives, and the Maxim of Quality*. SALT 17, University of Connecticut, May 11 2007 <<http://people.umass.edu/potts/talks/davis-potts-speas-salt17-slides.pdf>>.

- De Haan, Ferdinand. 1999. Evidentiality and Epistemic Modality: Setting Boundaries. *Southwest Journal of Linguistics* 18:83-101.
- De Haan, Ferdinand. 2001. The Relation between Modality and Evidentiality. *Linguistische Berichte Sonderbeft* 9:201-216.
- DeLancey, S. 1986. Evidentiality and Volitionality in Tibetan. In Wallace Chafe and J. Nichols, eds., *Evidentiality: the Linguistic Coding of Epistemology*, 203-213. Norwood, NJ: Ablex.
- Faller, Martina T. 2002. Semantics and Pragmatics of Evidentials in Cuzco Quechua, PhD diss., Stanford University.
- Faller, Martina T. 2003. The Evidential and Validational Licensing Conditions for the Cusco Quechua Enclitic -Mi. *Belgian Journal of Linguistics* 16:7-21.
[Available from
[http:// www.mpi.nl/world/persons/private/marfal/publicat.htm](http://www.mpi.nl/world/persons/private/marfal/publicat.htm).]
- Fasola, C. 2007. A Unified Semantics for the Quechua Question and Negation Marker - chu. In Amy Rose Deal, ed., *Proceedings of SULA 4: Semantics of Under-Represented Languages in the Americas*, 81-97. Amherst, MA: University of Massachusetts, Graduate Linguistic Student Association.
- Fox, Barbara. 2001. Evidentiality: Authority, Responsibility, and Entitlement in English Conversation. *Journal of Linguistic Anthropology*, 11(2): 167-192.
- Garrett, E. 2001. Evidentiality and Assertion in Tibetan. PhD diss., UCLA.
- Hardman, M. J. 1986. Data Source Marking in the Jaqi Languages. In Wallace Chafe and Johanna Nichol, ed., *Evidentiality: the Linguistic Coding of Epistemology*, 113-116. Norwood, NJ: Ablex.
- Ifantidou, Elly. 2001. *Evidentials and Relevance*. John Benjamins Publishing Company.
- Izvorski, R. 1998. The Present Perfect as an Epistemic Modal. In A. Lawson and E. Cho., ed, *Proceedings of Semantics and Linguistic Theory* 7. Stanford, CA: CSLI.
- Kärkkäinen, Elise. 2003. *Epistemic Stance in English Conversation*. John Benjamins Publishing Company.

Evidentials and Epistemic Modals in a Causal Event Structure

- Kwon, Iksoo. 2009. The Korean Evidential Marker *-te-* Revisited: Its Semantic Constraints and Distancing Effects in Mental Spaces Theory. Paper presented at *Fillmore Fest 2009: Frames and Constructions*, University of California, Berkeley, July 31-August 2, 2009.
- Lazard, G. 2001. On the Grammaticalization of Evidentiality. *Journal of Pragmatics* 33:358-368.
- Matthewson, L., H. Rullmann, and H. Davis. 2006. Evidentials are Epistemic Modals in St'át'imcets. Papers for the 41st International Conference on Salish and Neighboring Languages. *UBC Working Papers in Linguistics*, 18:211-263.
- Michael, Lev. 2010. Rethinking Quotatives, Reported Speech, and Utterance Responsibility: Implications of Nanti Self-Quotation. Paper Presentation at 2010 annual LSA meeting. Baltimore, Maryland. Jan 7-10, 2010.
- Nuyts, Jan. 2001. Subjectivity as an Evidential Dimension in Epistemic Modal Expressions. *Journal of Pragmatics* 33(3):383-400.
- Palmer, F.R. 1986. *Mood and Modality*. Cambridge: Cambridge University Press.
- Plungian, V. A. 2001. The Place of Evidentiality within the Universal Grammatical Space. *Journal of Pragmatics* 33(3):349-357.
- Rooryck, J. 2001a. Evidentiality, Part I. *GLOT International*, 5:125-133.
- Rooryck, J. 2001b. Evidentiality, Part II. *GLOT International*, 5:161-168.
- Sakita, Tomoko. 2002. *Reporting Discourse, Tense, and Cognition*. Oxford: Elsevier.
- Speas, Peggy. 2008. On the Syntax and Semantics of Evidentials. *Language and Linguistics Compass* 2(5):940-965.
- Sweetser, Eve. 1990. *From Etymology to Pragmatics*. Cambridge: Cambridge University Press.
- Talmy, Leonard. 1981. Force Dynamics. Paper presented at conference on Language and Mental Imagery. May 1981, University of California, Berkeley.
- Talmy, Leonard. 1988. Force Dynamics in Language and Cognition. *Cognitive Science* 12:49-100.

Iksoo Kwon

Willet, Thomas. 1988. A Cross-Linguistic Survey of the Grammaticalization of Evidentiality. *Studies in Language*, 12(1):51-97.

Iksoo Kwon
3901 Indian School Rd. NE #D210
Albuquerque, NM 87110

kwoniks@gmail.com

Interrogative Serial Verb Constructions in Kavalan*

DONG-YI LIN
University of Florida

1 Introduction: Interrogative Words as Verbs

There has been much research on the syntactic derivation of interrogative constructions, but the discussion on the syntactic categories of interrogative words is often neglected. One gap in the literature is the possibility that interrogative words can be used as verbs. Hagège (2008:3) defines an interrogative verb as “a kind of word which both functions as predicates and questions the semantic content of this predicate.” His typological study has revealed the morphological, syntactic, and semantic properties that interrogative verbs share crosslinguistically.

According to Lin (2010), interrogative verbs also exist in Kavalan, an Austronesian language in Taiwan, in that they have the same morphosyntactic distribution as verbs. Interrogative verbs in this language occur in the sentence-initial position, take tense/aspect markers, attract pronominal clitics, and are affixed with voice markers.¹ The following examples are for illustration.²

- (1) q<um>uni=isu tangi
 <AV>do.what=2SG.ABS just.now
 ‘What were you doing just now?’

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¹ The so-called voice system in Austronesian languages roughly refers to the concord between a verb and an absolutive-marked noun phrase in terms of the thematic role that this noun phrase plays.

² Glossing conventions are as follows: ABS – Absolutive; AV – Agent Voice; CLF – Classifier; COMP – Complementizer; ERG – Ergative; FUT – Future; GEN – Genitive; HUM – Human; I – Inclusive; LNK – Linker; NEG – Negation; OBL – Oblique; PFV – Perfective; PL – Plural; PV – Patient Voice; SG – Singular.

- (2) tanian-an-su=ti ya kelisiw
where-PV-2SG.ERG=PFV ABS money
'Where did you put the money?'

Note that *quni* ‘do what’ in (1) takes the agent voice marker and *tanian* ‘where’ in (2) takes the patient voice marker.

Lin (2010) also demonstrates that Kavalan interrogative verbs can occur in three different verbal structures: intransitive, transitive, and serial verb constructions. A verb sequencing structure with an interrogative verb is termed Interrogative Serial Verb Construction (ISVC) by Lin (2010). The interrogative verbs in Kavalan that can occur in an ISVC include *naquni* ‘do how,’ *tanian* ‘where,’ and *tani* ‘how many/much,’ as illustrated by the following sentences.

- | | | | | | | |
|-----|---|---------|----------|----------------|-------|------|
| (3) | naquni-an-su | m-kala | ya | sunis | a | ya |
| | do.how-PV-2SG.ERG | AV-find | ABS | child | LNK | that |
| | ‘How do you find that child?’ | | | | | |
| | | | | | | |
| (4) | tanian-an-su | pizi | ya | kelisiw-ta | | |
| | where-PV-2SG.ERG | AV.put | ABS | money-1IPL.GEN | | |
| | ‘Where do you put our money?’ | | | | | |
| | | | | | | |
| (5) | kin-tani-an-su=pa | | p<m>ukun | ya | sunis | |
| | CLF.HUM-how.many-PV-2SG.ERG=FUT | | <AV>beat | ABS | child | |
| | ‘How many (more) children will you beat?’ | | | | | |

All these examples contain an interrogative verb that occupies the sentence-initial position and is followed by a lexical verb.

The present study will provide justification for the analysis of an ISVC as a true Serial Verb Construction (SVC) and further investigate the syntactic relationship between the interrogative verb and the lexical verb in this construction. What syntactic operations are involved in the derivation of an ISVC will also be discussed. The findings suggest that ISVC sentences in Kavalan do not constitute a homogeneous class in terms of the syntactic relationship between the interrogative verb and the lexical verb. The interrogative verb *naquni* ‘do how’ behaves like a raising predicate and takes a lexical VP as its complement. By contrast, an ISVC headed by *tanian* ‘where’ features obligatory control of the theme argument and adjunction of a lexical VP to the interrogative verb.

2 Interrogative Serial Verb Constructions in Kavalan

This section argues that a Kavalan ISVC is a type of SVC based on the crosslinguistic diagnostics of verb serialization. It will also be demonstrated that the

interrogative verb and the lexical verb in an ISVC are not coordinated. The interrogative verb, not the lexical verb, should be analyzed as the main verb.

2.1 Kavalan ISVC as a Type of SVC

A Serial Verb Construction (SVC) can be informally defined as a syntactic construction where two verbs are juxtaposed without being connected by any marker. There is still no consensus about its formal syntactic definition. However, studies on verb serialization in diverse languages have revealed the following crosslinguistic properties of an SVC (Muysken and Veenstra 2006).

- (6) Crosslinguistic Properties of SVCs
 - a. The two verbs in an SVC are not separated by any overt linker, coordinator, or subordinator.
 - b. The two verbs in an SVC are interpreted with the same tense value.
 - c. Only one negator is possible in an SVC.
 - d. The structural relationship between the two verbs or verb phrases in an SVC is subordination instead of coordination.
 - e. The two verbs in an SVC must share an argument.

These crosslinguistic properties of an SVC will serve as the diagnostics to examine whether Kavalan ISVCs belong to an SVC. Our findings suggest that an ISVC in Kavalan conforms to all the properties of an SVC and thus should be construed as a special type of SVC.

(6a) states that there is no overt linker that separates the two verbs in an SVC. Likewise, no overt linker can intervene between the interrogative verb and the lexical verb in a Kavalan ISVC. As exemplified by the following sentences, the interrogative verb and the lexical verb cannot be separated by a linker, coordinator, or complementizer.

- (7) naquni-an-su (*a/sRi/tu) m-kala ya sunis
 do.how-PV-2SG.ERG LNK/and/COMP AV-find ABS child
 ‘nay
 that
 ‘How do you find that child?’

The second diagnostic characteristic of an SVC concerns the temporal relation between the two verbs (6b). The two verbs in an SVC must be interpreted under the same temporal frame. The interrogative verb and the lexical verb in an ISVC must be interpreted with the same tense value as well. In (8), both the interrogative verb and the lexical verb must receive a past tense interpretation. This is

further confirmed by the ungrammaticality of (9), which shows that the lexical verb cannot host its own tense or aspect markers.

- (8) naquni-an-su=ti m-kala ya sunis ‘nay
do.how-PV-2SG.ERG=PFV AV-find ABS child that
‘How did you find that child?’
- (9) *naquni-an-su=ti kala=pa ya sunis ‘nay
do.how-PV-2SG.ERG=PFV find=FUT ABS child that
‘What did you do (in the past) to find the child (in the future)?’

The third criterion (6c) is that only one negator is possible in an SVC. As illustrated by (10), an ISVC can contain one negator at most and it must precede the interrogative verb.

- (10) mai tanian-an-su (*mai) m-nubi ya kelisiw
NEG where-PV-2SG.ERG NEG AV-hide ABS money
‘Where don’t you hide the money?’

As stated in (6d), another distinguishing property of an SVC is that the syntactic relationship between the two verbs is not coordination, but some form of subordination. In other words, the structure of an SVC is distinct from covert coordination where two constituents are coordinated without an overt linker. The following discussion will delineate the syntactic properties of VP-coordination in Kavalan and then show that a Kavalan ISVC is not derived via coordination.

In Kavalan, two verbs or verb phrases can be conjoined with the optional coordinator *sRi*, as demonstrated in (11).

- (11) mu-Rtut (sRi) t<m>ibuq sunis ‘nay
AV-frightened and <AV>fall child that
‘The child was frightened and fell.’
- (12) pukun-an-na (sRi) qaRat-an-na aiku
hit-PV-3ERG and bite-PV-3ERG 1SG.ABS
‘He hit and bit me.’

In addition, the coordinated elements can undergo permutation. Reversing the word order of the two verbs in (11) does not lead to ungrammaticality, nor does this affect the truth conditional meaning of the sentence. Finally, as shown in (11) and (12), the second verb can be affixed with either the agent voice marker or the patient voice marker.

A Kavalan ISVC does not exhibit any of these syntactic properties of a coordinate structure. As already shown in (7), the optional coordinator, *sRi*, is not allowed in an ISVC. Secondly, the interrogative verb and the lexical verb cannot undergo permutation. The interrogative verb occurs in the sentence-initial position and must precede the lexical verb. A sentence where the lexical verb precedes the interrogative verb is ungrammatical, e.g., (13).

- (13) *m-kala naquni-an-su ya sunis a yau
 AV-find do.how-PV-2SG.ERG ABS child LNK that
 ‘How do you find that child?’

Finally, unlike the second verb in VP-coordination, the lexical verb in an ISVC can only take the agent voice marker, but not the patient voice marker, as illustrated below.

- (14) *tanian-an-su nubi-an ya kelisiw-ta
 where-PV-2SG.ERG hide-PV ABS money-1IPL.GEN
 ‘Where did you hide our money?’

This requirement, the AV-restriction on the lexical verb, indicates that the lexical verb in such sentences is defective and does not act like a full-fledged independent verb. In other words, the two verbs in an ISVC are not coordinated, but involve some form of subordination.

Finally, as stated in (6e), the two verbs in an SVC share at least one argument. This is also true of Kavalan ISVCs. In (3), the interrogative verb *naquni* ‘do how’ has an agent argument, *su* ‘2SG.ERG,’ which is also interpreted as the agent of the embedded lexical verb. The interrogative verbs in (4) and (5) share a theme argument with the lexical verbs. The interrogative scope of *tanian* ‘where’ in (4) only covers the theme argument as the intended meaning of the question concerns the location of this theme argument. This theme argument is also interpreted as the theme argument of the lexical ditransitive verb, *pizi* ‘AV.put.’ Likewise, the absolutive noun phrase in (5) is the theme argument of both *tani* ‘how many’ and *pukun* ‘beat.’ The shared arguments in these sentences are all expressed only once.

In conclusion, a Kavalan ISVC exhibits all the crosslinguistic properties of an SVC listed in (6). Therefore, an ISVC in Kavalan should be construed as a special type of SVC.

2.2 Interrogative Verb as the Main Verb in ISVC

As argued in 2.1, the fixed linear order and the AV-restriction on the lexical verb in an ISVC suggest that this construction is not derived via VP-coordination. The

irreversibility of the word order of the two verbs and the AV-restriction on the lexical verb instead indicate that the lexical verb is subordinate to the interrogative main verb.

In a verb sequencing sentence with a main verb and a secondary, subordinate, or embedded verb, the linear order of the two verbs is fixed in that the main verb must precede the secondary verb. For example, in a *try*-type control sentence like (15), the main verb, *paska* ‘try,’ must precede its verbal complement, *qapaR* ‘catch.’ When their word order is reversed, the sentence becomes ungrammatical. Moreover, the secondary verb can only be affixed with the agent voice marker. It observes the AV-restriction and cannot take the patient voice marker, as illustrated by the ungrammaticality of (16).

- | | | | | |
|------|---------------------------|-----------------------|-----------|-------------|
| (15) | <i>paska-an-ku</i> | <i>q<m>apaR</i> | <i>ya</i> | <i>saku</i> |
| | try-PV-1SG.ERG | <AV>catch | ABS | cat |
| | ‘I try to catch the cat.’ | | | |

- | | | | | |
|------|---------------------------|-----------------|-----------|-------------|
| (16) | * <i>paska-an-ku</i> | <i>qapaR-an</i> | <i>ya</i> | <i>saku</i> |
| | try-PV-1SG.ERG | catch-an | ABS | cat |
| | ‘I try to catch the cat.’ | | | |

The second verb in a Kavalan SVC also conforms to the AV-restriction.

The AV-restriction is thus an indication of a non-finite reduced subordinate clause. A Kavalan ISVC is parallel to verb sequencing sentences that contain a subordinate verb phrase in terms of word order properties and the AV-restriction. The interrogative verb in an ISVC behaves like a main verb because it must precede the lexical verb and can take the patient voice marker. By contrast, the lexical verb, which must follow the interrogative verb and observes the AV-restriction, is secondary to the interrogative verb. Please see (13) and (14) in the previous section.

The case-marking pattern in an ISVC further corroborates this argument. In a sentence with a control main verb and its verbal complement like (15), it is the voice marker on the main verb that determines the case of the nominal arguments. In (15), the agent argument receives ergative case and the theme argument absolutive case. This conforms to the case-marking pattern of a patient voice sentence. When the agent argument is marked absolutive and the theme argument is marked oblique as in (17) below, the sentence becomes ungrammatical.

- | | | | | | |
|------|-------------------------|-----------------------|-------------|-----------|-------------|
| (17) | * <i>paska-an</i> | <i>k<m>apaR</i> | <i>aiku</i> | <i>tu</i> | <i>saku</i> |
| | try-PV | <AV>catch | 1SG.ABS | OBL | cat |
| | ‘I try to catch a cat.’ | | | | |

This shows that the agent voice marker on the secondary verb does not determine how the nominal arguments are case-marked.

As for ISVCs, the case-marking pattern is contingent on the patient voice marker on the interrogative verb. Consider the following sentences.

- (18) *tanian-an-su* *m-nubi* *ya* *kelisiw*
where-PV-2SG.ERG AV-hide ABS money
'Where do you hide the money?'

- (19) **tanian-an* *m-nubi* *aisu* *tu* *kelisiw*
where-PV AV-hide 2SG.ABS OBL money
'Where do you hide the money?'

(18) exhibits the case-marking pattern of a patient voice sentence in that the agent argument receives ergative case and the theme argument receives absolutive case. If *m-nubi* 'AV-hide' were the main verb of the sentence, we would expect the agent to receive absolutive case and the theme oblique case, contrary to fact, as demonstrated by the ungrammaticality of (19).

To summarize, the following syntactic properties of Kavalan ISVCs suggest that they are derived via subordination of the lexical verb to the interrogative main verb.

- (20) a. The interrogative verb must precede the lexical verb.
 b. The lexical verb must obey the AV-restriction.
 c. The case-marking pattern of the nominal arguments is contingent on the voice marker affixed to the interrogative verb.

3 The Syntactic Relationship Between the Two Verbs in an ISVC

3.1 Complementation or Adjunction

The discussion so far has revealed that a Kavalan ISVC is not derived via coordination of an interrogative verb and a lexical verb. Having excluded the possibilities of coordination, we investigate whether a Kavalan ISVC involves complementation or adjunction in this section. Our findings suggest that an ISVC headed by *naquni* 'do how' is derived via complementation of a lexical verb phrase to the interrogative verb, whereas the syntactic relationship between *tanian* 'where' and its following lexical verb is adjunction.

The following two lists summarize the properties of complements and adjuncts respectively on the basis of Bierwisch's (2003) and Dowty's (2003) discussion. The properties mainly consist in the syntactic and semantic relationship between a head and its complement/adjunct. They will serve as the diagnos-

tics for the distinction between complementation and adjunction in the following discussion.

- (21) Properties of a complement Y in relation to its head X :
- a. A head X without its complement Y is not well-formed or X is different from [XY] in terms of category or meaning.
 - b. Without Y, the meaning of X is incomplete or incoherent or Y can still be inferred from the linguistic or situational context.
 - c. Y saturates an argument position of X. In other words, X discharges an argument position to Y.
- (22) Properties of an adjunct Y in relation to its head X:
- a. A head X without its adjunct Y is well-formed and X is the same as [XY] in terms of category or meaning.
 - b. Y merely restricts the meaning or denotation of X.
 - c. Y discharges an argument position to X without determining the morphosyntactic properties of [XY].

(21a), (21b), (22a), and (22b) basically capture our informal intuition about complements and adjuncts. That is, a complement can be obligatory, but an adjunct is always optional. This is motivated by the semantic aspects of a complement and an adjunct in that a complement functions to complete the meaning of its head, whereas an adjunct serves to modify the meaning of its head.

The criteria in (21c) and (22c) deserve a more detailed discussion. (21c) states that a head discharges an argument position to its complement. Couched in traditional syntactic terms, a head assigns a Θ -role to its complement or the complement receives a Θ -role from the head. (22c) is mainly motivated by the semantic analysis of adjuncts. The Neo-Davidsonian analysis of adverbial modifiers advocated by Parsons (1990) treats adverbial modifiers as predicates of underlying events. An adjunct like an adverbial modifier is viewed as a type of semantic predicate that also has argument positions to discharge. For example, the adverb *slowly* in *John runs slowly* takes the verb phrase as its argument. While a head discharges an argument position to its complement, it saturates an argument position of its adjunct. Although both a head and an adjunct can discharge an argument position, an adjunct does not determine the morphosyntactic properties and category of the resultant phrase.

With the diagnostics listed in (21) and (22), we can now probe into the syntactic relationship between the interrogative verb and the lexical verb in an ISVC. Consider *naquni*-ISVC first. First of all, the lexical verb in an ISVC headed by *naquni* 'do how' like (3) is obligatory. The deletion of the lexical verb would result in a sentence that has a totally different interpretation. This is illustrated in (23) below. The sentence in (23) does not contain a lexical verb and its

intended meaning is altered. It does not inquire about the method of how to do something, but questions what one does to the theme argument.³

- (23) *naquni-an-su* *ya* *sunis* *a* *yau*
do.what-PV-2SG.ERG ABS child LNK that
'What do you do to that child?'

The relationship between *naquni* and its following lexical verb thus conforms to the first two criteria of complementation in (21a) and (21b). Without the lexical verb, the meaning of *naquni* is incomplete or incoherent.

The diagnostic of argument saturation also indicates that the lexical verb in a *naquni*-ISVC is a complement. Along the lines of the Neo-Davidsonian analysis proposed by Parsons (1990), *naquni* should be semantically analyzed as a predicate that selects for an action. It discharges an argument position to a verb phrase. Although both an adjunct and a head can discharge an argument position, an adjunct can never determine the morphosyntactic properties of the resultant phrase. As argued in the previous discussion, *naquni* functions as the main verb in an ISVC and the voice marker on it determines the case-marking pattern of the nominal arguments. This suggests that the argument saturation property that holds between *naquni* and its following lexical verb must emanate from the head-complement configuration instead of the adjunct-head configuration. The interrogative verb *naquni* is a head and it discharges an argument position to its verbal complement. In conclusion, the three properties of complementation listed in (21) are all observed in a *naquni*-ISVC. The lexical verb phrase in a *naquni*-ISVC should be analyzed as a complement to *naquni*.

The analysis of a *naquni*-ISVC delineated above is not applicable to an ISVC headed by *tanian* 'where,' which exhibits different syntactic and semantic properties concerning the relationship between the interrogative verb and the lexical verb. Unlike the lexical verb in a *naquni*-ISVC, the lexical verb in a *tanian*-ISVC is optional and its deletion does not alter the interpretation of the interrogative verb.

Consider the following sentence where *tanian* is used alone as a verb without a lexical verb.

- (24) *tanian-an-su* *ya* *kelisiw-ta*
where-PV-2SG.ERG ABS money-1IPL.GEN
'Where do you put our money?'

³ If both the lexical verb and the theme argument are deleted, the question can still be interpreted as a do-how question. However, in this case, the question must be understood elliptically. That is, there still must be some salient discourse information about an action or event that can be understood as the complement of *naquni* 'do how.'

Lin (2011) argues that when *tanian* is used as a verb, it undergoes head movement to v_{CAUSE} and that the resultant verbal structure denotes a ditransitive event that can be semantically decomposed as ‘X causes Y to become where.’ This interpretation of verbal *tanian* remains intact regardless of the presence/absence of a lexical verb. Both (4) and (24) denote a ditransitive event and are intended to inquire about the location of the theme argument no matter what action is involved. In other words, without the lexical verb, *tanian* still remains unchanged in terms of its category and logical meaning. This observation corresponds to the first property of adjunction in (22a). The addition of a lexical verb to (24) changes the question to a more specific one, e.g., (4) and (18). In other words, the lexical verb in a *tanian*-ISVC functions like a modifier, specifying the action of the ditransitive event. This further suggests that the lexical verb is an adjunct in accordance with the second criterion of adjunction: an adjunct merely restricts the meaning or denotation of its head.

The semantic relationship between *tanian* and its following lexical verb further confirms that the lexical verb functions as an adjunct to the verbal head, *tanian*. The interrogative verb *tanian* does not semantically select for an event or action. Instead, it selects for a theme argument. Lin (2011) has shown that the use of *tanian* as a verb is restricted to a question that inquires about the location of a theme argument in a ditransitive event. In a question that inquires about the location where an event takes place, *tanian* cannot be used as a verb. This is illustrated by the ungrammaticality of (25).

- (25) **tanian*-an-su q<m>an ya ‘esi na babuy
 where-PV-2SG.ERG <AV>eat ABS meat GEN pig
 ‘Where do you eat pork?’

This restriction on the verbal use of *tanian* suggests that *tanian* discharges an argument position to a theme noun phrase, not to a verb phrase. Therefore, the lexical verb in a *tanian*-ISVC cannot be the complement of *tanian*.

Instead, it is the main interrogative verb *tanian* that saturates an argument position of the VP headed by the ditransitive lexical verb. A ditransitive verb like *pizi* ‘put’ or *nubi* ‘hide’ requires both a theme argument and a location argument. In a sentence like (4) or (18), this ditransitive verb shares a theme argument with *tanian*. However, its location argument is syntactically realized as the main verb of the sentence.

Note that *tanian* cannot be the syntactic complement of this ditransitive verb, or otherwise its movement to v would violate the Head Movement Constraint or the Empty Category Principle. On the assumption that the verbal structure of a ditransitive verb contains a VP-shell (Larson 1988), the theme argument of the verb *nubi* ‘hide’ in (18) is base-generated in the specifier of the lower VP and the location argument in the complement position. The problem of this structure is

that it predicts that *tanian* can never be syntactically realized as a verb if the head of the lower VP is occupied by a lexical verb. The head movement of *tanian* from the lower VP to *v* has to cross an intervening head, i.e., *nubi* ‘hide’ under *V*, and thus will incur a violation of the Head Movement Constraint. This prediction is wrong as *tanian* is still the main verb of an ISVC even if there is a lexical verb.

We are thus faced with a conundrum. The ditransitive verb in a *tanian*-ISVC requires *tanian* to be its location argument, but at the same time, it is impossible for *tanian* to be base-generated as the complement of this ditransitive verb, or otherwise *tanian* cannot undergo head movement to *v*. This issue can be resolved if we adopt the adjunction analysis of the lexical ditransitive verb. As stated in (22c), an adjunct is able to discharge an argument position to its head although it does not determine the morphosyntactic properties of the phrase. The morphosyntactic evidence for the analysis of *tanian* as the main verbal head in an ISVC is quite robust. The only way it can saturate an argument position of the ditransitive verb is to adjoin the ditransitive verb to the verb phrase headed by *tanian*. As an adjunct, the *vP* headed by *nubi* ‘hide’ in (18) can discharge an argument position to the head *tanian*, thereby satisfying the requirement that it should have a location argument.

In conclusion, the lexical verb in a *tanian*-ISVC not only functions like a modifier to verbal *tanian*, but it also assigns a Θ -role to verbal *tanian* simultaneously. All the syntactic and semantic evidence converges on the conclusion that the lexical verb in a *tanian*-ISVC is an adjunct to verbal *tanian*.

To summarize, Kavalan ISVCs do not form a homogenous class in terms of the structural relationship between the interrogative verb and the lexical verb. The interrogative verb *naquni* ‘do how’ takes a verb phrase as its complement, whereas *tanian* ‘where’ takes a theme noun phrase as its complement and a verb phrase as its adjunct.⁴ The following section will present one more piece of evidence for the differentiation between these two types of ISVCs and will argue that they are derived via distinct syntactic operations.

3.2 Raising or Control

The preceding section has argued that a *naquni*-ISVC and a *tanian*-ISVC represent two distinct structures. The former exhibits complementation, but the latter adjunction. There is another semantic difference between the two types of ISVC. While *naquni* shares an agent argument with its verbal complement, *tanian* shares a theme argument with its verbal adjunct. In other words, only *tanian*-ISVCs exhibit theme-argument sharing. This semantic difference corresponds to the ways that the theme arguments in the two types of ISVC are case-marked.

⁴ Please refer to Lin (2011) for a discussion on how interrogative verbs in Kavalan are derived and how they should be analyzed syntactically.

Consider the following two ISVC sentences and pay attention to the case marking of the theme arguments.

- (26) *naquni-an-su* *m-kala* *ya/tu* *sunis*
do.how-PV-2SG.ERG AV-find ABS/OBL child
‘How do you find the child?’
- (27) *tanian-an-su* *m-nubi* *ya/*tu* *kelisiw*
where-PV-2SG.ERG AV-hide ABS/OBL money
‘Where do you hide the money?’

In a *naquni*-ISVC like (26), the theme NP can receive either absolutive case or oblique case. However, the theme NP in a *tanian*-ISVC (27) must be case-marked absolutive. If it receives oblique case, the sentence becomes ungrammatical. This empirical observation on the case-marking of the theme arguments suggests that the theme NP in a *naquni*-ISVC can either stay in the complement clause or move to the matrix clause, whereas the theme NP in a *tanian*-ISVC must be syntactically realized as an argument in the matrix clause.

In (26), when the theme NP is case-marked oblique, it should be analyzed as the object of the embedded verb, which takes the agent voice marker. When it receives absolutive case, it should be syntactically treated as an argument of the matrix verb, which takes the patient voice marker. The following simplified bracketed structures represent the two different syntactic positions that the theme argument in a *naquni*-ISVC can occupy.

- (28) [_{matrix} *naquni*-PV [_{complement} AV-Lexical.Verb OBL-Theme]]
- (29) [_{matrix} *naquni*-PV [_{complement} AV-Lexical.Verb] ABS-Theme]

Regardless of its syntactic position, the absolutive/oblique NP is interpreted as the theme argument of the lexical verb and it does not belong to the argument structure of *naquni*. This thematic feature suggests that *naquni* is a raising verb. The raising analysis can resolve the issue of the syntax-semantics mismatch of (29). Semantically, the theme NP is not an argument of the matrix verb, *naquni*, but it receives absolutive case, which is normally assigned to the theme argument of a PV-marked verb.

We assume that the theme NP in a *naquni*-ISVC can enter the derivation without any Case features or with an absolutive Case feature. In the former situation, it remains in the embedded clause as the complement of the lexical verb and is assigned the default inherent oblique Case in the embedded agent voice clause. This leads to the derivation of (28). Note that it is not necessary for a

patient voice sentence to have an absolutive NP. Kavalan does not have an expletive either.

When the theme NP in a *naquni*-ISVC enters the derivation with an absolutive Case feature, it must move to the matrix clause to check Case. This is because a non-finite clause cannot license absolutive Case in Kavalan. Only a finite T can check absolutive Case. As shown in 2.1, the lexical verb in an ISVC is defective and is not allowed to take any tense or aspect markers. This suggests that the embedded clause in an ISVC is not TP or is not headed by a finite T. In either case, there is no absolutive Case feature in the embedded clause. The theme NP thus has to move to the matrix clause to check absolutive Case against the finite T. The analysis of *naquni* as a raising predicate can be represented by the following bracketed structure.

- (30) [_{matrix} *naquni*-PV ERG=Agent [_{complement} AV-lexical verb *t_i*]
 ABS=Theme_{*i*}]

This raising analysis explains why the theme argument, which is thematically part of the embedded lexical verb, structurally belongs to the matrix interrogative predicate phrase. It is also compatible with the complement analysis of the lexical VP in the preceding section. Extraction out of a complement is allowed, whereas extraction out of an adjunct is forbidden due to the Condition on Extraction Domain.

By contrast, the theme argument in a *tanian*-ISVC is shared by the interrogative verb and the lexical verb, but it can only be syntactically realized as the absolutive NP of the matrix interrogative verb, which is affixed with the patient voice marker. The raising analysis of *naquni*-ISVCs cannot be extended to *tanian*-ISVCs. The lexical verb phrase in a *tanian*-ISVC is an adjunct clause, which is a syntactic island. If the theme NP in (4) were base-generated in the lexical verb phrase and then were extracted out of this phrase, the Condition on Extraction Domain would be violated. The grammaticality of (4) suggests that the theme NP does not undergo this illicit movement.

Moreover, on the Government and Binding approach, the Θ -Criterion stipulates that the relationship between Θ -roles and argument NPs must be bi-unique. Therefore, the only way that the matrix interrogative verb and the lexical verb in (4) or (27) can share an argument is to resort to PRO. In the VP headed by the lexical verb, there is a PRO controlled by the absolutive NP. In other words, a *tanian*-ISVC exhibits adjunct control, i.e., control into an adjunct clause. The postulation of a PRO in a *tanian*-ISVC can account for its semantic property of theme-argument-sharing and also the syntactic distribution of the theme argument.⁵ The following bracketed structure portrays adjunct control in a *tanian*-ISVC.

⁵ The PRO analysis of a *tanian*-ISVC is faced with a theoretical problem regarding the syntactic

- (31) [tanian-PV ERG=Agent [_{adjunct} AV-lexical.verb PRO_i] ABS=Theme_i]

4 Conclusion and Implications

This paper has argued that a Kavalan ISVC should be analyzed as a special type of SVC with an interrogative word as the main verb. The analysis has also revealed that a *naquni*-ISVC and a *tanian*-ISVC exhibit two different subordinate structures and are derived via distinct syntactic operations. The lexical verb in a *naquni*-ISVC is a complement to the interrogative verb and the theme argument of the lexical verb can undergo raising to the matrix clause. By contrast, the lexical verb in a *tanian*-ISVC is an adjunct and the theme argument of *tanian* controls the PRO in the adjoined lexical verb phrase.

This study has both empirical and theoretical implications. Empirically, we have demonstrated that not only can interrogative words be used as verbs but they can also function as the main verb in an SVC (cf. Hagège 2008). It is thus worthwhile to investigate whether interrogative words can also be used as the main verb in an SVC in other languages or this syntactic phenomenon is unique to Kavalan or other Austronesian languages in Taiwan.

The analysis on the structure of ISVCs has significant implications to the theory of argument structure and the syntactic representations of heads, complements, and adjuncts. The syntactic structure of a *naquni*-ISVC is a transparent realization of its semantic structure as per Parsons (1990) in that a modifier is a head and a modifiee is a complement both syntactically and semantically in this particular construction. However, none of the current proposals on the structure of ditransitive sentences can account for the syntactic structure of a *tanian*-ISVC where a location argument is syntactically realized as a verbal head with a ditransitive verb as an adjunct modifier. This suggests that there is no perfect one-to-one correspondence between the syntax and semantics of argument structure. A full discussion on how the current theories of argument structure and syntactic headedness can be modified to accommodate the Kavalan data presented here, especially ISVCs headed by *tanian*, is beyond the scope of the present study, but this research direction is definitely worth pursuing.

position where PRO can occur. On standard analysis, PRO can only occur in the subject position of a non-finite clause. Although the PRO in a *tanian*-ISVC is in a non-finite clause, it does not occupy the subject position, but the object position. Our analysis, however, does not constitute a problem for Movement Theory of Control as adjunct control can be treated as an instance of sideward movement (Hornstein 2003). The discussion on this theoretical issue is beyond the scope of the present paper.

References

- Bierwisch, Manfred. 2003. Heads, Complements, Adjuncts: Projection and Saturation. In E. Lang, C. Maienborn, and C. Fabricius-Hansen, eds., *Modifying Adjuncts*, 113-159, Berlin: Mouton de Gruyter.
- Dowty, David. 2003. The Dual Analysis of Adjuncts/Complements in Categorical Grammar. In E. Lang, C. Maienborn, and C. Fabricius-Hansen, eds., *Modifying Adjuncts*, 33-66, Berlin: Mouton de Gruyter.
- Hagège, Claude. 2008. Towards a Typology of Interrogative Verbs. *Linguistic Typology* 12:1-44.
- Hornstein, Norbert. 2003. On Control. In R. Hendrick, ed., *Minimalist Syntax*, 6-81, Malden, MA: Blackwell Publishing.
- Larson, Richard. 1988. On the Double Object Construction. *Linguistic Inquiry* 19:335-391.
- Lin, Dong-yi. 2010. Interrogative Verbs in Kavalan: Implications for Syntactic Categories. Paper presented at Austronesian Formal Linguistics Association XVII, May 7-9, in Stony Brook.
- Lin, Dong-yi. 2011. A Syntactic Account of Interrogative Verbs in Kavalan. Paper presented at the 47th Annual Meeting of the Chicago Linguistic Society, April 7-9, in Chicago.
- Muysken, Pieter and Tonjes Veenstra. 2006. Serial Verbs. In M. Everaert and H. van Riemsdijk, eds., *The Blackwell Companion to Syntax IV*, 234-270, Malden, MA: Blackwell Publishing.
- Parsons, Terence. 1990. *Events in the Semantics of English: A Study in Subatomic Semantics*. London: Kluwer.

Dong-yi Lin
University of Florida
Department of Linguistics
4131 Turlington Hall
Gainesville, FL 32611-5454

dylin@ufl.edu

Variations in Tsou Numeral Expressions: Multipliers, Exponents, and Related Issues

GUJING LIN

Tzu-Chi University

1 Introduction

The present study investigates numeral expressions in Tsou, focusing on how lower cardinals combine with the two arithmetic strategies of addition and multiplication for composing higher cardinals. The investigation shows that in serial counting, two sets of lower cardinals collaborate for deriving higher cardinals up to the thousands on a decimal basis. The pattern of collaboration works in a way that one set of numerals (set A) marks numbers under ten as well as the hundreds ($x*100$), and the other set (set B) is employed for the tens ($x*10$) and the thousands ($x*1000$). I argue that the use of the two sets of lower cardinals is regulated in relation to the different exponentiations of the base 10.

This paper is structured as follows. Section 2.1 summarizes previous studies on the principles for constructing higher numerals. Section 2.2 presents a brief overview of numerals in Formosan and other Austronesian languages, based on the studies by Blust (2009), Zeitoun, Teng, and Ferrell (2010), and Li (2006). Section 3 deals with the patterns for composing higher numerals in Tsou, with a special focus on how the two sets of lower cardinals display a typologically unusual pattern in which the expression of the multiplier registers the exponentiation of the numeral base (10 in the case of Tsou). Section 4 is the conclusion.

2 Literature Review

2.1 Numeral Systems: Regularities and Variations

Interest in numeral systems rarely fades away from the scholastic circle. Scholars with various theoretical persuasions devote a remarkable amount of attention to the principles for designating number values in languages (Schmidt 1926, Heine 1997, Comrie 2008, to name three). Despite the diverse theoretical leanings of

individual researchers, a near consensus emerges that higher numerals, if relevant in the surveyed language, are typically constructed according to the pattern in which some lower numeral *x* multiplied by a base *n* plus some other numeral *y* (Comrie 2008). Use of subtraction for constructing numerals is also attested, but its occurrence is significantly limited.

Even though the ideal for designating number values is for the above-mentioned *xn+y* formula to be consistently served by the same set of numerals, as illustrated by the Mandarin example (1) below, various departures from the ideal have been reported.

(1) Mandarin

san bai san shi san
three hundred three ten three
“333 (=3*100+3*10+3)”

Of the various departures, a frequently attested type occurs when two (or more) bases serve the *xn+y* pattern, creating seemingly irregular variations among the otherwise regular series. Heine (1997:26) reports that Breton has “17” and “19” expressed by a decimal base with addition (17=10+7; 19=10+9), but the number value “18” is instead constructed on a senary base (18=3*6). Comrie (2008) reports the hybrid decimal-vigesimal system of Basque in which the numbers up to 99 are expressed using a base of 20, whereas the hundreds are constructed with a base of 10 (i.e., the number value 256 is expressed by the pattern *x*100+y*20+z*). In both Breton and Basque, variations in numeral expressions stem from the existence of two (or more) bases.

(2) Basque (Comrie 2008)

berr-eun eta berr-ogei-ta-hama-sei
two-hundred and Two-twenty-and-ten-six
“256” (=2*100+2*20+16)

2.2 Numerals in the Formosan Languages

Number values in the Formosan languages are predominately designated using the decimal system (Li 2006, Zeitoun, Teng, and Ferrell 2010). A similar preference for the decimal system is also observed among other Austronesian languages (Blust 2009). Li (2006) surveys 14 Formosan languages and reports a prevailing use of the decimal system. Of the 14 surveyed languages, Pazih is the only language displaying abundant features of a quinary system, as illustrated in (3). Unlike the pattern in Pazih, numerals in most of the other Formosan languages display features of a decimal system, as illustrated by the data from Amis in (4)

below.¹

(3) Pazih (Li 2006:139, 148-150)

ida	“1”
dusa	“2”
turu	“3”
supat	“4”
xasep	“5”
xaseb-uza	“6 (=5+1)”
xaseb-i-dusa	“7 (=5+2)”
xaseb-i-turu	“8(=5+3)”
xaseb-i-supat	“9(=5+4)”

(4) Amis (Li 2006:139)

cəcay	“1”
tosaʔ	“2”
toloʔ	“3”
səpat	“4”
limaʔ	“5”
ʔənəm	“6”
pitoʔ	“7”
faloʔ	“8”
siwaʔ	“9”
moʔtəp; poloq	“10”

Aside from being predominately decimal-based, numerals in Formosan languages also demonstrate a human/non-human dichotomy (Li 2006). Example (5) below illustrate the numerals for counting human referents in Amis, which derive from the non-human numerals in (4) via Ca-reduplication.²

¹ Amid the general preference for the decimal system, Li notes that the expressions for the number values “6” and “8” have been modified in languages located in northern Taiwan. The expression for “6” in Thao, for instance, is constructed as *ka-turu* “2*3” (*ka* “2 times”; *turu* “three”). The expression for “8” in Amis, to take another example, is expressed using the base of 4. Li concludes that Formosan numerals are predominately decimal-based; variations exist only to a limited scale. Such a predominance of the decimal system is also seen in Blust's (2009) description of numerals in the Austronesian languages in general.

² Li (2006:135) notes that human numerals in Formosan languages may derive from non-human numerals by Ca-reduplication (as found in Atayal, Seediq, Kanakanavu, Saaroa, Bunun, Thao, Amis, and Siraya), prefixation (as found in Rukai, Paiwan, Puyuma, and Kavalan), or by suppletion (as found in Tsou and Kavalan for the numeral “one”).

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(5) Amis human numerals (Li 2006:139)

ca-cəcay	“1”
ta-tosaʔ	“2”
ta-toloʔ	“3”
sa-səpat	“4”
la-limaʔ	“5”
ʔa-ʔənəm	“6”
pa-pitoʔ	“7”
fa-faloʔ	“8”
sa-siwaʔ	“9”
ma-moʔtəp	“10”

Li concludes that the human/non-human distinction is a shared feature among the Formosan languages and can be reconstructed for Proto-Austronesian (PAN). Blust (2009) holds a similar view, proposing to reconstruct two sets of numerals for Proto-Austronesian, one for counting non-human referents, the other for human referents.

Zeitoun, Teng, and Ferrell (2010) further Li's and Blust's research but propose an alternative analysis regarding numerals in the Formosan languages. While Zeitoun and her colleagues in general concur with the proposal to erect the human/non-human distinction for numerals, they argue that more attention should be directed toward the use of two sets of numerals for designating values under 10 and the tens, respectively.³ The two sets are named “free numerals” and “bound numerals” by the morphological status of their component members. Of the two sets, free numerals are employed for designating number values under 10 and bound numerals are for the multiples of ten (20, 30...90), as shown by the Puyuma data in (6) below.

(6) Nanwang Puyuma (Zeitoun, Teng, and Ferrell 2010:868)

sa	1	pulru'	10
drua	2	maka-betra'an	20
telru	3	maka-telru-n	30
pat	4	maka-pet-el	40
lrima	5	maka-luwatr	50
enem	6	maka-nem-en	60
pitu	7	maka-pitu	70
walru	8	maka-walru	80
iwa	9	maka-iwa	90

³ The distinction is found in Mantauran Rukai, Isbukun Bunun, Mayrinax Atayal, Truku Seediq, Tsou, Saaroa, Kanakanavu, Thao, Tungho Saisiyat, and Nanwang Puyuma (Zeitoun, Teng, and Ferrell 2010: 868).

Zeitoun and her colleagues note that the expressions for 20-90 (the multiples of ten) in Nanwang Puyuma involve the co-occurrence of the prefix *maka-*, a suffix, and a bound numeral which in certain cases are formally distinct from its free counterpart, as illustrated by *drua* “2” and *maka-betra’an* “20”. Such formal distinctions justify the co-existence of two sets of numerals. Their finding provides a critical insight to numerals in Nanwang Puyuma and other Formosan languages, even though there is no further description regarding the extent to which these distinctions may apply, nor is there discussion on the consequence they may have to the structuring principles of numeral systems in general. I will return to these two issues in the following section.

2 Numerals in Tsou: When Multipliers Register the Exponents of the Numeral Base⁴

My goal in the following paragraphs is two-fold: (1) to draw attention to the regularities emerging from the variations in Tsou numerals, especially when these variations are considered in broad context, and (2) to highlight their relevance to the structuring principles of numeral systems in general. I argue that the variations seen in Tsou numerals (for serial counting) stem from the collaboration of two sets of numerals,⁵ and the collaboration is related to the different exponentiations of the base 10.

Like Nanwang Puyuma, Tsou also illustrates features of two sets of numerals: while one set of numerals designates number values under ten, the other set is employed for encoding the tens, as shown in (7) below.

⁴ The following research develops independently from Zeitoun and her colleagues' work. Tsou numerals first came to my attention when I was researching the morphophonological patterns of this language and intended to use the numerals, which form a well-defined subsystem, for testing different working hypotheses.

⁵ Zeitoun, Teng, and Ferrell (2010) also report the existence of two sets of numerals in Tsou.

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(7) Tsou

<i>coni</i>	1	<i>ma-ski</i>	10
<i>yuso</i>	2	<i>m-pus-ku</i>	20
<i>tuyu</i>	3	<i>m-tue-hu</i>	30
<i>sipti</i>	4	<i>m-sipti-hi</i>	40
<i>eimo</i>	5	<i>m-emo-hi</i>	50
<i>nomi</i>	6	<i>m-onmi-hi</i>	60
<i>pitu</i>	7	<i>m-pitvi-hi</i>	70
<i>voyu</i>	8	<i>m-voevi-hi</i>	80
<i>sio</i>	9	<i>m-sio-hi</i>	90

At first glance, the expressions for the tens (i.e., $x \times 10$) in (7) appear to be constructed by associating the prefix *m(a)-* and the suffix *-hi/hu* with the corresponding numeral *x* in the leftmost column, thus giving rise to the impression that the two affixes *m(a)-* and *-hi/hu/ku*⁶ together mark the value of ten. A close look indicates that the formation of the tens is not immediately transparent. The opacity is manifest in the pairs of *coni* ‘1’ vs. *ma-ski* ‘10’ and *yuso* ‘2’ vs. *m-pus-ku* ‘20’. There is nothing in the form of *yuso* ‘2’ and *pus* (as of *m-pus-ku* ‘20’), for instance, to indicate that the latter is directly derived from the former, nor is the presumptive *y~p* alternation attested in this language (Tsuchida 1976, Ho 1976).

The assumption that the prefix *ma-* and the suffix *-hi/hu/ku* together designate the value of ten is also misleading. A comparison of the tens (shown in the third column from the left in (7)) with other numeral expressions in Tsou indicates that *ma-* and *-hi/hu/ku* can be dissociated from each other. Of the two affixes, only *ma-* can be identified with the value of ten, the numeral base in Tsou. The suffix *-hi/hu/ku* is found to contribute to the designation of values from 1 to 9. In (8) below, the suffix *-hi/hu/ku* combines with the roots *pus* and *teu* and denotes the number of times for which a particular action recurs. There is nothing in the meaning of *m?e-pus.ku* ‘ask for something again’ and *m?e-to-teu.hu* ‘ask for something for the third time’ that may suggest the value of ten.

⁶ The three forms are allomorphs governed by vowel harmony and a phonological rule which turns /h/ to /k/ in Tsou. Morpho-phonological changes involved in Tsou numerals would be dealt with in another presentation/paper.

(8a)

te=ʔo *mʔe-pus.ku* *to* *fue=su?*
 AUX.IRR=1SG AF.ask.for-two(B) NTOP sweet.potato=2SG
 “May I have sweet potatoes from you again?” (Lit.: “May I ask for your
 sweet potatoes for the second time?”)

(8b)

te=ʔo *mʔe-to-teu.hu* *to* *fue=su?*
 AUX.IRR=1SG AF.ask.for-REDU-three(B) NTOP sweet.potato=2SG
 “May I have sweet potatoes from you for the third time?”

To distinguish *pus.ku* and its peer numerals from their counterparts in the leftmost column of (7), which do not take the *hu/hi/ku* suffix, for this presentation I would refer to the latter as Set A numerals and the former as Set B numerals. The distinction between the two sets is found to extend to the construction of the hundreds and the thousands, as shown in (9)⁷ below. Set A numerals are used for constructing the hundreds together with the circumfix *seʔ-...-a* ‘hundred’, as shown by *seʔ-coni-a* ‘100’. Set B numerals are used for constructing the thousands, as shown by *posi-po-pso.hi* ‘2000.’ During the formation, Set B numerals combine with the bound morpheme *posi-* ‘thousand’ and a partial reduplication process that copies the root-initial consonant followed by the fixed vowel *o*.

⁷ The alternation between *pus.ku* (as in *m-pus.ku* ‘20’) and *pso.hi* (as in *posi-po-pso.hi* ‘2000’), together with other seemingly irregular alternations between corresponding forms within the same numeral set in (9), involves vowel deletion and vowel harmony. All the related morpho-phonological changes would be dealt with in another presentation/paper.

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(9)

Set A ⁸		Set B		Set A		Set B	
<i>coni</i>	1	<i>ma-ski</i>	10	<i>seʔ-coni-a</i>	100	<i>posifou</i>	1000
(<i>veiau-cni</i>)	(n+1)						
<i>yuso</i>	2	<i>m-pus.ku</i>	20	<i>seʔ-eich-a</i>	200	<i>posi-po-pso.hi</i>	2000
(<i>veiau-eso</i>)	(n+2)						
<i>tuyu</i>	3	<i>m-tue.hu</i>	30	<i>seʔ-tuev-a</i>	300	<i>posi-to-tue.hu</i>	3000
(<i>veiau-teu</i>)	(n+3)						
<i>sipti</i>	4	<i>m-sipti.hi</i>	40	<i>seʔ-sipt-a</i>	400	<i>posi-so-spot.hi</i>	4000
(<i>veiau-spoti</i>)	(n+4)						
<i>eimo</i>	5	<i>m-emo.hi</i>	50	<i>seʔ-einv-a</i>	500	<i>posi-yo-emo.hi</i>	5000
(<i>veiau-emo</i>)	(n+5)						
<i>nomi</i>	6	<i>m-onmi.hi</i>	60	<i>seʔ-nonv-a</i>	600	<i>posi-no-nmi.hi</i>	6000
(<i>veiau-nmi</i>)	(n+6)						
<i>pitu</i>	7	<i>m-pitvi.hi</i>	70	<i>seʔ-pitv-a</i>	700	<i>posi-po-ptu-hu</i>	7000
(<i>veiau-ptu</i>)	(n+7)						
<i>voyu</i>	8	<i>m-voevi.hi</i>	80	<i>seʔ-voev-a</i>	800	<i>posi-vo-veo.hi</i>	8000
(<i>veiau-veo</i>)	(n+8)						
<i>sio</i>	9	<i>m-sio.hi</i>	90	<i>seʔ-si-a</i>	900	<i>posi-so-sio.hi</i>	9000
(<i>veiau-sio</i>)	(n+9)						

As an interim summary, the construction of Tsou cardinals may appear to contain lots of irregular variations, as found in *yuso* ‘2,’ *m-pus.ku* ‘20,’ and *posi-po-pso.hi* ‘2000.’ When more data are considered, it occurs that the suffix *-hi/hu/ku* is unrelated to the designation of the base 10 (and its various exponentiations like 100 and 1000); instead, the suffix *-hi/hu/ku*, together with the associated root, contributes to designating another set of number values from 1~9. The collaboration of these two sets of numerals leads to the variations in Tsou

⁸ Set A numerals may surface as different allomorphs in different morpho-phonological environments, as found in *coni* ‘1’ vs. *veiau-cni* ‘plus 1’ (as in *maski veiau-cni* ‘11; 10 plus 1’) and *yuso* ‘2’ vs. *veiau-eso* ‘plus 2’ (as in *maski veiau-eso* ‘12; 10 plus 2’).

numerals: Set A numerals are employed for 1~9 and the hundreds, whereas Set B numerals are for the decades and the thousands.

The collaboration of Set A and Set B numerals imposes significant consequences to our overall understanding of numeral systems, particularly how numerals are linguistically structured and where variations to the structuring principles may arise. As mentioned in Section 2, higher numerals, if relevant in the surveyed language, are typically constructed by the pattern in which some lower numeral *x* multiplied by a base *n* plus some other numeral *y* (Comrie 2008). Variations to the *xn+y* formula typically arise when the surveyed language has more than one numeral base (see Section 2.1). In Tsou numeral system, however, the opacity in expressions arises from the alternating forms of the multiplier *x*. To better illustrate the form alternation, I label the components of the *xn+y* formula in subscript below.

$$\begin{array}{llll}
 (10) & \textit{posi-po-pso.hi} & \textit{ho} & \textit{m-pus.ku} & \textit{veiau-eso} \\
 & \text{thousand-REDU-2(B)} & \text{and} & \text{ten-2(B)} & \text{plus-2(A)} \\
 & \text{"2022 (=10}^3 \textit{ }_n \text{*2(B)}_x \text{+10}^1 \textit{ }_n \text{*2(B)}_x \text{+10}^0 \textit{ }_n \text{2(A)}_x \text{)"}
 \end{array}$$

As illustrated by (10), the form of the multiplier *x* alternates between Set A numeral *eso* (the allomorph of *yuso* ‘two’, see (9)) and Set B numeral *pso.hi* (and its allomorph *pus.ku*). The alternation is found related to the exponentiation of the base 10: When the base 10 is raised to the power 0 and 2, the multiplier would be expressed by Set A numeral. When the base is raised to the power 1 and 3, the multiplier would be expressed by Set B numeral. Tsou numerals thus embody an unusual pattern in which the expression of the multiplier registers the different exponentiations of the base.

3 Conclusion

Even though the construction of Tsou numerals may appear opaque at first glance, a close inspection of the variations illustrates that two sets of lower cardinals collaborate to derive higher cardinals. The pattern of collaboration works in a way that Set A numerals mark number values under ten as well as the hundreds ($x*100$), whereas Set B numerals are employed for the tens ($x*10$) and the thousands ($x*1000$). Tsou numerals thus embody an unusual pattern in which the expression of the multiplier registers the exponentiation of the base, and this pattern highlights a new source of variation which hopefully will bring in more inclusive understanding of numeral expressions in general.

References

- Blust, Robert. 2009. *The Austronesian Languages*. Canberra: Pacific Linguistics.
- Comrie, Bernard. 2008. Numeral Bases. In: Haspelmath, Martin & Dryer, Matthew S. & Gil, David & Comrie, Bernard (eds.) *The World Atlas of Language Structures Online*. Munich: Max Planck Digital Library, chapter 131. Available online at <http://wals.info/feature/131>
- Greenberg, Joseph H. 2000. Numeral. in G. Booij, C. Lehmann, J. Mugdan, in collaboration with W. Kesselheim, and Stavros Skopeteas (eds.) *Morphology. An International Handbook on Inflection and Word Formation / Ein internationales Handbuch zur Flexion und Wortbildung*. Vol 1. Berlin/New York: Mouton de Gruyter.
- Heine, Bernd. 1997. *Cognitive Foundation of Grammar*. Oxford: OUP.
- Ho, Dah-An. 1976. "Zou-yu-yin-yun (Tsou phonology)," *Bulletin of the Institute of History and Philology* 47, no. 2: 245-274.
- Li, Paul J. 2006. Numerals in Formosan Languages. *Oceanic Linguistics* 45.1: 133-152.
- Schmidt, P.W. 1926. *Die Sprachfamilien und Sprachkreise der Erde*. Heidelberg: Carl Winter's Universitätsbuchhandlung.
- Tsuchida, Shigeru. 1976. *Reconstruction of Proto-Tsouic phonology*. Tokyo: Institute for the Study of Languages and Cultures of Asia and Africa, Tokyo Gaikokugo Daigaku.
- Zeitoun, Elizabeth, Stacy F. Teng, and Raleigh Ferrell. 2010. Reconstruction of '2' in PAN and Related Issues. *Language and Linguistics* 11:4:853-884.
- Gujing Lin
No. 67, Jieren St., Hualien
97074, Taiwan, R.O.C

paicxeevi@mail.tcu.edu.tw

A Figure's Final Location must be Identifiable: Localizer Distribution in Chinese Motion Expressions

JINGXIA LIN
*Stanford University*¹

Introduction

A language sensitive to a thing-place distinction (e.g., cup vs. Paris) may use some thing-to-place conversion devices so that a thing can be conceptualized as a place. For instance, *indlu* 'house' in Zulu is a thing noun, so it must take a prefix and suffix so that it is understood as a place, as in *ngena endlini* 'enter the house' (Talor 1996). However, Mandarin Chinese behaves inconsistently in the use of the conversion device --- the addition of a localizer (e.g., *li* 'inside') to a thing noun--- in that the device is not required in every situation where a thing is understood as a place, cf. *dao chezi-*(li)* 'arrive car-inside' and *jin chezi-(li)* 'enter car-inside'. I argue that such inconsistent use is closely related to the other function of localizers: specifying the search domain of a ground that a figure is located with respect to at the end of a motion event. Specifically, Chinese adheres to a Localizer Condition according to which a localizer is not required if the information conveyed in the path verb and the (thing) ground is sufficiently specific to identify the figure's final location with respect to the (thing) ground. This condition is sensitive to both the figure-ground spatial relationships specified by path verbs and the physical and functional properties of grounds (Stosic 2007, Tutton 2009, among others). In addition, I show that the effects of the Localizer Condition are observed in other languages, despite differences in encoding spatial relations (Ameka 1999, Choi and Sarda 2007).

1 Converting Thing to Place

PLACE and THING are recognized as two ontological categories (Jackendoff

¹ I am very grateful to Beth Levin for her very helpful comments on the materials discussed in this paper. Abbreviations: AGR= Agreement marker; ASP= Aspect marker; CM= Class marker; CS= Conjunctive suffix; DET= Determiner; NEG= Negative marker; NOM= Nominative; PST= Present tense; TS= Terminal suffix; LOC= Locative/generic preposition; PL= Plural.

1983, cf. Choi and Sarda 2007, Stosic 2007). Spatial regions that can locate things are typically conceptualized as places (e.g., New York, China) (Jackendoff 1983). Things are physical objects, e.g., tree, table, that stand or move with respect to one another (Jackendoff 1983, cf. Choi and Sarda 2007). However, a thing concept can be converted into a place concept. For instance, a table by itself is a thing, but it can be conceptualized as a place if it is used as a support for other things (e.g., plates, books). Languages vary in the degree of their sensitivity to the distinction between places and things. In English, nouns are not morphologically marked to distinguish a place from a thing (Taylor 1996). For instance, a table is understood as a thing and a place, respectively in (1a) and (1b), but the conceptual difference is not morphologically marked.

- (1) a. I bought **a table**. (table as a thing)
b. The book is on **the table**. (table as a place)

In contrast, nouns denoting things in Zulu must be locativised so as to express a place meaning, as in (2) (Taylor 1996).

- (2) a. ngena **endlini** b. *ngena **indlu**
enter house-LOC enter house
'enter the house' (Taylor 1996: 295)

In Mandarin Chinese as well, a thing noun, or common noun, usually cannot be used as a place noun. As (3) illustrates, *fangzi* 'house' and *zhuozi* 'table' cannot be taken directly as the complements to the locative preposition *zai* 'at'; rather, a localizer such as *-li* 'inside' in (3a) and *-shang* 'on top of' in (3b) must be used to convert the thing nouns into place nouns.²

- (3) a. xiaohai *zai* **fangzi**-(**li**) wanr
kid at house-inside play
'The kid is playing in the house.'
b. **xiaomao** **zai** **zhuozi**-(**shang**) shuijiao
kitty at table-on.top.of sleep
'The kitty is sleeping on the table.'

Chinese has monosyllabic and disyllabic localizers. Besides *-li* and *-shang*, other

² Chinese localizers are grammaticalized from nouns (Chappell and Peyraube 2008, Huang, Li, and Li 2009, among others). However, previous studies have not yet reached a consensus as to whether these morphemes belong to a lexical category other than noun or are instead a subclass of noun (see Li 2009, among others). Therefore, these forms are referred to in different terms, e.g., as "NP enclitics" by Sun (2006: 85, 2008), "locative particles" by Li and Thompson (1981: 391), "postpositions" by Liu (2008: 39). For the purpose of this paper, I use the relatively neutral term "localizer".

monosyllabic localizers include *wai* ‘outside’, *xia* ‘down’, *qian* ‘front’, *hou* ‘back’, *li/nei/zhong* ‘inside’, and *pang* ‘side’ (Li and Thompson 1981, Sun 2006). Disyllabic localizers are formed via the addition of a suffix such as *bianr* ‘side’, *mianr* ‘face’, or *tou* ‘head’ to a monosyllabic localizer, e.g., *-libianr* ‘inside’, *shang-mianr* ‘on top of’ (ibid.).

However, localizers are not used consistently in Chinese to convert a thing noun into a place word. For instance, localizers are required by *fangzi* and *zhuozi* when they are taken as complements by the path verb *dao* ‘arrive’ in (4).

- (4) a. xiaohai dao le **fangzi**-(**li**)
 kid arrive ASP house-inside
 ‘The kid went into the house.’
 b. xiaomao dao le **zhuozi**-(**shang**)
 kitty arrive ASP table-on.top.of
 ‘The kitty went onto the table.’

But *fangzi* and *zhuozi* can be directly taken as complements by the path verb *jin* ‘enter’ and *shang* ‘ascend’, respectively, as in (5a) and (5b).

- (5) a. xiaohai jin le **fangzi**
 kid enter ASP house
 ‘The kid entered the house.’
 b. xiaomao shang le **zhuozi**
 kitty ascend ASP table
 ‘The kitty went onto the table.’

By drawing evidence from expressions of directed motion events in Modern Mandarin Chinese, this paper shows that a language sensitive to a place-thing distinction may behave inconsistently in their use of thing-to-place conversion devices. The term “directed motion event” refers to an event in which a moving object moves spontaneously (without an external cause) in a certain direction with respect to a reference object and ends up in a new location as a consequence of that event. The moving object and the reference object are called “figure” and “ground” (Talmy 2000: 25), respectively. This paper proposes that if a figure’s location with respect to the thing is identifiable based on the information of a motion expression, then the thing is understood as a place without a conversion device. In Chinese, a localizer does not need to be explicitly used, if the figure’s location at the end of its motion can be identified via the direction lexicalized in a motion verb and the physical and functional features of the place conceptually shifted from the thing.

2 Previous Studies on the Distribution of Chinese Localizers

With the exception of Lamarre (2007) and Cai (2006), previous studies have

seldom discussed the environments where a thing NP needs to co-occur with a localizer in order to function as the complement to a path verb.

Cai (2006) proposes that a thing NP cannot co-occur with a localizer in the sequence “manner of motion verb + path verb + ground NP + deictic complement”, as in (6).

- (6) ta zou chu **jiaoshi-(*li)** qu
 he walk exit classroom-(inside) go
 ‘He went out of the classroom.’ (Cai 2006: 68)

However, many counter-examples can be found. For instance, (7) shows a motion expression with the same sequence as that in (6), but a localizer is required for the ground NP *zhuozi* ‘table’.

- (7) mayi pa dao **zhuozi-*(xia)** qu
 ant crawl arrive table-(under) go
 ‘The ant crawled under the table.’

Lamarre (2007: 5) also claims that the path verbs *hui* ‘return’, *dao* ‘arrive’, *lai* ‘come’ and *qu* ‘go’ “require a localizer on the locative NP if it is not *per se* a place word.” She does not provide further evidence for this claim, but counterexamples can be found, as in (5), where the path verb *jin* ‘enter’ takes a common noun directly as its complement.

3 The Localizer Condition on Localizer Distribution in Thing Ground NPs

Path verbs, or “verb of inherently directed motion” (Levin 1993: 263), lexicalize both motion and direction (Talmy 2000). Chinese path verbs that can take ground NPs directly as their complements in Chinese include *jin* ‘enter’, *chu* ‘exit’, *shang* ‘ascend’, *xia* ‘descend’, *hui* ‘return’, *dao* ‘arrive’, and the deictic path verbs *lai* ‘come’ and *qu* ‘go’ (cf. Lamarre 2008, Cai 2006, Guo and Chen 2009, and others). When these path verbs follow a manner of motion verb or another motion verb, they are usually referred to as “directional complements” in some previous studies such as Liu (1998) cf. Tai (2003). However, these directional complements express the same direction and take the same ground NPs as the corresponding path verbs; thus, for convenience, the term “path verbs” is used regardless of whether they are path verbs or directional complements.

I propose that the use of localizers with the ground NPs taken as complements by Chinese path verbs is closely related to the other important function of the localizers, i.e. to specify the “search domain”, the “space anchored to the ground” where a physical object is located (Ameka 1999: 9, cf. Nikitina 2008). In other words, the localizers specify where with respect to the ground, e.g., on top of,

above, inside, outside, under, or on bottom of, the figure can be found. And the use of localizers conforms to a Localizer Condition:

(8) **Localizer Condition:** A localizer needs to occur and convert the thing noun into a place word if the information conveyed in the verb and the physical and functional properties of the ground is not sufficiently specific to identify the figure's location with respect to the ground at the end of the motion event.

The condition is sensitive to (a) the figure-ground spatial relationships specified by the path verb, and (b) the physical and functional properties of the grounds. The remainder of this section discusses them in more detail.

3.1 Degree of Specification of Direction in Path Verbs

Not only does each path verb lexicalize a distinct direction, but path verbs may also differ from each other as to the degree of specification they provide for the direction (Rappaport Hovav and Levin 2010). Furthermore, the more specific the direction lexicalized by a path verb is, the more restricted it is in its selection of ground NP complements because it requires its complements to encode a location compatible with this particular direction. For instance, the verb *jin* 'enter' denotes motion with an 'into' direction. That is, a figure moving in this way crosses a boundary and moves into the enclosed region across the boundary. Thus, the ground complements to this direction must be enclosed regions, whereas non-enclosed regions are not allowed by *jin* 'enter', as in (9).

- (9) a. **jin* **fangjian-wai**
 enter room-outside
 # 'enter the outside of the room' (intended meaning)
 b. **jin* **fangjian-shang**
 enter room-on.top.of
 # 'enter onto the room' (intended meaning)

With a path verb that lexicalizes a more specific direction and a ground compatible with the direction of motion, a motion expression contains sufficient information to allow the identification of the figure's final location. Consider *jin* 'enter' once more. By carrying out the motion of entering, the figure must be located inside an enclosed region. According to the Localizer Condition, the ground NP *fangzi* 'house' does not need co-occur with a localizer, which is why (5a), repeated here as (10a), is felicitous. The use of the localizer *-li* in (10b) does not violate the Localizer Condition, but it is dispreferred because of information redundancy.

- (10) a. xiaohai jin le **fangzi**
 Kid enter ASP house
 'The kid entered the house.'
 b. xiaohai jin le **fangzi-li**
 kid enter le hosue-inside
 'The kid entered the house.'

Figure 1 illustrates the use of localizers with thing NPs that are taken by the path verbs *jin* 'enter' found in the PKU Corpus.³ All entities denoted by the five NPs denote enclosed entities with clear-cut boundaries that separate their interior and exterior spaces; and localizers expressing 'inside' are more often not used with these NPs.

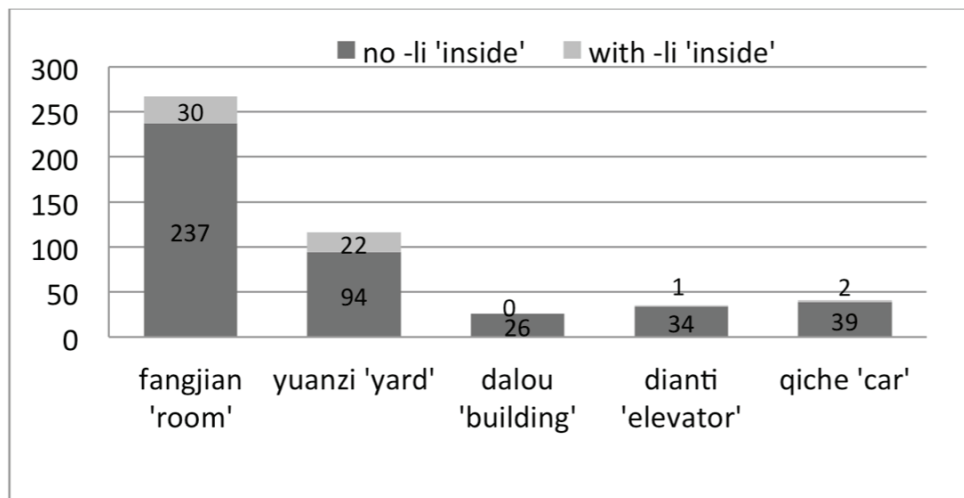


Figure 1: The use of *-li* 'inside' with NPs taken as complements by *jin* 'enter'

In contrast, a path verb lexicalizing a less specific direction is also less restricted in its selection of ground NPs. For instance, the path verb *dao* 'arrive' is not specific because a figure can arrive at a location from different directions. In particular, depending on the figure's source location, the figure can arrive from a location outside, inside, below, or above the location to be arrived at. Therefore, all the ground NPs taken by path verbs lexicalizing more specific directions, e.g., the path verbs *jin* 'enter', *chu* 'exit', *shang* 'ascend', and *xia* 'descend', are also available as complements of *dao* 'arrive'.

However, a motion expression with a verb lexicalizing a less specific direction cannot precisely identify the figure's location with respect to the ground. Consider

³ The PKU Corpus refers to corpus of Modern Chinese constructed by the Center for Chinese Linguistics at Beijing University. The corpus is available online at <http://ccl.pku.edu.cn/>. Currently (4/2011), it has 307,317,060 characters as updated on 7/20/2009.

the motion event that involves *dao* ‘arrive’ and *fangzi* ‘house’. Since a house has an interior and exterior, and since a figure can start moving from either the interior or exterior of the house, the expression *dao fangzi* arrive house fails to identify whether the figure arrives inside or outside of the house if contextual clue is unavailable. Therefore, a localizer is necessary, as in (11), cf. *jin* ‘enter’ in (10).

- (11) a. xiaohai dao le **fangzi-li**
 kid arrive ASP house-inside
 ‘The kid went into the house.’
 b. xiaohai dao le **fangzi-wai**
 kid arrive ASP house-outside
 ‘The kid went out of the house.’

In addition, because *dao* is not specific as to the direction of motion, a figure carrying out an event of arrival can potentially reach any accessible location from any direction. Consider the common noun *qiche* ‘car’ as another example. *Qiche* cannot be directly taken as a complement by *dao* ‘arrive’ according to the Localizer Condition. The PKU Corpus shows that among all 45 instances of *dao qiche* arrive car, there are only two instances (4%) in which a localizer is not used. Figure 2 shows the frequency of each localizer co-occurring with *qiche* as a complement to *dao*.⁴

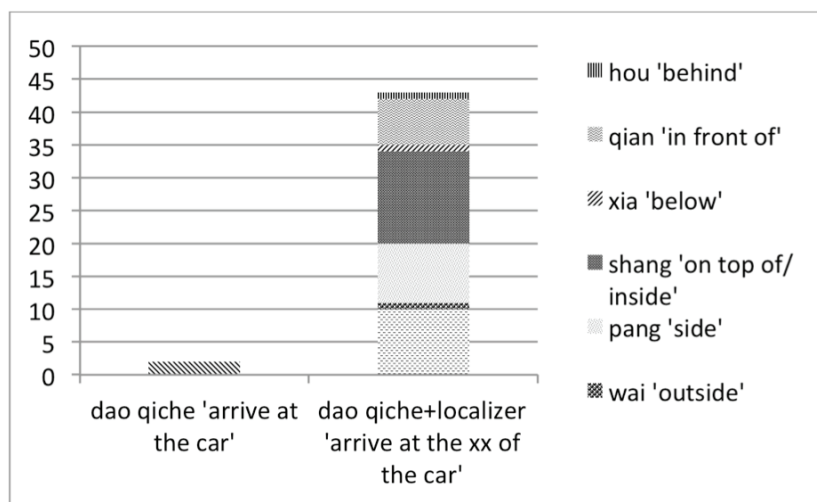


Figure 2: Frequency counts of *qiche* ‘car’ as a complement to *dao* ‘arrive’

⁴ For convenience, this paper uses one monosyllabic localizer to represent all the different forms of localizers expressing the same search domain found in the corpus, e.g., *-shang* ‘on’ covers *-shang* ‘on, up’, *-shangmianr* (lit.) ‘on-face’, *-shangtour* (lit.) ‘on-head’ and *-shangbianr* (lit.) ‘on-side’ and *-li* ‘inside’ covers *-li* ‘inside’, *-limian* (lit.) ‘in-face’, *-litou* (lit.) ‘in-head’, *-libian* (lit.) ‘in-side’, *-zhong* ‘inside’, and *-nei* ‘inside’.

Other path verbs also differ in the degree of specification of direction. For instance, like *jin* ‘enter’ and *chu* ‘exit’, the directions lexicalized in *shang* and *xia* are so specific that a figure cannot move in any other direction. As illustrated in (12), *shang* ‘ascend’ only lexicalizes motion up to a location, and is unable to describe motion going down from a location or into a region, although the location or region may have accessible space for going down or going into.

- (12) a. shang **zhuzi**
ascend table
'go up to the table'
- b. *shang **zhuzi-xia**
ascend table-under
'go up to the [space] under of the table' (intended meaning)

The directions of motion lexicalized in the deictic path verbs *lai* ‘come’ and *qu* ‘go’ vary with respect to the deictic center (usually the speaker). When the speaker’s location with respect to the ground is not inferable, a localizer is required. For instance, as illustrated in (13a), the motion expression does not indicate whether the speaker is inside or outside the room, and thus it is not inferable whether the figure moves into or out of the room. Therefore, localizers *-li* ‘inside’ and *-wai* ‘outside’ are necessary to express motion into or out of the room, respectively, as in (13b).

- (13) a. *lai/qu **fangjian**
 come/go room
 b. lai/qu **fangjian-li/wai**
 come/go room-inside/outside
 ‘come/go into/out of the room’

In contrast, when the deictic center's location is known, a localizer is optional. For instance, as shown in (14), the figure (and the speaker) was originally located outside of Pantani's room; and she assumed Pantani to be in the room and then went inside the room. In this sentence, the spatial relationships among the figure, Pantani, and the room are explicit, thus making *-li* 'inside' unnecessary.

- (14) youyu dangtian henchang shijian meiyou kan-dao Pantani,
because that.day very.long time NEG see-arrive Pantani
suoyi qu ta **fangjian** chakan
so go his room check
'[I] went to his room for a check because [I] did not see Pantani for a
very long time on that day.' (PKU Corpus)

The path verb *hui* ‘return’ lexicalizes a direction more specifically than do *dao* ‘arrive’, *lai* ‘come’ and *qu* ‘go’, but less so than *jin* ‘enter’, *chu* ‘exit’, *shang* ‘ascend’, and *xia* ‘descend’. For instance, like *jin* and *chu*, *hui* is able to directly

take a ground NP denoting a region-like entity, e.g., *fangjian* ‘room’, from which the figure’s location is understood to be inside of the region. However, unlike *jin*, *chu*, *shang*, and *xia*, which only describe motion with a fixed direction, *hui* may refer to motion in any possible direction, just like *dao* ‘arrive’. As illustrated in (15), *hui* is able to express both motion into a region or onto a surface when the NPs co-occur with appropriate localizers, whereas other path verbs such as *jin* ‘enter’ cannot express motion onto a surface of an entity, and *shang* ‘ascend’ cannot express motion into a region.

- (15) a. *hui* **zhuozi-shang**
 return table-on.top.of
 ‘return to the top of the table’
 b. *hui* **zhuozi-li**
 return table-inside
 ‘return to the inside (e.g., a drawer) of the table’

As shown above, although all the path verbs lexicalize certain paths, they differ from each other in the specification of the paths, which in turn determines whether their common noun ground NPs need to be converted into place words by localizers. As indicated by the Localizer Condition, a path verb lexicalizing a more specific direction tends to take a compatible thing NP directly as its ground NP. In contrast, a path verb lexicalizing a less specific direction requires its ground NP to co-occur with a localizer so as to help identify the figure’s location with respect to the ground.

3.2 The Functional Properties of the Ground

Many grounds possess more than one spatial domain (e.g., the inside and top of a box), and these spatial domains may be accessed by a figure in different directions. For instance, a figure can move along the horizontal axis into a box or along the vertical axis onto the top of the box. Thus, a box can potentially co-occur with the localizers *-li* ‘inside’ and *-shang* ‘on top of’. Nonetheless, I propose that a ground is more often accessed from a salient accessible axis, that is, the axis corresponding to the direction of motion in which a figure can reach the ground’s “use space” (Svorou 1994: 15) and take advantage of its canonical function there. The use space of the ground refers to the spatial domain with that ground’s most salient functional property, i.e. the use and purpose of the ground (Svorou 1994, Chu and Wang 2008). If the figure moves in the direction of that use space, the localizer specifying the corresponding spatial domain is unnecessary because it is understood that after the motion, the figure will be located in that use space of the ground. I will illustrate the effects using *maopajia* (lit.) ‘cat climb shelf’ and *maolong* (lit.) ‘cat cage’ as examples.

The most salient function of *maopajia* (lit.) ‘cat climb shelf’, a tree-like entity with ledges that a cat can jump onto and rest, is to support cats rather than contain them, even though a *maopajia* may also have a cubby hole that the cat can enter and stay in. Thus, the path verbs *shang* ‘ascend’ and *xia* ‘descend’, but not *jin* ‘enter’ and *chu* ‘exit’, can take *maopajia* directly as their complement, as in (16a). On the other hand, the most salient function of *maolong* (lit.) ‘cat cage’, a house-like container for a cat to rest in, is to provide an enclosed area for a cat, though it may include interior ledges. Thus, *maolong* can co-occur with the path verbs *jin* ‘enter’ and *chu* ‘exit’, but not with *shang* ‘ascend’ and *xia* ‘descend’, as in (16b).

- (16) a. xiaomao tiao shang/xia/*jin/*exit le **maopajia**
 small.cat jump ascend/descend/enter/exit ASP cat.climbing.shelf
 ‘The kitty jumped up to/down from the cat tree.’
 b. xiaomao tiao *shang/*xia/jin/chu le **maolong**
 small.cat jump ascend/descend/enter/exit ASP cat.cage
 ‘The kitty jumped into/out of the cat cage.’

However, although a ground usually has only one spatial domain carrying the most salient function of this ground, this domain may be conceptualized in different ways, hence accessible from different directions. For instance, entities such as *feiji* ‘airplane’, *huozhe* ‘train’, and *qiche* ‘car’ can be treated both as bounded regions and supporting surfaces at the same time: on the one hand, these entities can hold human beings in their interior regions; on the other hand, the floors inside their interior spaces are the most salient spatial domains because the floors are the only domains that humans can stay on. Therefore, the common nouns encoding these entities may co-occur with both *jin* ‘enter’ and *shang* ‘ascend’. In addition, no matter whether these entities co-occur with *jin* or *shang*, the humans’ location is always inside and on the surface floor of these entities. Thus, localizers such as *-li* ‘inside’ and *-shang* ‘up, on top of’ are unnecessary, as shown in (17). This omission of localizers further supports the Localizer Condition: a localizer is not used if the figure’s final location can be identified with respect to the ground.

- (17) a. jin feiji b. shang feiji
 enter plane ascend plane
 ‘board the plane’ ‘board the plane’

3.3 Summary

This section shows that the use of localizers with thing ground NPs obeys the Localizer Condition. Chinese has examples where a localizer is used although it is unnecessary according to the condition, or a localizer is not used even though it is

expected by the condition. Detailed explanation is not provided in this paper, but I argue that these examples should not be taken as a challenge to the Localizer Condition, because in those examples, the use of localizers is also affected by the number of syllables in the ground NPs and pragmatic motivations (cf. Sun 2008).

4 A Cross-linguistic Perspective on the Localizer Condition

Languages may use different ways to express the search domain. For instance, Likpe (Central Togo) uses postpositions (Ameka 1999), as in (18), whereas Korean uses “relational noun of localization” (Choi and Sarda 2007), as in (19).

- (18) bə-bəə bə-nyǎ bəə be-tidi be-tsywá
 3PL-come 3PL-see that CMPL-person CMPL-some
 sí lǎ kǎ-tíni kǎ-lǎ
 sit LOC CM-mountain under
 ‘When they came they saw that there were some people living/staying at the bottom of the mountain.’ (Ameka 1999: 22)

- (19) mimi-ga cap^han-ŋi-e oll-a-ga-s’-ə
 Mimi-NOM keyboard-top-LOC move.up-CS-go-PAST-TS
 ‘Mimi (a cat) climbed on the keyboard.’ (Choi and Sarda 2007: 137)

However, the Localizer Condition appears to be operative in these languages as well.

4.1 The Distribution of Postpositions in Likpe

Ameka (1999) observes that Likpe postpositions are not used in all spatial expressions. He proposes two conditions for their omission. One is that postpositions become unnecessary whenever the verb and the ground can be “interpreted stereotypically” (Ameka 1999, 26). By stereotypical interpretation, Ameka provides an example showing that when the figure is in a ground with a containing region (e.g., a building), the postposition expressing ‘inside’ is not expressed because the figure can be typically understood to be located inside of the ground, as in (20).

- (20) o-kpé dí-yó
 3SG-V CM-building
 ‘He is in the building.’ (Ameka 1999: 26)

The second condition is relevant to the direction specified as part of a verb’s lexical meaning. Postpositions are unnecessary if the search domain is indicated by the meaning of the verb (and context). For instance, Ameka points out that the

verb *tákə́* ‘make contact with supporting surface’ does not require the ground to take the postposition *ə-suə* ‘surface’ in order to express an ‘on horizontal surface’ relation because the verb already entails the meaning of surface contact, as in (21).

- (21) ku-kwə ko-má tákə́ li **shelf**
CM-book AGR-DET V LOC shelf
‘The book is on the shelf.’ (Ameka 1999: 26)

These two conditions in Likpe are comparable to the condition of using localizers in Chinese. That is, a postposition or localizer is not needed to further specify the figure’s location when it can be inferred from the verb and the nature of the ground.

4.2 The Distribution of “Relational Noun of Localization” in Korean

Korean also has a similar condition. According to Choi and Sarda (2007), the path verbs *dilə-ga-da* ‘move in’ and *na-ga-da* ‘move out’ select a ground denoting a three-dimensional object with an interior (e.g., house), as in (22a). If the ground has no interior (e.g., table), a localizer (or “relational noun of localization” in Choi and Sarda) must follow the noun denoting the ground, as in (22b).

- (22) a. Insu **cib-e** dil-ə-ga-n-da
Insoo house-LOC move.in-CS-go-PST-TS
‘Insoo is entering the house.’
b. insu-ga **c^hεgsaŋ-mit-e** dil-ə-ga-n-da
Insoo-NOM table-underneath-LOC move.in-CS-go-PST-TS
‘Insoo is going under the table.’ (Choi and Sarda 2007: 136)

Therefore, Both Korean and Likpe operate like Chinese in their optional use of localizers (or relational nouns of localization, postpositions); that is, the use of localizers is determined by whether it is necessary to help identify the figure’s final location. In addition, as in Chinese, the localizers expressing ‘inside’ and ‘on top of/above’ are the ones that are most often omitted in Korean and Likpe.

5 Conclusion

In this paper, I have shown that although Chinese show some sensitivity to the thing-place distinction, the localizer as a thing-to-place conversion is not required in all motion expressions. Therefore, Chinese on one hand is unlike English which is not sensitive to the distinction at all, and on the other hand is unlike Zulu that always require some devices for converting a thing noun into a place noun. In addition, I provide evidence showing that the use of Chinese localizers is influenced by the other function of the localizers, i.e. specifying the search domain in

relation to a ground where the figure is located. Conforming to the Localizer Condition, a localizer is required to co-occur with a thing ground NP if the figure's final location cannot be identified via the information conveyed in the path verb and the ground, so that it can help specify the spatial relationship between the figure and the ground. In addition to Chinese, I have shown that the Localizer Condition can also be found in other languages, including those which use adpositions rather than verbs to encode spatial relationships. The cross-linguistic similarities indicate a general operation in the encoding of spatial relationships and the search domain.

References

- Ameka, Felix K. 1995. The linguistic construction of space in Ewe. *Cognitive Linguistics* 6(2/3): 139-181.
- Ameka, Felix K. 1999. Spatial information packaging in Ewe and Likpe: A comparative perspective. In Sabine Neumann, ed., *Comparing African Spaces*, 7-34. Koln: Frankfurter Afrikanistische Blatter.
- Cai, Tian. 2006. Lun donghou fuhe quxiang dongci he chusuo mingci de weizhi [On the position of post-verbal complex path verbs and locative nouns]. *Jinan daxue huawen xueyuan xuebao [Journal of Huawen College in Jinan University]* 4: 66-71.
- Chappell, Hilary and Alain Peyraube. 2008. Chinese localizers: Diachrony and some typological considerations. In Dan Xu, ed., *Space in languages of China: Cross-linguistic, Synchronic and Diachronic Perspectives*, 15-38. Dordrecht: Springer.
- Choi-Jonin, Injoo and Laure Sarda. 2007. The expression of semantic components and the nature of ground entity in orientation motion verbs: A cross-linguistic account based on French and Korean. In Michel Aurnague, Maya Hickmann, and Laure Vieu, eds., *The Categorization of Spatial Entities in Language and Cognition*, 123-152. Amsterdam/Philadelphia: John Benjamins.
- Chu, Zexiang and Yin Wang. 2008. Kongjian shiti de kejudian yu houzhi fangweici de xuanze [The accessible space of spatial entities and the selection of localizers]. *Yuyan Yanjiu [Studies in Language and Linguistics]*, 28.4:50-62.
- Jackendoff, Ray. 1983. *Semantics and cognition*. Cambridge, Massachusetts: MIT Press.

- Lamarre, Christine. 2007. The linguistic encoding of motion events in Chinese: With reference to cross-dialectal variation. In Christine Lamarre and Toshio Ohori, eds., *Typological Studies of the Linguistic Expressions of Motion Events, Vol. 1: Perspectives from East and Southeast Asia*, 3-33. Tokyo: University of Tokyo.
- Lamarre, Christine. 2008. The linguistic categorization of deictic direction in Chinese: With reference to Japanese. In Dan Xu, ed., *Space in languages of China: Cross-linguistic, Synchronic and Diachronic Perspectives*, 69-98. Dordrecht: Springer.
- Levin, Beth. 1993. *English Verb Classes and Alternations: A Preliminary Investigation*. Chicago: University of Chicago Press.
- Li, Charles N. and Sandra A. Thompson. 1981. *Mandarin Chinese: A Functional Reference Grammar*. Berkeley: University of California Press.
- Li, Yafei. 2009. Hanyu fangweici de cixing yiqi lilun yiyi [Chinese Localizers: grammatical nature and theoretical significance], *Zhongguo Yuwen [Studies of the Chinese language]* 2: 99-109.
- Liu, Danqing. 2008. Syntax of space across Chinese dialects: Conspiring and competing principles and factors. In Dan Xu, ed., *Space in languages of China: Cross-linguistic, Synchronic and Diachronic Perspectives*, 39-67. Dordrecht: Springer.
- Liu, Yuehua. 1998. *Quxiang Buyu Tongshi [On Directional Complements]*. Beijing: Beijing Language and Culture University Press.
- Nikitina, Tatiana. 2008. Locative terms and spatial frames of reference in Wan. *Journal of African Languages and Linguistics* 29(1): 29-47.
- Rappaport Hovav, Malk and Beth Levin. 2010. Reflections on manner/result complementarity. In Edit Doron, Malka Rappaport Hovav, and Ivy Sichel, eds., *Syntax, Lexical Semantics, and Event Structure*, 21-38. Oxford: Oxford University Press.
- Sun, Chaofen. 2006. *Chinese: A Linguistic Introduction*. Cambridge: Cambridge University Press.

- Sun, Chaofen. 2008. Two conditions and grammaticalization of the Chinese locative. In Dan Xu, ed., *Space in Languages of China: Cross-linguistic, Synchronic and Diachronic Perspectives*, 199-228. Dordrecht: Springer.
- Stosic, Dejan. 2007. The prepositions *par* and *à travers* and the categorization of spatial entities in French. In Michel Aurnague, Maya Hickmann, and Laure Vieu, eds., *The Categorization of Spatial Entities in Language and Cognition*, 71-92. Amsterdam/Philadelphia: John Benjamins.
- Svorou, Soteria. 1994. *The grammar of space*. Amsterdam/Philadelphia: John Benjamins.
- Tai, James. 2003. Cognitive relativism: Resultative construction in Chinese. *Language and Linguistics*, 4.2:301-316.
- Talmy, Leonard. 2000. *Toward a Cognitive Semantics, volume II: Typology and process in concept structuring*. Cambridge: MIT Press.
- Taylor, John R. 1996. The syntax and semantics of locativised nouns in Zulu. In Martin Pütz and René Dirven, eds., *The Space in Language and Thought*, 287-305. Berlin: Mouton De Gruyter.

Another Overt Surface Anaphor: Norwegian ‘and that’

HELGE LØDRUP and MARIANNE HOBÆK HAFF

University of Oslo

1 Introduction¹

An insight from the seventies that has proved fruitful to research to this very day is the distinction between deep and surface anaphora made in Hankamer and Sag (1976). Deep anaphora are ordinary pronouns, which refer to objects in the linguistic or non-linguistic context. Surface anaphora, on the other hand, cannot be deictic; they must have a linguistic antecedent. One important example is the zero anaphor in VP and predicate ellipsis, as in (1)-(2).

- (1) Have you read the book? – Yes, I have Ø
- (2) Are you sure? – Yes, I am Ø

To be interpreted as an antecedent of a surface anaphor, a linguistic expression must be able to have the position of the anaphor, and satisfy standard syntactic conditions on well-formedness in this position (such as selection, theta-marking, case-marking, etc.).

Beside VP and predicate ellipsis, the sluicing construction is a surface anaphor construction. An example is (3).

- (3) He ran home – I don’t know why Ø

Surface anaphora are often realized as zero in English. This is not a necessary property, however. English *so* can be a surface anaphor with different types of antecedents. An example from Hankamer and Sag (1976:415) is (4).

- (4) Look, John, your boat is sinking. – Why, so it is.

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In other Germanic languages, surface anaphora are often overt (i.e. phonologically realized). In Norwegian (and Swedish and Danish), the pronoun *det* ‘it, that’ is used as a surface anaphor with VP and predicate pronominalization (see Lødrup 1994 on Norwegian, Houser et al. 2007 on Danish, Herold 2009 on Swedish). Norwegian examples are (5)-(6).

- (5) Har du lest boka? – Ja, **det** har jeg
have you read book.DEF – yes that have I
‘Have you read the book? Yes, I have’
(6) Er du sikker? – Ja, jeg er **det**
are you sure – yes I am that
‘Are you sure? Yes, I am’

The pronoun *det* is the central surface anaphor with VP and predicate pronominalization. It can also be used in sluicing in main or subordinate clause questions, even if this option is restricted.² An example is (7) (where the alternative left dislocation analysis should be disregarded).

- (7) Han løp hjem – Hvorfor **det** vet jeg ikke
he ran home – why that know I not
‘He ran home – I don’t know why’

Zero realization is also possible for Norwegian (and Scandinavian) surface anaphors. Zero is the normal realization with sluicing. It is also possible to some extent with VP and predicate pronominalization; it sounds best in questions and negative sentences with a very strong focus, as in (8).

- (8) Jeg har funnet de vises sten – Har du virkelig Ø?
I have found the wise.GEN stone – have you really
‘I have found the sorcerer’s stone – Have you really?’

2 Some General Properties of the ‘and that’ Construction

This paper is about sentences like the Norwegian (9).

- (9) Han løp hjem, og **det** i full fart
he ran home and that in full speed
‘He ran home, and that at full speed’

Example (9) contains two parts. The first part is a regular clause. The second part

² This was pointed out in Lødrup (1994). Craenenbroeck (2010) discusses this option in Dutch, also mentioning French and Norwegian. He names the construction ‘spading.’

consists of the coordinator *og* ‘and’, the pronoun *det* ‘it, that’ and an adjunct. (The coordinator *men* ‘but’ is possible as an alternative to *og* ‘and’.) The pronoun takes the full clause preceding the coordinator as its antecedent, and the adjunct is interpreted as if it belongs to this clause (but see section 5).

The construction will be called the ‘and that’ construction. The part preceding the coordinator will be referred to as the full clause, and the rest as the reduced clause.³ The adjunct following *det* will be called the stranded adjunct.

This construction is very productive in Norwegian. It can also be found in some other languages (Scandinavian, German, English, French), but to our knowledge, it is hardly mentioned in the literature (but see Leira 1987 on Norwegian, and Hobæk Haff 1987:114-20, 188-92 on French). We will describe the construction, and show that *det* is a surface anaphor (as proposed in Lødrup 1994), and that the construction has the properties to be expected, given the theory of surface anaphora.

The antecedent

The full clause can be a main clause, as in example (9) above, or an embedded clause, finite as in (10), or non-finite as in (11). (Examples (10)-(11) are, like some other examples, edited sentences from web pages and other texts. These examples are marked ‘ed txt,’ while unedited text sentences are marked ‘txt.’)

- (10) De forventer at vi skal gjøre alt riktig, og **det** med en gang [ed txt]
they expect that we shall do everything right and that with one time
‘They expect that we will do everything right, and that at once’
- (11) Jeg har lyst til å denge noen, og **det** skikkelig [ed txt]
I have urge to (PREP) to (INF.M.) beat somebody, and that properly
‘I feel like beating somebody, and that properly’

The adjunct

The adjunct is usually an adverbial that is not valency-bound. It can be of any formal category that can take an adverbial function (PP, DP, CP, AdvP). The adjunct can also be a ‘free’ predicate, whose logical subject is the subject or object of the full clause. When it is an adjective, as in (12), it agrees with its logical subject (in number, and gender if singular).

- (12) De stupte i vannet, og **det** nakne
they dived in water.DEF and that naked.PLUR
‘They dived into the water, and that naked’

³ We assume that what is coordinated is the full clause and the reduced clause. As an alternative, one could assume that the coordination is on a lower level, with the conjuncts sharing the subject. It is not easy to find arguments that could distinguish between these analyses, and the difference between them does not seem to be important to the main points of this paper.

Word order

The reduced clause usually follows the full clause, but it can also precede a constituent of this clause, as in (13). Even then, the whole clause is understood as the antecedent.⁴

- (13) John sa – og **det** med god grunn – at dette er siste gang
John said and that with good reason that this is last time
‘John said – and that with a good reason – that this is the last time’

Speech act

The ‘and that’ construction often expresses an assertion of the speaker. It does not have to be asserted, however, for example when the full clause is a conditional clause, as in (14).

- (14) Ingen betaler for nyheter hvis vi leverer dem gratis, og **det** med bilder
[ed txt]
nobody pays for news if we deliver them free and that with pictures
‘Nobody pays for news if we deliver them free, and that with pictures’

3 The ‘and that’ Construction and the Theory of Surface Anaphora

We will now discuss some properties of the ‘and that’ construction that follow from a surface anaphor analysis.

There is a focusing effect

Like other cases of surface anaphora, the ‘and that’ construction has a focusing effect. The anaphor is always stressed, as overt surface anaphora usually are (Lødrup 1994), and there is also stress on the adjunct. Adjuncts that cannot be focused cannot be stranded. An important group is so-called sentence adverbs (i.e. adverbs that are usually left adjoined to VP, expressing e.g. modality, negation, focus, and speaker attitude). An example is (15). These adverbs can precede another stranded adjunct, however, as in (16).

- (15) John mistet pengene, *og **det** sannsynligvis
John lost money.DEF and that probably
‘John lost the money, and that probably’

⁴ It is not common that a coordination has its second conjunct within its first conjunct. However, this is also possible in another case, as in (i).

(i) John sa – og jeg forstår ham godt – at dette er siste gang
John said and I understand him well that this is last time
‘John said – and I understand him well – that this is the last time’

It has been claimed that this is not real coordination (Huddleston et al. 2002:1350).

- (16) John mistet pengene, og **det** sannsynligvis i byen
John lost money.DEF and that probably in city.DEF
'John lost the money, and that probably in the city'

Sentence adverbs behave in a parallel way in another focus construction, namely the cleft construction. Cleft sentences do not allow sentence adverbs to take the focus position (Faarlund et al. 1997:808). However, a sentence adverb can 'follow' a clefted constituent into the superordinate clause (compare *John probably lost the money in the city* and *It was probably in the city that John lost the money*).

There is also another parallel to cleft sentences. The Norwegian cleft construction is sometimes used without a real focus effect, especially in non-colloquial style (Faarlund et al. 1997:1092-93). The same is true of the 'and that' construction. An example is (17). This non-finite sentence gives an explanation of a word, and there can be no motivation for focusing the reduced clause.

- (17) dobbelsjekke Kontrollere at ei opplysning stemmer [..]
double-check control that a piece.of.information is.correct
'double-check Control that a piece of information is correct
og **det** hos ei anna skriftleg el munnleg kjelde [ed txt]
and that at an other written or oral source
and that with a different written or oral source'

The antecedent and the surface anaphor can belong to different utterances

The full clause and the reduced clause are not necessarily a unit from the point of view of sentence grammar. The reduced clause can be contributed by a different speaker than the full clause, as in (18). This represents a general property of surface anaphora, see for example (1)-(2) and (4)-(6) above.

- (18) A: Han har ikke gjort noe annet enn å feste – B: Og **det** hver eneste natt
he has not done anything else than to party – and that every single night
'He has not done anything but partying – And that every single night'

The pronoun cannot be deictic

The pronoun cannot refer to the non-linguistic context, it can only have the full clause as its antecedent. Again, this represents a general property of surface anaphora.⁵ This point might seem to be contradicted by the fact that the demonstrative *dette* 'this' is sometimes used instead of *det*. An example is (19).

⁵ Like other surface anaphor constructions, the 'and that' construction can be used without an expressed antecedent for the surface anaphor in some cases (Merchant 2004:717-724). An unexpressed antecedent must be something that is very salient in the situation, in a way that makes it the obvious thing to say. For example, if you see a colleague drinking whiskey, you could say *Og **det** i arbeidstiden* 'and that during working hours'.

- (19) Hun sverger på det, og **dette** på en troverdig måte [txt]
she swears on it and this in a credible way
'She swears to that, and this in a credible way'

This demonstrative is not a real demonstrative, however; it does not allow a non-linguistic antecedent. It should be seen as a variant of the surface anaphor.

The pronoun can (sometimes) be replaced by zero

An important fact is that the pronoun can alternate with zero in some cases, as in (20).

- (20) Pillene gjorde ham frisk, og (**det**) på overraskende kort tid
pills.DEF made him well and that in surprisingly short time
'The pills made him well, and (that) in surprisingly short time'

This alternation of a pronoun and zero in a language without pro-drop is striking. However, the alternation is natural when the pronoun is a surface anaphor, because surface anaphora can be zero.

The zero option seems to be restricted to some PP adjuncts. It is not acceptable with all PP adjuncts, as shown in (21). It is also unacceptable with adjuncts that are not PPs, an example is (22).

- (21) Han løp hjem, og *(**det**) til tross for været
he ran home and that in spite of weather.DEF
'He ran home, and that in spite of the weather'
(22) Han løp hjem, og *(**det**) fordi han var sulten
he ran home and that because he was hungry
'He ran home, and that because he was hungry'

It is not easy to pinpoint the difference in meaning contributed by the choice between a pronoun and zero. Our general impression is that the zero option usually requires more stress and more focus (with a possible exception for some adjuncts with *med* 'with,' especially fixed expressions like *og med god grunn* 'and with good reason'). Apart from this, the construction with zero seems to have the same properties as the construction with a pronoun.⁶

The zero option could be compared to the zero option with VP anaphora, as in

⁶ Hobæk Haff (1987:114-20) (on French) discusses the zero version of the 'and that' construction together with other cases of ellipsis in coordinations, under the heading "Le second conjoint est «emphatisé»" ('the second conjunct is emphasized'). See also Hobæk Haff (1987:188-91). Huddleston et al. (2002:1345-1350) (on English) classify the zero version of the 'and that' construction as "End-attachment coordination", and call it "Addition of a new element". Their example is (i).

(i) The match was won by Kim, and very convincingly too (Huddleston et al. 2002:1347)

example (8) above. In both cases, the overt anaphor is the unmarked option in Norwegian, and the zero option is subject to conditions that are not clear, but seem to involve the degree of stress and focus.

4 Grammatical Treatment

From Hankamer and Sag (1976), an important strategy to account for surface anaphora has been to assume that a copy of the antecedent is present in the position of the surface anaphor at some level of representation. A difficult and to some extent theory internal question is what level of representation is involved. This is not the place to discuss different theories of surface anaphora. For expository purposes, we will adopt a ‘naïve’ syntactic approach. The basic assumption is – as in Hankamer and Sag (1976) – that a copy of the antecedent is present in the position of the surface anaphor at a ‘deep’ syntactic level.

In Lexical Functional Grammar, LFG, the ‘deep’ grammatical representation is the functional structure, with syntactic functions and morphosyntactic features. This is the level where the antecedent is represented (Levin 1982, Lødrup 1994). The ‘surface’ representation is the constituent structure. An overt surface anaphor is present there, while a zero anaphor is not.

The general point is that the syntax of the clause with the surface anaphor is as if the antecedent were actually present in the place of the surface anaphor. The stranded adjunct shows grammatical properties that require a full clausal representation of the surface anaphor (even if there are not many grammatical phenomena that can be realized in a structure as rudimentary as the reduced clause).

We will first discuss the syntax of the adjunct with respect to adjective agreement and phenomena related to binding: reflexive and variable binding, and principle C of Binding Theory. These phenomena belong to functional structure in LFG – the level of representation in which the surface anaphor is represented by (a copy of) the full clause. The prediction is that the stranded adjunct should behave just like it would if it were a part of the full clause.

Agreement

It was mentioned above that the stranded adjunct can be a free predicate, as in (12) above, reproduced as (23).

- (23) De stupte i vannet, og **det** nakne
they dived in water.DEF and that naked.PLUR
‘They dived into the water, and that naked’

When the free predicate is an adjective, it must agree with its logical subject, which is the subject or object of the full clause. This follows from the clausal representation of the surface anaphor.

Reflexive binding

Another relevant phenomenon is reflexive binding. A reflexive in the stranded adjunct can be bound by the subject of the full clause, as in (24). (Note that subjects bind reflexives in adjuncts in Norwegian, see Lødrup 2007.)

- (24) Han produserer våpen, og **det** hjemme hos seg selv
he produces weapons and that home at REFL self
'He produces weapons, and that in his own home'

Binding belongs to functional structure in LFG, and the binding in (24) follows from the clausal representation of the surface anaphor.

Variable binding

An example with a reflexive possessive in the stranded adjunct is (25).

- (25) Hver eneste sanger fikk applaus, og **det** fra moren sin
every single singer got applause and that from mother.DEF POSS.REFL
'Every single singer got applause, and that from his/her mother'

This example shows variable binding. The possessive is interpreted as a variable, bound by the quantifier in the subject. This kind of variable binding is known to be possible only when the quantifier is syntactically more prominent than the variable (Reinhart 1983). Prominence is understood here as defined on the relational hierarchy; the relevant level is functional structure. Again, the facts follow from the clausal representation of the surface anaphor.

Principle C

The 'and that' construction also behaves as predicted with respect to condition C of Binding Theory, which says that a referential expression must not be bound (Chomsky 1981:188). For example, in (26), the subject pronoun in the full clause cannot corefer with the proper name in the stranded adjunct.

- (26) Han ble kastet ut, og **det** av Johns mor
he was thrown out and that by John.GEN mother
'He was thrown out, and that by John's mother'

Again, this follows from the clausal representation at functional structure, where the pronoun is syntactically more prominent than the proper name.

5 Scope

The 'and that' construction does not necessarily have the same meaning as the

corresponding simple clause without ‘and that.’ Negation and focus adverbs cannot scope over a stranded adjunct.⁷ Their scope is known to be sensitive to focus structure in the surface realization of the sentence, and at this level, the surface anaphor has replaced (the copy of) the full clause. In (27), the PP is the preferred scope of *bare* ‘only.’ In (28) with the ‘and that’ construction, this PP is a stranded adjunct, and it cannot be the scope of *bare* ‘only.’ Instead, the verb must be the scope in (27).

- (27) Han danser bare med Marit
he dances only with Marit
‘He dances only with Marit’
(28) Han danser bare, og **det** med Marit
he dances only and that with Marit
‘He dances only, and that with Marit’

To some extent, it is possible to scope over the stranded adjunct by placing the adverb in front of it, as in (29). (This adverb placement is discussed in section 3, see example 16.)

- (29) Han danser, og **det** bare med Marit
he dances and that only with Marit
‘He dances, and that only with Marit’

Negation behaves in the same way as focus adverbs. In the text example (30), the negation cannot scope over the stranded adjunct, and one gets the impression that this is the reason the ‘and that’ construction is used.⁸

⁷ Quantifiers behave as expected with the surface anaphor analysis. For example, (i) is ambiguous, allowing the quantifiers to take high or low scope, just like the corresponding sentence without ‘and that.’

(i) Mange mennesker går over fjellet, og **det** hver dag
many people walk across mountain.DEF and that every day
‘Many people walk across the mountain, and that every day’

⁸ Examples (i)-(ii) also show that the stranded adjunct cannot be the scope of a focus adverb in the full clause.

(i) Det var bare jeg som fikk anmerkning i meldingsboka mi
it was only I who got bad.mark in message.book.DEF my
‘It was only I who got a bad mark in my message book’
(ii) Det var bare jeg som fikk anmerkning – og **det** i meldingsboka mi
it was only I who got bad.mark and that in message.book.DEF my
‘It was only I who got a bad mark and that in my message book’

These examples were constructed by Atle Grønn, who points out that (i) and (ii) have different interpretations. In (i), the alternative set actualized is a set of students who could have gotten bad marks in their message books. In (ii), on the other hand, the alternative set is a set of students who could have gotten bad marks – not necessarily in their message books.

- (30) De har ikke byttet ut sverdene og **det** for å vekke guttenes interesse [txt]
they have not replaced PART swords.DEF and that to arouse
boys.DEF.GEN interest
'They have not replaced the swords, and that to arouse the boys' interest'

6 An Alternative Analysis Rejected

The facts presented in section 4 rule out a possible alternative analysis of the 'and that' construction. In this alternative analysis, the pronoun is a 'deep' pronoun referring to the event of the full clause, and there is a silent light verb in the second conjunct. According to this alternative analysis, the structure is as in (31).

- (31) Han løp hjem, og det skjedde i full fart
he ran home and that happened in full speed
'He ran home, and that happened at full speed'

There are several arguments against a missing verb analysis. It is often not clear what verb should be inserted to make an acceptable sentence, e.g. in sentences with stative verbs such as (32). When the full clause is non-finite, a verb is not enough – an auxiliary and a tense would have to be inserted as well. An example is (11) above, reproduced as (33).

- (32) Jeg var stolt, og **det** til tross for at resultatet kunne vært bedre [ed txt]
I was proud and that in spite of that result.DEF could been better
'I was proud, and that even if the result could have been better'
(33) Jeg har lyst til å denge noen, og **det** skikkelig [ed txt]
I have urge to (PREP) to (INF.M.) beat somebody, and that properly
'I feel like beating somebody, and that properly'

More important arguments are given by the phenomena discussed in section 4. The missing verb analysis does not work when the adjunct is a free predicate. Example (34) (based upon example 12/23) is ungrammatical, because the free predicate does not get the right kind of subject.

- (34) De stupte i vannet
they dived into water.DEF
*og det skjedde naken / nakent / nakne
and that happened naked.MASC.SG / naked.NEUT.SG / naked.PLUR

The reason for the ungrammaticality is not only the agreement problem; (34) would also be ungrammatical with a non-agreeing adjective (such as *beruset* 'intoxicated').

The missing verb analysis is also unable to predict the binding facts. It could not relate the reflexive to its binder in example (24), reproduced as (35), because *han* ‘he’ and the reflexive are not parts of the same clause at any level of representation. When a light verb is inserted in (35), a non-reflexive pronoun is the only option, as shown in (36).⁹

- (35) Han produserer våpen, og **det** hjemme hos seg selv
he produces weapons and that home at REFL self
‘He produces weapons, and that in his own home’
- (36) Han produserer våpen, og det skjer hjemme hos ham selv / *seg selv
he produces weapons and that happens home at him self / REFL self
‘He produces weapons, and that happens in his own home’

7 Other Languages

It was shown that Norwegian uses the pronoun *det* ‘it, that’ in the ‘and that’ construction – and to some extent *dette* ‘this.’ As mentioned in section 1, *det* is also used in the other constructions with surface anaphora: VP and predicate pronominalization, and sluicing.

The ‘and that’ construction can also be found in English, French, and German. These languages also show – to a varying degree – an overlap between the forms used in the ‘and that’ construction and the forms used in other surface anaphor constructions.

In the German example (37), the pronoun *das* ‘that’ is used. The demonstrative *dies* ‘this’ is also possible, as in (38).

- (37) Batman lebt und **das** in Corpus Christi [txt]
Batman lives and that in Corpus Christi
‘Batman lives and that in Corpus Christi’
- (38) Irland bietet für jeden etwas. Und **dies** auf typisch irische Art [txt]
Ireland offers for everybody something and this in typical Irish way
‘Ireland offers something for everybody. And this in a typical Irish way’

⁹ Another alternative analysis has been suggested to us, in which the ‘and that’ construction is derived from the *gjøre det* ‘do that’ construction. The structure is then really as in (i).

(i) Han løp hjem, og ~~han gjorde~~ **det** i full fart
he ran home and ~~he did~~ that in full speed
‘He ran home, and ~~he did~~ that at full speed’

It could be noted that the *gjøre det* ‘do that’ construction is also a surface anaphor construction, a type of VP pronominalization (Lødrup 1994). One important argument against the analysis in (i) is that it depends upon the fact that Norwegian uses the same pronominal form in the ‘do that’ construction and the ‘and that’ construction. The analysis cannot be transferred to languages that do not have a ‘do that’ construction using the same form as the ‘and that’ construction – for example English and French (see section 7).

German has VP and predicate pronominalization (Herold 2009). These constructions take *das* ‘that’ as the central surface anaphor, just like the ‘and that’ construction (even if *es* ‘it’ is also possible in some cases). An example with VP pronominalization is (39).

- (39) Hast du das Buch gelesen? – Ja, **das** habe ich.
have you the book read – yes that have I
‘Have you read the book? – Yes, I have’

In the French example (40), the pronoun *ce* ‘it, that’ is used (Hobæk Haff 1987:114-20, 188-92).

- (40) Nous n’en citerons que quelques-unes, et **ce** à titre indicatif [txt]
we NEG thereof cite only some and that to title indicative
‘We only cite some of them, and that as a guide’

As in Norwegian and German, (more) demonstrative forms can also be used, namely *cela* and *ça* ‘it, that,’ as in (41) and (42).

- (41) Tu es mon frère et **cela** pour toujours [txt]
you are my brother and that for always
‘You are my brother, and that forever’
(42) Je t’aime, et **ça** depuis 8 ans [txt]
I you love and that since 8 years
‘I have now loved you for 8 years’

The form *ça* is also used in sluicing (Craenenbroeck 2010), an example is (43).¹⁰

- (43) A: Je vais à Londres B: Quand **ça**? (Craenenbroeck 2010:103)
I go to London – when that
‘I am going to London. When?’

English uses the pronoun *that* in the ‘and that’ construction, as in example (44), or the demonstrative *this*, as in (45). (The example sentences are from the British National Corpus, thanks to John Payne.)

¹⁰ French differs from Scandinavian and German in that there is no regular VP pronominalization (and no VP ellipsis, Lobeck 1995). Predicate pronominalization is possible, however, with a different form, namely *le* ‘it.’ An example is (i).

(i) Êtes-vous directrice? Oui, je **le** suis (Cornish 1986:116)
are you (female)director – yes I it am
‘Are you a (female) director? Yes, I am’

- (44) I had to take one step every two minutes, and **that** in slow motion
(45) Rob Andrew has, as he himself admits, only recently begun to display his Wasps form for England – and **this** after 26 caps

Standard English differs from the other languages mentioned in that the forms used in the ‘and that’ construction are not found as surface anaphora in other constructions. There are dialects, however, that use *that* with predicate pronominalization, Huddleston et al. (2002:1538 note 50) give (46)-(47) as examples of responses to *It’s an absolute swindle*. (The % signs indicate dialectal variation.)

- (46) %**That** it is
(47) %It is **that**

We see, then, that all the languages discussed – including English, if non-standard forms are taken into account – show an overlap between the set of forms used in the ‘and that’ construction and the set of forms used in other surface anaphor constructions.

8 Conclusion

Overt surface anaphora are found in a small family of constructions, which includes VP and predicate pronominalization, and sluicing (and possibly the case discussed in Lødrup 2012). The surface anaphor discussed here extends this family. Overt surface anaphora raise several theoretical challenges, especially concerning their relation to ellipsis. These must be left to future research.

References

- Chomsky, Noam. 1981. *Lectures on Government and Binding*. Dordrecht: Foris.
- Cornish, Francis. 1986. *Anaphoric Relations in English and French: A Discourse Perspective*. London: Croom Helm.
- Craenenbroeck, Jeroen van. 2010. *The Syntax of Ellipsis: Evidence from Dutch Dialects*. New York: Oxford University Press.
- Faarlund, Jan Terje, Svein Lie and Kjell Ivar Vannebo 1997 *Norsk referansegrammatikk*. Oslo: Universitetsforlaget.
- Hankamer, Jorge and Ivan A. Sag. 1976. Deep and surface anaphora. *Linguistic Inquiry* 7(3):391-426.

- Herold, Jenny Ström. 2009. *Proformen und Ellipsen: Zur Syntax und Diskurspragmatik prädikativer Anaphern im Deutschen und im Schwedischen*. Lunder germanistische Forschungen 70. Visby: eddy.se.
- Hobæk Haff, Marianne. 1987. *Coordonnants et éléments coordonnés*. Oslo: Solum. Diffusé en France par Didier Érudition.
- Houser, Michael J., Line Mikkelsen, and Maziar Toosarvandani. 2007. Verb phrase pronominalization in Danish: Deep or surface anaphora? In Erin Brainbridge and Brian Agbayani (eds.) *Proceedings of the Thirty-Fourth Western Conference on Linguistics*, 183-195. Fresno CA: Department of Linguistics, California State University.
- Huddleston, Rodney, John Payne and Peter Peterson. 2002. Coordination and supplementation. In Rodney Huddleston and Geoffrey K. Pullum (eds.) *The Cambridge Grammar of the English Language*, 1273 - 1362. Cambridge: Cambridge University Press.
- Leira, Vigleik. 1987. Uttrekking - syntagmetypen "og det ...". *Maal og Minne* 1987:208-210.
- Levin, Lori S. 1982. Sluicing: A lexical interpretation procedure. In Joan Bresnan (ed.) *The Mental Representation of Grammatical Relations*, 590-654. Cambridge, MA: MIT Press.
- Lobeck, Anne. 1995. *Ellipsis. Functional Heads, Licensing, and Identification*. Oxford: Oxford University Press.
- Lødrup, Helge. 1994. "Surface proforms" in Norwegian and the Definiteness Effect. In Mercé Gonzalez (ed.) *Proceedings of the North East Linguistics Society* 24, 303-315. Amherst: GLSA, Department of Linguistics, University of Massachusetts.
- Lødrup, Helge. 2007. A new account of simple and complex reflexives. *Journal of Comparative Germanic Linguistics* 10(3):183-201.
- Lødrup, Helge. 2012. Some Norwegian 'type anaphora' are surface anaphora. *Journal of Germanic Linguistics* 24(1):23-52.
- Merchant, Jason. 2004. Fragments and ellipsis. *Linguistics and Philosophy* 27(6):661-738.

Another Overt Surface Anaphor

Reinhart, Tanya. 1983. *Anaphora and Semantic Interpretation*. London: Croom Helm.

Helge Lødrup
University of Oslo
Department of Linguistics and Scandinavian Studies
Pb 1102, Blindern, NO-0317 Oslo, Norway

helge.lodrup@ilf.uio.no

Marianne Hobæk Haff
University of Oslo
Department of Literature, Area Studies and European Languages
Pb 1003, Blindern, NO-0315 Oslo, Norway

m.h.haff@ilos.uio.no

Lexical Prefixes and Tibeto-Burman Laryngeal Contrasts

DAVID R. MORTENSEN

University of Pittsburgh

Introduction

The correspondences between Tibeto-Burman onsets are complex and often difficult to explain as products of regular, phonetically conditioned sound change. This is particularly true with regard to their laryngeal features. In his ground-breaking reconstruction of Proto-Tibeto-Burman (PTB), Benedict (1972:17–18) provides the following set of reflexes for his reconstructed PTB stops:

PTB	Tibetan	Jingpho	Burmese	Garó	Mizo
*p	p ^h ~p	p ^h ~p~b	p ^h ~p	p ^h ~p~b	p ^h ~b
*t	t ^h ~t	t ^h ~t~d	t ^h ~t	t ^h ~t~d	t ^h ~t~ts ^h
*k	k ^h ~k	k ^h ~k~g	k ^h ~k	k ^h ~k~g	k ^h ~k
*b	b	b~p~p ^h	p	b~p~p ^h	b
*d	d	d~t~t ^h	t	d~t~t ^h	d
*g	g	g~k~k ^h	k	g~k~k ^h	k

Benedict reconstructs only two series of stops, despite the fact that there are a far larger number of consonant correspondences. Some of these complexities are the result of regular, phonetically conditioned sound changes, the conditioning environment for which can be readily reconstructed. However, even after these changes are factored out, many of the patterns of correspondence cannot be derived mechanically from Benedict's reconstruction. Benedict is aware of this fact, and proposes that laryngeal features, specifically aspiration, were “unstable” in PTB and the unpredictable reflexes of PTB voiceless stops are a reflex of this variability in the proto-language. A similar thread runs through the work of Matisoff, who maintains basically the same two-way laryngeal contrast as Benedict and views deviation from this contrast as the reflex of synchronic variation in the protolanguage and its successors (Matisoff 2003). Matisoff sometimes abstracts over the causes of this variation, which could include dialect borrowing, analogical processes, and (as Matisoff explicitly notes) the effects of morphological operations.

Some scholars who have worked on Tibeto-Burman reconstruction have questioned whether the Benedict-Matisoff system of two laryngeal contrasts is adequate. Peiros and Starostin (1996) reconstruct no less than four series of obstruents for PTB (voiceless, voiceless aspirated, voiced, and voiced aspirated). More recently, Button (2009:74–75) has questioned whether PTB might have at least had a three-way contrast (voiceless, voiceless aspirated, and voiced) among obstruents. He notes that roots, such as **ka* ‘bitter’, tend to have aspirated reflexes across the Tibeto-Burman family (and even in Chinese), while others such as **kəy* ‘barking deer’ tend to have unaspirated reflexes throughout the family (reconstructions from (Matisoff 2003)). Button thus entertains the idea of projecting the three-way contrast found in Kuki-Chin languages back to Tibeto-Burman, but remains uncommitted, noting that the only satisfactory answer may be Matisoff’s observation that such apparently unconditioned splits could be due to lexical prefixes which are now lost.

The problem with which Button grapples there is an instance of a more general problem: the interaction between lexical affixes and sound change. LEXICAL AFFIXES are defined here as affixes selecting for bases of a particular, potentially arbitrary class and not performing a well-defined grammatical or semantic function. Similar types of morphology are found in other language families, including the Yuman languages of North America (Miller 2001). The existence of quasi-productive affixes of this kind makes possible what I will call the PHANTOM PREFIX MANEUVER: an affix is added to a stem, provides the conditioning environment for a sound change, and is eliminated (perhaps by the aforementioned sound change). This would give rise to apparently unconditioned splits with comparative morphological evidence. The purpose of this paper is to argue that PHANTOM PREFIX EFFECTS should be expected in Tibeto-Burman based on the properties of lexical prefixes in Tibeto-Burman languages, to show that the phantom prefix hypothesis, while it seems excessively powerful, makes specific predictions, and to contend that these predictions are born out for Tibeto-Burman languages of the Burma-India border area (a superset of the Kuki-Chin languages on which Button (2009) concentrated).

These languages will be referred to here as the Borderlands languages. The specific groups that will be examined, following the classification from Burling (2003), are Kuki-Chin (exemplified by Mizo and Tedim), Old Kuki (exemplified by Sorbung), Tangkhulic¹ (exemplified by Ukhul Tangkhul and Kachai), Zeme (exemplified by Rongmei and Liangmei), and Angami-Pochuri (exemplified by Khonoma Angami). As Burling points out, a genetic relationship between these languages has not yet been established on rigorous grounds and it is possible that each of these groups (except Kuki-Chin and Old Kuki) form a separate top-level branch of Tibeto-Burman. This paper will advance a contrary view, namely that each of

¹ Burling using the term Tangkhul for the group. I use Tangkhulic here to make it clear that the whole group is intended, rather than a particular language.

these groups except Angami-Pochuri form a subgroup within Tibeto-Burman. All of these languages are spoken in a compact area stretching in India from Mizoram through Manipur to southern Nagaland and including contiguous parts of Burma.

Examples of problematic correspondences among Borderlands languages are given in Table 1, which shows cognates having coronal stop onsets. As shown in

Gloss	Angami	Rongmei	Liangmei	Ukhrul	Sorbung	Mizo	Tiddim
‘custom’	de	-dün	—	—	—	—	da:n
‘quiet/cool’	—	—	—	—	dài	dai	dai ³
‘dew’	zi	—	—	—	ʔə-dái-cuu	dai	dai ¹
‘stand’	—	diŋ	—	—	—	diŋ	diŋ ¹
‘chop’	du	—	—	k ^h ə-ru	dùu	—	—
‘egg’	dzü	roi-dui	—	ha-ru	ʔə-waa-cuu	ar-tui	tui ¹
‘water’	dzü	dui	ta-dui?	ta-ru	cuu	tui	tui ¹
‘weave’	do	dük	dak	k ^h ə-rak	—	ta?	—
‘short’	ke-dzü	dui-mei	—	—	tòo	toi	—
‘large’	ke-di	dai-mei	ka-di-pu	—	-táa-	—	—
‘grandchild’	tsu	—	—	ʔa-ru	—	tu	—
‘flesh/body’	—	—	pa-te?	—	ʔə-táak	tak-sa	—
‘ant’	—	n-tieŋ	ma-tiaŋ	—	ciŋ-fii-pá	—	—
‘black’	ka-ti	—	ka-tik-bu	kə-tsik	—	—	—
‘arrow’	tilüsi	—	—	—	t ^h ëe	t ^h al	t ^h al ¹
‘deep/thick’	su	t ^h uk	—	kə-t ^h uk	t ^h üuk	t ^h u:k	t ^h u:k ¹

Table 1: Coronal stop correspondences among Angami-Pochuri (Angami Khonoma), Zeme (Rongmei and Liangmei), Tangkhulic (Ukhrul), Old Kuki (Sor-bung), and Kuki-Chin (Mizo [=Lushai] and Tiddim) languages. Angami, Rongmei, Liangmei, and Mizo data are from Marrison (1967); Tiddim data are from Bhaskararao (1996); Ukhrul and Sorbung data are from the author’s field notes.

the table, there are four different patterns of correspondence among cognates in this group: one where onsets are voiced across the representative languages, one where they are voiced in Angami-Pochuri, Zeme, and Tangkhulic languages but not in Old Kuki or Kuki-Chin languages, one where they are voiceless unaspirated across the languages, and one where they are voiceless aspirated except in Angami. Comparable sets can be assembled for labial and velar stops as well as two series of affricates (coronal and palatal). If one was to reconstruct a laryngeal contrast for each correspondence set, we would indeed have four series of obstruents, as proposed by Peiros and Starostin (1996). Here, I propose instead that the distinction between the two voiced sets and the two voiceless sets arose due to phantom prefix effects.

1 Lexical Prefixes in Tibeto-Burman

Tibeto-Burman lexical prefixes display properties not typical of affixes, to the extent that certain scholars have objected to classifying them as affixes at all (Hill 2009:174). While prototypical affixes mark semantic or grammatical features, TB lexical prefixes sometimes do neither. While prototypical affixes sit on a scale of productivity between fully productive affixes and fossilized formatives that cannot, from a synchronic viewpoint, be analyzed from the stem, TB lexical prefixes display a kind of sporadic productivity. This results in extreme variability even across closely related languages. In fact, one of the most compelling reasons for viewing TB lexical prefixes as prefixes, rather than fossilized parts of the stem, is that they are so readily replaced by other prefixes.

1.1 Variability

An inescapable fact of Tibeto-Burman comparative linguistics is the variability displayed in the distribution of lexical prefixes, even among very closely related languages. The Tangkhulic languages, for example, are a compact family which, despite their mutual unintelligibility, are often considered “dialects” of the same language by their speakers. Nevertheless, they show great variation in the lexical prefixes that appear in cognate lexical items: This variation has two implications:

Ukhrul	Tusom	Huishu	Kachai	
k ^h ə-ŋə-ci	kə-tsi	kə-tsik	k ^h ə-ŋə-tse	‘fear’
t ^h ə-ruk	t ^h -ru-he	sə-ru?	ʃə-ruk	‘six’
ŋə-luŋ	lū-kuə	sə-luŋ	kə-luŋ	‘stone’
ha	ŋə-ʃi	ʔa-r-we	kə-fu	‘axe’

Table 2: Examples of Tangkhulic cognates displaying variability in lexical prefixes.

that lexical prefixes are treated as analyzable morphological constituents, not an unsegmentable portion of the stem, and that changes in the lexical prefix do not necessarily imply changes in the grammatical or semantic properties of stems.

1.2 Form

Tibeto-Burman words often have an iambic, sesquisyllabic (syllable and a half) structure. In formal terms, TB prefixes are the light syllables or semisyllables in sesquisyllabic words. In the Borderlands languages, there is often an additional grammatical prefix before this lexical prefix in certain syntactic contexts. Words thus tend to have the formal structure shown in (1):

$$(1) \quad (C-)_{\text{pfx}_g}(C-)_{\text{pfx}_l}[CV(V)(C)]_{\text{root}}$$

- a. pfx_g: grammatical prefix (nominalizer, possessor, noun marker).
- b. pfx_l: lexical prefix.

While there are exceptions, the prefixes tend to lack an underlying vowel and to display predictable vocalism (typically a short mid-central or high vowel).

In general, at most one prefix may occupy each “slot.” This means that there are a finite number of “classes” to which each stem (lexical prefix + root) can belong: one for each lexical prefix and one for stems lacking any lexical prefix.

1.3 Distribution

The distribution of lexical prefixes in Tibeto-Burman languages is not completely arbitrary. Instead, it is multiply determined. The relevant factors can be classified, in order of decreasing prototypicality, as valency, semantic class, and euphony (phonological typicality).

Valency-changing prefixes At least since Wolfenden (1929), it has been noted that there are two widespread prefixes in Tibeto-Burman languages which are associated with certain types of argument structure and event semantics. The prefix **s-* was apparently valency-increasing, associated with “outward directed” action, and **m-* was valency-decreasing, associated with stative, reflexive, and reciprocal events. While neither of these prefixes is productive in most modern Tibeto-Burman languages, there is widespread evidence for their past productivity. For example, in Burmese (and Yi-Burmese languages generally) there are numerous causative-simplex pairs where the causative has an aspirated onset and the non-causative has an unaspirated onset (Cornyn and McDavid 1943; Matisoff 1970). On the basis of comparative evidence, the causatives can often be shown to reflect stems containing the **s-* prefix (Matisoff 1970, 2003).

Various subgroups of Tibeto-Burman have innovated additional valency-changing prefixes, some of which are productive. For example, in Sorbung (probably a member of the Old Kuki group) and some of the Kuki-Chin languages, there is a productive causative /*m-*/ (Hartmann 2001; Mortensen 2010). However, even for the most productive cases, there are usually no neat form-meaning mappings: there are typically formally identical prefixes occurring in semantically incompatible verb stems, nouns, and numerals. For example, the productive Sorbung causative *mə-* overlaps formally with class prefixes found in animal names (*məjju* ‘mouse’, *mətir* ‘shrew’, *məhit* ‘leech’) and body parts (*məluuŋ* ‘heart’, *mətoó* ‘lap’, *mətin* ‘nail/claw’) and reflexes of the PTB **m-* verbal prefix (*mənáam* ‘smell’, *mənúu* ‘laugh/smile’, *mət^hak* ‘be itchy’), which was characteristically valency *reducing*.

Semantic class prefixes Other lexical prefixes in Tibeto-Burman languages are vaguely classificatory in function. These have developed, diachronically, from clas-

sifying compounds where the first constituent is (1) a hypernym of both the complement and of the compound as a whole or (2) an incorporated noun classifying the event to which it refers. For example, some instances of the Sorbung prefix *cə-* are transparently derived from the word *cəu* ‘water’ in composition:

Water Related	<i>cəkòo</i>	‘river’
	<i>cəlàm</i>	‘spring’
	<i>cəlòk</i>	‘flood’
	<i>cəkàaŋ</i>	‘drought’
	<i>cəluàŋ</i>	‘flow (v.)’
Other	<i>cəkàap</i>	‘tongs’
	<i>cəhàa</i>	‘leaf-monkey; langur’
	<i>cəkùì</i>	‘dance’

Table 3: Sorbung stems with the prefix *cə-*, most of which are related to water.

Heads which occur in a very large number of compounds are vulnerable to reanalysis as part of the prefix and concomitant phonological reduction.

Other examples of this type include body-parts with the prefix **m-*, probably from **mi* ‘person’ (Benedict 1972) and Tangkhulic nouns and verbs related to the mouth with the prefix **m-*, probably from **mor* ‘mouth’ (Mortensen 2003).

Euphonic prefixes When valency changing prefixes and semantic class prefixes are factored out of Tibeto-Burman lexicons, a substantial residue remains. These are prefixes that serve no discernible function except to make the form of a stem more like that of other stems in the language. These prefixes are subject to, and the product of, various types of local and non-local analogical processes. The next section provides empirical validation for this claim.

2 Influences on Prefix Selection

The category to which a stem belongs—whether it includes a prefix and, if so, which—emerges from a competition among formal (phonological), semantic, and grammatical factors. The observed variability in lexical prefixes is best understood as a result of the indeterminacy of this interaction. In the following section, I describe the result of two experiments conducted on lexical collections from Borderlands languages (both from the Tangkhulic branch) which demonstrate the reality of this interaction.

2.1 Experiment 1: Kachai lexicon

The first experiment sought to determine whether formal biases in the distribution of lexical prefixes would be detectable in a list of basic vocabulary items from a

Tibeto-Burman language. I chose to use a word list collected from the Tangkhulic language Kachai, originally compiled for general comparative and descriptive purposes.

Methods The Kachai word list consisted of 389 unique lexical items, with a bias towards body part terms, kinship terms, and animal names. Words from the list were coded according the formal factors and lexical category (noun, verb, or numeral). Models predicting the occurrence of each prefix via phonological factors (onset, nucleus, and coda of the following syllable) and lexical category were explored using the multiple logistic regression program *Rbrul* for the R statistics environment. Several factors describing the phonological properties of the onset were coded: labial, coronal, dorsal, laryngeal, sonorant, nasal, plosive, aspirated, and fricative.

Results One or more of the phonological properties of the onset of the following syllable was a significant predictor for the presence of each of the prefixes but one. For this prefix (*ŋ-*), lexical category was the only significant predictor. It was much more likely to occur in verbs than in nouns and did not occur in numerals. For all others, formal factors were better predictors. The absence of any lexical prefix was also best predicted by a phonological factor (a following non-coronal onset), but was also weakly predicted by lexical category (verbs and nouns were more likely to lack lexical prefixes than numerals). A summary of the best predictors for each of the prefixes is given in Table 4.

Prefix	Predictors
∅-	¬Coronal*** > Lexical Category
p-	¬Plosive*** > Dorsal* > ¬Aspirated
m-	¬Labial** > ¬Fricative**
k-	Coronal**
ŋ-	Lexical Category**
c-	Labial** > Dorsal > Laryngeal

Table 4: Best predictors for Kachai prefixes. * $p < 0.025$, ** $p < 0.01$, *** $p < 0.001$.

Discussion Effects of form on prefix selection are robust enough to be identified even in relatively small, heterogeneous word lists. In general, it appears that prefixes are preferentially affixed to roots where the following onset is phonologically different from the prefix consonant. Thus, *m-* is significantly more frequent in stems where the following onset is not labial. The fact that there are no frequent coronal prefixes explains the fact that non-coronal roots are disproportionately likely to lack

a lexical prefix. On the other hand, simple difference cannot explain all of the patterns observed. For example, the specific affinity between *k*- and coronals (but not labials) suggests a language-specific set of analogical processes.

2.2 Experiment 2: Ukhrul verbs

The preliminary experiment on the Kachai word list validated the idea that phonological factors play a role in prefix selection. However, it was not clear whether this effect was robust throughout the data or was confined to the more opaque prefixes in nouns and numerals. The heterogeneous nature of the data set also made it difficult to code systematically for semantic factors. Looking at a larger data set consisting only of verbs would allow these shortcomings to be addressed.

Methods The complete set of verbs from a dictionary of Ukhrul Tangkhul (Bhat 1969) was filtered so it only contained one instance of each attested verb stem. This left a set of 1235 verb stems. Verbs were then coded for both phonological and semantic variables (onset, nucleus, coda, stative, causative, reciprocal, reflexive). Semantic categories were coded according to English gloss. For example, words glossed as “cause to *X*” or “make *X*” were coded as causative. Models for predicting each prefix based on these formal and semantic factors were explored using the multiple logistic regression program *Rbrul* for the R statistics environment.

Results For each of the four prefixes tested, *Rbrul* found a model consisting of significant factors. In each of these models, a formal factor—the onset of the root syllable—was a significant predictor. For two of the prefixes (*m*- and *p*-) the onset of the following syllable was the *best* predictor. Semantic factors were also significant predictors:

Prefix	Predictors
Ø-	¬Caus*** > ¬Recip** > Onset** > ¬Reflex*
p-	Onset*** > Reflex** > Caus
m-	Onset*** > State***
k-	¬State*** > Onset**
ŋ-	Recip*** > ¬Caus*** > Onset
c-	Caus*** > Onset** > ¬State**

Table 5: The best predictors for Ukhrul Tangkhul prefixes. **p* < 0.025, ***p* < 0.01, ****p* < 0.001.

Discussion The current distribution of prefixes in Standard Tangkhul (Ukhrul) verbs is best understood as a product of an interaction between formal factors and the morphosyntactic/semantic factors that prototypically govern the distribution of

affixes. As a result, the set of stems contain a particular lexical prefix, or no prefix, is phonologically skewed, as is illustrated in Table 6. The patterns observed are those expected from the Kachai study. Prefixes are dispreferred to the extent that they are similar to the initial onset of the root. The absence of any common coronal prefixes probably accounts for the relatively high frequency at which roots with non-coronal onsets occur without lexical prefixes.

p-	logodds	m-	logodds	c-	logodds	k-	logodds	ŋ-	logodds	θ-	logodds
r	13.752	t ^h	5.421	m	1.179	n	1.741	w	1.544	ŋ	1.501
j	13.696	s	5.263	p	1.026	ts	1.634	p ^h	1.350	k ^h	0.507
ŋ	13.441	c	5.060	k	0.785	p	1.423	k ^h	1.226	m	0.338
h	13.286	r	5.056	h	0.731	j	1.350	s	1.077	p ^h	0.299
n	12.014	k	5.047	ʃ	0.527	t	1.262	m	1.025	w	0.158
w	-5.339	ʃ	5.036	n	0.292	h	1.075	k	0.914	t	0.026
ts	-5.373	h	5.033	ts	0.289	t ^h	1.041	p	0.912	t ^h	0.007
m	-5.394	j	5.011	t ^h	0.064	ŋ	1.033	j	0.813	c	0.001
t	-5.402	t	4.789	t	-0.056	c	1.003	n	0.805	ʃ	-0.038
ʃ	-5.462	n	4.706	w	-0.119	r	0.864	r	0.769	ts	-0.093
k	-5.489	k ^h	4.458	p ^h	-0.131	s	0.726	c	0.743	p	-0.197
t ^h	-5.518	ts	4.323	k ^h	-0.179	ʃ	0.662	ʃ	0.659	s	-0.265
p	-5.541	p ^h	-11.709	s	-0.249	k	0.418	h	0.632	k	-0.277
c	-5.560	p	-11.764	ŋ	-0.419	p ^h	0.396	ts	0.583	j	-0.369
s	-5.562	w	-11.814	c	-0.438	w	0.071	t	0.531	n	-0.508
p ^h	-5.608	m	-11.949	r	-0.846	m	0.060	t ^h	-0.045	h	-0.522
k ^h	-5.939	ŋ	-11.965	j	-2.457	k ^h	-14.759	ŋ	-13.539	r	-0.566

Table 6: Occurrence of prefixes with onsets.

3 Predictions of the “Phantom Prefix” Model

Given that the distribution of lexical prefixes is both multiply determined and diachronically unstable, a scenario in which a prefix is added to a root, then eliminated as part of a sound change that affects the initial consonant of the root, is plausible. Such a hypothesis is problematic, though, in that it seems unconstrained in its explanatory power. At first glance, it appears able to explain any development. Applied indiscriminately, one could even use it to reduce the PTB obstruent inventory to a single series, or a single consonant.

However, when the matter is examined more closely, it becomes clear that sound changes triggered by lexical prefixes are likely to have certain properties. The “phantom prefix” hypothesis makes certain predictions which the multiplication of contrasts in the proto-language does not. These predictions are problematic to verify because they tend to be probabilistic rather than categorical, but they are, nevertheless, verifiable. This section identifies several of these predictions and shows that they are consistent with the hypothesis that the three-way laryngeal contrasts found in Borderlands languages is a secondary, prefix-conditioned development.

3.1 Localization of deviation

Lexical affixes are most likely to trigger sound changes at the location of attachment. Thus, a language with lexical prefixes would be expected to show more apparently irregular developments in the initial segments of roots than in the final segments. This is difficult to test in a non-circular fashion without a generally agreed-upon reconstruction for the ancestor of the whole language family under discussion and a comprehensive understanding of what developments should be considered “regular.” However, as the following sections will make clear, there are various ways in which questions of this type can be investigated. The most important of these are semantically related doublets.

3.2 Cross-series patterning of splits

While, as demonstrated, lexical prefixes may have a phonologically biased distribution, they nevertheless tend to occur in a broad range of phonological contexts. This means that changes in laryngeal features triggered by lexical prefixes are likely to occur across whole phonological series, or even multiple phonological series, rather than in a smaller subset of the phonological inventory.

This seems consistent with a development in the Kuki-Chin languages (which is probably shared with at least the Tangkhulic languages (Mortensen and Miller 2009)). In many these languages, there are two series of sonorants: a voiced series and a voiceless series. The Hakha Lai phonological inventory, for example, includes /hm/, /hn/, /hŋ/, /hl/, and /hr/ in addition to /m/, /n/, /ŋ/, /l/, and /r/. (Matisoff 2003) views at least some of the voiceless sonorants in the Kuki-Chin languages as reflecting the fusion of the PTB *s- prefix with the following onset. There are at least two reasons for believing this. First, non-Kuki-Chin cognates of some of the etyma displaying this development have prefixes reflecting *s-.

PTB	Written Tibetan	Lai (Hakha)	Gloss
*s-nap	snabs	hnab	‘snot’
*s-ram	sram	-hrem	‘otter’
*s-min	smin-pa	hmîn	‘ripe/well-cooked’

Second, there are numerous causative-simplex pairs which differ only in the voicing of the stem-initial consonant. These appear to reflect stems with and without the historical *s- causative prefix, respectively (VanBik 2009):

Simplex		Causative	
maàn	‘crush (v.i.)’	hmàan	‘crush (v.t.)’
mit	‘go out (light)’	hmit	‘extinguish (light)’
ŋerʔ	‘be entwined’	hŋerʔ	‘entwine’
rĭl	‘roll (v.i.)’	hrĭl	‘roll (v.t.)’
làaw	‘be alarmed’	hlàaw	‘alarm (v.t.)’

However, these causative-simplex pairs are not limited to sonorants. There are numerous parallel doublets with voiceless obstruents where the contrast is in aspiration:

Simplex		Causative	
pok	‘be open’	p ^h ok	‘open (v.t.)’
tolʔ	‘slide (v.i.)’	t ^h olʔ	‘slide (v.t.)’
kǎaŋ	‘burn (v.i.)’	k ^h ǎaŋ	‘burn (v.t.)’
kiak	‘break (v.i.)’	k ^h iak	‘break (v.t.)’
tsat	‘be severed’	ts ^h at	‘sever’
trǔm	‘decrease (v.i.)’	t ^h rum	‘decrease (v.t.)’

This is especially significant because the aspirated-unaspirated distinction is one of the contrasts that is not directly accounted for by the Benedict-Matisoff reconstruction of PTB. In light of these data, it is likely that at least some of the aspirated onsets and voiceless sonorants in Kuki-Chin languages share a common origin, namely the PTB *s- prefix.

3.3 Persistence of semantically related doublets

Unfortunately, not all of the Borderlands language that display unexplained splits present such unambiguous evidence for their origins. However, they do seem to satisfy a more general prediction of the phantom prefix hypothesis, namely that the lexicons of the affected languages should be littered with doublets reflecting pairs of prefixed and unprefixed forms. These should differ either minimally or systematically in semantics and should show the effects of the split conditioned by the prefixes. The causative-simplex pairs from Kuki-Chin languages are a special case of this phenomenon. However, there are many other examples in Borderlands languages.

For example, in Sorbung (Old Kuki) there are two reflexes of PTB *dzy-, /j/ and /c/. These are reflected in the doublet cúup ‘breast’, jùup ‘suck’ from PTB *dzyo:p ‘breast/suck.’ This is paralleled by the doublet cǎu ‘water’, jǎu ‘wet.’ In Ukhrul (Tangkhuic) there are two reflexes of PTB *tsy-, /s/ and /ts/. This split is reflected in couplets like *sa ‘be hot’, *tsa ‘be ill/be feverish’ from PTB *tsya ‘hot/hurt/pain/ill.’

An even more pervasive kind of doublet can be identified only comparatively. In VanBik’s (2009) reconstruction of Proto-Kuki-Chin, he notes that there are numerous roots for which both an aspirated and unaspirated form, or both a voiced and voiceless form, must be reconstructed. For example, ‘foot/leg’ must be reconstructed as *kee based on evidence from Hakha Lai, Falam Lai, and Mizo but as *k^hee based on evidence from Tedim and Paite. Likewise, Mara, Hakha Lai, Falam Lai, Mizo, Sizang, and Khumi suggest that ‘hand’ should be reconstructed as *kut while Mindat Cho, Tedim, Thado, and Paite suggest that it should be reconstructed

as **k^hut*. While systematic counts have not yet been made, it appears from VanBik's reconstruction that variation in the laryngeal features of initial consonants, as shown in these examples, is the most common type of variation that must be reconstructed for Proto-Kuki-Chin.

3.4 Developments with soft phonological and semantic biases

VanBik (2009) notes with some puzzlement that doublets are not evenly distributed across the Kuki-Chin lexicon. For example, there are few causative-simplex doublets with coronal stops, affricates, or nasals, while there are many with labial and dorsal consonants. There are also relatively few instances of /t^h/ from PTB **t-* (most instances of /t^h/ are regular reflexes of PTB **s-*). In light of the results from the study of prefixes in Ukhrul Tangkhul, this is likely to be the result of a selectional bias towards bases that are phonologically unlike the prefix. If the aspirated/voiceless members of these couplets are reflexes of stems containing **s-*, and if **s-* was more likely to be affixed to roots with non-coronal onsets, the resulting aspiration/devoicing would be less frequent in coronals than in non-coronals.

On the other hand, not all voiceless sonorants or aspirated reflexes of PTB voiceless stops can be derived from causative **s-*, nor does the phantom prefix model predict that they should originate from the source, except in a strictly formal sense. For example, neither Hakha Lai *k^hăaw* 'grasshopper' from PTB **ka:w* or Hakha Lai *-hni?* 'two' from PTB **g-ni-s* is causative and neither has cognates with the **s-* prefix elsewhere in Tibeto-Burman. What the hypothesis does predict is that there will be probabilistic biases in the boundaries of the resulting split in both phonological and semantic domains. This is born out in Kuki-Chin, where stems with initial aspirated obstruents and voiceless sonorants are more likely to be causative in their semantics than roots without these properties.

4 Two Series are Sufficient

If lexical prefixes may both expand their domain in unpredictable ways and trigger sound changes that result in their own destruction, it is possible to reconstruct only a two-way laryngeal contrast in PTB and still derive the correspondence sets shown in Table 1. Assume that Zeme, Tangkhulic, Old Kuki, and Kuki-Chin share a common ancestor more recent than PTB and that in this ancestor language a set of prefixes that could induce voicelessness/aspiration (including but perhaps not limited to **s-*) proliferated. These prefixes then coalesced with following onsets through a regular sound change, yielding the unaspirated/unaspirated split in voiceless stops and the voiced/voiceless split in sonorants that are seen in various languages within this group.

This hypothesis has the added benefit of explaining why segmental reflexes of the PTB **s-* prefix do not seem to occur in the languages belonging to this group. It

is true that they display instances of the PTB animal prefix, which Matisoff (2003) also reconstructs as *s-, but these tend not to be fully reduced and include an underlying vowel. In other words, they were likely to be formally distinct from the *s-causative. Matisoff (2003) also suggests that the Ukhrul Tangkhul causative prefix ʃi-/ci- is a reflex of the PTB *s- prefix, but on the basis of internal reconstruction it can be shown the palatal stop allomorph is the historically prior form, making it a poor match for PTB *s- (Mortensen and Miller 2009). While other PTB prefixes are well preserved, *s- is not. This makes sense if segmental reflexes of *s- were destroyed as part of the sound change that gave rise to the aspirated/unaspirated split.

Subsequently, after Kuki-Chin and Old Kuki had split from the rest of the group, I propose that there was a second prefix-induced split which resulted in two sets of reflexes for PTB voiced stops. Parallel changes did not occur in Tangkhulic or Zeme, yielding the complicated correspondence seen in Table 1. Unfortunately, little can be said about this prefix currently, or even whether it prevented devoicing, induced voicing, or induced devoicing.

This brings us back to the primary problem of the phantom prefix maneuver: because it relies upon a causal factor that is eliminated by the event that it triggers, it slouches dangerously close to a just-so story. At first glance, it may even seem equivalent to stipulating the existence of one or more additional phonological series. It is a mechanism of massive power that is probably impossible to constrain in strictly categorical terms. In a word, it is an undesirable analytic option. The reason I have argued for it is not that it is inherently desirable, but because it is more desirable than the competing options. Despite its great power, it makes a variety of interesting probabilistic predictions about the lexicons of affected languages. While a great deal of additional work remains to be done, these predictions are generally consistent with my findings for Borderlands languages. Predictions that should be tested, or tested more rigorously, include the following:

- (2) a. Doublets that differ in the laryngeal features of initial consonants are significantly more frequent than those that differ in vocalism or the final consonant (excluding independently motivated morphological processes like Kuki-Chin stem alternation).
- b. Nouns with initial voiceless sonorants in Kuki-Chin share more formal and semantic properties with nouns having aspirated stops than nouns having unaspirated stops.
- c. There are semantic and/or phonological biases distinguishing the two sets of reflexes of PTB voiced stops.

These avenues for future research highlight the greatest advantage of the phantom prefix hypothesis, namely that it invites us to ask more interesting questions than the alternatives.

References

- Benedict, Paul K. 1972. *Sino-Tibetan, a Conspectus*. Cambridge: University Press.
- Bhaskararao, Peri. 1996. A computerized lexical database of Tiddim Chin and Lushai. In Tsuyoshi Nara and Kazuhiko Machida, eds., *A Computer-Assisted Study of South-Asian Languages*, 27–143, Tokyo: ILCAA.
- Bhat, D. N. Shankara. 1969. *Tankhur Naga vocabulary*, volume 67. Poona: Deccan College Postgraduate and Research Institute.
- Burling, Robbins. 2003. The Tibeto-Burman Languages of Northeastern India. In Graham Thurgood and Randy J. LaPolla, eds., *The Sino-Tibetan Languages*, 169–191, London: Routledge.
- Button, Christopher Thomas James. 2009. A Reconstruction of Proto Northern Chin in Old Burmese and Old Chinese Perspective. PhD dissertation, SOAS, University of London.
- Cornyn, William and Raven McDavid. 1943. Causatives in Burmese. *Studies in Linguistics* 1(18):1–6.
- Hartmann, Helga. 2001. Prenasalization and preglottalization in Daaï Chin, with parallel examples from Mro and Maru. *Linguistics of the Tibeto-Burman Area* 24(2):123–142.
- Hill, Nathan. 2009. Review of Handbook of Proto-Tibeto-Burman: System and Philosophy of Sino-Tibetan Reconstruction. *Languages and Linguistics* 10(1):173–195.
- Marrison, Geoffrey E. 1967. The classification of the Naga languages of North-East India. PhD dissertation, University of London, School of Oriental and African Studies.
- Matisoff, James A. 1970. Glottal Dissimilation and the Lahu High-Rising Tone: A Tonogenetic Case-Study. *Journal of the American Oriental Society* 90(1):pp. 13–44.
- Matisoff, James A. 2003. *Handbook of Proto-Tibeto-Burman: System and Philosophy of Sino-Tibetan Reconstruction*. University of California Press.
- Miller, Amy. 2001. *A grammar of Jamul Tiipay: Amy Miller*. Hawthorne, N.Y.: Mouton de Gruyter.
- Mortensen, David R. 2003. Comparative Tangkhul. Ms. UC Berkeley.

Lexical Prefixes and Tibeto-Burman Laryngeal Contrasts

- Mortensen, David R. 2010. The Place of Sorbung in Tibeto-Burman. Paper presented at ICSTLL (International Conference on Sino-Tibetan Languages and Linguistics), Lund, Sweden, October 16.
- Mortensen, David R. and James A. Miller. 2009. Proto-Tangkhul Onsets in Comparative Perspective. Paper presented at ICSTLL (International Conference on Sino-Tibetan Languages and Linguistics), Chiangmai, November 4.
- Peiros, Ilia and Sergej A. Starostin. 1996. *A Comparative Vocabulary of Five Sino-Tibetan Languages (6 vols.)*. Parkville, VIC: Univ. of Melbourne, Dept. of Linguistics and Applied Linguistics.
- VanBik, Kenneth. 2009. *Proto-Kuki-Chin: A Reconstructed Ancestor of the Kuki-Chin Languages, STEDT Monograph Series*, volume 8. Berkeley: STEDT.
- Wolfenden, Stuart Norris. 1929. *Outlines of Tibeto-Burman linguistic morphology*. London: Royal Asiatic society.

David R. Mortensen
University of Pittsburgh
2816 Cathedral of Learning
Pittsburgh, PA 15260

drm31@pitt.edu

Logophoric First-person Terms in Japanese and Generalized Conversational Implicatures

KOICHI NISHIDA

Shimonoseki City University

This article discusses the logophoric reading of first-person terms (FPTs) like *watasi* ‘I’ in Japanese, both in and out of complement clauses, showing that it is a case of what Levinson (2000) calls “generalized conversational implicatures” (GCIs). I will show where, how and why the Gricean Maxim of Quantity can derive the logophoric reading of Japanese FPTs.

This article is organized as follows. Section 1 shows typological evidence for a link between FPTs and logophoric terms. Section 2 focuses on Japanese FPTs occurring in the complement clauses of verbs of communication, developing Hasegawa and Hirose’s (2005) argument that Japanese has two types of FPTs that correspond to two aspects of the speaker’s Self, i.e. the private Self and the public Self. Section 3 deals with Japanese FPTs occurring in article titles, which take the form of noun phrases modified by relative clauses. Section 4 discusses the theoretical implications of this study. Section 5 concludes this article.

1 A Typological Observation

Typologically, there are languages in which FPTs can be used as logophoric terms (cf. Siewierska 2004:203). For example, Schlenker (2003:68) points out that Amharic, a Semitic language in North Central Ethiopia, uses the first-person element in the complement to indicate coreference with the matrix subject, as in (1a), but such a use of the first-person pronoun “I” is unacceptable in English, as in (1b):

- (1) a. *jon jəgna nə-ññ yil-all*
John hero be.PF-1sO 3M.say-AUX.3M
‘John_i says he_i is a hero.’ Literally, ‘John_i says I_i am a hero.’
b. John_i says he_i is a hero.
*John_i says I_i am a hero.

Similar facts are found in Navajo, as noted by Akmajian and Anderson (1970:6) with example (2), and in Punjabi, as noted by Bhatia (2000:645) with (3):

- (2) Mary Jáan 'ayóí 'áníínish'ní yíłní.
'Mary told John that she likes him.' Literally, M. told J., 'I like you.'

- (3) Gurnek_i ne aakhiaa ki mǎi_i jǎãvaagaa.
Gurnek ERG say-PAST that I go-FUT-1 Masculine-SG
'Gurnek_i said that he_i would go' or 'Gurnek_i said that I_j would go.'

These data have a common property in representing the utterance of the original speaker, or the message source referred to by the matrix subject, suggesting that when FPTs are used in the contexts representing the original speaker's utterance, there is a reasonable motivation for them to be used as logophoric terms.

Japanese FPTs, too, can occur in a complement clause to indicate coreference with the third-person matrix subject. Japanese does not formally distinguish between direct discourse and indirect discourse complements; example (4) does not specify whether the complement is a quote or not. In (4), *watasi* in the complement of verbs like *iu* 'say' and *yorokobu* 'be glad' can be coreferential with the matrix subject, creating a direct discourse-like reading that reproduces Hanako's self-reference, but *watasi* in the complement of verbs like *siru* 'know' and *kiku* 'hear' can only refer to the current speaker.

- (4) Hanako_i-wa tugi-wa watasi_i-no deban-da to
Hanako-TOP next-TOP I-GEN turn-COP COMP
{it-teiru/ yorokon-deiru/ *sit-teiru/ *kii-teiru}.
{say-STATE/be-glad-STATE/ know-STATE/ hear-STATE}
'Hanako_i {says/is glad/*knows/*hears} that the next time is her_i turn.'

This shows that the logophoric FPTs occur only with a specific type of verbs.

The contrast in (4) agrees with "the logocentric verb hierarchy," adopted from Stirling (1993:259), who points out that typologically, the higher in rank a given verb is, the more readily it accepts a logophoric term in its complement:

- (5) communication > thought > psychological state > perception

In this hierarchy, verbs of communication are different because they take message sources as subjects. Sells (1987:455) defines the discourse role SOURCE as "the one who makes the report." Here I develop this concept to argue that only an individual who expresses his message in speech can play the message source role. This means that it cannot be played by an individual who thinks about some message in his mind, nor by one who is in a particular psychological state about

it, nor by one who perceives it; these cases do not involve speech, and do not send messages to other people. To make a tentative generalization from the above data, verbs of communication like *iu* and *yorokobu* in Japanese are high in the hierarchy in (5) and so can introduce an FPT as a logophoric marker, which marks the matrix subject as a message source. On the other hand, verbs like *siru* and *kiku* are low in the hierarchy, and are incompatible with logophoric markers.

A similar fact is found with the Mongolian first person genitive *minu* ‘my’ (Siqin, personal communication). In (6), *minu* can be taken as being coreferential with the matrix subject when the verbs are *helju* ‘say’ and *bayarlju* ‘be glad,’ but not when they are *medeju* ‘know’ and *sonoscu* ‘hear.’

- (6) Sicin_i dara-ni minu_i egelje geju {helju-baina/
Sicin next I-GEN turn COMP {say-STATE/
bayarlju-baina/*medeju-baina/*sonoscu-baina}.
be-glad-STATE/*know-STATE/*hear-STATE}
‘Sicin_i {says/is glad/*knows/*hears} that the next time is her_i turn.’

This indicates that the hierarchy in (5) is cross-linguistically valid, and further that logophoricity is conceptually rooted in the reproduction of self-reference as it is verbally expressed in communication by the referent of the matrix subject.

2 Japanese Logophoric First Person Terms

I am going to argue that in light of Japanese data, FPTs are motivated to be used as logophoric terms when they help reproduce the dialogue between the original speaker and the current speaker. My argument makes crucial use of the fact that Japanese has two types of FPTs: one is *zibun*, which refers to what Hirose (2000), Hirose (2002), and Hasegawa and Hirose (2005) call the “private Self,” and the others are terms like *watasi* and *boku*, which refer to what they call the “public Self.” It is shown that the logophoric use of FPTs of the latter type is rooted in their communicative, hearer-oriented nature.

It is clear from the above examples that only the complements of verbs of communication may accept the logophoric FPTs. It might be argued, however, that *yorokobu* in (4) is not a verb of communication, but instead is a verb of psychological state, which is lower in the hierarchy. In fact, it means not just a psychological state of being glad, but is extended to mean the communicative action of ‘being glad with saying that...’ In this extended sense, *yorokobu* is used as a verb of communication which assigns the message source role to the subject. In other words, *yorokobu* can denote an action which accompanies the utterance with which the subject communicates its gladness to other people.

This extension is not available with verbs of perception like *kiku* ‘hear,’ since hearing does not accompany utterance. As far as action verbs can denote actions

that accompany utterance, for example, *warau* ‘laugh’ and *ikigomu* ‘become eager,’ they accept the logophoric FPTs, as in (7). However, *omou* ‘think’ is different. It is a verb of thinking, and is ranked second in the hierarchy in (5).

- (7) Hanako_i-wa tugi-wa watasi_i-no deban-da to
 Hanako-TOP next-TOP I-GEN turn-COP COMP
 {warat-ta/ ikigon-da/ (*)omot-ta}.
 {laugh-PAST/become eager-PAST/ think-PAST}
 ‘Hanako_i {laughed/became eager/(*)thought} (with saying) that the next time was her_i turn.’

In (7), *watasi* in the complement of *omou* can be taken either as being referential to the current speaker or as being coreferential with Hanako. This ambiguity comes from the fact that *omou* can be used either as a verb of thinking or as a verb denoting an action involving utterance, which is paraphrased as ‘saying what one thinks.’ The logophoric *watasi* is compatible only with the latter sense.

When *zibun* is used in place of *watasi* in (4), *zibun* is coreferential with Hanako, irrespectively of whether the complement is taken by a verb of communication or by a verb of perception, as illustrated in (8):

- (8) Hanako_i-wa tugi-wa zibun_i-no deban-da to
 Hanako-TOP next-TOP self-GEN turn-COP COMP
 {it-teiru/ yorokon-deiru/ sit-teiru/ kii-teiru}.
 {say-STATE/ be-glad-STATE/ know-STATE/ hear-STATE}
 ‘Hanako_i {says/is glad/ knows/hears} that the next time is her_i turn.’

This is because *zibun* is an inherent logophoric term, and the logophoric reading belongs to its proper meaning. By contrast, there are two pieces of evidence that the logophoric reading of FPTs like *watasi* is a conversational implicature.

First, the logophoric reading of *watasi* is cancelable. Although it is unnatural, it is additionally possible to read *watasi* with *it-teiru* in (4) as being referential to the current speaker rather than as being coreferential with Hanako.

Second, the logophoric reading is non-detachable. In Japanese, FPTs that have the same sense as *watasi* can produce the same logophoric reading. While ‘I’ in English is a pronoun with little descriptive content, each Japanese FPT is a noun which has descriptive content. Historically, *watasi* means ‘private,’ and *boku* means ‘male servant.’ Suzuki (1973/1978) notes that Japanese has a strategy of self-reference, saying that “[you] refer to yourself with the description of the role that you play for your addressee.” This addressee-oriented strategy is characteristic of the speech of adults who address children: because of this, an elementary school teacher refers to himself as *sensei* ‘teacher’ when talking to his pupils and a father refers to himself as *otoosan* ‘father’ when talking to his child.

In this way, Japanese can produce different FPTs from descriptive nouns if the chosen noun denotes the speaker's role for the addressee.

This strategy also holds of these descriptions that are used with verbs of communication to obtain the logophoric reading. In (9), *iu*, but not *omou*, brings about the logophoric reading of descriptive nouns like *sensei* and *otoosan*:

- (9) Ken_i-wa (seito-ni/musuko-ni) tugi-wa {boku_i-no/ sensei_i-no/
 Ken-TOP pupil-to/ son-to next-TOP I-GEN teacher-GEN
 otoosan_i-no} deban-da to {it-teiru/ *omot-teiru}.
 father-GEN turn-COP COMP {say-STATE/think-STATE}
 'Ken_i{says (to his pupils/to his son)/*thinks}that the next time is his_i turn.'

This contrast occurs because, unlike *omou*, *iu* is a verb of hearer-directed communication which can readily reproduce the communicative situation in which the subject, Ken, refers to himself as *sensei* or *otoosan* in addition to *boku* when addressing his pupils or his son.

So, what is the sense that is shared by *watasi*, *boku* and *sensei*, but not by *zibun*? I argue that this question can be answered in terms of the presence or absence of the hearer(s) with whom the speaker intends to communicate.

In a series of articles (Hirose 2000, Hirose 2002, and Hasegawa and Hirose 2005), Hirose has argued that the speaker's Self has two different aspects; one is the private Self and the other the public Self. The private Self is the speaker as the subject of thinking who uses his words to express his thoughts and feelings. On the other hand, the public Self is the speaker as the subject of communicating who uses his words to communicate with his hearer(s). Specifically, Hasegawa and Hirose (2005) argue that the two contrastive aspects of the speaker's Self correspond to two types of FPTs in Japanese: one is *zibun*, which denotes the private Self as a thinker having no intention to communicate with others, and the other is a set of terms like *watasi*, *boku*, *otoosan*, *sensei* and so on, which express the public Self having the intention to communicate with others.

Hasegawa and Hirose (2005:238-239) point out that there is a difference in meaning between (10a) with *zibun* and (10b) with *watasi*. Both (10a-b) are intended to mean 'my consciousness of being a genius.'

- (10) a. zibun-wa tensai da to-iu isiki
 self-TOP genius COP COMP-say consciousness
 Literally, 'the consciousness: I'm a genius'
 'the consciousness of being a genius'
 b. ?? watasi-wa tensai da to-iu isiki
 I-TOP genius COP COMP-say consciousness
 Literally, 'the consciousness of the fact that I am a genius'
 'the consciousness of being a genius'

To cite Hasegawa and Hirose's argument:

Example (10a) is perfectly acceptable; it is a self-contained expression in which *zibun* refers to the subject of consciousness, whoever s/he actually is. By contrast, (10b) sounds odd because *watasi* is a public expression, presupposing an addressee, and hence should not appear in a description of consciousness proper. Public-expression pronouns are used by the speaker to refer to herself only when she has a communicative intention. Thus, if (10b) is used in a communicative situation in which the speaker reports her own consciousness to another person, it becomes acceptable, e.g. (11).
(Hasegawa and Hirose 2005:239)

- (11) Watasi-ga {zibun/ watasi}-wa tensai-da to-iu
 I-NOM self/ I -TOP genius-COP QUOT-say
 isiki-o motta-no-wa tyoodo
 consciousness-ACC had-Nominalizer-TOP just
 sono-toki desi-ta.
 that-time COP(Polite Form)-PAST
 Literally, 'It was at just that time that I acquired the consciousness:
 I'm a genius.'
 'It was just at that point in time that I became aware of my genius.'

Hasegawa and Hirose note that "the use of *watasi* in (11) is licensed by the speaker as a communicating agent (i.e. the outer, public Self), whereas (10b) lacks such a communicative context and therefore brings about anomaly."

I argue that this hearer-oriented nature of the public, or communicative Self allows for the ambiguity of FPTs like *watasi*: they are used both for self-reference in which the current speaker refers to himself and for logophoric terms which represent the message source expressed in the same sentences in which they are used. It is shown that the two uses are distinguishable in terms of the Gricean Maxim of Quantity, and that their logophoric use can be derived as a GCI.

The communicative FPTs characteristically require the presence of hearers. Since message source and hearer make a pair in dialogue, this means that the referent of a given communicative FPT is the individual from whom the hearer receives its message. In other words, in order to identify the FPT's referent, it is first necessary to identify who the hearer is. It might appear that hearers are identified with minimum effort, for they are simply assumed to be other people who are faced with the current speaker. But this is not always the case, and this assumption is one effect of the second submaxim of the Maxim of Quantity.

According to Grice (1975:45), the Maxim of Quantity consists of two complementary submaxims, as in (12):

- (12) a. Make your contribution as informative as is required (for the current purposes of the exchange).
- b. Do not make your contribution more informative than is required.

In the current context, the Maxim of Quantity is understood in terms of the following two instructions:

- (13) a. Provide enough information about who the hearer is for the message source expressed by the FPT for the current purposes of the exchange.
- b. Provide the minimum information about who the hearer is for the message source expressed by the FPT.

The idea is that the speaker who introduces a message source other than himself flouts the minimum effort requirement provided by the second instruction in that he lets hearers make an otherwise unnecessary inference about who the relevant hearer is, which gives rise to the FPT's logophoric reading as an implicature.

In the default case, a communicative FPT like *watasi* is used in line with the second instruction in (13b) to refer to the current speaker. The hearer(s) can be identified with the minimum information provided by his presence. Unless otherwise specified, the speaker is a message source for the person he addresses, and the hearers are conventionally assumed to be others who are faced with him.

In the marked case, on the other hand, the speaker flouts the second instruction to observe the first one in (13). In (4), for example, he introduces a message source other than himself, i.e. Hanako, who requires her hearer to communicate with. This hearer cannot be identified with the person faced with the current speaker, since there is no reason to suppose that the person faced with Hanako is the same as the person faced with him. This militates against the hearer-identification convention provided by the second instruction, which leads the hearers to infer that the first instruction instead comes into operation.

The presence of the matrix clause with a verb of communication shows that the current speaker is a reporter of the message from the matrix subject, and is a hearer from its point of view. On the assumption that the message source expressed by the FPT in this context talks to the current speaker, hearers can infer that the FPT is coreferential with the message source referred to by the matrix subject. In this way, the logophoric reading of an FPT like *watasi* can be derived as an implicature. Since this reading is generally given to FPTs for the communicative Self used in the contexts which introduce message sources other than the current speaker, it is a GCI. Thus, the following generalization holds:

- (14) In Japanese, FPTs for the communicative Self can be diverted as logophoric terms when the FPT used stands for an individual who takes the current speaker as a hearer of its message.

When the original message source's hearer is expressed, as in (9), the current speaker still is a reporter, and may be an indirect hearer of that source: he may hear its message, not directly, but indirectly from the relevant hearer expressed.

In sum, Japanese FPTs like *watasi* and *boku* (but not *zibun*) refer to message sources who talk to their hearers. They refer to the current speaker when he himself is a message source for his hearer, but not when he is a reporter of another message source. This is because reporters talk about what they have heard from original speakers to introduce them as being more important message sources than they are. In this sense, a reporter is a hearer from the original message source's point of view. In the context where there is enough information that the current speaker is a reporter of another message source, the FPTs for the communicative Self are taken to be referential to that message source rather than to him.

In what follows, the same arguments can be reproduced in relation to the FPTs used in titles of magazine articles, where there are no verbs of communication taking complement clauses, but are only stylistic conventions that the article titles introduce the main characters of the articles who act as message sources.

3 Logophoric First Person Terms in Article Titles

In Japanese, logophoric FPTs can also occur in article titles. The title in (15) is found in a book magazine that features the favorite books of famous people like Rena Tanaka. In (15), with *erabu* 'select' and *okuru* 'offer,' *watasi* is taken to be coreferential with Rena, but with *sitteiru* and *kiku*, it is not.

- (15) Tanaka Rena_i-ga {erabu/okuru/*sit-teiru / *kiku} watasi_i-no
 Tanaka Rena-NOM {select/offer / know-STATE/ hear} I-GEN
 aidoku-syo
 favorite-book
 'Her_i favorite book that Rena Tanaka_i {selects/sends as a gift/*knows/
 *hears about}'

As reflected in the gloss, the coreferential reading of *watasi* in (15) is expressed as the cataphoric reading of *her* in English. As for their lexical meanings, *erabu* and *okuru*, as well as *siru* and *kiku*, are not verbs of communication. But the main character's activities in a magazine article conventionally include selecting and sending her favorite book as a gift, but not knowing or hearing about it, so as to make her a message source for the readers (cf. Corazza et al. 2002).

Article titles are the contexts which are conventionally supposed to introduce

message sources, and in this sense, they bring about similar effects to verbs of communication. In other words, the writer of an article title featuring a message source may act as a reporter, and hence a hearer of that message source. As in (16), in article titles, the logophoric FPTs are compatible only with the verbs which express what the main character conventionally does as a message source:

- (16) Tanaka Rena_i-ga {susumeu/ omoidasu/ *sain-suru/
 Tanaka Rena-NOM {recommend/ recollect/ write signature on/
 *kopii-suru} watasi_i-no aidoku-syo
 photocopy} I-GEN favorite-book
 ‘Her_i favorite book that Rena Tanaka_i {recommends/recollects/
 *writes signature on/*photocopies}’

There is a basic difference between the actions by which the main character can send her message with an utterance and those by which she cannot. In a magazine article, the main character is conventionally expected to talk, recommending or recollecting memories of her favorite book, from which the reader can receive messages from her. By contrast, neither writing her signature on it nor photocopying it is a conventional action involving an utterance, and so the reader cannot regard as a message source the person who writes her signature on a book or who photocopies it. Thus, in (16), the logophoric reading is not available with *sain-suru* ‘write signature on’ nor with *kopii-suru* ‘photocopy,’ and the *watasi* with them can only be taken to be referential to the current speaker.

The present analysis provides a natural account of the fact that the communicative FPTs can occur by themselves in the title of a TV or radio program. As in (17a), they are especially appropriate for the request programs in which the listeners or viewers can participate as message sources, but not for those in which they just receive information from TV or radio:

- (17) a. Boku-no ik-kyoku, watasi-no ik-kyoku
 I-GEN one-song, I-GEN one-song
 ‘my (favorite) one song, my (favorite) one song’
 b. ??Zibun-no ik-kyoku
 self-GEN one-song
 ‘my (favorite) one song’ [Intended]

In (17a), *boku* and *watasi* are taken to stand for each of the listeners who have sent their requests to the program, probably by saying “I want to listen to this song or that song.” In this sense, each listener is a message source, and can be represented by the FPTs for the communicative Self.

It is now clear why the FPTs work as part of titles of request programs, but the inherent logophoric term *zibun* does not, as in (17b). The *zibun*-version in (17b)

can also be used as a title of a radio or TV program, but this is not a title of a request program. Instead, this is appropriate as a title of a program in which only one guest comes to talk about his or her favorite song. This is because the thinking Self represented by *zibun* is part of the monologue in which the subject speaks just for himself, but the communicative FPTs are part of the dialogue in which the subject talks with others, and acts as a message source towards the addressee. Request is specific to dialogue, and cannot be made in monologue.

4 Theoretical Implications

The present account has a close relation to Kuno (1972), who argues that the logophoric third person pronoun in an indirect discourse complement is derived from the underlying first person pronoun in a direct discourse complement. In his direct discourse analysis, the logophoric pronoun, *he* in (18a), for example, is derived from the first person ‘I’ in the direct discourse in (18b):

- (18) a. John_i expects that he_i will be elected.
b. John expects, “I will be elected.”

Since the speaker (actually, the thinker) refers to himself with a pronoun, but not with a name when he thinks of his internal feeling, the logophoric pronoun cannot be replaced by a name, either. Thus, as in (19), in the complement placed in the subject of a passivized sentence, too, the pronoun wins over the name as far as the complement represents John’s internal feeling:

- (19) a. That he_i will be elected is expected by John_i.
b. *That John_i will be elected is expected by him_i.

When applied to Japanese, Kuno (1972:193) points out that the logophoric third person pronoun is realized by *zibun*, as in:

- (20) John_i-wa zibun_i-ga toosen-suru koto-o kitaisi-teiru.
John-TOP self-NOM be elected COMP-ACC expect-STATE
‘John_i expects that he_i will be elected.’

However, Kuno does not, and need not, deal with other FPTs in Japanese. As Kuno himself notes, in his direct discourse analysis, the complement clause represents the direct internal feeling of the matrix subject, which, in our terms, belongs to the subject’s monologue rather than to its dialogue with others. Thus, the underlying first person pronoun for the logophoric pronoun has only to denote the Self as a thinker who has no intention to communicate with others.

By contrast, my account is based on the subject’s dialogue in which he com-

municates with others by referring to himself with FPTs like *watasi* or *boku*. As *boku* is specified for a male who talks with people to whom he is expected to lower himself, these FPTs stand for, and allow the hearer or reader to infer, the personal relations between the subject and his addressee(s).

Because the logophoric reading of the FPTs is a GCI attached, not to the FPTs as such, but to the function of identifiable message sources, it arises in the complement of verbs of communication and in the article titles; both contexts are used to express the topic referent as a message source.

On the basis of Amharic examples like (1a), Schlenker (2003) argues that attitude verbs like ‘say that...’ involve what Kaplan (1977) calls “the monster operator,” by which the deictic center is shifted from the current speaker to the speaker of the reported speech act. It is true that attitude verbs such as verbs of communication in (5) offer the simplest context about which the hearer (or reader) can assume the presence of an independent speaker other than the current speaker. As we have seen, however, the monster operator’s effects are not unique to attitude verbs, but also occur in contexts in which a message source is introduced to show its presence in dialogue. This means that the monster operator can be pragmatically analyzed as the hearer’s conventional inference that, since the presence of an independent message source implies the presence of an independent ego (cf. Lyons 1982), there must be another individual in first person, as distinguished from the current speaker.

According to Clements (1975:141), logophoric pronouns are employed “to distinguish reference to the individual whose speech, thoughts, or feelings are reported or reflected in a given linguistic context, from reference to other individual.” However, the Japanese data show that there is a difference between cases where logophoric terms are used to refer to the individual whose speech is reported and those where they are used to refer to the individual whose thoughts or feelings are reported. An individual’s speech can develop into dialogue, but her thoughts or feelings cannot. Since the Japanese FPTs for the communicative Self are based on dialogue, they can occur only in the first cases.

5 Conclusion

Japanese FPTs are different in type from English ‘I’ in that the first person referent is the current speaker in default cases, but it may be the topic individual who qualifies as a message source in the local context, and thus the FPT in question can be diverted into logophoric terms in that context. I have shown that these two cases are distinguished in terms of the Maxim of Quantity, and that the logophoric reading of a given communicative FPT is derived as a GCI. When the current speaker uses an FPT for self-reference, he makes dialogue with other(s) to whom he talks. When he uses it as a logophoric term, on the other hand, he reproduces dialogue between him and the original message source to whom he is

a hearer. In the former use, Japanese communicative FPTs are deictic terms whose deictic center is the current speaker, but in the latter use, they may be deictics whose deictic center is relativized to who the hearer is. This suggests that while the meaning of the Japanese FPTs is decomposed into the Self and the message source role, but can be free from the current turn of speech, the meaning of first person pronouns like English 'I' can be decomposed into the Self and the current turn of speech, but is underspecified as to the message source role.

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References

- Akmajian, Adrian, and Stephen Anderson. 1970. On the Use of Fourth Person in Navajo, or Navajo Made Harder. *International Journal of American Linguistics* 36:1-8.
- Bhatia, Tej K. 2000. Lexical Anaphors and Pronouns in Punjabi. In B. C. Lust, K. Wali, J. W. Gair and K. V. Subbarao, eds., *Lexical Anaphors and Pronouns in Selected South Asian Languages: A Principled Typology*, 637-714. Berlin: Mouton de Gruyter.
- Clements, George N. 1975. The Logophoric Pronoun in Ewe: Its Role in Discourse. *Journal of West African Languages* 10:141-177.
- Corazza, Eros, William Fish and Jonathan Gorvett. 2002. Who is I? *Philosophical Studies* 107:1-21.
- Grice, H. Paul. 1975. Logic and Conversation. In P. Cole and J. L. Morgan, eds., *Syntax and Semantics, Vol. 3, Speech Acts*, 41-58. New York: Academic Press.
- Hasegawa, Yoko and Yukio Hirose. 2005. What the Japanese Language Tells Us about the Alleged Japanese Relational Self. *Australian Journal of Linguistics* 25:219-251.

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- Hirose, Yukio. 2000. Public and Private Self as Two Aspects of the Speaker: A Contrastive Study of Japanese and English. *Journal of Pragmatics* 32:1623-1656.
- Hirose, Yukio. 2002. Viewpoint and the Nature of the Japanese Reflexive *Zibun*. *Cognitive Linguistics* 13:357-401.
- Kaplan, David. 1977/1989. Demonstratives: An Essay on the Semantics, Logic, Metaphysics, and Epistemology of Demonstratives and Other Indexicals. In J. Almog, J. Perry and H. Wettstein, eds., *Themes from Kaplan*, 481-563. Oxford: Oxford University Press.
- Kuno, Susumu. 1972. Pronominalization, Reflexivization, and Direct Discourse. *Linguistic Inquiry* 3:161-195.
- Levinson, Stephen, C. 2000. *Presumptive Meanings: The Theory of Generalized Conversational Implicature*. Cambridge, Mass: MIT Press.
- Lyons, John. 1982. Deixis and Subjectivity: Loquor, Ergo Sum? In R. J. Jarvella and W. Klein eds., *Speech, Place, and Action*, 101-124. Chichester: John Wiley and Sons.
- Schlenker, Philippe. 2003. A Plea for Monsters. *Linguistics and Philosophy* 26:29-120.
- Sells, Peter. 1987. Aspects of Logophoricity. *Linguistic Inquiry* 18:445-479.
- Siewierska, Anna. 2004. *Person*. Cambridge: Cambridge University Press.
- Stirling, Lesley 1993. *Switch-Reference and Discourse Representation*. Cambridge: Cambridge University Press.
- Suzuki, Takao. 1973. *Kotoba to Bunka*. Tokyo: Iwanami. Also Published as *Words in Context*, trans. by A. Miura, 1978. Tokyo: Kodansha International.
- Koichi Nishida
Shimonoseki City University
2-1-1 Daigaku-cho, Shimonoseki-shi
Yamaguchi 751-8510

nishida-k@shimonoseki-cu.ac.jp

On Number and Numberlessness in Languages without Articles^{*}

ASYA PERELTSVAIG
Stanford University

Introduction

This paper is concerned with the representation of number in languages without articles, focusing on two distantly related languages: Russian and Armenian. It is argued that morphological number and semantic number are mediated by syntactic number, encoded even in languages lacking articles via a dedicated functional projection, NumP. Thus, an argument is made against the strongest anti-DP position that denies any functional projections inside a nominal in a language without articles (cf. Fukui 1986, 1988; Chierchia 1998; Baker 2003:113). Instead, it is shown that at least the projection of NumP must be assumed even for article-less languages (cf. also Pereltsvaig 2001, 2006, 2007a, b, 2008, 2009; Rutkowski 2002a, b, 2006, 2007, 2012; Bailyn 2004).

The focus of this paper is on the so-called number-neutral nominals, that is nominals that denote ‘one or more X’: semantically, such nominals are neither singular (‘one X’) nor plural (‘more than one X’). We argue that the semantic number-neutrality of such nominals results from the lack of the syntactic number feature, normally hosted in NumP, which we show to be absent in such nominals. Depending on the language, such number-neutral nominals can be morphologically either singular or plural; furthermore, we show that the morphological expression of number neutrality does not correlate with whether a given language has articles or not.

The rest of the paper is organized as follows: number-neutral nominals are introduced in section 1 and their syntactic properties are discussed in more detail in section 2. In section 3 number-neutral nominals in article-less languages are compared with those in languages with articles. Section 4 fleshes out the analysis

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and discusses its consequences for *pluralia tantum* nouns in Russian.

1 Number-neutral Nominals

It has long been noted that some morphologically plural nominals in English, such as the boldfaced nominal in (1a), do not necessarily denote plural individuals. Thus, the question in (1a) can be truthfully and felicitously answered as in (1b):¹

- (1) a. Do you have **children**?
b. Yes, I have one.

A semantico-pragmatic analysis has been proposed for such instances of number-neutrality (also referred to as “inclusive plurals”) in Sauerland (2003), Sauerland, Anderssen & Yatsushiro (2005) and recently by Grimm (to appear). According to them, morphologically plural nominals denote both atomic and plural individuals, but under normal circumstances the atomic interpretation is ruled out by pragmatic principles; however, in certain semantically or pragmatically defined contexts (downward entailing for Sauerland et al., kind-instantiating for Grimm) these pragmatic principles do not apply, making the atomic interpretation available.

While such semantico-pragmatic approach may be appropriate for number-neutral nominals in English, we will show that it is not suitable for their counterparts in Russian or Armenian. In those languages, one also finds number-neutral nominals in contexts similar to those in the English examples:

- (2) a. Russian
U vas est' **deti**?
to you there-is children
'Do you have **(one or more)** children?'
b. (Western) Armenian (cf. Bale et al. 2010)²:
Bezdig unis?
child have(2.SG)
'Do you have **(one or more)** children?'

Two things are worthy of note here. First, while in Russian number-neutral nominals are morphologically plural, much like in English (cf. (1a) above), in

¹ Note that such number-neutrality in English is restricted by some (so far poorly understood) pragmatic factors: one is unlikely to enquire *Do you have husbands?* to find out about someone's marital status.

² Throughout this paper, Armenian is illustrated with examples from both Western and Eastern Armenian. The two varieties are very similar when it comes to number-neutral nominals but differ significantly in other respects.

Armenian number-neutral nominals are morphologically singular. Second, unlike in English, where number-neutral nominals are restricted to certain semantically/pragmatically defined contexts, as mentioned above, in Russian and Armenian number-neutral nominals can also be found in other contexts, which are defined syntactically rather than semantically, as discussed below.

In particular, in Russian number-neutral nominals are found as complements of intensive reflexives (cf. Tatevosov 2006; Kagan & Pereltsvaig 2011a, b), as in (3); as complements of the preposition *v* ‘into’ in the *v-prezidenty* construction (cf. Bailyn 2002; Pereltsvaig 2006), as in (4); and as complements of syntactic compounds (cf. Trugman 2008; Pesetsky 2010), as in (5). In the remainder of this paper, we will focus on the first two constructions. As in (2a) above, the number-neutral nominals in these constructions are morphologically plural, yet denote ‘one or more X’.

- (3) Lena na-jela-s’ **kotlet**.
 Lena na-ate-sja cutlets(GEN)
 ‘Lena ate her fill of cutlets.’ =
 = ‘Lena ate (one or more) cutlets & Lena doesn’t want to eat (one or more) cutlets anymore.’
- (4) Medvedeva vybrali v **prezidenty**.
 Medvedev they-elected into presidents
 ‘Medvedev has been elected president.’
- (5) klonirovanie **životnyx** / remont **avtomobilej**
 cloning animals / repairing cars
 ‘cloning of animals/an animal’; ‘repair of cars/a car’

Similarly, in Armenian number-neutral nominals are not limited to downward entailing or kind-instantiating contexts, as shown by the Eastern Armenian examples below from Dum-Tragut (2009:106) and Megerdooian (2011):

- (6) a. Dursek a pòloc’ **mard** tes a.
 go out AUX.1SG.AOR street person.NOM see AUX.1SG.AOR
 ‘I went out on the street and saw **(one or more)** persons.’
- b. Ara-n **girkh** a ań-el.
 Ara-NOM book AUX.3SG.PR buy-PERF
 ‘Ara has bought **(one or more)** books.’

Note that number-neutral nominals in Armenian are uniformly morphologically singular. In fact, morphologically plural nominals in Armenian can denote only plural individuals and cannot have the “inclusive plural” reading of English

plurals as in (1a). This is shown with a Western Armenian example from Bale et al. (2010):

- (7) **Bezdig-ner** unis?
child-(INDEF.PL) have(2.SG)
‘Do you have **(two or more)** children?’

In the next section, we show that number-neutral plurals in Russian and number-neutral singulars in Armenian are but two sides of the same coin not only because of their common interpretation (“inclusive”, or “denoting both atomic and plural individuals”), but because both types of nominals exhibit the same syntactic properties.

2 Properties of Number-neutral Nominals in Russian and Armenian

The number-neutral nominals in Russian and Armenian – despite differing in the morphological number – share a set of common syntactic properties: they are syntactically selected, but not syntactically incorporated (cf. Baker 1988), and they fit the syntactic profile of a Small Nominal (cf. Pereltsvaig 2006).

While the contexts in which number-neutral nominals can appear in Russian and Armenian cannot be defined in purely semantic or syntactic terms, as mentioned above, such nominals are clearly syntactically selected. For example, in Russian they can be selected by a certain preposition, the preposition *v* ‘into’, or by certain verbal morphology (specifically, the combination of the accumulative prefix *na-* and the reflexive suffix *-sja*, which as discussed in Kagan and Pereltsvaig 2011a, b does not amount to the sum of the two parts).³ In Armenian number-neutral nominals can appear in the predicative position (i.e., as complements of the copula) or as objects (i.e., complements of certain verbs); moreover, number-neutral nominals in subject position are quite restricted: typically, they appear as subjects of unaccusative verbs or the copula, that is as internal arguments of a verb.

However, it is not possible to analyze number-neutral nominals as being syntactically incorporated in the sense of Baker (1988). First, number-neutral nominals need not be adjacent to the selecting verb and can be separated from it by an adverbial:

- (8) a. Lena *na-jela-s’* *s* *utra* **kotlet.**
 Lena *na-ate-sja* from morning cutlets.GEN
 ‘Lena ate her fill of cutlets first thing in the morning.’

³ Pereltsvaig (2006) shows that verbal morphology (such as the accumulative prefix *na-*) can impose selectional restrictions on what appears to be the complement of the verb.

- b. Lena na-jela-s' do otvala **kotlet.**
 Lena *na-ate-sja* to falling.off cutlets.GEN
 'Lena ate cutlets up to the brim.'

Second, number-neutral nominals can contain more than just a bare noun: they can contain adjectival, adverbial or prepositional modifiers, as in (8a-c), or complements, as in (9).

- (9) a. Lena na-jela-s' **rybnyx kotlet.**
 Lena *na-ate-sja* fish cutlets.GEN
 'Lena ate her fill of fish cakes.'
 b. Lena na-jela-s' **kotlet po-požarski.**
 Lena *na-ate-sja* cutlets.GEN Pozharsky-style
 'Lena ate her fill of cakes Pozharsky-style.'
 c. Lena na-jela-s' **kotlet s podžaristoj koročkoj.**
 Lena *na-ate-sja* cutlets.GEN with fried-up crust
 'Lena ate her fill of cakes with a fried-up crust.'
- (10) Gorbačëva vybrali v **prezidenty SSSR.**
 Gorbachev they-elected into presidents USSR.GEN
 'Gorbachev was elected president.'

Thus, we must conclude that number-neutral nominals are phrasal. However, as we show immediately below, they are structurally deficient, lacking room for certain pre-nominal elements. In other words, these nominals fit the syntactic profile of a Small Nominal, more specifically of a bare NP. More specifically, number-neutral nominals lack the room for expressions of specificity. For instance, neither the complements of intensive reflexives nor the complements of *v* 'into' in Russian allow such modifiers as *opredelënnye* 'certain, specific', leading to the ungrammaticality of the following examples:

- (11) a. *Ja najelas' **opredelënnyx kotlet.**
 I *na-ate-sja* specific cutlets
 b. *On izbiraetsja v **opredelënnye prezidenty.**
 He being-elected into specific presidents

Similarly, in (Eastern) Armenian number-neutrality obtains only with non-specific morphologically singular objects. If a specificity marker is added, the nominal is no longer number-neutral (example from Megedoomian 2011):

- (12) Ara-n **girkh-ə** aʔ-el a.
 Ara-NOM book-SP buy-PERF AUX.3SG.PR
 ‘Ara has bought {the / a specific} book.’ (not ‘books’!)

Furthermore, number-neutral nominals have no room for expressions of quantity. For example, a numeral or a measure noun cannot be added to such nominals in Russian, leading to the ungrammaticality of examples in (13) and (14); similarly, in Armenian a singular object with an overt numeral is not number-neutral (example in (15) is from Megerdooomian 2011).

- (13) a. *Ja najelas’ **pjati kotlet.**
 I *na*-ate-*sja* five cutlets
 b. *Ja napilas’ **stakana vody.**
 I *na*-drank-*sja* glass water
- (14) *Obama i Medvedev byli izbrany v **dva prezidenta.**
 Obama & Medvedev were elected into two presidents
 ‘Obama & Medvedev were elected into presidents.’
- (15) yerex-erk-ə **me hat muk** en č’ar-el.
 child-PL-NOM one CL mouse AUX.3PL.PR find-PERF
 ‘The children have found a mouse.’ (not ‘mice’!)

Moreover, number-neutral nominals have no room for higher adjectival modifiers, in the sense of Svenonius (2008), Beauseroy and Knittel (2008), such as evaluative adjectives. This is true for complements of intensive reflexives, as shown in (16a), and complements of *v* ‘into’ in Russian, as shown in (16b).

- (16) a. *Ja najelas’ **otvratitel’nyx kotlet.**
 I *na*-ate-*sja* terrible burgers
 b. *On rešil ballotirovat’sja v **dostojnye gubernatory.**
 he decided to-run into worthy governors
 ‘He decided to run for a worthy governor.’

In addition to lacking room for expressions of specificity or quantity and for higher adjectival modifiers, number-neutral nominals pattern with other Small Nominals, discussed by Pereltsvaig (2006), in that they are inert for movement either for scope or for focus. As shown by Kagan and Pereltsvaig (2011), complements of intensive reflexives can have only surface scope; Pereltsvaig (2006) shows that complements of the preposition *v* ‘into’ are likewise scopally inert. Finally, bare singular objects in Armenian are likewise scopally inert: they cannot take scope over another quantified noun phrase:

- (17) amen mi yerexa girkh a af-el.
 all one child book AUX.3SG.PR buy-PERF
 ‘Every child has bought a book/books.’ (unambiguous: Karine Megedoomian, p.c.)

Nor can number-neutral objects in Armenian move outside the vP for focus. Thus, as discussed in detail by Megedoomian (2011), bare singular, number-neutral objects appear in the vP, whereas specific singular objects (which are not number-neutral, as discussed above in connection with (12)) can move out of the vP. Although the word order in the following two examples is exactly the same – S-O-Aux-V – Megedoomian argues that they have different structure: the vP is bracketed in both sentences below.

- (18) a. Ara-n [girkh a af-el].
 Ara-NOM book AUX.3SG.PR buy-PERF
 ‘Ara has bought {a book/books}.’
 b. Aram-ə girkh-ə a [af-el].
 Aram-NOM book-SP AUX.3SG.PR buy-PERF
 ‘It is the (specific) book that Aram bought.’

According to Megedoomian, the auxiliary can appear in Armenian in one of two positions: (a) as a second position clitic in the vP, with the element immediately preceding it marking the left edge of the vP, or (b) in FocP. These two possibilities are instantiated by the two sentences in (16a-b), respectively. In addition to the difference in interpretation (i.e., whether the object is focused, as in (16b), or not, as in (16a)), the structural differences between these sentences can be shown by placement of manner adverbials such as *arag* ‘fast’: it can be placed between the auxiliary and the lexical verb in (16b), but not in (16a)):

- (19) a. *Ara-n [girkh a arag af-el].
 Ara-NOM book AUX.3SG.PR fast buy-PERF
 b. Aram-ə girkh-ə a [arag af-el].
 Aram-NOM book-SP AUX.3SG.PR fast buy-PERF
 ‘It is the (specific) book that Aram bought fast.’

The manner adverbial appears in Armenian at the left edge of the vP; hence, it can appear in the position preceding the lexical verb in (17b). Note that the auxiliary in this sentence appears outside the vP, in FocP, to be precise. In contrast, in (17a) the adverbial is not at the left edge of the vP, which leads to the ungrammaticality of this sentence. When both a manner adverbial and a bare singular object appear in vP, the former must precede the latter, with the auxiliary following the first element in the vP, in this case the manner adverbial:

- (20) Ara-n [arag a **girkh** af-el].
Ara-NOM fast AUX.3SG.PR book buy-PERF
‘Ara has bought {a book/books} fast.’

To recap, the bare singular object, which is number-neutral, cannot appear outside the vP in Armenian. This is in line with the generalization that number-neutral nominals are inert to movement.

3 **Comparison with Languages with Articles**

As mentioned in section 1 above, number-neutral nominals are found also in languages with articles; for the purposes of this paper, we are particularly interested in number-neutral nominals whose occurrence is not determined by semantico-pragmatic factors, as it is the case in English. In fact, such number-neutral nominals are found in many languages with articles, including Norwegian, Brazilian Portuguese, Catalan (illustrated with examples below), as well as Spanish and Romanian (cf. Dobrovie-Sorin et al. 2010).

- (21) a. Norwegian (Borthen 2003):
Per har hatt **hund** i ti år.
Per has had dog in ten years
‘Per has had dog(s) for ten years.’
b. Brazilian Portuguese (Schmitt & Munn 2002):
Eu acho que vi **livro** espalhado pelo chão.
I think that saw book spread on floor
‘I think that I saw book(s) spread on the floor.’
c. Catalan (Espinal & McNully 2011:93)
Busco **pis**.
look-1SG apartment
‘I’m looking for {an apartment/apartments}.’

What is crucial here is that number-neutral nominals in Norwegian, Brazilian Portuguese and Catalan share with their counterparts a number of properties that “tend to cluster together” (Rullmann 2011). First, they are bare in the sense of lacking functional syntactic structure. Second, they are, as mentioned above, number-neutral. Third, they are not incorporated (in the sense of Baker 1988), that is, they are not morphosyntactically integrated with the verb tighter than regular objects. Forth, they are scopally deficient in the sense of obligatorily having the narrowest scope possible. Fifth and final, they are weakly referential in the sense of having only a reduced ability to license discourse anaphora.

These properties are illustrated below with the Norwegian bare singulars (which are, by definition, bare). That these bare singulars are number-neutral is

highlighted by the fact that they can be picked up by plural anaphors such as *alle* ‘all’ (example from Borthen 2003:146).

- (22) Per har hatt **hund** i ti år.
 Per has had dog in ten years
Alle har vært svært snille.
 all have been very kind
 ‘Per has had dog(s) for ten years. They all have been very kind.’

Furthermore, Norwegian bare singulars are not syntactically incorporated; in fact, they can be multi-word phrases and not just single (bare) nouns, as shown by the example below from Borthen (2003:164).

- (23) Ola ønsker seg kopp med bilde av Mikke Mus.
 Ola wants REFL cup with picture of Mickey Mouse
 ‘Ola wants a cup with a picture of Mickey Mouse.’

Like other number-neutral nominals considered in this paper, Norwegian bare singulars are scopally deficient, so that the sentence in (24) unambiguously means ‘All the children tried on some jacket or other’ (cf. Borthen 2003:24).

- (24) Alle barna prøvde jakke.
 all children-DEFSUFF tried jacket
 ‘All the children tried on some jacket or other.’

Finally, Norwegian bare singulars are weakly referential in that they license the type-anaphor *dét* ‘that’ but not the token-anaphor *den* ‘it’ (cf. Borthen 2003:39-41).

- (25) a. Per ønsker seg **ny** **båt**,
 Per wants REFL new boat(MASC),
 men **dét** får han nok aldri.
 but that-NEUT gets he probably never
 ‘Per wants a new boat, but he probably will never get that.’
 b. Jeg ønsker meg **sykkel** til jul.
 I want REFL bike to Christmas.
 ??**Den** er blå.
 ??it is blue
 ‘I want a bike for Christmas. It is blue.’

To account for this clustering of properties, we assume that the central property on which the others hinge is bareness. In particular, bareness implies that

there are no structural space for determiners or other quantificational elements, which in turn implies the properties of scopal deficiency and weak referentiality. Furthermore, we take bareness (in the relevant sense) to be a necessary but not a sufficient condition for syntactic incorporation into the verb. Finally and most importantly for the present paper, bareness implies that there is no syntactic number projection, which in turn results in number-neutrality. The parallel clustering of these properties in languages with and without articles suggests that syntactic number and the lack thereof (which translates into semantic number-neutrality) is to be analyzed in a parallel fashion in both types of languages. Ergo, languages without articles have a dedicated functional projection for number, NumP.

4 Proposal and Consequences

So far, we have argued that number-neutral nominals – including those in languages with and without articles – are syntactically bare, meaning they lack the functional projection hosting number and numerals, NumP. In other words, such number-neutral nominals are bare NPs (cf. Dobrovie-Sorin et al.’s 2010 analysis of bare singulars in Spanish).

However, you will recall from our discussion in sections 1 and 2 above that in Russian number-neutral nominals are realized morphologically as plurals. This means that morphological plurality does not always reflect the presence of [–singular] feature in syntax.⁴ Similar views are espoused by Pesetsky (2010) and Alexiadou (2011). For Pesetsky, however, it is morphological singularity that is not always a reflection of [+singular] feature in syntax, as he takes singular complements of paucal numerals to be numberless. As we show in this paper, truly number-neutral nominals in Russian are morphologically plural; for an alternative analysis of the apparently singular complements of paucal numerals, see Pereltsvaig (2011a, b). Alexiadou (2011) takes a similar view to ours, based on a different set of data. She discusses plural mass nouns in Greek (the English counterpart of which is something like *The river discharges its waters into the lake*) and comes to the conclusion that the plural morphology of such plural mass nouns is not associated with NumP.

Following Pesetsky (2010) and Alexiadou (2011), we propose here the number feature is introduced into the computation by the NumP projection. Furthermore, the head of NumP establishes an agreement relation with the noun. Thus, if the NumP has a [–singular] feature, the N receives the same value of the number feature and appears in the plural morphological form. Conversely, if the NumP has a [+singular] feature, the N receives the same value of the number feature and

⁴ For the same of the presentation, we will assume that the number feature is [±singular]. The essence of our proposal does not change if the [±plural] feature is used instead.

appears in the singular morphological form. In the absence of NumP, the noun does not receive the value for its number feature; the default morphological realization of such numberless nouns is plural in Russian.

This analysis has an interesting consequence for the so-called *pluralia tantum* nouns in Russian, such as *nožnicy* ‘scissors’, *brjuki* ‘trousers’, *sutki* ‘24-hour period’, etc. Unlike other nouns, whose number specification is determined syntactically, through agreement with NumP, *pluralia tantum* nouns are specified for number lexically. In other words, they are specified as [–singular] in the lexicon. As a result, *pluralia tantum* nouns are not compatible with paucal numerals, such as *dva* ‘two’, *tri* ‘three’ and *četyre* ‘four’.

- (26) *tri {sutki / sutok }
 three 24-hour.period(PL).NOM / 24-hour.period(PL).GEN
 ‘3 24-hour periods (i.e., 72 hours)’

Paucal numerals introduce their own (paucal) number specification, which, following Bailyn and Nevins (2008), we will formulate as [–singular, –augmented]. *Pluralia tantum* nouns, however, have no paucal form; they are lexically specified as plural (which, taking into account the existence of paucal in Russian, might be rendered as [–singular, +augmented]). This clash between the paucal number introduced by the paucal numeral and the plural number of the *pluralia tantum* noun itself results in the ungrammaticality of examples like (26).

Note that there is no problem combining *pluralia tantum* nouns with non-paucal numerals. Non-paucal numerals in Russian include higher numerals (5+).

- (27) *pjat’ sutok
 five 24-hour.period(PL).GEN

Moreover, the so-called collective numerals are non-paucal as well, even though they can encode the same lower numerosities as paucal numerals: for example, semantically the collective numeral *troje* and the paucal numeral *tri* are identical in that both encode the same numerosity, ‘three’.

- (28) troje sutok
 three 24-hour.period(PL).GEN
 ‘3 24-hour periods (i.e., 72 hours)’

Note further that apart from their appearance with *pluralia tantum* nouns, collective numerals are limited to masculine human nouns.

- (29) a. troe parnej
 three chap.PL.GEN
 ‘3 chaps’
- b. *troe devušek (OK: tri devuški)
 three girl.PL.GEN three girl.SG.GEN
 ‘three girls’
- c. *troe dnej (OK: tri dnja)
 three day.PL.GEN three day.SG.GEN
 ‘three days’

To recap, our analysis of number as being introduced into the computation by the NumP allows us to account for the peculiar combination possibilities of *pluralia tantum* nouns with different types of numerals in Russian.

References

- Alexiadou, Artemis. 2011. Plural Mass Nouns and the Morpho-syntax of Number. In Mary Washburn, Katherine McKinney-Bock, Erika Varis, Ann Sawyer, and Barbara Tomaszewicz, eds., *Proceedings of the 28th West Coast Conference on Formal Linguistics*, 33-41, Somerville, MA: Cascadilla Proceedings Project.
- Bailyn, John Frederick. 2002. Overt Predicators. *Journal of Slavic Linguistics* 10(1-2):23-52.
- Bailyn, John Frederick. 2004. The Case of Q. In Olga Arnaudova, Wayles Browne, María Luisa Rivero, and Danijela Stojanovic, eds., *Proceedings of FASL 12*, 1-36, Ann Arbor, MI: University of Michigan Press.
- Bailyn, John Frederick and Andrew Nevins. 2008. Russian Genitive Plurals are Impostors. In Andrew Nevins and Asaf Bachrach, eds., *Inflectional Identity*, Oxford: Oxford University Press.
- Baker, Mark C. 1988. *Incorporation: A Theory of Grammatical Function Changing*. Chicago, IL: University of Chicago Press.
- Baker, Mark C. 2003. *Lexical Categories. Verbs, Nouns, and Adjectives*. Cambridge, UK: Cambridge University Press.
- Bale, Alan; Michaël Gagnon, and Hrayr Khanjian. 2010. Cross-linguistic Representations of Numerals and Number Marking. *Proceedings of SALT 20*, 1–15.

- Beauseroy, Delphine and Marie-Laurence Knittel. 2008. *Nombre et adjectifs : le cas des noms abstraits* (= Number and adjectives : the case of abstract nouns). Paper presented at the Workshop on nominal and verbal plurality, Paris, CNRS, 7-8 November 2008.
- Borthen, Kaja. 2003. *Norwegian bare singulars*. Ph.D. thesis, Trondheim: NTNU.
- Chierchia, Gennaro. 1998. Reference to Kinds Across Languages. *Natural Language Semantics* 6(4) 339-405.
- Dobrovie-Sorin, Carmen, Tonia Bleam and M. Teresa Espinal. 2010. Bare Nouns, Number and Types of Incorporation. Ms., CNRS/Université Paris 7.
- Dum-Tragut, Jasmine. 2009. *Armenian*. Amsterdam: John Benjamins.
- Espinal, M. Teresa and Luise McNally. 2011. Bare Nominals and Incorporating Verbs in Spanish and Catalan. *Journal of Linguistics* 47: 87-128.
- Fukui, Naoki. 1986. *A Theory of Category Projection and its Applications*. Ph.D. thesis, Massachusetts Institute of Technology.
- Fukui, Naoki. 1988. Deriving the Differences between English and Japanese: A Case Study in Parametric Syntax. *English Linguistics* 5: 249-270.
- Grimm, Scott. To appear. Plurality is Distinct from Number Neutrality. To appear in *Proceedings of NELS 41*.
- Kagan, Olga and Asya Pereltsvaig. 2011a. Bare NPs and Semantic Incorporation: Objects of Intensive Reflexives at the Syntax-semantics Interface. In Wayles Browne, Adam Cooper, Alison Fisher, Esra Kesici, Nikola Predolac, and Draga Zec, eds., *Formal Approaches to Slavic Linguistics 18*, 226-240, Ann Arbor, MI: Michigan Slavic Publications.
- Kagan, Olga and Asya Pereltsvaig. 2011b. Syntax and Semantics of Bare NPs: Objects of Intensive Reflexive Verbs in Russian. In Olivier Bonami and Patricia Cabredo Hofherr, eds., *Empirical Issues in Syntax and Semantics 8*, 221-238.
- Megerdooomian, Karine. 2011. *Focus and the Auxiliary in Eastern Armenian*. Paper presented at Berkeley Linguistic Society, Berkeley, February 2011.

- Pereltsvaig, Asya. 2001. *On the Nature of Intra-Clausal Relations: A Study of Copular Sentences in Russian and Italian*. Ph.D. thesis, McGill University.
- Pereltsvaig, Asya. 2006. Small nominals. *Natural Language and Linguistic Theory* 24(2):433-500.
- Pereltsvaig, Asya. 2007. *Copular Sentences in Russian. A Theory of Intra-Clausal Relations*. Springer.
- Pereltsvaig, Asya. 2007. On the Universality of DP: A View from Russian. *Studia Linguistica* 61(1):59-94.
- Pereltsvaig, Asya. 2008. Split Phrases in Colloquial Russian. *Studia Linguistica* 62:5-38.
- Pereltsvaig, Asya. 2011a. As Easy as Two, Three, Four? In Wayles Browne, Adam Cooper, Alison Fisher, Esra Kesici, Nikola Predolac, and Draga Zec, eds., *Formal Approaches to Slavic Linguistics 18*, 417-434, Ann Arbor, MI: Michigan Slavic Publications.
- Pereltsvaig, Asya. 2011b. On Numberlessness and Paucal Numerals in Russian. The talk presented at the FASL 2011 meeting, MIT, May 2011.
- Pesetsky, David. 2010. Russian Case Morphology and the Syntactic Categories. Ms., MIT.
- Rullmann, Hotze. 2011. *Scopal Deficiency and Number*. The talk presented at the Discussion Workshop on Weak Referentiality, Utrecht, March 2011.
- Rutkowski, Paweł. 2002. Noun/pronoun Asymmetries: Evidence in Support of the DP hypothesis in Polish. *Jezikoslovlje* 3(1-2):159-170.
- Rutkowski, Paweł. 2002. Numerals as Grammaticalised Nouns: A Generative Approach. *Interlingüística* 13(3):317-328.
- Rutkowski, Paweł. 2006. Why Polish Numerals Should Not be Analyzed as Nouns. In Changguk Yim, ed., *Minimalist Views on Language Design: Proceedings of the 8th Seoul International Conference on Generative Grammar*, 249-263, Seoul: Hankook/Korean Generative Grammar Circle.
- Rutkowski, Paweł. 2007. *The Determiner Phrase Hypothesis as a Tool of Syntactic Analysis of Polish Nominal Phrases*. Ph.D. thesis, Warsaw University.

- Rutkowski, Paweł. 2012. The Syntax of Floating Intensifiers in Polish and its Implications for the Determiner Phrase Hypothesis. In Zhenya Antic, Charles B. Chang, Emily Cibelli, Jisup Hong, Michael Houser, Clare S. Sandy, Maziar Toosarvandani, and Yao Yao, eds., *Proceedings of the Thirty-Second Annual Meeting of the Berkeley Linguistics Society*. Berkeley: Berkeley Linguistics Society.
- Sauerland, Uli. 2003. A New Semantics for Number. In R. Young and Y. Zhou (eds.) *Proceedings of SALT 13*, Ithaca, NY: CLC Publications.
- Sauerland, Uli; Jan Andersen, and Kazuko Yatsushiro. 2005. The Plural is Semantically Unmarked. In Stephan Kepser and Marga Reis, eds., *Linguistic Evidence*, 413-434, Berlin, Germany: Mouton de Gruyter.
- Schmitt, Christina & Alan Munn. 2002. The Syntax and Semantics of Bare Arguments in Brazilian Portuguese. In Pierre Pica and Johann Rooryck, eds., *Linguistic Variation Yearbook*. Vol. II, 185-216, Amsterdam: John Benjamins.
- Svenonius, Peter. 2008. The Position of Adjectives and other Phrasal Modifiers in the Decomposition of DP. In Louise McNally and Christopher Kennedy, eds., *Adjectives and Adverbs*, 16-42, Oxford: Oxford University Press.
- Tatevosov, Sergei. 2006. Measuring Individuals, Partitioning Events: Semantics of Cumulative Verbs in Russian. In Peter Kosta and Lilia Schurcks, eds., *Linguistic Investigations into Formal Description of Slavic Languages*, 529-544, Frankfurt: Peter Lang.
- Trugman, Helen. 2008. *Modifiers of Bare Nouns in Russian*. The talk presented at FDSL 7.5, Moscow Independent University, December 2008.

Asya Pereltsvaig
Department of Linguistics
Margaret Jacks Hall, Building 460
Stanford, CA 94305-2150
USA

asya_pereltsvaig@yahoo.com

Grammaticized Discourse Connectivity

MARTIN PORT

City University of New York

Introduction

The purpose of this study is to address what we consider to be an insufficiently structured picture of discourse connectivity. Here we define “discourse connectivity” as the way in which the illocutionary force of a sentence is established in terms of its relation to context. In general, linguists (e.g. Asher and Lascarides 2003, Webber et al. 2003) consider this to be accomplished by a process that I will describe as “reasoning-based.” This type of discourse connection is achieved in two ways. The first way is for a speech act to be spelled out explicitly, in the form of an overt discourse connective. For example, the discourse adverbial “then” is used to establish that a discourse element has a Narrative function. The second way is for the speech act to be established by a process of defeasible inference. Thus, if one discourse element follows another, this would normally establish that it has a Narrative function, in accordance with a Gricean maxim of manner.

What these two types have in common is that they establish discourse connectivity exclusively by a process of reasoning, either monotonic or non-monotonic. Here, however, we propose a distinction between two types of discourse connectivity: reasoning-based and grammar-based. Grammar-based connectivity is based on processes of syntax: configurational/anaphoric factors. By making this distinction, we can predict the occurrence of speech acts that cannot be predicted by adverting exclusively to reasoning processes.

Examples of reasoning-based connectivity are:

Reasoning-based connectivity

First process: entailed, explicit relation

- (1) a. Joel rang the bell.
- b. Then Greg opened the door.

Discourse relation: Narration, mandated by discourse connective *then*.

- (2) a. Arnold tripped over a brick.
- b. Consequently he stubbed his toe.

Discourse relation: Result, mandated by adverbial connective *consequently*.

Second process: defeasible, inferred relation.

- (3) a. Joel rang the bell.
- b. Greg opened the door.

Discourse relation: Narration, this time inferred by pragmatic means, e.g., a Gricean maxim of Manner or Relevance. This inference could be cancelled by a continuation such as:

- (3) c. ... but that was before Joel rang the bell.

- (4) a. Arnold tripped over a brick.
- b. He stubbed his toe.

Discourse relation: Result, pragmatically inferred. This relation is defeasible as in:

- (4) c. ... which was what led him to trip over the brick in the first place.

Reasoning-based speech acts, then are divided into two categories: either entailed-and-explicit or defeasible-and-inferred.

Grammar-based examples do not fall into either of these categories. This type of relation is entailed-and-implicit. Here we study two cases of grammar-based connectivity: adverb-fronting constructions and zero-anaphor constructions. Examples are

Grammar-based connectivity

Case 1: Discourse with adverb-fronting construction

- (5) **Discourse**
 - a. What happened at 5:12?
- Continuations**
 - b. I turned slowly
 - c. *Slowly I turned.
 - d. I finally caught up with him at Niagara Falls. Slowly I turned.

The in situ form of (5b) is grammatical in isolation. But adverb fronting requires further contextual support. It produces the effect of a discourse connective with narrative force. It is grammatical only when preceded by another discourse element, as in (5d).

This narrative force is not given by either a monotonic or non-monotonic reasoning process:

- There is no overt adverbial discourse connective such as *then*.
- Also, the relation is not defeasible, as shown by the following:

- (6) a. I finally caught up with him at Niagara Falls.
- b. *Slowly I turned, although that was before I saw him.

Case 2: Discourse with zero-anaphor construction

(Note: henceforth we refer to “zero anaphora” as “Definite Understood Arguments”, or DUA.)

- (7) **Discourse:** Paige fell on Rachel's property.

Continuations

- (8) a. Paige sued Rachel (but not for that reason).
- b. Paige sued Rachel (although that happened prior to her falling).
- (9) a. Paige sued U. (U is the understood argument or zero anaphor.)
- b. *... but not for that reason.
- c. *... although that happened prior to her falling.

The overt-complement forms in (8) are unconstrained in interpretation. However, the omitted complement form (9a) is constrained to an illocutionary force that could be given as Result (illustrated by (9b)) or Narration (9c).

The latter interpretations are given grammatically, by an anaphoric relation. There is no overt adverbial phrase, and the relation is not defeasible.

Our conclusion is that the “grammatical” cases provide a closer discourse connection than other cases.

We define two speech acts, “event description” and “event narration”, to describe this contrast. An event description is produced by reasoning-based processes, and an event narration is produced by grammar-based processes. Both speech acts are apparently narrative; but the closer connection given by a narration require the distinctions we have made.

1 Mechanisms of Connectivity

We now pursue the following question: can both reasoning-based and grammatically induced discourse connectivity to established by a single grammatical process?

A theory answering this requirement would have to relate two factors:

- (i) The way in which the discourse-connective element, whatever its character, is related to its matrix. For example, in (5d), how is *slowly* associated to the

sentence of which it is a part?

(ii) The way in which the discourse-connective element is related to the context element. For example, how is the interpretation of the omitted complement in (9a) associated to the discourse context in (7)?

Two types of association are implicated in our examples: syntactic and contextual. A sentence adverb such as fronted *slowly* (or for that matter, *then*) is associated with the sentence syntax of its matrix. A definite understood argument has a discourse-anaphoric rather than a syntactic connection to its matrix; and its illocutionary force is established through this connection. How then do factors of discourse and syntax combine to produce the illocutionary force of Narration, or of Result?

In addressing these questions, the approach I will take is to determine whether the data under consideration can be accommodated in the framework of “Discourse-level Lexicalized Tree Adjoining Grammar”, or DLTAG (Webber et al. 2003, Forbes 2003). The advantage of this system for our purpose is that it shows the interaction of syntactic and discourse/anaphoric factors in producing illocutionary force. Since the data under consideration involves such interactions, it seems possible that this approach can be extended to include these grammatically produced illocutionary forces.

The purpose of DLTAG is to “capture the mechanism by means of which discourse adverbials are involved in discourse syntax and discourse semantics” (Webber et al. 2003: 560). In this system, discourse connectives are considered to be predicates, both syntactically and semantically. This view establishes a correspondence between compositional processes of syntax and those of discourse. Therefore, “DLTAG can build both the syntax and the compositional semantics of these predicates using the same syntactic and semantic mechanisms that are used to build the syntax and compositional semantics of predicates at the clause level” (Forbes 2003:190).

I will briefly describe the DLTAG mechanism. Following this, I will show its application to the data under consideration. The following description is based on Webber et al. (2003) and Forbes (2003).

A lexicalized Tree Adjoining Grammar (TAG) involves the following components:

- (i) a lexical anchor
- (ii) two types of elementary trees: initial trees that show basic functor-argument dependencies; and auxiliary trees that “introduce recursion and allow elementary trees to be modified and/or elaborated (Webber et al. 2003:574)
- (iii) two composition operations: substitution, which applies to composition of initial trees; and adjunction, which applies to composition of auxiliary trees.

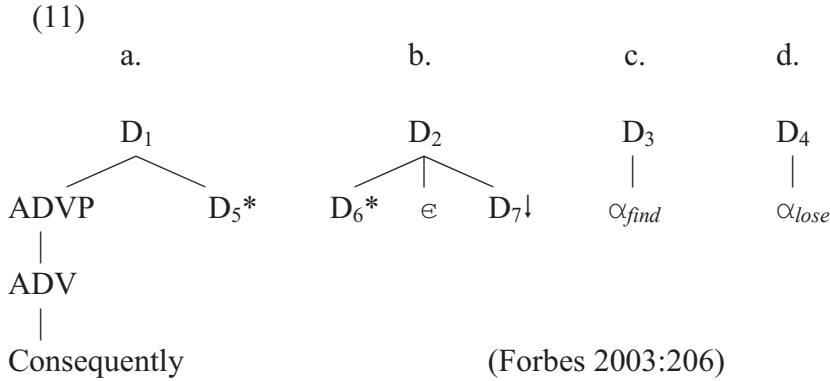
The following is a sample DLTAG analysis of a discourse with an adverbial cue phrase (from Forbes 2003:205 ff.)

Discourse

- (10) a. Mike found no new clients.
b. *Consequently*, he lost his job. (Forbes p.205).

Elementary trees of (8)

(“D” = discourse unit; α -trees are initial trees, β -trees are auxiliary trees. Nodes marked by “↓” are replaced by the initial tree being substituted. Nodes marked by “*” are adjoined to trees of any type (initial, auxiliary, or derived by a substitution operation—see Forbes 2003:160).



—(11a) is an auxiliary tree anchored by the adverb *consequently*. Since the adverb supplies optional modification, it is not a substitution tree.

—(11b) is an auxiliary tree anchored by the empty connective ϵ , represented by the period at the end of the first discourse element in (10a).

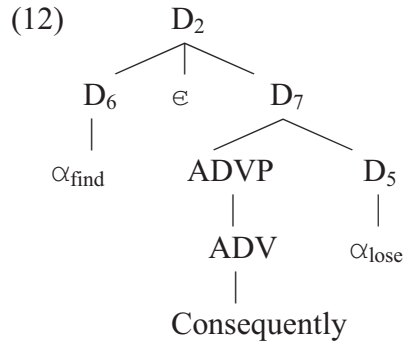
—(11c) represents (10a)

—(11d) represents the matrix element in (10b) (*he lost his job*).

These elementary trees are composed as follows:

- i. The auxiliary tree $\beta_{consequently}$ is adjoined to the initial tree α_{lose} at D_5 .
- ii. The result is substituted into β_ϵ at D_7 .
- III. α_{find} is adjoined to the result at D_6 .

This process yields:



This model shows the discourse adverbial to be a predicate, the first of whose arguments is given anaphorically and the second structurally with its matrix.

2 Analysis of Adverb-Fronting Data

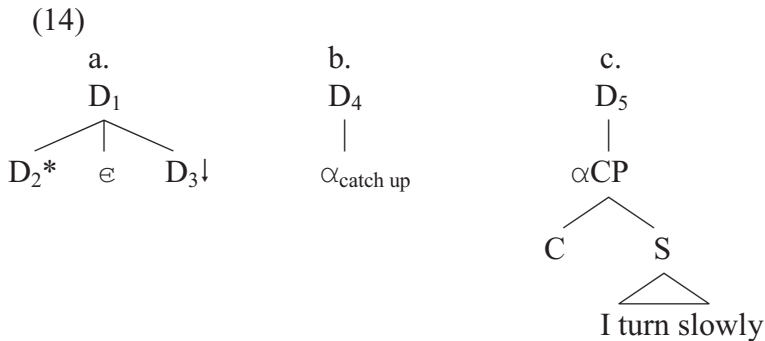
We now provide an analysis of data using the DLTAG model. Consider this discourse involving an adverb-fronting construction.

- (13) a. I finally caught with up him at Niagara Falls.
 b. Slowly_i I turned t_i.

Note that in what follows, we present (13a) as an unanalyzed discourse element “D_{catch up}.” However, we show some of the internal syntactic structure of (13b). This is because the fronted element *slowly* is not composed directly to *I turned* by a process of adjunction at the discourse level; rather it appears in its fronted position due to a process of syntactic movement.

Also, we give the initial tree anchored by *turn* as a CP, not an S/TP. Here C will serve as the position occupied by the fronted element.

Elementary trees for (13):

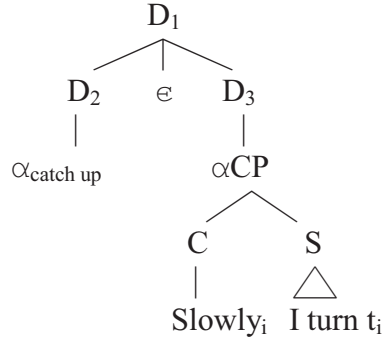


We now compose the discourse tree with the following steps.

- i. Substitute D_5 into D_3 .
- ii. Adjoin D_4 to D_2 .
- iii. Move adverb to connective position

This yields:

(15)



In this example, the adverb is adjoined in sentence syntax, not in discourse syntax. When fronted, it occupies the same position as an adverbial discourse connective like *consequently*. In C, the adverb provides Narrative force, connecting two discourse elements.

Thus we see the adverb as a predicate, in this case an abstract narrative predicate, where each argument is a proposition.

- (16) a. $NARR_{slowly}$ [catch_up, turn]
 b. NARR [p₁ p₂]

This view leads to an extension of the DLTAG theory, in the sense that the fronted adverb is not an anaphor in any obvious way. But like a discourse anaphor, it is associated with a prior discourse element; and this association is not established by syntactic binding. Our conclusion is that the illocutionary force of adverb fronting—a grammatical process—is explainable in terms of a theory that accounts for reasoning-based illocutionary force.

3 Analysis of DUA Data

For the DUA data, we begin by establishing the following premises; we then apply them to the data.

Premises

- i. As with adverb-fronting, illocutionary force is given by syntactic movement to a complementizer position.

- ii. The understood element “U” in a DUA sentence has two components, an operator and a predication: $U = \delta \exists x[P(x)]$
- iii. ” δ “ (the phonetic symbol eth) represents a particle or operator element that has the general meaning of “thus” or “therefore.”
- iv. The predication “ $\exists x[P(x)]$ ” is the “zero anaphor” that corresponds to some element in the discourse context.
- v. The δ -element is what undergoes movement in the discourse syntax. In its fronted position, it acts as a discourse predicate with two propositional arguments. As in the cue-phrase example from Forbes (2003), one argument is given anaphorically, the other structurally.

3.1 Structure of DUA Discourses

On the basis of the premises above, we give a picture of:

- A. The structure of understood arguments
- B. The structure of discourses involving these arguments

Consider,

- (17) a. Jones went up to the house.
- b. He stepped in U.

A. Structure of U

We will argue for the following structure for the understood argument “U”:

- (18) a. Approximate meaning of U: to _ his _ destination
 - b. Proposed representation of U: $\delta \exists x[\text{Jones's destination}(x)]$
- (The δ -operator corresponds to the understood particle *to*.)

B. Structure of discourse

The discourse of (17) is given as follows:

- (19) —Discourse structure is “ $\delta [p_1, p_2]$ ”
- “ δ ” is a predicate with two propositional arguments.
- p_1 = Jones_go_up
- p_2 = He_step_in_U

On the basis of the premises in (19), we argue for the following derivation of the discourse structure of (17):

- (20) “Deep structure” of discourse (syntactic representation):
- a. Jones went up to the house. (= 17a)
- b. $[_{CP} [_S \text{He stepped in } [\delta \exists x[\text{Jones's_destination}(x)]]]]$ (= 17b)

(21) “Surface structure” of discourse (syntactic representation):

- a. Jones went up to the house.
- b. $[_{CP} [_C \delta_i [_s \text{He stepped in } [_t_i \exists x [\text{Jones's_destination}(x)]]]]]$

The fronting of the operator is motivated by the requirement of establishing the definiteness effect of the null argument. In the C-position it licenses the empty category **U**. This yields a discourse predication of the form “ $\delta [p_1, p_2]$.”

(22) Semantic representation of (21)

$\delta[\text{Jones_go_up}, \text{He_step_in}]$

When it is fronted, the operator appears already associated with p_1 , since it originally applies to the predication “ $\exists x[P(x)]$ ”—which is itself anaphoric to p_1 .

3.2 Motivating the δ -Element

We now examine various types of data that provide evidence for the δ -element.

3.2.1 Data: DUA Constructions Derived by Omission of PP-Complement

We make the initial observation that many if not most DUA elements are derived from PP-sources.

Examples:

- (23) **Discourse:** Ray went up to the house. He walked in **U**.
 $U \approx \text{to_the_house_that Ray_went_up_to}$
- (24) **Discourse:** John is tall. Alice is taller **U**.
 $U \approx \text{than_John_is_d_tall}$
- (25) **Discourse:** Lulu was guilty. Thomas found out **U**.
 $U \approx \text{about_Lulu_being_guilty}$

In each case, there is a preposition/particle element in the interpretation of **U**, which contributes the meaning of aboutness. This element selects for a proposition (such as *Lulu_being_guilty*) that corresponds to the discourse context.

We conclude that an “aboutness” operator, applying to an element in the context, is present in the interpretation of **U**, when **U** stands in for a PP/PrtP element.

3.2.2 Data: DUA Verbs Selecting for More Than One Complement Type

Object of survey: epistemological verbs

Consider these contrasts:

- | | |
|-------------------------------|---------------------------------|
| (26) Verbs selecting for “U”. | (27) Verbs not selecting for U. |
| a. I know U. | a. *I believe U. |
| b. I found out U. | b. *I figured out U. |
| c. I forgot U.. | c. *I discovered U. |

These verbs select for more than one type of complement (*that*-clause, direct object, PP-complement): which of these types does U stand in for in (25)?

All the verbs of (26-27) take *that*-clauses.

- (28) I {know, find out, forget, believe, figure out, discover} that Bruce is innocent..

All take direct objects.

- (29) a. I {know, forget, believe, discover} Mary.
b. I {find, figure} Mary out.

But only DUA verbs take PP-complements.

- (30) a. I {know, find out, forgot} about that.
b. *I {believe, figure out, discover} about that.

Conclusion: in the DUA form, it is the *about*-complement, rather than a *that*-clause or direct object that is being dropped. Therefore, in (26), a particle meaning *about* is in the interpretation of U.

3.2.3 Data: Constructions With Negation.

Consider:

- (31) **Discourse**
a. What did Solon say?
Responses
b. *I don't know that Solon said.
c. I don't know what Solon said.
d. I don't know about that.
e. I don't know U.

In negated forms, a *that*-clause does not make sense; appropriate responses include wh-operators or PP-complements.

Conclusion: An “aboutness” operator, applying to an element in the context, is present in the interpretation of **U**, when **U** stands in for a PP/PrtP element.

3.2.4 Data: DUA Forms Not Based on PP-Complements

Here we provide an extension to conclusion of (31), to the effect that the operator is present in all occurrences of **U**, even if the overt complement of the DUA-element is not a PP. This conclusion is supported by our original example:

- (32) a. Paige fell on Rachel’s property.
b. Paige sued Rachel (*but not for that reason).
c. Paige sued **U**. (U \approx Rachel_[for_that_reason])

Sue does not select for a PP; yet a PP of some sort is apparently present in the interpretation of the understood element. (32c) has a particular illocutionary force that brings in the “PP” interpretation. In particular, the *for_that_reason* provides discourse deixis—supporting the postulation of an “aboutness” element in **U**, even when it does not stand in for a prepositional phrase.

3.3 The Predicational Component of **U**

We have given “ $\exists x[P(x)]$ ” as the complement of “ δ ”. We argue for this as follows:

Consider,

(33) **Discourse:**

- a. Al was in the building.

Continuations:

- b. Brad followed Al.
c. *Brad followed **U**.

(34) **Discourse:**

- a. Al was walking around the building.

Continuations:

- b. Brad followed him.
c. Brad followed **U**.

(35) **Discourse:**

- a. Paige didn't like Rachel

Continuations:

- b. ... so Paige sued Rachel.
c. *... so Paige sued **U**.

- (36) **Discourse:**
a. Paige fell on Rachel's property.
Continuations:
b. ... so Paige sued Rachel.
c. ... so Paige sued **U**.

These contrasts show that two factors are necessary to license argument drop:

Factor A: mention in discourse of an argument that could serve as an overt complement to the verb.

Factor B: mention in discourse of an eventuality whose description includes semantic features of the verb

(33) and (35) include only Factor A—mention of a potential complement to the verb (i.e. *Al* and *Rachel*). **U** is not licensed, although an overt direct object is possible, as in (33b) and (35b). However (34) and (36) include both factors, and **U** is licensed as in (34c) and (36c).

—In (34) Factor A is an element, *Al*, that could be the antecedent of *him*.

—In (36) Factor A is an element *Rachel*, that could serve as an overt complement to the verb.

—In (34) Factor B is constituted by the idea of *motion*, which is part of the semantic structure of *follow*.

—In (36) Factor B is constituted by the idea of a tort, which is part of the semantic structure of *sue*.

Our conclusion is that both the argument and eventuality-predicate (corresponding to Factors A and B respectively) must be in the interpretation of **U**. Therefore, **U** includes the formula “ $\exists x[P(x)]$ ”, where the x corresponds to the argument and P corresponds to the predicate.

To sum up, the full structure of the understood element **U** is as follows.

U consists of two elements:

1st element – aboutness operator “ δ ”.

2nd element – predication anaphoric to discourse context: $\exists x[P(x)]$.

Examples:

- (37) a. Paige fell on Rachel's property. Paige sued **U**.
b. **U** = $\delta [\exists x [\text{responsible_for_tort}(x)]]$

- (38) a. **Statement:** Bruce is innocent.
 b. **Response:** I know **U**.
 c. $U = \delta [\exists p [\text{Bruce_being_innocent } (p)]]$

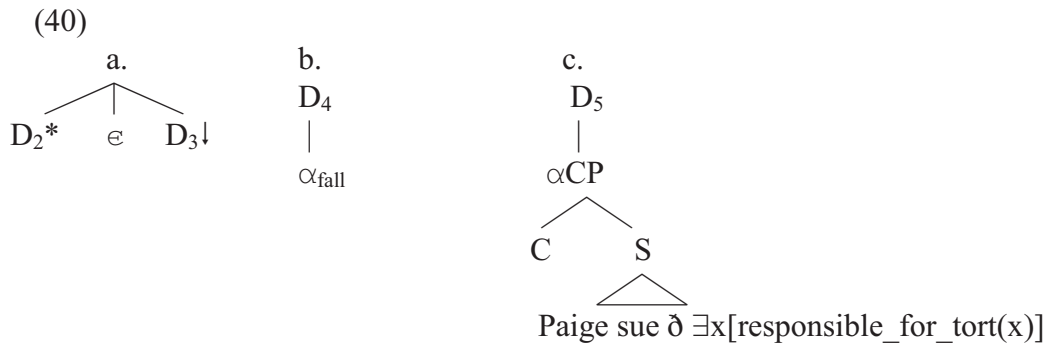
3.4 Discourse Syntax

Having provided a picture of the understood element “**U**” in a DUA construction, we are now in a position to examine the discourse syntax of our data.

DLTAG analysis

- (39) a. **Discourse:** Paige fell on Rachel's property.
 b. **Continuation:** Paige sued **U**.
 $U = \delta [\exists x [\text{responsible_for_tort}(x)]]$

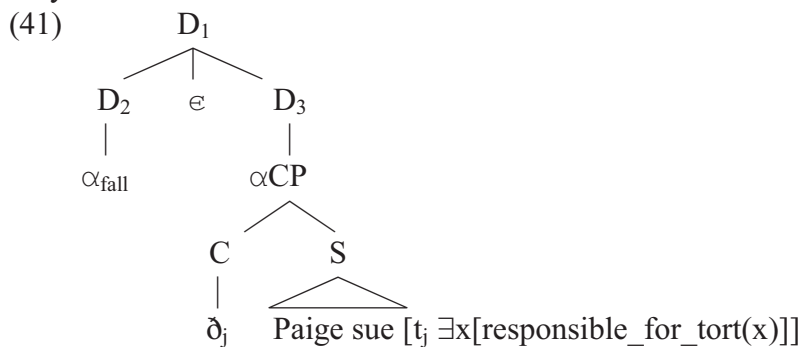
Elementary trees



These trees are composed as before.

1. Substitute α_{CP} at D_3 .
2. Adjoin α_{fall} at D_2 .
3. Front δ to C.

This yields:



This move places δ in a scoping position where it can act as a predicate with two propositions as arguments:

Semantic representation

- (42) a. $\delta_j[\alpha_{fall}, \alpha_{sue}]$
 b. $\delta[p_1, p_2]$

—The entire U-element is related anaphorically to the first discourse element “ α_{fall} ”, because δ in its base position applies to the “[$\exists x$ [responsible-for-tort(x)]]” predication, which is itself anaphorically related to α_{fall} .

—Fronting of δ is motivated by the necessity to provide the definiteness effect of the DUA structure. In this fronted position, the operator:

—can license the empty category U.

—can serve as an anaphoric connective, associating the two discourse elements of (39).

4 Conclusion

In this presentation we have tried to account for structurally/configurally achieved illocutionary force. Our hypothesis was that this could be established by the same grammatical process as reasoning-based illocutionary force. Since the former is given through a combination of structural and anaphoric factors, we have studied the question according to the DLTAG framework, which accounts for adverbial connectives that have two arguments, one structural and one anaphoric. A main advantage of the DLTAG system for our data is that it builds discourse structure on top of clausal structure, using the same principles of composition. This is an advantage because of our claim that the adverb/operator position is filled by a process of syntactic movement, but acts as an anaphoric connective providing illocutionary force.

References

- Asher, Nicholas and Alex Lascarides. 2003. *Logics of Conversation*. Cambridge: Cambridge University Press.
- Fillmore, Charles J. 1986. Pragmatically Controlled Zero Anaphora. Berkeley Linguistic Series 12:95-107
- Forbes, Katherine M. 2003. Discourse Semantics of S-Modifying Adverbials. Doctoral dissertation, University of Pennsylvania.

Grammaticalized Discourse Connectivity

Grice, H.P. 1968. Logic and Conversation. In Steven Davis, ed. 1991. *Pragmatics: A Reader*. New York: Oxford University Press.

Port, Martin. 2008. Understood Arguments and Complex Logical Forms. *Proceedings of the thirty-eighth Western Conference on Linguistics*:252-265.

Port, Martin. 2010. *Omitted Arguments and Complexity of Predication*. Doctoral dissertation, The City University of New York. ProQuest/UMI, Publ. (PQDT Open).

Webber, Bonnie, Matthew Stone, Aravind Joshi, & Alistair Knott. 2003. Anaphora and Discourse Structure. *Computational Linguistics* 29,4:546-587.

Martin Port
410 W. 24 St.
New York, NY 10011

mport2500@aol.com

Variation in the Syntax of the Partitive Structure

HELEN STICKNEY, CHELSEA MAFRICA, and JORDAN LIPPMAN
University of Pittsburgh

Introduction

This paper presents survey data suggesting that there is inter- and intra-speaker variation in the syntax of the partitive structure in English. We focus on bi-nominal partitives like (1) that contain two nouns. The first noun *box* (henceforth N1) in these partitives denotes a unit of measure. The second noun *chocolates* (henceforth N2) denotes a substance or group of items.

- (1) a box of those chocolates

Following Stickney 2009 we consider the partitive to be a bi-nominal structure consisting of two distinct DPs. As such, an adjective preceding the construction should only be able to modify N1 (Selkirk 1977). However, English speakers show variation in their ability to allow an adjective to modify N2. We propose that the grammaticalization of partitives in English (Rutkowski 2007) and its interaction with the language acquisition device account for the data. Our account is consistent with Roberts & Roussou's (2003) account of diachronic change.

This paper is organized as follows. In section 1, we will discuss the syntax of the partitive in contrast to the pseudopartitive, a related construction. In section 2 we will discuss previous literature that investigates the processing of the partitive and the pseudopartitive and literature that analyzes the pseudopartitive as the grammaticalized version of the partitive. Section 3 presents the survey experiment and its results. In section 4 we will argue that the results are indicative of both grammaticalization of particular partitive phrases and a more global change in the syntax of the partitive in English.

1 Partitive and Pseudopartitive Syntax

The syntactic and semantic literature suggests that partitive (2) and pseudoparti-

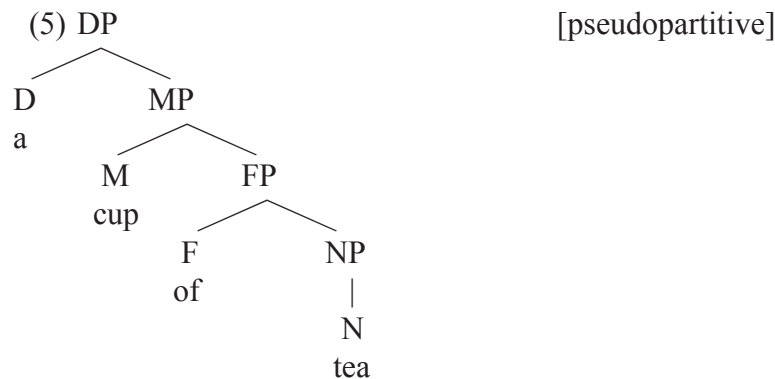
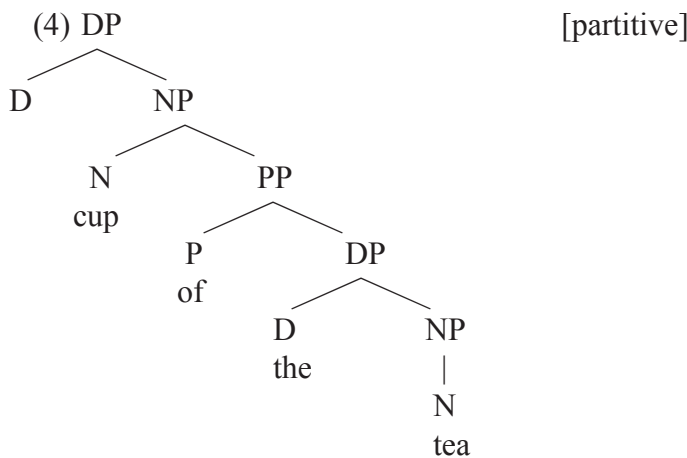
tive (3) are distinct constructions (Selkirk 1977, Alexiadou, Haegeman & Stavrou 2007, Stickney 2009, *inter alia*).

(2) a cup of the tea

(3) a cup of tea

The partitive is bi-phrasal, consisting of two NPs (Jackendoff 1977, Selkirk 1977, Hoeksema 1996, Stickney 2009). Semantically the partitive represents a measured proportion of a discourse-relevant set. The pseudopartitive, in contrast, is a single nominal projection that represents a single entity (Alexiadou, Haegeman & Stavrou 2007, Stickney 2009). What is the first NP and the PP in the partitive are Measure Phrase (MP) and FP in the pseudopartitive, respectively (see Stickney 2009 or Alexiadou, Haegeman & Stavrou for more discussion of these nodes).

The partitive is headed by N1 while the pseudopartitive is headed by N2. Thus the partitive *a cup of the tea* (4) is headed by *cup* while the pseudopartitive *a cup of tea* (5) is headed by *tea*.



The structures in (4) and (5) account for differences in syntactic patterns related to, among others, extraposition (Section 1.1), adjectival modification (Section 1.2), fronting and stranding, and recursion. See Stickney 2009 discussion of fronting and stranding, recursion, and further differences between these two constructions.

1.1 Extraposition

Pseudopartitives allow low-attached modifiers to extrapose (6-7). The partitive (8-9) does not (Stickney 2009:54).

- (6) A number of questions concerning electromagnetism were asked.
- (7) A number of questions were asked concerning electromagnetism.
- (8) A number of the questions concerning electromagnetism were asked.
- (9) *A number of the questions were asked concerning electromagnetism.

Conversely, the “of-phrase” cannot be extracted from the pseudopartitive (10-11), but can from the partitive (12-13). The following examples are from Selkirk (1977:304).

- (10) A lot of leftover turkey has been eaten.
- (11) *A lot has been eaten of leftover turkey.
- (12) A lot of the leftover turkey has been eaten.
- (13) A lot has been eaten of the leftover turkey.

Stickney accounts for the differences in modifier extraposition by treating the determiner in the partitive as marking a phase boundary, DP. Because this DP layer doesn’t exist in the pseudopartitive movement of the modifier is licit. In the case of movement of the “of-phrase,” Stickney implies that the FP *of* does not form a constituent with the material that it dominates in the pseudopartitive. The PP in the partitive, however, is free to move.

1.2 Adjectival Modification

Partitive and pseudopartitive differ in terms of how they interact with adjectives. Stickney 2009 shows that an adjective preceding N1 in the partitive structure

should only modify the first noun and should not be able to modify the second noun. Stickney assumes that an adjective adjacent to N1 that is modifying N2 has moved to that position from a position in N2's projection. Following Bošković 2008, she claims that this movement is blocked by the phase boundary created by the DP layer between these two nouns. An alternative analysis may be to say that English restricts adjectives to modifying only the closest noun (and that the pseudopartitive contains only one noun).

In a pseudopartitive structure there is no intervening DP and an adjective adjacent to N1 is able to modify N2. The following phrases are from Stickney (2009:72-73)

(18) A spiky pot of the beetles [partitive]

(19) A spiky pot of beetles [pseudopartitive]

According to Stickney, the phrase in (19) is compatible with a scenario in which the beetles are spiky. Whereas, the phrase in (18) only has the reading in which the pot is spiky. However, experimentally, Stickney finds some ambiguity with respect to adjectival modification and these two constructions. The rest of this paper is concerned with accounting for this ambiguity.

2 Processing of the Partitive and the Pseudopartitive

2.1 Difference Between Partitive and Pseudopartitive

Selkirk 1977 first illustrated that partitive and pseudopartitive have different syntactic structures, pointing out restrictions on various syntactic behaviors. However, as a final thought in the paper, Selkirk notes ambiguity in the behavior of each structure, especially with respect to verb agreement and s-selection¹ (20-21), which ultimately led her to suggest two structures for each based on headedness –i.e. both the partitive and the pseudopartitive have an N1-headed and an N2-headed version.

(20) Bill smashed a bottle of the wine.

(21) Bill drank a bottle of the wine.

The purely syntactic contrasts between partitive and pseudopartitive, such as extraposition, are not shown to be ambiguous, leading Stickney 2009 to assume only one structure for each: the partitive as bi-nominal and headed by N1, and the pseudopartitive as one noun headed by N2 (as seen in (4) & (5) above). Stickney

¹ Deevy 1999 confirms this ambiguity experimentally for the pseudopartitive.

investigates English-speaking children's acquisition of the difference between these two constructions.

Using adjectival modification (Section 1.2) as a diagnostic, Stickney presented children with a picture choice task containing both partitives and pseudopartitives. After listening to a short story, subjects were presented with either a partitive or a pseudopartitive with an adjective immediately preceding N1. They were then required to choose the picture that best represented the phrase, choosing between a picture that depicted N1 modified, one that depicted N2 modified and one in which neither noun was modified. Children in this experiment treated partitive and pseudopartitive the same, allowing N2 to be modified equally as often in each construction. Only the children in the oldest age group (5-6 year olds) restricted N2 modification in some partitives. The adult controls in this study distinguished significantly between partitive and pseudopartitive, but a surprising proportion of the adult data (~25%) showed N2 modification to being accepted with a partitive prompt. How are these data to be interpreted –especially in light of Selkirk's original suggestion that the partitive is ambiguous between two different syntactic structures? We suggest that partitives of the sort investigated in this paper are in the process of grammaticalizing, and that this grammaticalization is affecting the interpretation, structure, and the acquisition of the partitive structure in English.

2.2 Pseudopartitive as Grammaticalized Partitive

The idea that the pseudopartitive construction is the outcome of a process of syntactic grammaticalization originates with Koptjevaskaja-Tamm 2001, who reviews a range of languages (from a variety of language families) to show that pseudopartitives derive from partitives diachronically. This process is formalized by Rutkowski 2007 who analyzes pseudopartitives as being grammaticalized partitives following Roberts & Roussou's (1999) account of grammaticalization. Roberts & Roussou (1999, 2003) treat grammaticalization as a diachronic process brought about by systematic reanalysis of existing functional material or reanalysis of lexical material as functional. This is viewed as a process of simplification of structure and/or features. Rutkowski suggests that the pseudopartitive evolves in languages to accommodate partitives that are not referential and thereby do not necessitate the more complicated (and costly) bi-nominal structure. In these partitives, the N1 is systematically reinterpreted as a measure phrase and other material is deleted or reinterpreted, creating the pseudopartitives structure (22).

- (22) $[_{DP} a [_{MP} bowl]_j [_{FP} of_k [_{NP} e_i [_{PP} e_i [_{DP} her [_{MP} [_{NP} soup]]]]]]]]]$

Rutkowski suggests that during the transitional period from partitive to pseudopartitive there may be ambiguity in the language, giving rise to partitives that

may either be parsed with a partitive or a pseudopartitive structure. This ambiguity creates the ideal environment for broader language change. In Roberts & Roussou's account, ambiguity in a language may trigger the language learner's parameter setting device to set the parameter to the simpler/default option (based on the premise that the "language acquisition device is deterministic only to the extent that all parameters have to be set" (Roberts & Roussou 2003:12) – this does not imply that the learner necessarily sets all the same parameters extant in the target language). If the L1 English learner hears both partitives that contain two NPs and partitives that are part of single nominal projection but contain two noun-like elements (as in the pseudopartitive), the ambiguity may be enough to trigger the parameter setting in his I-language to treat all partitives as single nominal projections, despite the fact that the majority of English speakers may not have this parameter setting. We do not claim to know exactly what this parameter setting is, but we predict it would manifest a preference for parsing partitives as pseudopartitives in non-referential contexts.

Given the above analyses, there are two possible changes that may be happening in English: partitives may get parameterized as pseudopartitive in general or individual partitives may over time in the language become pseudopartitives.

One of these possibilities may account for the adult data seen in Stickney 2009. The 25% of adult responses that allowed N2 to be modified in the partitive may be indicative of particular partitives grammaticalizing (although Stickney shows that no particular partitive was more likely to allow N2 modification than any other) or may indicate that particular speakers have a different I-language that treats all bi-nominal partitives as pseudopartitives.

The following experiment was designed to investigate whether there exists a group of English speaking adults who might have a different I-language. If partitives are grammaticalizing on an item-by-item basis, then we should see particular partitives that behave more like pseudopartitives. If what we are seeing is a change in parameter setting, then we should see a split in English speakers – those who treat all partitives as if they were pseudopartitives (consistent with a new parameter setting) and those who do not.

Stickney 2009 suggests that it is the definite determiner that is, in fact, being reanalyzed in the grammars of the speakers that treat partitive as if it were pseudopartitive. However, she does not provide data that shows that the definite determiner is more likely to cause partitives to grammaticalize than partitives with other determiners (e.g. demonstratives or possessives). The survey experiment below seeks to investigate this issue as well.

3 Survey Experiment

In order to replicate and further investigate the adult data from Stickney 2009, we designed a survey experiment primarily intended to identify whether there was an

identifiable class of adult English speakers who treated partitive as pseudopartitive and to see if particular determiners are more likely than others to influence interpretation of adjectival modification of partitive phrases. In the experimental design phase, no attempt was made to identify particular partitives in the process of grammaticalizing, however, a post-hoc analysis was done to address this question (see Section 3.3).

3.1 Methods

Ninety-seven undergraduate students from the University of Pittsburgh completed a survey. The subjects were native English speakers with an average age of 21.

Each survey contained forty-eight partitive phrases that participants were instructed to read and rate for “naturalness” on a scale of 1 (unnatural) to 5 (natural). The basic structure of partitive phrases was as follows:

(23) a [adjective] [noun] of [determiner] [noun]

This experiment implemented a 2X4 within subjects design. The partitive phrases were created by manipulating whether the adjective was semantically compatible with N1 or N2 (referred to as N1-item and N2-item respectively) and the determiner (definite determiner, demonstrative, possessive pronoun, possessive phrase). Examples of the possible types of phrases follow:

(24) Eight possible phrases derived from ‘a [adj] box of [det] chocolates’

Det. type	N1-item	N2-item
definite determiner	(a) a cardboard box of the chocolates	(b) a semi-sweet box of the chocolates
demonstrative	(c) a cardboard box of those chocolates	(d) a semi-sweet box of those chocolates
possessive pronoun	(e) a cardboard box of his chocolates	(f) a semi-sweet box of his chocolates
possessive phrase	(g) a cardboard box of the man’s chocolates	(h) a semi-sweet box of the man’s chocolates

If a subject perceives the partitive to be a single nominal projection, like the pseudopartitive (5), then we predict that an adjective anywhere in this projection should be able to modify N2. If the subject perceives the partitive to be bi-

nominal, then an adjective adjacent to N1 should only be able to modify the higher noun phrase, N1. Thus, by manipulating whether an adjective was compatible with N1 or N2 we anticipated that subjects would rate as less natural any phrase containing an adjective-noun combination that was infelicitous. For example, if the subject's grammar could only allow an adjective preceding N1 to modify N1 and not N2, then we would expect him to rate (24b) as less natural than (24a).

There were eight counterbalanced versions of the survey. Each subject rated twenty-four N1-items and twenty-four N2-items. Each subject saw twelve of each determiner type, six as N1-items and six as N2-items.

3.2 Predictions

Given the literature reviewed in Section 2.2, we generate four predictions (Sections 3.2.1-3.2.4). These predictions will be evaluated in the discussion in Section 4.

3.2.1 P1: Subjects Will Prefer N1-items to N2-items

Stickney 2009 treats partitive and pseudopartitive as distinct syntactic constructions (4-5). If a subject's grammar treats the partitive and the pseudopartitive as distinct, then he will prefer N1-items to N2-items, giving them higher naturalness ratings. This is because an adjective in the higher noun phrase should not be able to modify a noun in the lower noun phrase in English (Section 1.2).

3.2.2 P3: Some Subjects Will Not Prefer N1

However, if language change is occurring by the changing of a parameter setting in the grammars of some English speakers, such that the structure of bi-nominal partitives grammaticalizes to become a single nominal projection like the pseudopartitive, then we expect that subjects who have this parameter setting will treat partitives as if they were pseudopartitives. This predicts the existence of subjects who do not distinguish between N1 and N2 or even prefer N2-items outright.

3.2.3 P2: Some Partitives Will More Readily Allow N2 Reading

If, as Rutkowski implies, over time particular partitives grammaticalize if they are frequently used in non-referential contexts, then evidence that particular N2-items are more likely to be rated as "natural" than others is predicted.

3.2.4 P4: The Type of Determiner Will Affect Acceptance of N2

Lastly, Stickney hypothesizes that a grammaticalized definite determiner is what allows N2 to be modified by an adjective adjacent to N1 in the partitives structure. This predicts an interaction between determiner type and high naturalness ratings for N2-items.

3.3 Results

We took two distinct approaches to the analyses of the rating data. First, we examined effects of item type (N1-items vs. N2-items) and determiner type within the entirety of the data (Section 3.3.1). Second, we identified individuals who tended to prefer N1-items to N2-items and those who did not and looked at each group to see if these types of individuals produced different ratings (Section 3.3.2).

3.3.1 Analyses at the Level of the All Ratings

The 2X4 ANOVA conducted on ratings revealed a main effect of item type (N1 vs. N2), $F(1,96) = 58.921$, $p = .00$, but no main effect of determiner and no interaction of item type and determiner on participant's ratings. The main effect of item type was due to participants rating N1-items as more natural than N2-items (25).

(25) Average ratings for N1 vs. N2-items by determiner type

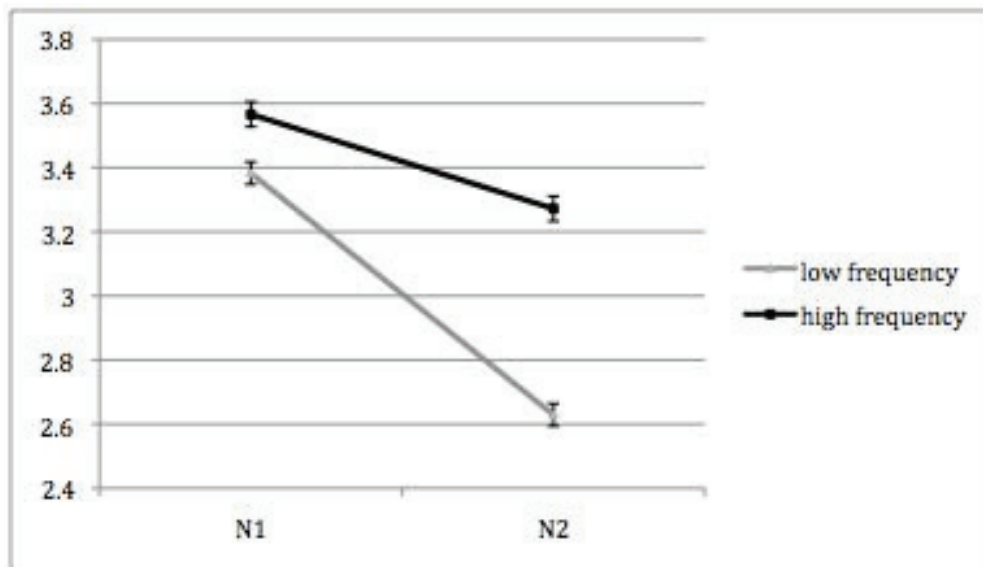
Item type	Overall	<i>the</i>	Demonstrative	<i>his</i>	<i>the man's</i>
N1	3.474	3.488	3.533	3.429	3.448
N2	2.951	2.948	3.060	2.969	2.826

When looking at whether particular partitives might be more likely to accept an N2 rating, we noticed that those phrases that might have common pseudopartitive counter-parts in English were getting higher ratings. For instance, the N2-item *a delicious plate of the food* was rated much more highly overall than then N2-item *a counterfeit suitcase of the cash*. A post hoc analysis of the effect of frequency and its interaction with item type on ratings was conducted. We used The Corpus of Contemporary American English (Davies 2008-) to determine frequency. Bi-nominal partitives in general are very infrequent in this corpus, however we found ample pseudopartitives. Thus we searched the pseudopartitive versions of these phrases. Instead of *box of the chocolates*, we searched *box of chocolates* and recorded the number of instances of each pseudopartitive counter-part to the partitive phrases in our data (forty-eight phrases in all). We divided the partitives in our survey into high and low frequency items via median split of the frequencies of their pseudopartitive counterparts.

A 2 (N1-items versus N2-items) X 2 (high versus low frequency) within subjects ANOVA was conducted on participants' ratings. This analysis identified a main effect of item type, $F(1,96) = 65.278$, $p < .01$, a main effect of frequency, $F(1,96) = 82.00$ $p < .01$, and an interaction of item type and frequency, $F(1,96) = 47.847$, $p < .01$.

An examination of ratings provided for N1-items and N2-items for high versus low frequency phrases shows there were larger differences between ratings provided for N1-items and N2-items for low frequency than high frequency phrases:

(26) Ratings by frequency and item type



In other words, whether a subject liked or disliked an N1-item was not strongly affected by frequency. However, the frequency of the pseudopartitive version of the phrase significantly affected the rating of N2-items. If a partitive was in the high frequency group, the corresponding N2-item would be given a higher naturalness rating, but this was not true of its corresponding N1-item.

3.3.2 Analyses at the Level of Participants

In order to investigate whether an individual subject differentiated between N1-items and N2-items, we subtracted his average N2-item score from his average N1-item score. Subjects were classed via median split as those who clearly preferred N1-items (N1-item minus N2-item score: 0.58 to 2.58) and those who preferred N2-items or who did not distinguish between N1-items and N2-items (N1-item minus N2-item score: -1.33 to 0.54).

A 2 (N1-item preference versus no preference) X2 (high versus low frequency

phrases) mixed-subjects ANOVA of acceptability ratings indicated a between-subjects main effect of preference group, $F(1,4654)=13.043$, $p < .00$, a within-subjects effect of frequency (described above), and no significant interaction of preference group and frequency.

The main effect of preference group indicates that participants who prefer N1-items have a larger discrepancy between N1-item and N2-item ratings than the other group of participants. Although there was an interaction between the frequency of phrases and the acceptance of N2-items, there was no interaction between subject group and frequency.

In sum, subjects overall prefer N1-items to N2-items, but a closer look shows that there is a split in subjects into those prefer N1-items to N2-items and those who don't differentiate between the two. A frequent pseudopartitive counterpart to the partitive makes it more likely that subjects will accept an N2-item, but does not affect the likelihood of accepting an N1-item. Whether a subject differentiates between an N1-item and an N2-item does not affect whether he/she is affected by the frequency of an item.

4 Discussion

First and foremost, the results of this survey experiment support the ambiguity in the syntax of the partitive identified by Selkirk 1977. There is often not a clear distinction between partitive and pseudopartitive in English. Although in general adult English speakers prefer N1-items to N2-items, two distinct groups of speakers can be described: those who treat N1-items as preferable to N2-items and those who do not. In addition, there is an affect of frequency on whether subjects like N2-items. However, there is no interaction between the preference group to which a subject belongs and the affect of frequency on N2-items. This suggests that two separate (but related) events are happening with bi-nominal partitives in English.

The data support three of our four predictions (Section 3.2). We discuss P1, P2 & P3 here and address P4 toward the end of this section. P1 is supported by the overall trend in the data of subjects rating N1-items as more natural than N2-items (25). This overall preference for N1-items is consistent with the syntactic structure in (4). An adjective preceding N1 in this partitive structure cannot modify N2, thus an adjective that is semantically compatible with N1 is more felicitous in these items than an adjective that is compatible with N2.

However, the data is also consistent with P2, which predicts the existence of speakers who treat partitives as if they were pseudopartitives if, following Roberts & Roussou 2003, language change is brought about by the triggering of a parameter setting that is different from the language of the environment. The N1-item minus N2-item score gives us two statistically significant groups of subjects, consistent with a conflicting parameter setting of this sort. The subjects with the

lower N1-item minus N2-item score allow an adjective adjacent to N1 to modify N2, suggesting that for these speakers, the bi-nominal partitive is a single nominal projection, like the pseudopartitive.

The data is also consistent with P3. Although the experiment design did not incorporate frequency, we were able to split the partitives based on the frequency of their pseudopartitive counterpart. This is a reliable predictor for a higher naturalness rating for N2-items. It had no effect, however, on the acceptance of N1-items. This seems to be preliminary evidence that certain (high-frequency, non-referential) partitives have grammaticalized in English.

We are not suggesting that the existence of pseudopartitives in English is new. Clearly pseudopartitives have been emerging from common bi-nominal partitive constructions for quite some time (some pseudopartitives have been in the language for hundreds of years). The influence of frequency in our data may be an example of individual partitives grammaticalizing (like *keg of the beer* to *keg of beer*), but may also be indicative of semantic (and syntactic?) blocking. Perhaps because the pseudopartitive *cup of tea* is highly frequent in English, the partitive version is somehow inaccessible to the hearer in non-referential contexts – although we are not sure how this should be formalized.

What we find most striking in these results is the fact that there does seem to be a segment of English speakers who allow an adjective adjacent to N1 to modify N2. We take the data to be affirmation that these speakers exist, although more research needs to be done to investigate this phenomenon. It does not seem to be a dialectal preference, however, as our subjects were relatively homogenous in their speech community (mostly from the Pittsburgh area) and Stickney's (2009) data came from students mostly from Western Massachusetts. Instead of a dialectal difference we suggest that this is evidence of the process of language change suggested by Roberts & Roussou. There is enough ambiguity in the language, given the tendency for bi-nominal partitives to be treated as pseudopartitives, to trigger a simpler parameter setting in some learners –resulting in a different I-language from their peers relevant to these constructions. We claim that the data is evidence of the process of a change in English.

Nevertheless, the data leaves many questions unanswered. If English is shifting toward treating a partitive like 'a cup of the tea' as if it were structurally 'a cup of tea,' what does this signify about the intermediary determiner? The structure in (5) does not leave room for a DP. This is one of the issues that leads Stickney to suggest that what is actually grammaticalizing is the determiner rather than the partitive construction. She hypothesizes a reanalysis of the features in the definite determiner that allows it to be treated as some other functional item that would fit into a lower node in the nominal domain. This leads us to the prediction in P4. However, this prediction was not borne out in our data. There is no difference in the rating of an N2-item given determiner type. We are left with no clear picture of what is happening to the determiner in these constructions. Rutkowski

suggests deletion in the process of grammaticalization, but deletion in the context of an experiment where subjects were reading partitive phrases does not seem quite plausible to us. But if not deleted, then where is the determiner located within these structures? Stickney 2009 also suggests an alternative hypothesis that these partitives may actually remain bi-nominal and that what changes is the features of DP that prevent adjectives from modifying lower in the structure. If this were the case it would mean that all the types of determiners used in our experiment are grammaticalizing. It is unclear what this would mean in the broader context of English syntax. Further research into the processing of determiners in bi-nominal partitives is needed.

This is the first study to look at synchronic data on the partitive and ask whether grammaticalization is in process. The data suggests that it is. However, if we are to assert that a particular parameter is being set that causes these partitives to be treated like pseudopartitives, a clear definition of that parameter is needed. According to Roberts & Roussou, grammaticalization is lexically driven. Is a particular functional projection like MP or DP the cause of the shift or can entire strings of words be parameterized?

We would also like to see the issue of referentiality addressed. Rutkowski claims that non-referential bi-nominal partitives are what undergo this process of grammaticalization into pseudopartitives. Clearly, referential partitives should be tested to see if an adjective adjacent to N1 can modify N2.

We are currently conducting a follow-up survey in which all partitive items have equal frequency. A survey with carefully measured high and low frequency items is also in order. We are also currently designing a series of online experiments to see if the ambiguity in the partitive structure shows up in real time judgments. In these online experiments we will be investigating a range of aspects of partitive syntax. We assume that the ambiguity present in the data is structural, thus we should expect to see the same ambiguity with extraposition, fronting, stranding, etc..

We are excited to provide data that adds to the literature on syntactic variation and the literature on the partitive structure. Our data is consistent with a generative approach to language change that suggests that parameter setting may be affected by ambiguity in the language. The next step is to identify the exact nature of the ambiguity that is triggering a new parameter setting for bi-nominal partitives in English.

References

Alexiadou, Artemis, Liliane Haegeman and Melita Stavrou. 2007. *Noun Phrase in the Generative Perspective (Studies in Generative Grammar)*. Mouton de Gruyter, New York & Berlin.

Helen Stickney, Chelsea Mafrica and Jordan Lippman

- Bošković, Željko. 2008. What will you have DP or NP? In: E. Elfner & M. Walkow, eds. *NELS 37: Proceedings of the 37th Annual Meeting of the North East Linguistic Society*, 101-114, GLSA: Amherst, Massachusetts.
- Davies, Mark. 2008-. The Corpus of Contemporary American English (COCA): 410+ million words, 1990- present. <http://www.americancorpus.org>.
- Deevy, Patricia. 1999. *The Comprehension of English Subject-Verb Agreement*, Doctoral Dissertation, GLSA: Amherst, Massachusetts.
- Hoeksema, Jacob. 1996. Introduction. In J. Hoeksema, ed., *Partitives*. Mouton de Gruyter, Berlin.
- Jackendoff, Ray. 1977. *X' Syntax: A study of phrase structure grammar*. Linguistic Inquiry Monograph Series 2, MIT Press, Cambridge, Massachusetts.
- Roberts, Ian, and Anna Roussou. 1999. A formal approach to 'grammaticalization'. *Linguistics* 37, 1011-1041.
- Roberts, Ian, and Anna Roussou. 2003. *Syntactic change: A minimalist approach to grammaticalization*. Cambridge: Cambridge University Press.
- Rutkowski, Pawel. 2007. The Syntactic Structure of Grammaticalized Partitives (Pseudo-partitives). In T. Scheffler, J. Tauberer, A. Eilam and L. Mayol, eds., *University of Pennsylvania Working Papers in Linguistics, vol. 13.1: Proceedings of PLC 30*, 337-350, Philadelphia: Department of Linguistics, University of Pennsylvania.
- Selkirk, Elisabeth O. 1977. Some remarks on noun phrase structure. In Akmajian, A., P. Culicover and T. Wasaw eds., *MSSB-UC Irvine Conference on the Formal Syntax of Natural Language*, 225-245.
- Stickney, Helen. 2009. The Emergence of DP in the Partitive Structure. *Open Access Dissertations*. http://scholarworks.umass.edu/open_access_dissertations/
- University of Pittsburgh
Department of Linguistics
2816 Cathedral of Learning
Pittsburgh, PA 15260
- helen.stickney@gmail.com

- (5) *Gianni è camminato in spiaggia
John is walk.PSTPRT in beach
Intended: John walked to the beach.
(Folli and Ramchand (2005): 97, (32a))

Notably, these readings are not consistently available, often varying with the verb: A directional reading is possible with Dutch *sprong* ‘jumped’ in (2) but not with *zwom* ‘swam’ in (3); it is allowed with Italian *rimbalzata* ‘bounce.PSTPRT’ in (4) but not with *camminato* ‘walk.PSTPRT’ in (5).

Two kinds of approaches have been proposed to explain both the availability of, and the variation in, these interpretations. The LEXICAL AMBIGUITY approach (Alonge 1997, Folli and Ramchand 2005, Fábregas 2007) attributes these interpretations to the ability of certain manner of motion verbs, and some prepositions, to take on a directional meaning.

An alternative account posits PRAGMATIC LICENSING (Nikitina 2008, Tutton 2009, Levin et al. 2009), attributing the directional interpretation to contextual-pragmatic factors such as aspectual properties of the manner verbs, and the nature of the ground described by the prepositional complement. For instance, manners of motion conceivable as describing a single, punctual motion event, e.g. *jump* most easily allow directional interpretations with locative prepositions (Cummins 1996, cf. (2)). Directional interpretations without directional morphemes are also less likely with “explicit descriptions of paths” (Nikitina 2008:185), and more compatible with describing the result of a spatial transition rather than motion along a path. Under this approach, the manner of motion verbs and locative morphemes involved consistently encode manner and location only. They do not themselves alternate with directional meanings.

This paper argues that analogous examples in Mandarin Chinese support the pragmatic approach over a lexical ambiguity analysis. Using data from the Peking University (PKU) online corpus, I show that a directional interpretation without a directional morpheme in Mandarin is facilitated by factors very similar to those observed in other languages. These factors include: (i) aspectually, a verb that describes short, punctual motion; (ii) a less specific path description; (iii) a less specific manner of motion; and (iv) the occurrence of the motion event clause in a narrative sequence.²

The paper is structured as follows: The next section lays out path encoding patterns in Mandarin and gives an overview of the corpus study. Section 2 presents the findings, demonstrating the generalizations with examples. Section 3 discusses

¹ Abbreviations: PSTPRT = past participle; ASP = aspectual marker; ASSOC = associative marker; DUR = durative marker; REDUP = reduplication

² I follow conventional practice in using terms such as Figure, Ground, Manner, and Path, respectively to describe the entity that moves, the place to or at which it moves, the kind of motion described, and the directional component of the motion event, if any.

how different manners of motion may interact with path and manner modification to facilitate or inhibit directional interpretations. Section 4 concludes the paper.

1 Preliminaries

This section provides background on the different ways in which path can be encoded in Mandarin, and outlines the corpus study.

1.1 Multiple path encoding options

A variety of lexical and morphosyntactic resources in Mandarin allows for several options in encoding directed motion events. First, “coverbs,” which are preposition-like morphemes that can also act as main verbs, may encode path e.g. *dao* ‘arrive/to’ and *jin* ‘enter/into’ (6, 7) or location e.g. *zai* ‘be at’ (8).

- | | | | | | | | | |
|-----|-----------|------------|-----|-------|------------|-----|-------|--------------|
| (6) | dao | lou-shang | (7) | jin | che-li | (8) | zai | he-bian |
| | arrive/to | floor-upon | | enter | car-within | | be.at | river-side |
| | arrive | upstairs | | enter | the car | | be | by the river |

A directed motion event can be expressed with path coverbs alone, as in (6, 7), or in combination with manner of motion verbs (9, 10):

- | | | | | | | | |
|-----|------|-----------|---------------------|------|-----------|-------|-----------------|
| (9) | zou | dao | shan-shang | (10) | kai (che) | jin | shan-li |
| | walk | arrive/to | mountain-upon | | drive car | enter | mountain-within |
| | walk | to/go | to the mountain top | | drive | into | the mountains. |

Another option is to use a path verb such as *diao* ‘drop’ (11). A path verb may occur with either a directional or locative coverb, or no coverb at all.

- (11) *diao* (zai/dao) shui-li
 drop be.at/to water-within
 drop into the water

In addition, a manner of motion verb with the locative coverb *zai* ‘be at’ allows a directional reading in some cases (12), though not in all (13):

- (12) wuya you jiao-le yi sheng ... **fei zai** qiang-shang
 crow again call-ASP one sound ... fly be.at wall-upon
 The crow cawed once more, and flew onto the wall. (directional) PKU
- (13) you shihou **fei zai** kong-zhong de wuya hui diao-xia-lai
 have time fly be.at space-within ASSOC crow will fall-down-come
 Sometimes, crows flying in the air would fall down. (locative) PKU

I argue the directional interpretation in (12) does not arise because *fei* ‘fly’ is ambiguous between a manner and a directional reading. Rather, this interpretation

arises from contextual-pragmatic factors that are relevant across languages. This proposal is based on a qualitative study of the factors that facilitate a directional interpretation when a manner of motion *V* is followed by the locative coverb *zai*.

1.2 Data and coding

I examined instances where the manner of motion verbs in (14-16) below are followed by *zai* ‘be at’ for the possibility of directional interpretations, using the Peking University Center for Chinese Linguistics online corpus (PKU).^{3, 4} I present data mainly from the verbs in (14) and (15), although I also discuss the verbs in (16).

(14) *tiao* ‘jump’ *pu* ‘throw oneself at’ *yue* ‘leap’

(15) *fei* ‘fly’ *gun* ‘roll’ *pa* ‘crawl’ *liu* ‘flow’

(16) *zou* ‘walk’ *pao* ‘run’ *you* ‘swim’ *hua* ‘slide’ *ben* ‘gallop’ *shi* ‘drive’

Metaphorical uses of the motion verbs were excluded from the data set. The remaining examples of *V zai* sequences were coded as directed motion, located motion, or as ambiguous between these readings.

For some verbs, e.g. *tiao* ‘jump,’ *pu* ‘throw oneself at,’ *fan* ‘overturn’ (not discussed here) there was no clear located motion sense available. For verbs like *pu* and *fan* in particular, the contrast was between a directed motion sense and a non-motional spatial configuration sense or result location sense. Cases like these were coded as locative, although they could also be reasonably excluded.

Directional *V zai* examples were compared with examples of the same verb occurring with the directional coverb *dao* ‘arrive/to.’ Because the frequency of *V dao* greatly exceeds directional *V zai*, only the first 100 examples of *V dao* were investigated.⁵ Again, metaphorical uses of the verbs were excluded. Cases in which the verb was further compounded with another manner verb (see discussion of (34) in section 3) were also excluded.

2 Results and discussion

The results of the study indicate that the kind of manner described by the motion verb has the greatest effect on whether the motion event has a directional interpretation, as foreshadowed in the preceding discussion of such verbs as *tiao* ‘jump.’⁶

³ URL: http://ccl.pku.edu.cn:8080/ccl_corpus/index.jsp?dir=xiandai

⁴ These verbs included a selection from 41 Mandarin manner of motion verbs listed in Chen and Guo (2009) (from nine Mandarin novels), and some others not found in their list, but counterparts of which have been studied in other languages.

⁵ An exception was made in the case of *liu dao*, ‘flow to,’ where all 121 examples found were examined.

⁶ All Mandarin data discussed forthwith are from the PKU corpus unless otherwise indicated.

Verbs describing “short,” punctual motion events favour directional interpretations. Directional interpretations are also facilitated by descriptions of motion over short distances to a proximal goal, which also suggest shorter, punctual motion events. This indicates the nature of the motion event is perhaps the most important factor for directional interpretations. Finally, a less specific manner description and occurrence in a narrative sequence of clauses also favour directional interpretations.

2.1 Effect of the verb

V zai examples were sorted into three classes, according to their relative compatibility with a directional interpretation. For current purposes this division is merely for convenience, although the verbs in Class I do seem to form a coherent class.

(17)	% of directional V- <i>zai</i>	# of Dir. Tokens/N
Class I: <i>Jump</i> -type verbs		
<i>tiao</i> ‘jump’	98%	45/46
<i>yue</i> ‘leap’	89%	8/9
<i>pu</i> ‘fling oneself on’	77%	179/232
Class II: Manners with more than one salient interpretation		
<i>fei</i> ‘fly’	27%	18/66
<i>gun</i> ‘roll’	39%	22/57
<i>liu</i> ‘flow’	59%	41/70
<i>pa</i> ‘crawl’	18%	30/169
Class III: Other manner verbs		
<i>zou</i> ‘walk’	< 0.1%	3/3832
<i>pao</i> ‘run’	4.5%	9/201
<i>you</i> ‘swim’	7%	2/27
<i>hua</i> ‘slither, slide’	9%	1/11
<i>ben</i> ‘gallop’	0%	0/13
<i>shi</i> ‘drive’	0%	0/20

Directional *V zai* relative frequencies

(17) shows that on the whole, manner of motion *V* with *zai* ‘be at’ does not consistently allow a directional interpretation. Class I verbs such as *tiao* ‘jump,’ *pu* ‘throw oneself at,’ etc., however, show directional interpretations almost exclusively with *zai* ‘be at’ (see also Tai (1975)). This could mean that *jump*-type verbs are directional, but examples like (18) show a directional interpretation is not necessary.

- (18) *tiao zai yang-guang-li de touming zhuzi*
 jump be.at sun-light-within DE transparent pearl
 Transparent pearls jumping in the sunlight.
music.douban.com/review/1132356/ - China

I defer discussion of Classes II and III till section 3. Below, I show that despite their strong compatibility with directional readings, Class I verbs are not path verbs.

2.2 Distinguishing manner and path-encoding verbs

At least two properties distinguish true path verbs from verbs that favour directional interpretations. First, they differ in the interpretations they allow with a directional complement e.g. *shangqu* ‘go up/onto.’ A motion verb with *shangqu* can encode upward motion, or a result location that is on top of a surface, regardless of the direction of motion. True path verbs such as *diao* ‘drop’ and *luo* ‘fall’ consistently describe motion in a particular direction (in these cases, downwards). With *shangqu* ‘go up/onto,’ verbs like *luo* ‘fall’ only allow a surface result location reading. Thus in (19), *luo-shangqu* means to move downwards and land on top of the bald pate. It does not mean the fly falls in an upward direction.

- (19) ...tou-ding liang-guang-guang, cangying **luo-shangqu** ye yao hua-dao
 ...head-top light-bright-REDUP housefly fall-upon also must slip-down
 ...a bright (bald) pate, a housefly landing on it would slip and fall.

The verb *tiao* ‘jump,’ however, with *shangqu* ‘up’ can indicate upward motion:

- (20) che lai-le, ta **tiao-shangqu** bi wo gao yi jie
 bus come-PERF 3sg jump-up compare 1sg tall one section
 The bus came, she jumped up, and was higher up than me.

Second, *jump*-type verbs contrast with true path verbs in their relative compatibility with the locative and directional coverbs *zai* ‘be at’ and *dao* ‘to.’ (21) shows that true path verbs such as *diao* ‘drop’ occur more frequently with the locational coverb *zai* ‘be at’ than the directional coverb *dao* ‘to.’ In contrast, manner of motion verbs that favour a directional interpretation such as *tiao* ‘jump’ and *pu* ‘throw oneself at’ show the opposite pattern, occurring more frequently with *dao* ‘to’ than *zai* ‘be at.’

- | | | | | | | | | |
|------|--------------------|--------------|-------------|--------------|---------------------------|------------------|-------------|--------------|
| (21) | Path Vs | V-zai | > | V-dao | Class I Vs | V-zai | < | V-dao |
| | <i>diao</i> ‘drop’ | 904 | | 568 | <i>tiao</i> ‘jump’ | 83 | | 977 |
| | <i>luo</i> ‘fall’ | 8001 | | 5335 | <i>pu</i> ‘throw self at’ | 232 ⁷ | | 556 |

Frequency of path verbs and *jump* type verbs with *zai* and *dao*

We can understand this contrast as reflecting a dispreference for redundancy in path encoding: A path-encoding verb may, but does not need, a directional coverb to entail a directional interpretation. A manner of motion verb may favour a directional

⁷ Except for *pu zai*, the numbers reported here are raw numbers which include metaphorical uses of the relevant verbs. They are thus different from the numbers reported in Table 1. There are actually 612 examples of *pu zai* ‘throw oneself at,’ exceeding that of *pu dao* ‘throw oneself to,’ but tellingly, all the examples of *pu dao* ‘throw oneself to’ show a motion sense, while only 232 of *pu zai* do. This is the number reported here.

interpretation, but does not entail one without a directional coverb. The more frequent presence of the directional coverb with such verbs can be seen as reflecting its non-redundant status. These generalizations support treating *jump*-type verbs not as path verbs, but as manner of motion verbs that favour a directional interpretation even with a locative coverb.

Cummins (1996:51) argues that in French, a manner of motion “conceived of a[s] smooth, unitary, unbroken” allows directional readings with a locative PP, whereas manners understood to consist of a series of repeated movements do not. This generalization also seems applicable in Mandarin. Manners of motion described by *jump*-type verbs are easily interpreted as describing a single, unbroken movement, and they show the highest frequency of directional *V zai*. The same factor is also at work in directional interpretations of Class II verbs with *zai* ‘be at.’

2.3 Non-salient path

Class II verbs in directional *V zai* examples often describe “local motion” to a proximal goal in which the path of motion is non-salient, supporting the idea that manners describing short, unbroken movement facilitate a directional interpretation. This contrasts with *V dao*, which more frequently describes a longer path and a distant goal. I demonstrate this point for each class II verb in turn.

2.3.1 FEI: ‘FLY

Dir. *fei-zai* ‘fly at’: 15/18 (83%) instances describe forceful propulsion of some object into the air just above (22), or of motion to some proximal location (e.g. (12) above).

- (22) ca de yi sheng, na guizi de naodai bian fei zai yi bian le
ONOM DE one sound that devil ASSOC head then fly at one side ASP
A sound of slicing, and the devil’s (Japanese soldier) head flew to one side.

Most examples of directional *fei zai* ‘fly be.at’ described caused motion of “small” items, with very few examples of flight by planes. (23) is one such example, but this example also describes motion to a proximal goal to the side of another plane flying nearby. This contrasts clearly with the long-distance journey described with *fei dao* ‘fly to’ in (24) below.

- (23) ... zhanji gaibian-le duixing, fei zai ta liang ce, wei ta
... fighter.jet change-PERF formation fly be.at 3sg two side for 3sg
hu hang
protect flight
... the fighter jets changed their formation and flew to his two sides to protect him.

***fei dao* ‘fly to’:** 45 out of the first 100 examples clearly described motion with a long distance goal (24), while only 2 clearly described motion to a proximal goal.

- (24) yuhangyuan cong diqiu fei dao yueqiu-shang
 astronaut from earth fly to moon-upon
 The astronaut flew from the earth to the moon.

2.3.2 PA: ‘CRAWL’

Dir. *pa zai* ‘crawl at’: 16/30 (53%) of the examples contained ground NPs describing locations that are relatively low, or are close to or even on the ground, e.g. onto someone’s knee, e.g. (25), so that climbing to that location involved a “short” path. Only 2/30 contained ground NPs describing a tree, and in neither case was it specified how high up the figure had climbed.

- (25) ...pa zai Ning Jinshan xigai-shang
 ...crawl be.at NAME knee-upon
 ...crawled onto Ning Jinshan’s knee.

***pa dao*: ‘crawl to’:** 34 out of the first 100 instances contained some kind of path description, e.g. of the (often considerable) path length (26), or of the path object.

- (26) renmen xun-yang houzi pa dao ershi-duo mi gao de
 people tame-rear monkey climb to twenty-more metre high ASSOC
 shu-shang caizhai
 tree-upon pluck
 People train monkeys to climb upon 20 metre tall trees to pluck (coconuts).

2.3.3 LIU: ‘FLOW’

The contrast between directional *liu zai* ‘flow at’ and *liu dao* ‘flow to’ is most clearly reflected in the kinds of Figure participating in the motion.

Dir. *liu zai* ‘flow at’: 29/41 examples (71%) described the flow of expunged bodily fluids (blood, sweat, tears, etc.). Out of these 29, 25 (86%) described the fluid flowing “locally,” e.g. a tear flowing to the cheek (27). Only 4 (10%) directional *liu zai* ‘flow at’ examples described the flow of large bodies of water in nature (e.g. rivers, lakes, waterfalls).

- (27) ...leizhu yan-zhe hongyun de lianjia liu zai chandong
 ...teardrop along-DUR blush ASSOC cheek flow be.at tremble
 de chun-bian
 ASSOC lip-side
 ...teardrops flowed along the blushing cheek to the side of trembling lips

liu dao ‘flow to’: 49/121 examples (40%) described the flow of natural bodies of water such as rivers, streams, springs, etc., while only 16/121 (13%) described the flow of expunged bodily fluids. 10 (8%) other examples described the flow of blood, but within the body as a circulatory system.

In the same vein, directional *liu zai* ‘flow at’ sentences less often contained path descriptions than those with *liu dao* ‘flow to.’

Dir. liu zai: ‘flow at’: Only 7/41 instances (17%) contained a source or path description, e.g. (27).

liu dao ‘flow to’: 45/121 examples (37%) of *liu dao* ‘flow to’ contained a path description. Moreover, the paths described are more varied, including both shorter (28) and long, convoluted (29) ones.

- (28) leishui cong ta yan-jiao liu dao er-gen
tears from 3sg eye-corner flow to ear-root
Tears flowed from the corner of her eye to her ear.

- (29) xiao he zai shan-zhong zuo-pan-you-rao ... liu dao
small river be.at mountain-within left-twine-right-loop ... flow to
Yu-feng shan-jiao-xia
Jade-peak mountain-foot-below
The little river twists and turns in the mountains ... flowing to the foot of the Jade Peak.

Crucially, none of the path expressions with *liu zai* ‘flow at’ describe motion over long distances or zigzagging paths.

2.3.4 GUN: ‘ROLL’

Dir. gun zai ‘roll at’: 14/22 (63%) examples described motion to a proximal goal:

- (30) ta ying ba Zufe la-qilai, Zufe gun zai ta shen-shang, haojiao
3sg forceful BA NAME pull-rise NAME roll be.at 3sg body-upon howl
She forced Zufe up by pulling her up. Zufe rolled onto her, howling.

gun dao ‘roll to’: 40 of the first 100 examples contained a proximal goal. Among these, 14 (35%) contained either explicit path descriptions, e.g. with a source phrase, or a more elaborate Ground NP. For instance, the path from the top to the bottom of the bed in (31) should be a short one, but the source location is explicitly encoded. This likely has the effect of making the path of motion salient. In contrast, only 2/22 (9%) directional *gun zai* ‘roll at’ examples contained a source phrase.

- (31) ...cong chuang-shang gun dao chuang-xia ...
...from bed-upon roll to bed-under ...
...roll from the bed to under it ...

Out of the first 100 instances of *gun dao* ‘roll to,’ 25 contained a path description, e.g. with a source phrase. The path described could be short (31), or long (32).

- (32) ta dai-zhe shang **cong shan-ding** gun dao **shan-jiao**
 3sg bring-DUR injury from mountain-top roll to mountain-foot
 He rolled, injured, from the mountain top to the foot of the mountain.

39 examples contained a goal phrase with the spatial clitics *-li* ‘within’ (33) or *xia* ‘under,’ which potentially adds to path complexity by describing continued motion within a container-like object, or along the vertical axis of an object with depth. (8 of these examples overlap those with source phrases, making for a total of 64 examples with elaborate path descriptions.) No such examples were found in the goal phrases of directional *gun zai* ‘roll at.’

- (33) ...gun dao wan zhang shen de shangou-**li** qu
 ...roll to 10,000 *zhang* deep ASSOC valley-within go
 ...roll into the 10,000 *zhang*⁸ deep valley.

Shorter, punctual motion events are likely to involve shorter distances and nearby goals. Class II verbs do not obviously describe short, punctual motion events, but the lower frequency and relative simplicity of path descriptions suggest short-distance motion to proximal goals, facilitating directional interpretations of *V zai*.

2.4 Non-specific manner

Nikitina (2008) noted that directional uses of English *in* are less likely when the verb describes a highly specific manner. This generalization is also supported by the Mandarin facts. First of all, some verbs that do not show directional uses of *V zai* can be said themselves to describe highly specific manners: e.g. *ben* ‘gallop’ is a special case of running, *you* ‘swim’ requires not only moving in water, but requires the swimmer to either be fish, or to move in certain particular manners.

Manner of motion verbs can be compounded to further elaborate the manner:⁹

- (34) ...**fei-ben** zai gong-lu-shang
 ...fly-gallop be.at public.road-upon
 ...galloping fast on the road.

⁸ Unit of measurement

⁹ Path encoding verbs such as *luo* ‘fall’ can also be compounded with a preceding manner verb. The resulting verb compound is also directional:

- (i) ...yi pian-pian meigui huaban **piao-luo** zai ...ren-men shen-shang
 ...one piece-REDUP rose petal drift-fall be.at ...person-PL body-upon
 ...Rose petals drifted down and fell onto people.

All such examples (excluded from the study) do not allow a directional interpretation with *zai* ‘be at,’ showing that highly specific manners disfavour directional interpretations. This point is also illustrated by a contrast between *pa dao* ‘crawl to’ and directional *pa zai* ‘crawl at.’ 32 out of the first 100 examples of *pa dao* ‘crawl to’ contained adverbials modifying the crawling motion, in particular, they described arduous – and thus slow – motion (35). Only one example of directional *pa zai* ‘crawl at’ was modified in this way.

- (35) ta **zhengzha-zhe** pa dao yi ge xiao shandong
3sg struggle-DUR climb to one CL small cave
He crawled, struggling, to a small cave.

2.5 A Narrative sequence favours directionality

Discourse context is also a factor in directional interpretations for *V zai*. 63% (45/71) of the class II directional *V zai* clauses occurred with preceding or following material that together with the motion clause, describe a sequence of events. This effect could arise directly from sequencing adverbials such as *yi ... jiu ...* ‘once ... then ...’ or *xian ... ranhou* ‘first ... and then’ (36).

- (36) ta que **xian** yao pa zai yizi-tui zhijian de hengdang-shang,
he but first must climb at chair-leg between ASSOC horizontal-bar-upon
ranhou cai nenggou pan dao yizi de zuoban
then only.then able climb to chair ASSOC seat
But he had first to climb onto the horizontal bar between the legs of the chair and only then could he climb onto the seat.

Alternatively, this interpretation can arise from a sequence of event-denoting (i.e. non-stative) clauses:

- (37) Gongsun Lü-e yi yao ya, shuang zu zai yan-shang li cheng,
NAME one bite tooth pair foot be.at rock-upon strong push
shenzi yi fei zai ban-kong-zhong
body already fly be.at half-space-upon
Gongsun Lü-e clenched her jaw, her feet pushed hard on the rock, and her body flew halfway into the air.

With locative *V zai* involving the same verbs, however, only 2/195 examples (1%) occurred in a narrative sequence.

The proportion of *V dao* clauses occurring in narrative sequences is overall somewhat lower than that of directional *V zai*, although different frequencies are found for different verbs. This is illustrated in (38).

(38)

	Class I verbs		Class II verbs	
	<i>pu</i> ‘throw self at’	<i>tiao</i> ‘jump’	<i>gun</i> ‘roll’	<i>fei</i> ‘fly’
Dir. <i>V-zai</i>	119/179 = 66%	26/45 = 57.8%	15/22 = 68%	14/18 = 78%
<i>V-dao</i>	70/100	25/100	13/100	46/100

Proportion of narrative sequences with directional *V zai* and *V dao*

(38) shows that the proportion of Class II *V zai* in a Narrative sequence is also slightly higher than that of Class I verbs. Moreover, Class II *V zai* are far more likely to occur in a Narrative sequence than their *V dao* counterparts. That is, the degree of directionality of an expression is inversely related to its likelihood of occurring in a Narrative sequence. *V dao*, which entails directionality, occurs less frequently in this environment than Class I *V zai* which does not entail, but is highly compatible with directionality. Class I *V zai* in turn is less likely to occur in a Narrative sequence than Class II *V zai*. This gradation again supports a pragmatic account for directional *V zai*, as a lexical ambiguity account would in any case have to appeal to pragmatic factors to explain these fine-grained contrasts.

3 Different manner verbs

Different verbs license a directional interpretation to different degrees. I return to the manner verbs in Class II and III below.

3.1 Class II verbs

Class II verbs, while more compatible with directional interpretations than Class III verbs, is not a coherent class. The verbs *fei* ‘fly’ and *gun* ‘roll,’ and especially *liu* ‘flow’ seem more compatible with directional interpretations than *pa* ‘crawl.’

Interestingly, Class II verbs also differ in terms of how directional *V zai* contrasts with *V dao*. Directional *pa zai* ‘crawl at’ seems more to be differentiated from *pa dao* ‘crawl to’ in terms of the manner of motion (e.g. with manner adverbials). *liu dao* ‘flow to,’ *gun dao* ‘roll to’ and *fei dao* ‘fly to’ contrast with their directional *V zai* counterparts in terms of path complexity. Yet all four are more likely to allow directional *V zai* than other manner verbs such as *zou* ‘walk’ and *you* ‘swim.’

I speculate that these verbs share the property of describing more than one kind of manner of motion, none of which is especially salient. For instance, *fei* ‘fly’ and *gun* ‘roll’ can describe the motion of both animate and inanimate themes. As noted in section 2.3.3, *liu* ‘flow’ can describe the motion of small trickles (blood, sweat, tears) or that of fluid systems (rivers, streams, bloodflow).

While *pa* ‘crawl’ can only apply to animates, it can describe the crawling of reptiles, possibly snakes, where the horizontal axis of the Figure is parallel to that of the Ground. It can also describe a climbing motion, e.g. of monkeys climbing up

a tree, or a punctual motion where a change of location is attained in one movement (see Cummins 1996, 1998), or slow, arduous motion when the Figure is in pain or under difficult conditions.

The richer manner description associated with *pa* ‘crawl’ could explain why *pa dao* ‘crawl to’ and directional *pa zai* ‘crawl at’ are differentiated more in terms of manner elaboration via adverbial modification, than in terms of path elaboration as in the case of *fei* ‘fly’ and *gun* ‘roll.’

3.2 Class III verbs

The question of what manners are less compatible with a directional interpretation also arises for other manner verbs such as *zou* ‘walk,’ *pao* ‘run.’ While *ben* ‘gallop’ and *you* ‘swim’ are arguably more specific in terms of the kinds of Figures that may engage in such motion, *zou* ‘walk’ can be used simply to indicate some kind of motion that is not necessarily walking:

- (39) ...qu che zou zai Wenling shi zhongxin de Zhonghua lu
...drive car walk be.at NAME city centre ASSOC NAME street
...cruising in a car along Zhonghua Road in the Wenling city centre.

This suggests for *zou* ‘walk,’ a directional interpretation is disallowed for different reasons from verbs like *ben* ‘gallop.’ It seems more likely that *zou zai* ‘walk at’ is not compatible with directional interpretation because *zou* ‘walk’ canonically describes slow movement, which does not facilitate a directional interpretation.

These observations suggest different verbs with *zai* ‘be at’ allow or disallow directional interpretations based on different factors. I leave for future work this question and its implications for the larger issue of the factors licensing directional interpretations without directional morphemes.

4 Conclusions

The verb, or the nature of the motion described by the verb, seems to be the most important factor determining whether *V-zai* allows a directional interpretation. The motion event properties that favour directional interpretations — punctual motion, ‘short’ paths, and less specific motion — are consistent with what has been observed by others (Cummins 1996, Baicchi 2005, Nikitina 2008). Finally, occurrence in a narrative sequence also facilitates a directional interpretation of *V zai* clauses.

This work indicates that directional interpretations of motion event sentences can arise in more ways than one even in the same language, consistent with recent observations (Cummins 1996, 1998, Asbury et al. 2008, Son 2007, Beavers et al. 2010, among others). This is a more complex picture than the classic two- or three-way typology originating from Talmy (1975).

Mandarin shows verb, satellite, and equipollent-framing options (Chen and Guo 2009:1750).¹⁰ That directional interpretations without directional morphemes are also available to Mandarin indicates these interpretations are not tied to the availability of some motion encoding option, or the lack thereof. The contextual-pragmatic factors licensing these interpretations in Mandarin are the same as those noted in other languages, including both English, traditionally regarded as satellite-framed, and Romance languages, traditionally classified as verb-framed, further pointing to the cross-linguistic generality of such interpretations.

Thus, overall, this work adds to the growing evidence that both language-particular resources and general contextual factors have a part to play in the linguistic encoding of motion events.

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References

- Alonge, A. 1997. Semantic lessicale e proprietà sintattiche dei verbi di movimento italiani. *SILFI* 3:31–63.
- Asbury, Anna, Berit Gerhke, Henk van Riemsdijk, and Joost Zwarts. 2008. Introduction. In Anna Asbury, Jakub Dotlačil, Berit Gerhke, and Rick Nowen, eds., *Syntax and semantics of spatial P*, 1–32, John Benjamins.
- Baicchi, A. 2005. Translating Phrasal Combinations Across the Typological Divide. In M.B. Papi, ed., *Studies in the Semantics of Lexical Combinatory Patterns*, 487–519, Pisa University Press.
- Beavers, John, Beth Levin, and Shiao Wei Tham. 2010. The Typology of Motion Verbs Revisited. *Journal of Linguistics* 41:331–377.
- Chen, Liang and Jiansheng Guo. 2009. Motion events in Chinese novels: Evidence for an equipollently-framed language. *Journal of Pragmatics* 41:1749–1766.
- Cummins, Sarah. 1996. Movement and Direction in French and English. *Toronto Working Papers in Linguistics* 15:31–54.
- Cummins, Sarah. 1998. Le mouvement directionnel dans une perspective d’analyse monosémique. *Langues et Linguistiques* 24:47–66.
- Fábregas, Antonio. 2007. The Exhaustive Lexicalisation Principle. *Nordlyd: Tromsø Working Papers in Linguistics* 34(2):165–199.

¹⁰The authors argue for an equipollent-framing classification.

- Folli, Rafaella and Gillian Ramchand. 2005. Prepositions and Results in Italian and English: An Analysis from Event Decomposition. In H. J. Verkuyl, H. de Swart, and A. van Hout, eds., *Perspectives on Aspect*, 81–105, Utrecht: Springer.
- Gerhke, Berit. 2006. Putting Path in Place. In *Proceedings of Sinn und Bedeutung 11*, 244–260.
- Levin, Beth, John Beavers, and Shiao Wei Tham. 2009. Manner of Motion Roots Across Languages: Same or Different? Talk given at the Roots Workshop, Universität Stuttgart, Germany.
- Martínez Vázquez, Montserrat. 2001. Delimited Events in English and Spanish. *Estudios Ingleses de la Universidad Complutense* 9:31–59.
- Nikitina, Tatiana. 2008. Pragmatic Factors and Variation in the Expression of Spatial Goals: The Case of *into* vs. *in*. In Anna Asbury, Jakub Dotlačil, Berit Gerhke, and Rick Nouwen, eds., *Syntax and Semantics of Spatial P*, Amsterdam: John Benjamins.
- Son, Minjeong. 2007. Directionality and Resultativity: The Cross-linguistic Correlation Revisited. *Nordlyd: Tromsø Working Papers in Linguistics* 34(2):126–164.
- Tai, James H.-Y. 1975. On Two Functions of Place Adverbials in Mandarin Chinese. *Journal of Chinese Linguistics* 3:154–179.
- Talmy, Leonard. 1975. Semantics and Syntax of Motion. In John P. Kimball, ed., *Syntax and Semantics*, volume 4, 181–238, New York: Academic Press.
- Thomas, Emma. 2004. On ‘Syntactic’ versus ‘Semantic’ Telicity: Evidence from *in* and *on*. *Belgian Journal of Linguistics* 18:145–166.
- Tutton, Mark. 2009. When *in* Means *into*: Towards An Understanding of Boundary-crossing *in*. *Journal of English Linguistics* 37:5–27.
- Zlatev, Jordan and Peerapat Yangklang. 2004. A Third Way to Travel: The Place of Thai in Motion-Event Typology. In Sven Strömquist and Ludo Verhoeven, eds., *Relating Events in Narrative 2: Typological and Contextual Perspectives*, 219–257, Mahwah, NJ: Lawrence Erlbaum Associates.

Department of East Asian Languages and Literatures
Wellesley College
106 Central Street,
Wellesley, MA 02481-8203

stham@wellesley.edu

The World Meets the Body: Sociocultural Aspects of Terminological Metaphor

JOSÉ MANUEL UREÑA and PAMELA FABER

Department of Translation and Interpreting

University of Granada, Spain

Introduction

The experientialist view of the embodied mind is condensed in Gibbs' (1999:155) affirmation that cognition is what happens when the body meets the world. Yet, it is also necessary to ask what happens when the world meets the body. In our opinion, conceptual metaphor analysis, whatever the knowledge field, is traceable to both sensory-motor inferences and cultural factors. On this basis, this paper analyzes a number of resemblance metaphor term pairs in English and Spanish, which were extracted from a text corpus of marine biology academic journals. Drawing on the examination of these terms, we propose a classification of metaphors that arranges them according to their level of socio-cognitive situatedness. This classification shows that sensorimotor perception and sociocultural factors merge into a physical-social experience that shapes scientific knowledge through metaphor, and that sociocognitive patterns involved in terminological metaphor formation give rise to inter-linguistic variation and commonalities.

As introductory background, let us briefly discuss the connection between bodily aspects and sociocultural aspects in Cognitive Linguistics. It should be highlighted that the relationship between both aspects has been a matter of controversy within this theoretical tradition. One body of research approaches metaphor from a purely neurophysiological and neurocomputational viewpoint. A case in point is Lakoff and colleagues' Neural Theory of Language, which is being developed in a range of parallel research works (cf. Dodge and Lakoff 2005, Feldman 2006). This strand downplays sociocultural factors involved in (metaphor-induced) embodied conceptualization, and focuses on the analysis of metaphor and other cognitive phenomena in terms of neural models, neural circuits, axonal firings and parietal-hippocampal networks.

This strand of research, which focuses on embodiment and on the biophysical

underpinnings of thought lately seems to be overshadowed by the second body of research, which highlights the situated nature of metaphor (cf. Gibbs 1999, Kövecses 2005, 2006, Yu 2008). Such research is also advocated by metaphor analysts in neighbouring disciplines, such as cognitive and psychological anthropology (cf. Kimmel 2008; Palmer 1996). The point is that many scholars opt for a metaphor description model that integrates both bodily and cultural experiences.

A good example is Kövecses (2005), whose contrastive study of English, Hungarian, and Spanish provides evidence of the existence of non-universal metaphors. These are motivated by sociocultural factors (including environmental, historical, and communicational aspects) and cognitive preferences and styles, including processes such as elaboration, focusing, and conventionalisation. Kövecses (2005:231) concludes that both types of parameters cannot be separated from each other, but rather work jointly.

1 Metaphor, Science, and Culture

The body-culture mergence has also found its way into science. It is now argued that the concrete sociocultural situatedness of individual language agents inevitably leads them to employ interpretive conceptualizations that are partial, ie. not shared by all of the members of the “expert” scientific community in question (Frank 2008:218). Sociocognitive Terminology Theory (Temmerman 2000) pioneered research into the way metaphor models life science knowledge as a consequence of the ongoing social, cognitive, and technological advances in Western civilization.

However, studies focusing on the interplay of physiological and cultural patterns have typically shown a preference for non-resemblance metaphors, in other words, metaphors that emerge from rich and abstract structures not involving physical or behavioral patterns (Lakoff and Turner 1989:91). As a consequence, resemblance metaphors, which arise because of comparison in physical appearance (typically shape, color, and size) or behavior, were left more or less out in the cold. For example, Larson (2008) elaborates on the biological, cultural, and linguistic origin of the war on invasive species within the domain of invasion biology, a subdiscipline of conservation biology concerned with strategies to maintain biodiversity. Larson identifies the macro-metaphors NATURAL LANDSCAPES ARE PERSONS, INVASION SPECIES ARE A DISEASE, and INVASION SPECIES ARE HUMAN INVADERS, and examines their historical and cultural bases.

The main reason for this preference is that resemblance metaphor was regarded by Lakoff and others as a fleeting kind of metaphor with an impoverished inner structure (Lakoff 1993, Lakoff and Turner 1989). Consequently, Conceptual Metaphor Theory has traditionally limited the treatment of resemblance metaphors to literature and poetry within Cognitive Poetics (e.g. Lakoff 1993, Lakoff and Turner 1989, Stockwell 2002).

Fortunately, in recent years there has been a renewed interest in resemblance metaphor. Corpus-based research both in general language (Deignan 2007) and specialized discourse (Caballero 2006 in architecture, Ureña and Faber 2010 in marine biology) shows that resemblance metaphors are well-established, conventional metaphors that arise from enduring and productive patterns of figurative thought, and that they are not only subscribed to literature, but also to general and specialized language.

Nevertheless, research offering a systematic approach to the body-culture conflation in terminological resemblance metaphor from a cross-linguistic perspective is long overdue. The translation-oriented work by Alexiev (2005) opens the door to this line of investigation. He carries out a corpus-based contrastive analysis of resemblance metaphor terms in Bulgarian, English, and Spanish in the fields of mining, geology, civil engineering, and architecture. Alexiev (2005:36) points out that the choice of a target language conceptualization strategy and a subsequent translation technique are determined not only by cognitive, but also by language- and culture-specific factors. On this basis, Alexiev (2005:108-115) establishes a set of culture-experiential parameters which determine the choice of the designation, and thereby, the general concept to be exploited in the terminological metaphorization process.

2 Method

2.1 Justification

This paper sheds light onto the relationship between the physical and the sociocultural underpinnings of terminological resemblance metaphor, an aspect that has hardly been researched. For this purpose, this study revises Alexiev's (2005) proposal, and suggests a typology of culture-induced marine biology metaphors arranged according to four criteria: culture-specificity, culture-typicality, the angles of referent perception, and degree of specificity.

2.2 Materials and Procedures

The framework is a contrastive study between English and Spanish resemblance metaphor terms extracted from a bilingual text corpus of marine biology academic journals. The nature of this corpus ensures the analysis of authentic, naturally occurring data. According to Charteris-Black (2004:19), corpus evidence helps the user to detect cases of inactive conventional metaphors and compensate for the arbitrariness of dictionaries.

This corpus was already used in a previous study (Ureña and Faber 2011), where we present an innovative methodology for the semi-automatic retrieval of resemblance metaphor term pairs in English and Spanish. In the first phase of the

methodology, the corpus was searched for target domain keywords in English and Spanish, such as *fish/pez*, *sea/de mar*, and *crab/cangrejo*. The great potential of this strategy has been documented in previous research (cf. Stefanowitsch 2006), but never applied to scientific texts. Secondly, a search was made for a set of lexical markers that are typical of scientific discourse. These markers include phrases such as *known as* and *conocido/a como*, and importantly, taxonomic designations, which are standard Latin names written in italics (e.g. *Portunus pelagicus*) and used by all scientists around the world. Taxonomic designations were important for resemblance metaphor and interlinguistic term pair detection because they turned out to co-occur with their corresponding (metaphorical) common names. Besides being quicker and more effective than manual searching, the combination of both these search strategies was found to successfully retrieve metaphors, also providing interlinguistic information regarding terminological metaphor.

Thus, the set of interlinguistic terminological metaphor pairs analyzed here was retrieved by means of the strategies applied in this previous study. The pairs were analyzed from an intercultural perspective following a bottom-up procedure. We contrasted the data, and established situatedness criteria by drawing on assumptions from social psychology, cognitive anthropology, and cognitive semantics.

3 Results and Discussion

3.1 Situated Metaphor and Inter-Linguistic Variation

In Social Psychology, *social identity* is defined as “that part of an individual’s self-concept which derives from his knowledge of his membership of a social group (*or groups*) together with the value and emotional significance attached to that membership” (Tajfel 1978:63) [our emphasis]. The possibility of membership in more than one group sanctions the assumption of a layered sociocultural structure, which presupposes generic and ingroup patterns. The notion of *ingroup membership* is envisaged in the definition of *human cognition* as a joint product of many people working over many years, combining and accumulating skills and knowledge (Tomasello 2000a:357). On this basis, scientific *perception* and *conception* are contingent on the divergent groups of experts who industriously work to obtain sound knowledge about the entities and phenomena under examination. For this reason, scientific knowledge can be regarded as situated. Accordingly, while English-language and Spanish-language marine biologists share a broad social cognition model – i.e. they belong to the same sphere of civilization (Kövecses 2005:68) – they constitute separate communities of scientists, who have their own self-group schemas impinging on universal sensorimotor experiences.

The next subsections provide an analysis of English-Spanish term pairs showing that metaphorical thought plays a major role in this impingement. One of the few scholars addressing this issue is Alexiev (2005), who suggests a set of culture-experiential parameters in the field of architecture and civil engineering. We review his proposal, and suggest a typology of resemblance metaphors according to their level of socio-cognitive situatedness. This typology distinguishes between culture-specificity, culture-typicality, unconstrained angles of referent perception, and degree of specificity.

3.1.1 First Level of Situatedness: Culture-Specificity

The incidence of culture in the conceptualization of specialized referents can give rise to evident cross-linguistic differences. Alexiev (2005:91,109) speaks of *degree of cultural typicality*, making a distinction between *culture-specific* and *culture-experiential parameters* that prompt such cross-linguistic differences. He states that a culture-specific metaphor results from a culture-specific (unique/realia) concept mapping, whereas a culture-experiential metaphor entails a concept-onto-concept mapping in one language which cannot be proved to affect the other one.

We agree with this distinction, but, in our view, the representative examples proposed by Alexiev to flesh out such distinction need revising. For instance, in his corpus, Alexiev (2005:114) finds the English-Bulgarian mining equivalents *bootleg*/гърне, which refer to the portion of shothole after a blast has been fired. Regarding the English term, Alexiev explains that the original sense of the word *bootleg*, ‘upper part of a boot,’ can only be found in some American English dictionaries and not in major British ones, which only define the noun *bootleg* as “something hidden, especially smuggled liquor.” For this reason, *bootleg* should be regarded as culture-specific (Alexiev, 2005:114). In the first place, Alexiev does not clarify the metaphorical relationship between the boot-part sense and the mining domain sense. When we looked into the issue, we discovered that the term *bootleg* designates “a hole, *shaped somewhat like the leg of a boot*, caused by a blast that has failed to shatter the rock properly” (*McGraw-Hill Dictionary of Scientific and Technical Terms*). Thus, this is an evident case of resemblance in shape.

Secondly, in this case, Alexiev considered the concept of *cultural specificity* from an intralinguistic perspective. One sense of a word, which is the one giving rise to the terminological metaphor, is only recognised in American English, not in British English. This is thus a case of intralingual variation. Evidently, this variation is not the reason why English-language experts use a different metaphor from those used by Spanish and Bulgarian experts to designate a shothole after a blast. Indeed, boots, the source domain of the English metaphor, are not unique to American culture, but also exist in Spanish-language countries, in Bulgaria, and in

most of the world. In other words, the comparison between the shape of a boot and that of a hole after a blast could very well have been made by Spanish and Bulgarian mining specialists as well. In our opinion, the bootleg metaphor is an instance of metaphor based on the angle from which the expert perceives the domain-specific referent (see subsection 3.1.3).

This research study targets culture-specific metaphors that arise from an interlinguistic, (rather than an intralinguistic) analysis. In this regard, a culture-specific metaphor can belong to one of three categories:

- (i) a metaphor emerging because it has *both* a culturally unique source domain and a culturally unique target domain;
- (ii) a metaphor arising because the source-domain concept is *solely* found in the expert community where such concept occurs;
- (iii) a metaphor arising because the source-domain concept, which is exclusive of *one* broader expert community, is only used by a cultural subgroup of such community.

The existence of boots across different languages and cultures is what makes *bootleg* unsuitable for types (ii) and (iii), and obviously, for type (i) too.

Concerning the Bulgarian term *гърне*, Alexiev affirms that this is an example of metaphor with a high degree of cultural typicality. Literally, *гърне* refers to the traditional cooking pot for the national Bulgarian bean stew dish (Alexiev 2005:114). There is thus a comparison in shape between the hole in the ground and the Bulgarian pot. In our view, this is not a case of metaphor based on cultural typicality, but rather a case of culture-specific metaphor since the source-domain concept exclusively belongs to Bulgarian gastronomic culture. Therefore, the term *гърне* fits the profile of type (ii) of our subtypology of culture-specific metaphors.

We found no empirical evidence of culture-specific resemblance metaphors belonging to type (i) in the marine biology corpus. Thus, this subsection includes resemblance metaphors belonging to types (ii) and (iii). Let us first focus on metaphors arising because the source-domain concept is unique to an expert community. One of these metaphors is the Spanish term *ochavo* (*Capros aper*). It designates a fish with a roundish shape (see picture in Appendix). This shape prompts the comparison between the fish and an *ochavo* (no literal translation into English), the coin used from the reign of Spanish king Philip III until the 19th century (*Diccionario de la Real Academia Española*). *Boarfish*, the English equivalent, is not culturally marked. The fish receives this name because of its projecting snout and bright red/orange coloring. Both languages rely on the same sensory mode (visual perception), and the same motivation for metaphorical transfer (shape). However, restrictive sociocultural factors bias the conceptualization of the specialized referent in Spanish. Moreover, the Spanish term lacks the metaphorical motivation of color, which does operate in the English unit. This is a clear example of how interaction with entities (in this case, objects, but also dwellings, people, fauna, and flora) exclusive of a physical environment during a

specific historical period critically constrains visual perception, a physiological capacity common to human beings.

Let us now focus on the third type of culture-specific metaphor, that is, metaphors that are exclusive of a cultural subgroup within a broader expert community. As previously stated, a sociocultural context is a layered structure which includes different subcontexts. Accordingly, although English-language and Spanish-language marine biologists belong to different subcultural backgrounds, they all form part of a broader social frame, which entails the sharing of a particular set of values, habits, and cognitive standpoints.

Nevertheless, on some occasions, a concept characteristic of such a broad social group of specialists is exclusively used by one cultural subgroup to metaphorically designate a specialized concept (third type of culture-specific metaphors in our classification). A representative example extracted from our corpus is the pair *blue manna crab/jaiba azul* ['blue jaiba' (*jaiba* is an untranslatable word into English)] (*Portunus pelagicus*). The metaphor *blue manna crab* is grounded in color and shape. The white spots on the blue shell of males of the species are compared to manna, snowflake-like food which, according to the Bible, was eaten by the Israelites in the wilderness during their flight from Egypt (see picture in Appendix). The source domain concept, manna, is one of the religious beliefs of Christianity. As a matter of fact, this species is abundant off the coasts of East Asian countries, where it is known as *flower crab* because the concept of *manna* does not exist there. Unlike English-language experts, Spanish-language experts, who largely share traditions and sociocultural values with English-language experts in Western civilization, do not use the manna metaphor, but simply call this crab *jaiba azul*, which is a non-figurative name.

3.1.2 Second Level of Situatedness: Culture-Typicality

As previously explained, Alexiev (2005:109) argues for the degree of cultural typicality of the general concept giving rise to the metaphorical concept. We agree with him that the more prototypical a referent is in a linguistic community, or the more frequently it is experienced, the more likely it will be for such a referent to take part in metaphorization processes.

We retrieved resemblance metaphor terms from the corpus that feature concepts typical though not exclusive of their corresponding community of speakers. One of them is the Spanish metaphor *camarón café* ['coffee shrimp'] (*Farfantepenaeus californiensis*), which emerges because of the brownish color of this shrimp (see picture in Appendix). As its taxonomic name indicates, this animal is found in the eastern Pacific, from the Californian coasts down to Perú. Accordingly, the common name *camarón café* was in all likelihood coined by Latin-American scientists. As is well known, Spanish-language countries such as Guatemala, Costa Rica, and particularly, Colombia are great coffee producers,

consumers and exporters. Thus, coffee can be considered a typical element of Latin-American culture. The English equivalent is the non-figurative term *brown shrimp*.

3.1.3 Third Level of Situatedness: Unconstrained Angles of Referent Perception

Alexiev (2005:108) states that the selection of a domain-specific referent designation is determined by the angle of referent perception, and that this angle is contingent on the experience of the metaphor designator in the particular culture. As a result, scientists, researchers and technologists belonging to different linguistic communities often select different domain-specific referent designations associated with different metaphors. Although this is doubtless true, the *experience of the particular culture* as well as the *angle of special referent perception* (Alexiev 2005) are too general notions, and thus, need greater specification.

- Metaphors motivated by exclusively cultural factors;
- Metaphors emerging from typically cultural factors;
- Metaphors determined by factors that, though neutral or equally familiar to experts from different communities, were used by the designator to coin the metaphor.

As with the first two types of situated metaphors, the locus of the metaphorical conceptualization in the third type is first individual. It then spreads among the group members through the dynamics of group interactions, and as a result, the metaphor is no longer reduced to individual representations (Shafarian 2008:119). In the third type of situated metaphor, however, the initially individual conceptualization is not determined by exclusive or typically salient sociocultural patterns, but simply by an expert's choice based on his/her unconstrained angle of perception of the domain-specific referent. The created term is eventually assumed by the scientific community that the expert belongs to because of peer pressure and group membership (Kristiansen 2008:412). Since the entrenchment of the metaphor only takes place in a particular community, we can speak of situated metaphor, thus giving rise to cross-cultural and cross-linguistic variation.

Experts from different linguistic communities can use either the same or different angles of domain-specific referent perception. When marine biology experts from different language communities examine the same organism from different angles, such an organism is not perceived and named in the same way. This cross-linguistic difference in *perception* constrains the (metaphorical) *conceptualization* of the organism. An example of this type of unconstrained angle of referent perception is the pair *ocean sunfish/pez luna* (Mola). The English term, which is not metaphorical, refers to this fish's habit of basking on its side at the sea surface, as though having a sunbath. English-language experts focus on the animal's behavior. This angle of referent perception differs from the angle

taken by Spanish-language marine biologists, who metaphorically refer to this animal as *moonfish* because of its rounded shape (see picture in Appendix).

When marine biology experts from different language communities examine the same organism from the same angle – i.e. they focus on the same specific feature to conceptualize the domain-specific referent –, the conceptualization process may result in different conceptual metaphors for each language or in the same metaphor. A clear example featuring different conceptual metaphors is the pair *thresher shark/tiburón zorro* (Alopias). A thresher is a man who beats grain with a flail (a long, thin tool). In marine biology, the term *thresher shark* arises because of resemblance in both shape and behavior. Regarding shape, the shark's unusually long, thin, caudal fin looks like a flail, and insofar as behavior is concerned, the shark uses its flail-like fin to strike its preys and daze them (see picture in Appendix). Originally, an English-language expert's angle of perception led him/her to compare this shark with a thresher, and thus coin the metaphorical term. The same process holds for its Spanish terminological equivalent, *tiburón zorro* 'fox shark.' This metaphor emerged because in Spanish, the shark's long caudal fin was perceived as resembling a fox's long tail.¹

First of all, both *thresher* and *fox* are possibly universal, or at least, widespread concepts that are not specifically associated with either English-language or Spanish-language communities. Secondly, experts from both communities use the same angle of domain-specific referent perception. In other words, they all focus on the same aspect of the referent, which is used as a *tertium comparationis* in the metaphorical conceptualization. In this case, the aspect shared is the shark's body part, viz. its tail. As previously mentioned, despite adopting the same angle of perception, English-language experts rely on a different metaphor from that used by their Spanish-language colleagues. Moreover, English-language biologists use two metaphorical motivations, shape and behavior, unlike Spanish-language biologists, who only use one (shape). This signifies that the angle of domain-specific referent perception and metaphorical motivations are very closely related, but are not necessarily lexicalized as one.

We now turn our attention to the second subcategory, which involves the conceptualization process resulting in the same metaphor in English and Spanish. Alexiev accounts for the incidence of cultural patterns in terminology metaphor from the perspective of translation studies. Alexiev (2005:115) underlines the level of specificity of special referent perception as one of the translation strategies used in the field of mining and architecture. His corpus data show that most non-metaphorical target language translation equivalents of source language metaphorical terms are superordinates. In other words, the target language culture usually perceives the same domain-specific referent at a higher level of generality

¹ Thus, this term also has a metonymic basis. Specifically, it is a whole-for-the-part metonymy since the whole source domain, FOX, is used instead of the specific concept, TAIL, which is actually the source element that inspires the metaphor.

than the source language culture.

In our study, we use the notion of *degree of specificity* to pin down differences between English and Spanish term pairs whose constituents are all metaphorical in nature. Specifically, the constituents of each of the interlinguistic pairs are both grounded in the same conceptual metaphor. There is a degree of specificity because one of the pair terms focuses on a more or less specific/generic aspect of the source conceptual domain than the other term. This phenomenon has been analyzed in general language non-resemblance metaphors. For instance, Kövecses (2005:154) considers it a type of differential cognitive preference involving a hierarchy of things or events. However, it had yet to be attested in specialized language, and concretely, in resemblance metaphors.

With this new criterion, we thus go further up the scale of metaphor situatedness to establish a fourth level. However, we consider degree of specificity to actually be a subtype of the expert's unconstrained angle of domain-specific referent perception since the source domain concepts are not exclusive or typical of the two language communities at work. English- and Spanish-language scientists view the domain-specific referent from the same angle of perception, i.e. they use the same aspect of the referent as the target domain concept to take part in the metaphorical process. Nevertheless, depending on the language, this aspect is compared to a more or less specific aspect of the source domain.

A good example of this phenomenon is the pair *triggerfish/pez ballesta* 'crossbow fish' (Balistidae). This fish erects the first two dorsal spines to scare potential predators away (see picture in Appendix). This behavior is compared with the functioning of a crossbow, whose trigger is pulled to keep enemies away. The English term focuses on the specific concept *trigger*, whereas the Spanish term designates the generic concept *crossbow*, which eventually constitutes the whole source domain. Thus, both expert communities rely on the same aspect of the target domain (same angle of perception), which is the dorsal spines of the fish. However, conceptualization of this sea organism through metaphor shows a clear difference in degree of specificity from an interlinguistic perspective.

3.2 Culture-Specificity Brings English and Spanish Together

Evidence has been given so far of the crucial influence of different types of situatedness and sociocultural factors on scientific knowledge to prompt English-Spanish differences through metaphor. We are now presenting a new scenario, in which cultural elements that are exclusive of one expert community shape the metaphorical conceptualization of a sea organism in this community and in others. In our case, this means that one culture critically influences the other so that both use the same conceptual metaphor, which is moreover subject to no degree of specificity from an interlinguistic perspective. In other words, there is total coincidence of both cultures at the conceptual and the linguistic levels.

The only example found in the corpus is the Spanish metaphorical common name *bailarina española*, which designates a species of nudibrach (scientific name *Hexabranchus sanguineus*). English-language marine biologists have adapted this name into the literal equivalent *Spanish dancer*, and use it in their academic journal articles. The dynamic mental image that this metaphor evokes integrates three closely interrelated metaphorical motivations. First of all, the intense red color of this nudibrach is similar to the color of a typical flamenco dancer's dress (see picture in the Appendix). Secondly, the spirals of the nudibrach look like the frills and flounces on the skirt of the dress. Thirdly, the nudibrach behaves like a flamenco dancer insofar as the nudibrach moves its spirals in a fluttering manner to advance through the water, much like the flamenco dancer moves the flounces on her skirt while performing. Thus, this metaphor combines physical appearance and behavioral patterns.

Importantly, it emerges from very specific Spanish cultural patterns, which are so appealing to outgroup specialists – in this case, English-language experts – that they adopted it to designate the same marine organism. Thus, in this case, English-language experts have assumed Spaniards' socio-cognitive patterns to make and communicate science.

4 Conclusions

The analysis of English-Spanish metaphorical term pairs extracted from academic journal articles on marine biology reveals that metaphorical conceptualization and categorisation of domain-specific referents are traceable not only to sensory-motor inferences, but also to cultural factors, which critically constrain the former. This fact challenges the feed-forward logic claim of experiential realism (Lakoff and Johnson 1999) that it is the body that necessarily comes first.

The interlinguistic term pairs analyzed offer empirical evidence that English and Spanish have conceptual differences that are culturally grounded. As Yu (2008:393) argues, cultural models set up specific perspectives from which certain parts of the body and certain aspects of bodily experience are viewed as especially salient and meaningful. Terminological metaphor analysis is thus an effective way of ascertaining and improving our understanding of inter- and cross-linguistic variation.

Based on this English-Spanish contrastive study, a typology of terminological metaphors is proposed that classifies them according to their level of socio-cognitive situatedness. This typology distinguishes between four levels: culture-specificity, culture-typicality, unconstrained angles of referent perception, and degree of specificity.

Finally, metaphorical terms, such as the Spanish name *bailarina española*, show that very specific sociocultural patterns exclusive of a particular linguistic community can be adopted by other community to conceptualize and lexicalize

the same referent through metaphor (*Spanish dancer*). This fact supports the claim that although cultural practices more often than not establish cross-linguistic differences, they can occasionally bring them together as well.

References

- Alexiev, Bojan. 1998. Contrastive Aspects of Terminological Metaphor. Unpublished Ph.D. thesis, University of Sofia, Bulgaria.
- Caballero, Rosario. 2006. *Re-Viewing Space: Figurative Language in Architects' Assessment of Built Space*. Berlin and New York: Mouton de Gruyter.
- Charteris-Black, Jonathan. (2004). *Corpus Approaches to Critical Metaphor Analysis*. New York: Palgrave-MacMillan.
- Csordas, Thomas. 1999. Embodiment and Cultural Phenomenology. In Gail Weiss and Honi Fern Haber, eds., *Perspectives on Embodiment: The Intersections of Nature and Culture* 143-162, New York: Routledge.
- Deignan, Alice. 2007. Image Metaphors and Connotations in Everyday Language. *Annual Review of Cognitive Linguistics* 5:173-191.
- Dodge, Ellen, and George Lakoff. 2005. Image Schemas: From Linguistic Analysis to Neural Grounding. In Beate Hampe and Joseph Grady, eds., *From Perception to Meaning: Image Schemas in Cognitive Linguistics* 57-92, Berlin: Mouton de Gruyter.
- Feldman, Jerome. 2006. *From Molecule to Metaphor: A Neural Theory of Language*. Cambridge (Massachusetts): MIT Press.
- Frank, Roslyn. 2008. The Language-Organism-Species Analogy: A Complex Adaptive Systems Approach to Shifting Perspectives on Language. In D. Geeraerts, R. Dirven and J.R. Taylor, eds., *Body, Language and Mind (vol. II): Sociocultural Situatedness* 215-262, Berlin and New York: Mouton de Gruyter.
- Gibbs, Raymond. 1999. Taking Metaphor out of Ours Heads and into the Cultural World. In Raymond Gibbs and Gerard Steen, eds., *Metaphor in Cognitive Linguistics* 145-166, Amsterdam: John Benjamins.

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- Kimmel, Michael. 2008. Properties of Cultural Embodiment: Lessons from the Anthropology of the Body. In D. Geeraerts, R. Dirven and J.R. Taylor, eds., *Body, Language and Mind (vol. II): Sociocultural Situatedness* 77-108, Berlin and New York: Mouton de Gruyter.
- Kövecses, Zoltan. 2005. *Metaphor in Culture: Universality and Variation*. New York: Cambridge University Press.
- Kövecses, Zoltan. 2006. *Language, Mind and Culture: A practical introduction*. Oxford: Oxford University Press.
- Kristiansen, Gitte. 2008. Idealized Cultural Models: The Group as a Variable in the Development of Cognitive Schemata. In D. Geeraerts, R. Dirven, and J.R. Taylor, eds., *Body, Language and Mind (vol. II): Sociocultural Situatedness* 409-432, Berlin and New York: Mouton de Gruyter.
- Larson, Brendon. 2008. Entangled Biological, Cultural and Linguistic Origins of the War on Invasive Species. In D. Geeraerts, R. Dirven and J.R. Taylor, eds., *Body, Language and Mind (vol. II): Sociocultural Situatedness* 169-196, Berlin and New York: Mouton de Gruyter.
- Lakoff, George. 1993. The Contemporary Theory of Metaphor. In Andrew Ortony, ed., *Metaphor and Thought* 202-251, Cambridge: Cambridge University Press.
- Lakoff, George, and Mark Johnson. 1999. *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought*. New York: Basic Books.
- Lakoff, George, and Mark Turner. 1989. *More than a Cool Reason: A Field Guide to Poetic Metaphor*. Chicago: Chicago University Press.
- Palmer, Gary. 1996. *Towards a Theory of Cultural Linguistics*. Austin: University of Texas Press.
- Shafarian, Farzad. 2008. Distributed, Emergent Cultural Cognition, Conceptualisation and Language. In D. Geeraerts, R. Dirven, and J.R. Taylor, eds., *Body, Language and Mind (vol. II): Sociocultural Situatedness* 109-136, Berlin and New York: Mouton de Gruyter.
- Stefanowitsch, Anatol. 2006. Words and their Metaphors: A Corpus-Based Approach. In Anatol Stefanowitsch and Stefan Th. Gries, eds., *Corpus-Based Approaches to Metaphor and Metonymy* 63-105, Berlin: Mouton de Gruyter.

- Stockwell, Peter. 2002. *Cognitive Poetics: An Introduction*. London: Routledge.
- Tajfel, Henri. 1978. Social Categorization, Social Identity and Social Comparison. In Henri Tajfel, ed., *Differentiation between Social Groups* 61-76, London: Academic Press.
- Temmerman, Rita. 2000. *Towards New Ways of Terminology Description*. Amsterdam: John Benjamins.
- Tomasello, Michael. 2000a. Primate Cognition: Introduction to the Issue. *Cognitive Science*, 24(3):351-361.
- Ureña, José Manuel, and Pamela Faber. 2010. Reviewing Image in Resemblance and Non-Resemblance Metaphors. *Cognitive Linguistics* 21(1):123-147.
- Ureña, José Manuel, and Pamela Faber. 2011. Strategies for the Semi-Automatic Retrieval of Metaphorical Terms. *Metaphor and Symbol* 26(1):23-52.
- Yu, Ning. 2008. The Relationship between Metaphor, Body and Culture. In D. Geeraerts, R. Dirven and J.R. Taylor, eds., *Body, Language and Mind (vol. II): Sociocultural Situatedness* 387-408, Berlin and New York: Mouton de Gruyter.






José Manuel Ureña
University of Castile-La Mancha, Spain
Department of Modern Philology
Avda. Camilo José Cela, s/n
13071 Ciudad Real, Spain



jmurena@ugr.es / josemanuel.urena@uclm.es

Pamela Faber
University of Granada, Spain
Department of Translation and Interpreting
11 Buensuceso Street
Granada, 18002

pfaber@ugr.es

Appendix. Typology and Pictures of the Sea Animals described in this Paper

LEVEL OF SITUATEDNESS	ENGLISH TERM	SPANISH TERM	PICTURE
Culture-specificity (source-domain concept unique to one expert community)	boarfish (metaphorical but not culture-specific)	<i>ochavo</i> (metaphorical and culture-specific)	
Culture-specificity (source-domain concept exclusive of a broader community used only by one cultural subgroup)	blue manna crab (metaphorical and culture-specific)	<i>jaiba azul</i> (neither metaphorical nor culture-specific)	
Culture-typicality	brown shrimp (neither metaphorical nor culture-typical)	<i>camarón café</i> (metaphorical and culture-typical)	
Different unconstrained angles of domain-specific referent perception	ocean sunfish (not metaphorical)	<i>pez luna</i> (metaphorical: based on shape)	
Same unconstrained angle of domain-specific referent perception (different conceptual metaphors)	thresher shark (metaphorical: based on shape and behavior)	<i>tiburón zorro</i> (metaphorical: based on shape)	

<p>Degree of specificity (same unconstrained angle of domain- specific referent perception: same conceptual meta- phor)</p>	<p>triggerfish (metaphorical: based on behavior)</p>	<p><i>pez ballesta</i> (metaphorical: based on behavior)</p>	
<p>Culture-specificity bringing English and Spanish together</p>	<p>Spanish dancer (metaphorical: based on shape, color, and behavior)</p>	<p><i>bailarina española</i> (metaphorical: based on shape, color, and behavior)</p>	

On the Role of Children's Deterministic Learning in the 'No-Overt-Subject' Stage in the L1 Acquisition of Spanish

JULIO VILLA-GARCÍA
Villanova University

Introduction

The occurrence of null subjects in the speech of children acquiring non-*pro*-drop languages like English has commanded a great deal of attention in a body of research that has resulted in a plethora of proposals, ranging from grammatical to processing explanations of the phenomenon in question (e.g., Bates 1976, Hyams 1986 *et seq.*, Bloom 1990, Valian 1991, Hyams and Wexler 1993, Rizzi 1994). Child null subjects are also attested in the speech of children acquiring *pro*-drop languages like Catalan and Spanish (Grinstead 1998 *et seq.*). In fact, Grinstead has argued that unlike children learning English, Spanish-acquiring children pass through a 'null-subject/no-overt-subject' stage, during which all of the child's subjects are null. This paper revisits Grinstead's 'null-subject' stage, which has often been contested in the literature, and shows that children acquiring Spanish do go through a stage during which subjects are invariably silent. Analogously, it is shown that children acquiring Puerto Rican Spanish, a Caribbean dialect which has been reported to be moving toward the negative setting of the Null Subject Parameter of Chomsky (1981), behaves exactly like non-Caribbean Spanish in the relevant respects. The paper advances an explanation of the 'null-subject' stage in child Spanish which appeals to Snyder's (2007) hypothesis of Grammatical Conservatism, which posits that children do not make use of a particular construction until they have acquired the linguistic requirements that regulate its appearance and distribution. Thus, children use null subjects at all times in Spanish because they have not yet determined the prerequisites needed to use lexical (i.e., overt) subjects.

The paper is organized as follows: Section 1 reviews the claims made in the literature with respect to child null subjects in *pro*-drop languages like Spanish. Section 2 outlines the current study and presents the results. Section 3 offers an account of the 'null-subject' phase in early Spanish. Section 4 concludes the paper.

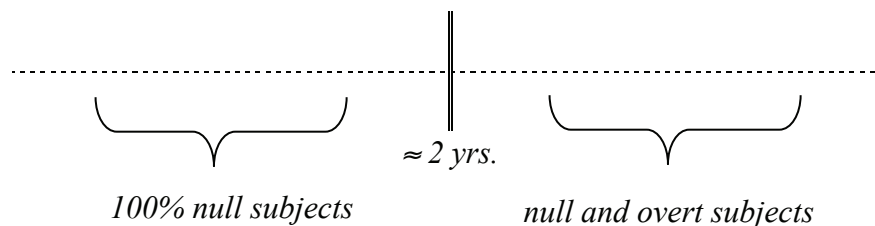
1 Child Null Subjects in Spanish

Grinstead (1998 *et seq.*) claims that children acquiring paradigmatic null-subject languages like Catalan and Spanish pass through a ‘null-subject’ stage, which lasts approximately until age 2 (see also Austin et al. 1997). This contrasts markedly with the observation that both null and overt subjects coexist in the speech of English-acquiring children.

Several authors have raised a number of criticisms against Grinstead’s claim that children learning Catalan and Spanish do not use lexical subjects at an early stage in development. Most notably, Aguado-Orea and Pine (2002) argue against the ‘null-subject’ stage by claiming that Grinstead’s (2000) data for Spanish are rather sparse and his conclusions are based on only one child. Similarly, the authors note that Grinstead’s (2000) hypothesis is difficult to test, in part because children’s early utterances occur during the ‘one-word’ stage. In parallel fashion, Bel (2001, 2003) reports that Catalan and Spanish children produce a rate of approximately 33% of overt subjects from the earliest utterances, with no significant increments in the use of overt pronouns after that point. Thus, Bel concludes that English-, Catalan-, and Spanish-acquiring children do not differ from each other with respect to null-subject use.

Nevertheless, the criticisms against Grinstead’s original claims are not well justified. First, Grinstead (1998) and Grinstead and Spinner (2009) used data from more than one Spanish-acquiring child. Moreover, it is important to consider that Grinstead’s claim that the ‘null-subject’ stage ends at around age 2 is just an approximation (cf. Brown’s 1973 ‘stages, not ages’). Therefore, Grinstead’s estimate cannot realistically be taken to mean chronological age. A given child may move to a period during which his/her speech starts to exhibit lexical subjects at age 1;6, whereas another child may do so at age 2;3 (Grinstead and Spinner 2009):

- (1) The ‘null-subject’ stage in the acquisition of Spanish



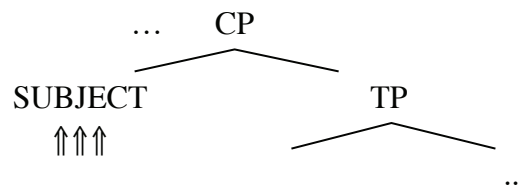
In this connection, note that the earliest transcript examined by Bel for a Catalan-acquiring child contains data recorded at age 1;6, all remaining transcripts starting over age 1;7. Given the preceding discussion that the age of 2 is a mere approximation, it is entirely possible to find overt subjects in the earliest transcript analyzed, which is in fact confirmed by the data from one of the chil-

dren studied by Bel, namely María (cf. the López-Ornat Corpus, CHILDES). In fact, as shown below, all the children of the present study started using overt subjects before age 2. Consequently, it cannot be concluded based on the issues raised by the aforementioned authors that children acquiring prototypical null-subject languages like Spanish do *not* go through a 'null-subject' stage; the current paper actually provides novel support for a 'no-overt-subject' stage in development.

1.1 Grinstead's Interface Delay Hypothesis

Grinstead's explanation for the 'null-subject' stage in Catalan- and Spanish-acquiring children's early speech contends that children use silent subjects all the time because they do not have access to the CP layer, which is the domain of the clause where Grinstead, following a highly influential line of research, assumes lexical subjects are located in languages like Spanish, as shown in (2).

- (2) The CP account of lexical subjects in languages like Spanish
(Contreras 1991, Olarrea 1996, Ordóñez 1997, Barbosa 2009, *inter alia*)



On this view, subjects are considered to be left-peripheral phenomena whose occurrence and distribution is regulated by information-structure notions such as topic and focus. Drawing on the CP account of overt subjects in *pro*-drop languages of the Spanish type, Grinstead (1998) advanced his Interface Delay Hypothesis, where 'interface' refers to the syntax-pragmatics interface. Grinstead (1998 *et seq.*) claims that children's access to the syntax-pragmatics interface is delayed, which accounts for why overt subjects start to appear later, crucially at the same time as uncontroversially left-peripheral phenomena such as topics (see also Villa-García and Snyder 2010).

Grinstead's prediction is that overt subjects should be attested early on in the acquisition of non-null-subject languages like English, however, since in these varieties subjects occupy the canonical subject position (i.e., Spec,TP), rather than a CP-related position, as is the case of Spanish, under the account in (2). Therefore, children acquiring non-null-subject languages like English should be able to project their subjects in Spec,TP, which amounts to saying that they do not have to access the syntax-pragmatics interface to use overt subjects, thus explaining why English-acquiring children are able to produce lexical subjects at a stage

when Spanish-acquiring children only use non-overt subjects.

Moreover, Ticio (2002, 2004) has argued with Toribio (1994, 2000), among others, that the Caribbean dialects of Spanish (Cuban, Dominican, and Puerto Rican Spanish) are no longer null-subject dialects *per se* (though see, e.g., Gutiérrez-Bravo 2008 for a dissenting view). Ticio (2002) predicts based on Grinstead (1998) that children acquiring no-longer-fully-null-subject varieties such as Caribbean Spanish should not exhibit a ‘no-overt-subject’ phase, much like children acquiring English, since they do not have to wait until the interface between syntax and pragmatics is available in order to produce lexical subjects, as their overt subjects are located in Spec,TP. Put another way, children acquiring Caribbean varieties of Spanish are not expected to exhibit the pattern of behavior displayed by children acquiring null-subject varieties like European Spanish. In support of this hypothesis, Ticio (2002) reports that at age 1;7, Ana’s usage of overt subjects is 18.20%, which constitutes apparent evidence that there is no ‘null-subject’ phase in child Puerto Rican Spanish, as expected if Caribbean Spanish is a non-null-subject language. As will be shown in Section 2.3, however, Ticio’s claim for child Caribbean Spanish is not well supported.

The CP account of overt subjects in non-Caribbean Spanish varieties has also been challenged in the literature. For instance, Goodall (2001) and Ortega-Santos (2005 *et seq.*), among others, have argued in favor of a Spec,TP account of subjects in *pro*-drop Spanish. Similarly, a number of authors have proposed that subjects can (but need *not* be) in the CP (Casielles 2001, Camacho 2006, López 2009, Villa-García 2012). For instance, Casielles (2001) notes the contrast in (3) (see also Zubizarreta 1998 and Zagona 2002, among others).

- (3) a. Ayer *(los) niños jugaban en el parque
 yesterday the children played in the park
 ‘Yesterday, the kids were playing in the park.’
 b. Niños, no creo que vengan a la fiesta
 children not believe_{1.SG} that come to the party
 ‘As for kids, I don’t believe any will come to the party.’

As the data in (3) show, whereas bare nominals are disallowed in Spec, TP—possibly due to a requirement that a noun in this position be a full DP—(cf. 3a)), preverbal bare NPs are possible as subjects provided that they are *bona fide* left dislocated (cf. 3b)). The contrast in (3) shows that preverbal subjects in Spanish can occupy different preverbal positions, namely Spec,TP and Spec,CP, contrary to what is often assumed in the literature. Further, in Villa-García (2012), I argue that there exists a dedicated subject position in the preverbal field in Spanish which can only be occupied by subjects to the exclusion of non-subject preverbal XPs. The relevant evidence comes from exhortative sentences introduced by *que*, as illustrated in (4).

- (4) ¡Que se vayan!
 that cl. go_{3,PL-Subj.}
 'I demand that they go away.'

In (4), the complementizer *que* is mandatory. I take *que* to be the lexical realization of the subjunctive mood, and thus the head of the lowest left-peripheral projection under Rizzi's (1997) articulated structure of the CP layer, namely FinitenessP, which Rizzi independently argues is the locus of finiteness and mood features. This claim is substantiated by the fact that dislocated phrases (i.e., topics) must precede the complementizer in the construction at hand (Demonte and Fernández-Soriano 2009, *inter alia*):

- (5) a. ¡A mi madre, que la lleven!
 my mother that cl. take_{3,PL-Subj.}
 b. *¡Que a mi madre la lleven!
 that my mother cl. take_{3,PL-Subj.}
 'I demand that they take my mother (with them).'

The example in (5b) not only shows that the complementizer is a very low CP-related head, as indicated by the fact that topics are above it, but also contrasts starkly with the data in (6), where a genuine subject can occur in the position sandwiched between *que* and the subjunctive verb.

- (6) a. ¡Que mi madre se vaya!
 that my mother cl. go_{3,SG-Subj.}
 'I demand that my mother go away.'
 b. ¡Que nadie la lleve!
 that nobody cl. take_{3,SG-Subj.}
 'I demand that nobody take her/it.'

Thus, the contrast between (5b) and (6) points to a crucial distributional asymmetry between topics and subjects, since subjects can occur between *que* and the subjunctive verb in the construction at hand, but a topic can only appear in a position higher than the complementizer. Under the CP account, whereby preverbal subjects are always left-dislocated, the different distribution of topics and of subjects in exhortative sentences headed by *que* remains unexplained (see Villa-García 2012 for further discussion). In sum, the empirical evidence just reviewed refutes the hypothesis that preverbal subjects in languages like Spanish are always topics in the left periphery, which in turn casts doubt on the adequacy of Grinstead's Interface Delay Hypothesis, which relies on the assumption that overt subjects in Spanish are CP-related constituents (cf. (2)). I therefore conclude that the explanation for the 'null-subject' stage in the acquisition of null-subject languages like Spanish must lie somewhere else.

2 The Current Study

In light of the preceding discussion, the remainder of the paper aims to present the results of a new longitudinal study which provides acquisitional and statistical support for Grinstead's claim that children acquiring Spanish pass through a 'null-subject' stage characterized by the complete absence of overt subjects with inflected verbs. Similarly, I show, *contra* Ticio (2002), that children acquiring Caribbean Spanish varieties display a pattern analogous to that of non-Caribbean-Spanish-learning children. In Section 3, I provide an account of the 'null-subject' stage which draws on Snyder's (2007) prospect of Grammatical Conservatism in children's spontaneous speech.

2.1 Longitudinal data

The data employed in this study include transcripts and not-yet-transcribed videotapes of four children's spontaneous speech, retrieved from the CHILDES database (Child Language Data Exchange System) and from the UConn-CLESS database (The University of Connecticut's Cross-Linguistic Early Syntax Study project). Details of the relevant corpora are provided in (7).

(7) Longitudinal data

<i>Child</i>	<i>Variety of Spanish</i>	<i>Corpus</i>	<i>Database</i>
Ana (♀)	Caribbean	Ana	UConn-CLESS
Emilio (♂)	European	Vila	CHILDES
Inés (♀)	European	Inés	UConn-CLESS
Irene (♀)	European	Llinàs-Grau/Ojea	CHILDES

2.2 Research Methods

The corpora selected for the present study contain a significant number of early transcripts exhibiting no overt subjects with verbs. The data were counted manually, since at present there is no reliable computer-assisted method to find overt subjects in Spanish in the corpora at hand. In order to ensure that the children had indeed mastered the relevant constructions, the measure of acquisition was taken to be FRU ("first of repeated uses"), that is, first clear use, followed soon after by additional, distinct uses (cf. Stromswold 1996 and Snyder and Stromswold 1997). Following standard practice, imitations, repetitions, and formulaic/lexicalized expressions were discarded. The statistical method used to check for concurrent emergence of null and overt subjects was the Binomial Test (Snyder, 2007: Ch.

5). The Binomial Test addresses the question of whether the apparent gap between two given constructions is plausibly due to a lower frequency of use for the construction emerging later, or whether there is in fact a statistically significant difference between the two ($p < .05$), as expected when the two constructions demand different prerequisites that the child needs to have prior to using the particular constructions successfully.

2.3 Results

As shown in (8), the corpora at hand contain a number of early transcripts for each of the four children analyzed which display no lexical subjects with inflected verbs. Recall from Sections 1 and 2.2 that care should be taken to ensure that the first transcript available does not already contain lexical subjects. By way of illustration, Inés's first transcript includes spontaneous data recorded at age 1;2. Before the first clear use/FRU of overt subjects in Inés's speech, I found 16 transcripts containing null-subject utterances, but crucially zero occurrences of lexical subjects with inflected verbs. It was actually not until age 1;6,5 that Inés produced her FRU of an overt subject.

(8) Age of Emergence of Overt Subjects

<i>Child</i>	<i>Variety of Spanish</i>	<i>Age of First Transcript Analyzed</i>	<i># of Transcripts With <u>No</u> Overt Subjects</i>	<i>Onset Age of Overt Subjects</i>
Ana	Caribbean	01;07,01	11	01;08,12 ¹
Emilio	European	00;11,09	11	01;09,19
Inés	European	01;02,00	16	01;06,05
Irene	European	01;05,27	6	01;07,05

As (8) demonstrates, the first clear uses of overt subjects in all of the children's speech were attested *before* age 2 in all cases (viz. the preceding discussion that the age at which the 'null-subject' stage concludes is merely an approximation). The child utterance in (9) is an example of an early overt subject in the transcripts under consideration.²

¹ Note that the measure of acquisition employed in the current study was "first of repeated uses," which is more conservative than that used by Ticio (2002).

² Preverbal and postverbal subjects in Spanish are acquired concurrently, as argued by Grinstead (1998 *et seq.*) for child Catalan and Mexican Spanish and Villa-García (2011) for European Spanish (though see Pierce 1989 and Casielles et al. 2006 for a different view).

- (9) Éste no cabe
 this not fits
 ‘This one doesn’t fit.’ [Inés, 01;09,03]

Note that at the point when children use only null subjects, there is no ban on overt subjects *per se*, as argued by Grinstead. Children simply do not produce subjects with inflected verbs. In other words, subject + complement (cf. (10a)) and verb + complement/predicate (cf. (10b)) combinations are possible at the earlier stage, which shows that the children producing subjectless sentences are not necessarily at the ‘one-word’ stage (cf. Section 1).

- (10) a. Mamá bigote
 mom moustache
 ‘Mom [has a] moustache.’ [Irene, 01;05,15]
 b. Es mío
 is mine
 ‘It is mine.’ [Emilio, 01;06,20]

It is important to note that Grinstead (1998 *et seq.*) based his results solely on chronological age (i.e., Grinstead did not employ statistical methods to check whether there is a significant discrepancy between the emergence of null subjects and the emergence of overt subjects). In order to ensure that there was a gap between the onset of null and overt subjects in child Spanish, a Binomial Test was performed (see Section 2.2). The results of the statistical analysis show that null subjects emerged significantly earlier than overt subjects in the speech of the children of this study (e.g., Puerto Rican Spanish – Ana: $p < .001$; European Spanish – Emilio: $p < .001$). This finding strongly argues for a grammar-based explanation of the discrepancy: the linguistic prerequisites that the children needed to acquire before making use of null and overt subjects were different in each case, with those for null subjects typically being acquired prior to those for overt subjects. This result confirms that the children analyzed passed through a ‘null-subject’ stage, as claimed by Grinstead (1998) and in contrast to Bel (2001, 2003) and Aguado-Orea and Pine (2002).

Furthermore, the results contradict Ticio’s (2002) contention that Puerto-Rican-Spanish-acquiring children do not go through a ‘no-overt-subject’ stage. More specifically, my re-analysis of Ana’s data shows that this child followed a trajectory akin to that of the European-Spanish-acquiring children, since 49 finite null subjects with inflected verbs were found before the first clear use of an overt subject. As a matter of fact, Inés and Irene, who were acquiring fully *pro*-drop Spanish, started using overt subjects earlier than Ana (cf. (8)). Hence, Ticio’s (2002) claim that there is no ‘null-subject’ stage in the acquisition of Caribbean Spanish is no longer tenable, and the apparent absence of the ‘no-overt-subject’ phase in Ana’s early utterances can no longer be taken as evidence for the pre-

sumed non-*pro*-drop nature of the Caribbean dialects of Spanish. Future research should care to investigate this claim further, however, since the current results are based on data from only one child.

3 Accounting for the Gap: Children's Deterministic Learning

Snyder (2007 and subsequent work) observes that children make strikingly few errors of "co-mission," in contrast to their rampant errors of omission, when one examines transcripts of their spontaneous speech. This observation is the cornerstone of Snyder's (2007:8) claim of Grammatical Conservatism:

[C]hildren do not begin making productive use of a new grammatical construction in their spontaneous speech until they have both determined that the construction is permitted in the adult language, and identified the adults' grammatical basis for it.

Under the hypothesis of Grammatical Conservatism in children's acquisition of syntax, children will use a construction only on condition that they have acquired the relevant (linguistic) prerequisites that the construction demands. Suppose further that children are conservative with respect to the production of overt subjects with verbs.³ It is well known that different languages place subjects in different positions. Children use subjects without verbs at an early stage, as noted by Grinstead (1998 *et seq.*) (cf. (10a)), but they avoid using them with verbal predicates, since they have not yet identified their placement possibilities with respect to (inflected) verbs. Once the necessary linguistic prerequisites to start using overt subjects in full sentences are in place, children begin to make successful, and, crucially, virtually error-free use of the construction. This hypothesis is corroborated by the fact that there is a significant discrepancy by Binomial Test between the emergence of null and overt subjects in the acquisition of Spanish (see Section 2.3), a gap which strongly calls for a grammar-based explanation. This possibility is wholly compatible with the contention put forward by Grammatical Conservatism that in their naturalistic speech, children appear to reserve judgment on points of grammatical variation, rather than making unwarranted commitments to non-adult parameter settings. Children use null subjects at all times at an early stage (see Bel 2001 for evidence that children's use of null subjects is pragmatically adequate), since the prerequisites for null subjects are already in place. Instead of attempting to use overt subjects tentatively, children "wait patiently" until the prerequisites for overt subjects are in place, consistent

³ See Villa-García (in press) for evidence in support of this claim with regard to subject placement in child Spanish. Snyder (2007 *et seq.*) shows that this is the case in the acquisition of the English verb-particle construction, and a similar pattern has recently been reported for the acquisition of Differential Object Marking in Spanish by Rodríguez-Mondoñedo (2008).

with the fact that children never make any mistakes regarding the position of overt subjects in Spanish (see fn. 3).

By adopting the hypothesis of Grammatical Conservatism, we avoid making (strong) claims about specific ‘grammatical stages’ in acquisition and circumvent the problem raised by adopting Grinstead’s Interface Delay Hypothesis, since not all subjects in Spanish are CP constituents (see Section 1.1).

At this point, an important question arises as to the exact nature of the linguistic prerequisites that the child needs to acquire before using null and overt subjects in Spanish, a matter that I leave for future research.

4 Conclusions

This paper has tackled the issue of the ‘null-subject’ stage in the acquisition of prototypical *pro*-drop languages like Spanish. The results of a longitudinal study involving four children acquiring Caribbean and European Spanish provide novel support for Grinstead’s (1998 *et seq.*) claim of the ‘no-overt-subject’ phase in development. However, it has been shown that Grinstead’s Interface Delay Hypothesis can no longer be maintained, for it relies on the incorrect assumption that overt subjects in languages like Spanish are always left-peripheral phenomena in the CP domain. Instead, this paper has pursued an alternative explanation which assumes that children are deterministic in their acquisition of language, and thus do not make use of a particular grammatical construction until they have acquired the necessary (linguistic) prerequisites for the construction. This, I claim, is what happens in the ‘null-subject’ stage: children do not begin to use overt subjects until the necessary prerequisites for the construction are acquired, and instead use null subjects at all times, which is a readily available option in adult Spanish. Further research should care to address the non-trivial issue of the exact nature of said prerequisites. An additional conclusion of this study is that children acquiring Caribbean Spanish do pass through a ‘no-overt-subject’ stage, *contra* the results reported in Ticio (2002).

References

- Aguado-Orea, Javier, and Julian Pine. 2002. There is no evidence for a ‘no overt subject’ stage in early child Spanish: a note on Grinstead (2000). *Journal of Child Language* 29:865-874.
- Austin, Jennifer, María Blume, David Parkinson, Barbara C. Lust, and Zelmira Núñez del Prado. 1997. The Status of Pro-Drop in the Initial State. In A.T. Pérez-Leroux and W. Glass, eds., *Contemporary Perspectives on the Acquisition of Spanish*, 37-54. Somerville, MA: Cascadilla Press.

On the Role of Children's Deterministic Learning

- Barbosa, Pilar. 2009. Two Kinds of Subject *pro*. *Studia Linguistica* 63(1):2-58.
- Bates, Elizabeth. 1976. *Language and Context*. New York: Academic Press.
- Bel, Aurora. 2001. Sujetos nulos y sujetos explícitos en las gramáticas iniciales del castellano y el catalán. *Revista Española de Lingüística* 31(2):537-562.
- Bel, Aurora. 2003. The syntax of subjects in the acquisition of Spanish and Catalan. *Probus* 15:1-26.
- Bloom, Paul. 1990. Subjectless sentences in child language. *Linguistic Inquiry* 21(4):491-504.
- Brown, Roger. 1973. *A first language: The early stages*. London: George Allen and Unwin Ltd.
- Camacho, José. 2006. Do Subjects have a Place in Spanish? In J-P Montreuil and C. Nishida, eds., *New Perspectives in Romance Linguistics*. Amsterdam-Philadelphia: John Benjamins.
- Casielles, Eugenia, Jean Andruski, Sahyang Kim, Geoffrey Nathan, and Richard Work. 2006. Syntactic and Discourse Features of Subjects in Child Spanish: Evidence from Spanish/English Bilingual Acquisition. *BUCLD* 30:72-83.
- Casielles, Eugenia. 2001. The Syntax and Semantics of Preverbal Topical Phrases in Spanish. In J. Gutiérrez-Rexach and L. Silva-Villar, eds., *Current Issues in Spanish Syntax and Semantics*, 65-82. Berlin/New York: Mouton DeGruyter.
- Chomsky, Noam. 1981. *Lectures on Government and Binding*. Dordrecht: Foris.
- Contreras, Heles. 1991. On the position of subjects. *Syntax and Semantics* 25:63-79.
- Demonte, Violeta, and Olga Fernández-Soriano. 2009. Force and finiteness in the Spanish complementizer system. *Probus* 21:23-49.
- Goodall, Grant. 2001. The EPP in Spanish. In W.D. Davies and S. Dubinsky, eds., *Objects and Other Subjects: Grammatical Functions, Functional Categories and Configurationality*, 193-223. Netherlands: Kluwer Academic Publishers.
- Grinstead, John, and Patti Spinner. 2009. The clausal left periphery in child Spanish and German. *Probus* 21:51-82.

- Grinstead, John. 1998. Subjects, sentential negation and imperatives in child Spanish and Catalan, Ph.D. Thesis, UCLA.
- Grinstead, John. 2000. Tense, Number and Nominative Case Assignment in Child Catalan and Spanish. *Journal of Child Language* 27(1):119-155.
- Gutiérrez Bravo, Rodrigo. 2008. Topicalization and Preverbal Subjects in Spanish *wh*-interrogatives. In J. Bruhn de Garavito and E. Valenzuela, eds., *Selected Proceedings of the 10th Hispanic Linguistics Symposium*, 225-236. Somerville, MA.: Cascadia Proceedings Project.
- Hyams, Nina, and Kenneth Wexler. 1993. On the grammatical basis of null subjects in child language. *Linguistic Inquiry* 24(3):421-459.
- Hyams, Nina. 1986. *Language acquisition and the theory of parameters*. Dordrecht: Reidel.
- López, Luis. 2009. *A Derivational Syntax for Information Structure*. Oxford: Oxford Studies in Theoretical Linguistics.
- Olarrea, Antxon. 1996. Pre and Postverbal Subjects in Spanish: A Minimalist Account, Ph.D. Thesis, University of Washington.
- Ordóñez, Francisco. 1997. Word Order and Clausal Structure of Spanish and Other Romance Languages. Ph.D. Thesis, CUNY.
- Ortega-Santos, Iván. 2005. On Locative Inversion and the EPP in Spanish. *Actas del VIII Encuentro Internacional de Lingüística del Noroeste de la Universidad de Sonora*. Universidad de Sonora, México, 131-150.
- Pierce, Amy. 1989. On the emergence of syntax: A crosslinguistic study. Ph.D. Thesis, MIT.
- Rizzi, Luigi. 1994. Early null subjects and root null subjects. In B. Lust, G. Hermon, and J. Kornfilt, eds., *Syntactic theory and first language acquisition: crosslinguistic perspectives*. Hillsdale, New Jersey: Erlbaum.
- Rizzi, Luigi. 1997. The fine structure of the left periphery. In L. Haegeman, ed., *Elements of Grammar*, 281-337. Dordrecht: Kluwer.
- Rodríguez-Mondoñedo Miguel. 2008. The acquisition of differential object marking in Spanish. *Probus* 20:111-45.

On the Role of Children's Deterministic Learning

- Snyder, William, and Karin Stromswold. 1997. The structure and acquisition of English dative constructions. *Linguistic Inquiry* 28(2):281-317.
- Snyder, William. 2007. *Child Language: The Parametric Approach*. Oxford: Oxford University Press.
- Stromswold, Karin. 1996. Analyzing children's spontaneous speech. In D. McDaniel, C. McKee, and H. Smith-Cairns, eds., *Methods for assessing children's syntax*, 22-53. Cambridge, MA.: MIT Press.
- Ticio, Emma. 2002. Dialectal Variation in the acquisition of the null subject parameter. In J. Costa and M. J. Freitas, eds., *Proceedings of Generative Approaches to Language Acquisition*, Associação Portuguesa de Linguística, Lisboa.
- Ticio, Emma. 2004. On the position of subjects in Puerto Rican Spanish. Ms., University of Connecticut, Storrs. [Published in *The University of Connecticut Working Papers in Linguistics (UCONNWPL)*, 12. M. Rodríguez-Mondoñedo and E. Ticio, eds.].
- Toribio, Almeida Jacqueline. 1994. Dialectal variation in the licensing of null referential and expletive subjects. In C. Parodi et al., eds., *Aspects of Romance Linguistic: Papers from the XXIV Linguistic Symposium on Romance Languages*, 409-431. Washington, D.C., Georgetown University Press.
- Toribio, Almeida Jacqueline. 2000. Setting Parametric Limits on Dialectal Variation in Spanish. *Lingua* 110:315-341.
- Valian, Virginia. 1991. Syntactic subjects in the early speech of American and Italian children. *Cognition* 40:21-81.
- Villa-García, Julio, and William Snyder. 2010. On the Acquisition of Overt Subjects, Topics and *Wh*-Questions in Spanish. In A. Castro, J. Costa, M. Lobo, and F. Pratas, eds., *Language Acquisition and Development: Proceedings of GALA 2009*. Cambridge: Cambridge Scholars Publishing.
- Villa-García, Julio. 2011. Acquisitional Evidence Bearing on the Account of Preverbal and Postverbal Subjects in Spanish. In L. Ortiz-López, ed., *Selected Proceedings of the 13th Hispanic Linguistics Symposium*, 178-189. Somerville, MA: Cascadilla Proceedings Project, www.lingref.com, document #2486.

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Villa-García, Julio. 2012. Spanish subjects can be subjects: Acquisitional and empirical evidence. *Iberia* 4(1): 1-46..

Villa-García, Julio. In press. A note on the virtually errorless L1 acquisition of clausal structure in Iberian Spanish. In E. Koulidobrova et al., eds., *The University of Connecticut Working Papers in Linguistics (UConnWPL)*. Cambridge, MA: MIT Working Papers in Linguistics.

Zagona, Karen. 2002. *The Syntax of Spanish*. Cambridge: Cambridge University Press.

Zubizarreta, María Luisa. 1998. *Word Order, Prosody and Focus*. Cambridge, MA: MIT Press.

Julio Villa-García
Department of Romance Languages and Literatures
Villanova University
800 Lancaster Avenue
Villanova, PA 19085-1699

julio.villa-garcia@villanova.edu

Depression as Register: Evidence from Mijikenda

EREZ VOLK

Tel Aviv University

Introduction

The current paper deals with two related subjects: the representation of depressor consonants and, more generally, the representation of tone. I discuss some of the tonal phenomena found in Mijikenda—a family of nine closely-related Bantu dialects of coastal Kenya—and show that they support a register-based view of depressors and a domain-based view of tone and register. Specifically, I show that the phenomenon known as Tonal Fission (Cassimjee and Kisseberth 1992) is best analyzed as the interaction of low and high register domains with high tone domains.

The Mijikenda dialects, in alphabetical order, are: Chonyi, Digo, Duruma, Giryama, Jibana (Dzihana), Kambe, Kauma, Rabai, and Ribe (Rihe). This work is based on recordings collected by Charles Kisseberth.

1 High Tone Shift

The first and most striking feature of Mijikenda tonology is exemplified in the Giryama data in (1), contrasting first-person and third-person subjects in the present tense.¹ Vowel length is not contrastive; the penult is predictably lengthened.

(1)	Present 1sg.	Present 3sg.	
	ni-na-ma:la	<u>a</u> -na-mă:la	‘want’
	ni-na-mala ku-gu:la	<u>a</u> -na-mala ku-gũ:la	‘want to buy’
	ni-na-mala ku-gula ngu:wo	<u>a</u> -na-mala ku-gula ngu:wo	‘want to buy clothes’

This is High Tone Shift in Mijikenda: an underlying high tone (here originating on the third-person singular subject prefix a-) *shifts* to the right within the phonological phrase, and is heard on the penult. Contrast this with a “spreading” language

¹ Notation: \acute{v} high, \grave{v} / v low, \check{v} rising, \hat{v} falling, $^{\downarrow}v$ downstep, \underline{v} underlying location of high tone. The tone-bearing unit is the mora, which may be a vowel or a syllabic nasal.

like the Southern Bantu language Xitsonga (Kisseberth 1994), where a high tone is pronounced on all intermediate TBUs as well and we get *y-á-tsútsúmelá:na* ‘they are running to each other.’

When a phrase has more than one underlying high tone, each high tone surfaces on the TBU preceding the next underlying high tone (2, 3) or at the underlying location of the next high tone (4); the conditions governing this “overlap” vary between dialects and are not relevant for the present discussion.

- (2) High verb stems in the present tense (Kambe):

Infinitive	Present 1sg.	Present 3sg.	
ku-lǎ:la	ni-na-lǎ:la	y _u -ná-lǎ:la	‘sleep’
ku-rě:ha	ni-na-rě:ha	y _u -ná-rě:ha	‘give back’
ku-rĩ:sa	ni-na-rĩ:sa	y _u -ná-rĩ:sa	‘feed’
ku-kalǎ:ŋga	ni-na-kalǎ:ŋga	y _u -ná-kalǎ:ŋga	‘fry’
ku-kalangĩ:ra	ni-na-kalangĩ:ra	y _u -ná-kalangĩ:ra	‘fry for’
ku-tsungurĩ:ra	ni-na-tsungurĩ:ra	y _u -ná-tsungurĩ:ra	‘peep’

- (3) High verb stems in the present tense, with an object prefix (Kambe):

Present 3sg.

y _u -na-ní-rě:ha	‘(s)he’s giving back to me’
y _u -na-ní-hĩrĩ:ka	‘(s)he’s taking me along’
y _u -na-ní-sĩkĩ:ra	‘(s)he remembers me’

- (4) High verb stems in the present tense (Chonyi):

Infinitive	Present 3sg.	Present 3sg. + OP	
ku-há:dza	y _u -ná-há:dza	y _u -na-rí-há:dza	‘name’
ku-lá:vya	y _u -ná-lá:vya	y _u -na-chí-lá:vya	‘give’
ku-tá:la	y _u -ná-tá:la	y _u -na-βá-tá:la	‘count’
ku-téŋgé:za	y _u -na-téŋgé:za	y _u -na-chi-téŋgé:za	‘repair’
ku-kalǎ:ŋga	y _u -na-kalǎ:ŋga	y _u -na-chi-kalǎ:ŋga	‘fry’

I shall employ the concept of *feature domains* (Kisseberth 1994; Cole and Kisseberth 1994; Cassimjee and Kisseberth 1998). A feature domain—in this case, a High Tone Domain (HTD)—is a “plan for the realization of a feature”: a sequence of TBUs which “belong” to a single high tone. A high tone can only be realized (“expressed”) on TBUs which are in a high tone domain, but may, due to various factors, remain unexpressed on some—or even all—TBUs. In (5) we see the domain representation of a spreading language like Xitsonga, and in (6) is the shifting behavior of Mijikenda, where high tones are only expressed on the head (here, rightmost) element of the domain, which nevertheless includes additional TBUs.

- (5) Xitsonga, domain-based view (high tone domain marked by parentheses):
(y-á-tsútsúmeláa)na
- (6) Kambe, domain-based view: *(y_u-na-ní)-(sĩkĩ)ra*

Domains are mostly used (and most directly useful) within Optimality Theory; the domains representation, together with the set of constraints governing domain structure and feature expression, is Optimal Domains Theory (ODT). In cases such as those discussed above, we would have some constraint promoting the expansion of High Tone Domains—call it MAXIMAL HTD—and a higher-ranked constraint prohibiting the expansion of a HTD onto the ultima—the well-known NONFINALITY—as well as a set of constraints leading to the expression of the feature only on the head TBU. I shall not be overly concerned here with the “Optimal” part of Optimal Domains Theory; instead, I intend to demonstrate its applicability to depressor effects in Mijikenda.

2 Depressors I: Restricting High Tone Shift

It is well known that voicing tends to affect pitch. In many languages, a vowel following a voiced consonant will be pronounced at a lower pitch than otherwise. In a number of tone languages this has been phonologized to the point that we see a set of so-called “depressor” consonants which interact with tonal processes. In Mijikenda, depressors are basically the voiced (non-prenasalized) obstruents (stops, fricatives, and affricates, not including β). Their effect on High Tone Shift is readily seen in the data below:

(7) Depressors restricting HTS to stem (Giryama):

Non-depressed stem:

ku- $\beta\ddot{u}$: \ddot{o} ya	\underline{a} -na- $\beta\ddot{u}$: \ddot{o} ya	‘despise’
ku-f \ddot{i} :tsa	\underline{a} -na-f \ddot{i} :tsa	‘hide’
ku- $\beta a\beta\ddot{u}$:ka	\underline{a} -na- $\beta a\beta\ddot{u}$:ka	‘search around in the grass’
ku-f \ddot{u} t \ddot{a} :ma	\underline{a} -na-f \ddot{u} t \ddot{a} :ma	‘squat’
ku- $\beta a\beta$ uk \ddot{i} :ra	\underline{a} -na- $\beta a\beta$ uk \ddot{i} :ra	‘be searchable’
ku-ch \ddot{i} mbir \ddot{i} :ra	\underline{a} -na-ch \ddot{i} mbir \ddot{i} :ra	‘flee to’

Depressed stem:

ku-b \ddot{a} :nda	\underline{a} -ná-b \ddot{a} :nda	‘break’
ku-d \ddot{o} :na	\underline{a} -ná-d \ddot{o} :na	‘engrave’
ku-b \ddot{a} mb \ddot{a} :nda	\underline{a} -ná-b \ddot{a} mb \ddot{a} :nda	‘break up’
ku-d \ddot{a} ng \ddot{u} :la	\underline{a} -ná-d \ddot{a} ng \ddot{u} :la	‘persevere’
ku-b \ddot{a} mbah \ddot{u} :la	\underline{a} -ná-b \ddot{a} mbah \ddot{u} :la	‘wrench apart’
ku-g \ddot{b} eg \ddot{b} el \ddot{e} :ka	\underline{a} -ná-g \ddot{b} eg \ddot{b} el \ddot{e} :ka	‘fall with resounding noise’

(8) Depressors restricting HTS to OP (Duruma):

y \underline{u} -na-ch \ddot{i} -b \ddot{a} :nda	y \underline{u} -ná-vi-b \ddot{a} :nda	‘(s)he’s breaking [cl.7/8]’
y \underline{u} -na-r \ddot{i} -h \ddot{a} :dza	y \underline{u} -ná-ga-h \ddot{a} :dza	‘(s)he’s naming [cl.5/6]’
y \underline{u} -na-ch \ddot{i} -b \ddot{i} nik \ddot{i} :za	y \underline{u} -ná-vi-b \ddot{i} nik \ddot{i} :za	‘(s)he’s covering [cl.7/8]’

- (9) Depressors restricting HTS to OP (Giryama):
a-na-rí-rě:ha a-ná-ga-rě:ha ‘(s)he’s giving back [cl.5/6]’
a-na-kí-fĩ:tsa a-ná-vi-fĩ:tsa ‘(s)he’s hiding [cl.7/8]’
a-na-í-kalǎ:ŋga a-ná-zi-kalǎ:ŋga ‘(s)he’s frying [cl.9/10]’
- (10) Depressors restricting HTS to OP (Kambe):
yu-na-ní-hĩrĩ:ka yu-ná-ga-hĩrĩ:ka ‘(s)he’s sending me/[cl.6]’
- (11) Depressors restricting HTS to OP (Kauma):
a-na-chí-sǒ:ma a-ná-vi-sǒ:ma ‘(s)he’s reading [cl.7/8]’

Where the expected surface location of a high tone is depressed, High Tone Shift is restricted. Note that this only applies to the surface location and not to any intermediate TBUs, e.g., in Giryama a-na-zazigĩrĩ:ka ‘(s)he is willing to play’, where HTS passes over three depressors.

The apparently universal link between voicing and lowered pitch has led authors such as Bradshaw (1999) to claim that [+voice] and [Low Tone] are a single feature—see Downing (2009) for an overview of these “single-source” theories. Others, such as Rycroft (1980) or Downing and Gick (2001), have pointed out that voicing and depression are not entirely parallel: in some cases, depression is governed by other (e.g., morphological) factors, and in others there are voiceless depressors as well as voiced non-depressors.

This is the case in Mijikenda. In Giryama, the phonemes [h], [f] and [ǒ] all have depressor and non-depressor counterparts; in other words, they restrict High Tone Shift in some morphemes but not in others:

- (12) Depressor and non-depressor [h] in Giryama:
- | Non-depressor | | Depressor | |
|----------------------|------------------|------------------------|----------------|
| <u>a</u> -na-hâ:la | ‘take’ | <u>a</u> -ná-hũ:la | ‘dish up food’ |
| <u>a</u> -na-hóhǒ:la | ‘bend’ | <u>a</u> -ná-hohǒ:sa | ‘pervert’ |
| <u>a</u> -na-háhĩ:sa | ‘cause to vomit’ | <u>a</u> -ná-hendzě:za | ‘consent’ |
- (13) Depressor and non-depressor [f] in Giryama:
- | Non-depressor | | Depressor | |
|-------------------------|--------------|------------------------|----------|
| <u>a</u> -na-fwâ:ha | ‘be fitting’ | <u>a</u> -ná-fĩ:tsa | ‘hide’ |
| <u>a</u> -na-fútâ:ma | ‘squat’ | <u>a</u> -ná-fufũ:la | ‘revive’ |
| <u>a</u> -na-fwéǒeǒě:ka | ‘be ashamed’ | <u>a</u> -ná-fĩnikĩ:ra | ‘cover’ |
- (14) Depressor and non-depressor [ǒ] in Giryama:
- | Non-depressor | | Depressor | |
|-----------------------|-------------------|---------------------|---------------------------------|
| N/A | | <u>a</u> -ná-ǒǎ:a | ‘fasten string around calabash’ |
| <u>a</u> -na-ǒéǒě:dʒa | ‘coax’ | <u>a</u> -ná-ǒǎi:wa | pass. of ku-ǒǎ:a |
| <u>a</u> -na-ǒúnyũ:ka | ‘become contused’ | <u>a</u> -ná-ǒyǒ:ma | ‘speak with foreign accent’ |

2.1 Low Register Domains

In her ODT-based analysis of Xhosa tonology, Cassimjee (1998) argues that depression is best analyzed as a register feature: depressor consonants, as well as depressor-like morphological factors, form Low Register Domains, just like underlying high tones form High Tone Domains. The depressor effect we've seen so far in Mijikenda can clearly also be analyzed in such a way, although the benefit is not immediately evident. All we need to do is group all sequences of depressed TBUs in a phonological phrase into Low Register Domains, marked in the following data in boldface:

(15) High Tone Domains and Low Register Domains:

(a-na-zazi giri i)ka	'(s)he is willing to play' (Giryama)
(a-na-zazi i)ga	'(s)he is playing' (Giryama)
ni-na- vi -(b <i>iniki</i> i)za	'I'm covering [cl.8]' (Ribe)
(a-na-gula nguú)wo	'(s)he is buying clothes' (Chonyi)
cho(me a-ka-m-piga baraá)ka	'and Chome hit Baraka' (Giryama)
ni-na-(b <i>abadi</i> i)ka	'I'm walking slowly with a stick' (Gir.)
n-(o laga guú)de	'I'm killing a night dove' (Ribe)

The restriction of High Tone Shift could then be derived simply as a restriction on the expression of a high tone in a Low Register Domain. In a word like the Duruma *yú-ná-vi-binikí:za* '(s)he's covering [cl.8]', for example, the domain structure is *(yú-ná)-vi-(b*iniki*i)za*, and the expected form **(yú-na-ví)-(b*iniki*i)za* violates the ban on depressed high tones.

So far, however, Low Register Domains offer no clear advantage over directly saying "no high tone on a depressed TBU". The strongest point for Low Register Domains, as well as the "depression as a feature" view, comes from a rather unusual tonal phenomenon limited to two of the Mijikenda dialects.

3 Depressors II: Fission

In Ribe and Kauma we see a tonal phenomenon first described by Cassimjee and Kisseberth (1992) as "Fission,"² exemplified below with data from two speakers of Ribe, marked here Ribe₁ and Ribe₂ (the speakers differ somewhat in their morphology, but not tonally).

² The name "Fission" is based on an autosegmental, derivational analysis of the phenomenon, which shall not concern us here.

(16) Examples of Fission

In Ribe₁:

ku-súbũ:tu ‘to dare’

cf. ku-súbũ:tu (Chonyi)

ku-galá-gǎ:la ‘to writhe’

cf. ku-galá-gǎ:la (Chonyi)

w-á-zi-pĩ:ga ‘(s)he’s hitting [cl.10]’

cf. w-a-ni-pĩ:ga ‘(s)he’s hitting me’

w-á-zi-fúgũ:la ‘(s)he’s untying [cl.10]’

cf. n-a-zi-fugu:la ‘I’m untying [cl.10]’

In Ribe₂:

a-ndá-ga-fúgũ:la ‘(s)he’ll untie [cl.6]’

cf. ni-nda-ga-fugu:la ‘I’ll untie [cl.6]’

a-na-mala ku-gula ŋgũ:wo ‘(s)he wants to buy clothes’

cf. ni-na-mala ku-gula ŋgu:wo ‘I want to buy clothes’

a-na-píga má-bumbũ:mbu ‘(s)he’s beating drums’

cf. ni-na-píga ma-bumbumbu ‘I’m beating drums’

a-na-sága má-gondolõ:we ‘(s)he’s pounding grain’

cf. ni-na-saga ma-gondolo:we ‘I’m pouding grain’

Fission is especially striking in the phrasal data from Ribe₂. Compare a-na-píga má-bumbũ:mbu ‘(s)he is beating drums’ with ni-na-píga ma-bumbumbu ‘I’m beating drums.’ Clearly, in the third-person form there is only one underlying high tone, and yet it is heard in three different places: one is the penult, the target of High Tone Shift, but two more places are on TBUs which precede depressors. Descriptively, fission can be phrased in the following way: a high tone surfaces before every depressor it passes in the “wake” of High Tone Shift. In domain terms, we have here a single High Tone Domain in which the feature is pronounced on three non-consecutive TBUs: (a-na-píga má-bumbuú)mbu. (Note that, within the autosegmental framework, such a surface structure is impossible since it violates the “adjacency constraint” (Goldsmith 1976); autosegmentally, Fission requires multiple surface high tones.) But how do we derive Fission?

3.1 High Register Domains

The following analysis of Fission was inspired in part by McCarthy’s (2004) concept of “Headed Spans.” Since we have already seen that depressors can be represented as Low Register Domains, I suggest that a phonological phrase in Mijikenda is exhaustively parsed into alternating Low and High Register Domains. Just as a span of consecutive depressed TBUs form a Low Register Domains, a span of consecutive non-depressed TBUs should form a High Register Domain. And just like all feature domains in general, Register Domains are headed; in the case of Mijikenda, they are right-headed, meaning that the rightmost element in a High Register

Domain is in some sense considered to be the most prominent. Once we have these domains, Fission immediately falls out: an “extra” high tone will surface before every depressed TBU, since it is *the head of a High Register Domain*.

Consider for example the phrase *a-na-píga má-bumbũ:mbu*. Marking all (Upper and Lower) Register Domains with curly brackets, the domain structure here is (*a-na-pí*){*ga*}{*má*}-{*bu*}{*mbuú*}*mbu*}. The syllables *pí* and *má* are the heads of High Register Domains *and* are inside a High Tone Domain, and so (in the dialects that have Fission) the high tone is also expressed on them. On the other hand, the final syllable (*mbu*) does not get an extra high tone; although it is the head of a High Register Domain, it does not belong to a High Tone Domain, and so the feature “High” may not be expressed on it.

3.2 Some Properties of Fission

The domain-based analysis sheds light on two additional properties of Fission.

3.2.1 Fission and Depressor Sequences

One property of Fission discussed in Kisseberth and Volk (2007) can be described as follows: an extra H appears before every depressor, but never on a depressed TBU. This is exemplified below.

- (17) No extra high tone on a depressed TBU:

ni-nda-vi-gũ:la ‘I will buy [cl.8]’
βa-nda-vi-gũ:la ‘(s)he will buy [cl.8]’ (**βa-nda-v⁺i-gũ:la*)

ni-na-ga-zumbu:la ‘I’m seeking [cl.6]’
βa-na-ga-zumbũ:la ‘(s)he’s seeking [cl.6]’ (**βa-na-g⁺a-zumbũ:la*)

Take *βa-nda-vi-gũ:la* as an example. We see Fission on *-nda-*, since it precedes the depressed *-vi-*. However, there is no Fission on *-vi-* itself, despite the fact that the following syllable (*gũ:*) is depressed. This is what the register analysis predicts. Consider the domain structure: (*βa-nda*)-{*vi-gu*}{*ú*}*la*}, and recall the condition for Fission: on the head of every High Register Domain. Now, the *-vi-* is part of a *Low* Register Domain, and obviously cannot be the head of any High Register Domain. In other words, on this analysis we do not need to add a condition to Fission along the lines of “pronounce every pre-depressor TBU as high, *unless it is depressed itself*”; the register domain approach makes it impossible even to predict Fission resulting in an “extra” high tone on a depressed TBU.

3.2.2 Fission and High Tone Domains

There is a more subtle property of Fission which appears trivial at first, but is nevertheless quite useful in the tonal analysis of Mijikenda. Note that Fission can only result in a high tone appearing on a TBU which is part of a High Tone Domain. The trivial implication of this is that we do not get spurious high tones in phrases where there is no underlying high tone, e.g., *ni-nda-vi-gu:la* and not **ni-ndá-vi-gu:la*. But the point here is that the presence of an underlying high tone in the phrase is not enough; Fission can only operate along the “path” of High Tone Shift. This is the reason why we get an extra high tone on the *lá* in *ku-galá-gǎ:la* but never on the *ku*-prefix: the High Tone Domain here starts on the stem and, although the syllable following the *ku*- is depressed (*ga*), Fission may not operate there.

An example of the cases where this fact really helps us can be seen in the imperative. Consider first the imperative in *Giryama*:

(18) The imperative (data from *Giryama*):

Low stems:

<i>gu:la</i>	‘buy!’	<i>gulǎ:-ni</i>	‘(pl.) buy!’
<i>tso:la</i>	‘pick up!’	<i>tsolǎ:-ni</i>	‘(pl.)’
<i>tsuku:la</i>	‘carry!’	<i>tsukulǎ:-ni</i>	‘(pl.)’
<i>suku:ma</i>	‘push!’	<i>sukumǎ:-ni</i>	‘(pl.)’
<i>marigi:za</i>	‘close!’	<i>marigizǎ:-ni</i>	‘(pl.)’

High stems:

<i>fu:la</i>	‘wash clothes!’	<i>fulǎ:-ni</i>	‘(pl.)’
<i>pa:ta</i>	‘get!’	<i>patǎ:-ni</i>	‘(pl.)’
<i>siki:ra</i>	‘hear!’	<i>sikirǎ:-ni</i>	‘(pl.)’
<i>kala:ŋga</i>	‘fry!’	<i>kalaŋgǎ:-ni</i>	‘(pl.)’
<i>kalaŋgi:ra</i>	‘fry for!’	<i>kalaŋgirǎ:-ni</i>	‘(pl.)’
<i>teŋgeneze:ra</i>	‘make with/for!’	<i>teŋgenezerǎ:-ni</i>	‘(pl.)’

The singular imperative forms like *marigi:za* or *teŋgeneze:ra* appear to carry no high tone whatever. It is only when the plural suffix *-ni* is added that we hear the latent high tone. (This type of behavior is actually quite common in Mijikenda, but lies beyond the scope of the present discussion.) The question we’re interested in here is this: what is the underlying location of this high tone? At first glance, it might appear to be a floating tone which is barred from surfacing (for whatever reason) in the singular imperative. Evidence from the dialects with Fission, however, proves what the correct analysis must be:

(19) Fission in the Ribe₁ imperative:

No depressors:

la:la	‘sleep!’	lalǎ:-ni
ri:sa	‘feed!’	risǎ:-ni
kala:ŋga	‘fry!’	kalaŋǎ:-ni
hiri:ka	‘send!’	hirikǎ:-ni

Depressors:

galá-ga:la	(*gala-ga:la)	‘writhe!’	galá-galǎ:-ni
galú:za	(*galu:za)	‘change!’	galúzǎ:-ni
hégu:la	(*hegu:la)	‘remove from the fire!’	hégulǎ:-ni
súbu:tu	(*subu:tu)	‘dare!’	súbutǔ:-ni

The fact that Fission results in a surface high tone as early as the first syllable in hégu:la and súbu:tu shows that the high tone here cannot be floating; there must be a High Tone Domain that covers *the entire stem*, i.e., the domain structure of hégu:la is ({hé}{**gu**}{ula}), and a depressor-less imperative like kala:ŋga ‘fry’ has the domain structure (kalaan̄ga)—no Low Register Domains, no Fission.

There is one point that still remains, which is this: if we have a High Tone Domain that covers the stem in these verbs, why don’t we get a high tone on the head of that domain, namely on the ultima? Why get kala:ŋga and not *kala:ŋgá? This brings us back to the same Nonfinality effect we used above to explain why High Tone Shift stops on the penult: the final syllable in a phonological phrase in Mijikenda is never pronounced with high pitch. When morphological or other factors create a High Tone Domain that includes the ultima, that High tone is simply unable to surface. But facts such as Fission (as well as the surface location of preceding high tones) clearly show that the High Tone Domain has real surface presence.

4 Conclusion

As I have shown, the domains abstraction allows us to represent directly the phenomenon of Tonal Fission in Mijikenda. This supports the view of depression as a register effect, as opposed to the “single-source” view of depressors. Furthermore, by adding the notion of High Register Domains we get a natural motivation for Fission, as well as an almost trivial explanation of its scope and behavior.

References

- Bradshaw, Mary. 1999. A Cross-Linguistic Study of Consonant-Tone Interaction. Ph.D. thesis, Ohio State University.

- Cassimjee, Farida. 1998. *Isixhosa Tonology: An Optimal Domains Theory Analysis*. LINCOM Studies in African Linguistics, München: LINCOM Europa.
- Cassimjee, Farida and Charles W. Kisseberth. 1992. The Tonology of Depressor Consonants: Evidence from Mijikenda and Nguni. In *Proceedings of the Eighteenth Annual Meeting of the Berkeley Linguistics Society: Special Session on the Typology of Tone Languages*, 26–40, Berkeley Linguistics Society.
- Cassimjee, Farida and Charles W. Kisseberth. 1998. Optimal Domains Theory and Bantu Tonology: a Case Study from Isixhosa and Shingazidja. In Larry M. Hyman and Charles W. Kisseberth, eds., *Theoretical Aspects of Bantu Tone*, 33–132, CSLI Publications.
- Cole, Jennifer and Charles W. Kisseberth. 1994. An Optimal Domains Theory of Harmony. *Studies in the Linguistic Sciences* 24(2).
- Downing, Laura J. 2009. On Pitch Lowering Not Linked to Voicing: Nguni and Shona Group Depressors. *Language Sciences* 31:179–198.
- Downing, Laura J. and Bryan Gick. 2001. Voiceless Tone Depressors in Nambya and Botswana Kalang'a. In *Proceedings of BLS*, volume 27.
- Goldsmith, John. 1976. Autosegmental Phonology. Ph.D. thesis, MIT, Cambridge, MA.
- Kisseberth, Charles W. 1994. On Domains. In Jennifer Cole and Charles W. Kisseberth, eds., *Perspectives in Phonology*, 133–166, CSLI Publications.
- Kisseberth, Charles W. and Erez Volk. 2007. Theoretical Implications of Depressor Consonants. Handout given at the Workshop on Segments and Tone, Meertens Instituut, Amsterdam, June 7–8, 2007.
- McCarthy, John J. 2004. Headed Spans and Autosegmental Spreading. ROA-685.
- Rycroft, David K. 1980. The Depression Feature in Nguni Languages and its Interaction with Tone. Communication no. 8, Department of African Languages, Rhodes University, Grahamstown.

Erez Volk
Department of Linguistics
Tel-Aviv University
Tel-Aviv 69978, Israel

erez.volk@gmail.com

On Topic/Focus Agreement and Movement

BARRY C.-Y. YANG

National United University

Introduction

Chinese is the so-called isolating language or sometimes it is termed the “cool language” (Huang 1984) with respect to agreement and movement. In this paper, I would like to discuss three apparently unrelated phenomena and try to subsume them into general conditions on agreement and movement.

1 Three Apparently Unrelated Phenomena

The first phenomenon is the “discourse *pro*-drop”. That is, while on the one hand Chinese allows its subjects and objects to be omitted as in (1), unlike English in (2), on the other hand it does not employ rich morphological marking to restore its missing elements as in (3), unlike Italian in (4).

- (1) a. *e lai le.*
 come Perf.
 ‘[He] has come.’
 b. *Ta mai e le.*
 he buy Perf.
 ‘He has bought [it].’
- (2) a. *Has come.
 b. *He has bought.
- (3) (wo/ni/ta/women/nimen/tamen) shuo
 I/you.sg/he/we/you.pl/they speak

- (4) (io) parlo ‘I speak’
 (tu) parli ‘you.sg speak’
 (egli) parla ‘he/she speak’
 (noi) parliamo ‘we speak’
 (voi) parlate ‘you.pl speak’
 (essi) parlano ‘they speak’

The second phenomenon is the *wh*-construal. That is, while English overtly moves its *wh*-items to the sentence-initial position to take the scope as in (5), Chinese generally does not (6).

- (5) Whom_i does he like *t*_i?

- (6) Ta xihuan shei?
 he like whom
 ‘Whom does he like?’

Unless under certain special context, e.g., D-linking or contrastive focus, can Chinese *wh*-items undergo overt movement as in (7) (Wu 1999).

- (7) a. Shei_i/Na-ge-ren_i [ni zui xihua *t*_i]?
 which-CI-person you most like
 ‘Who/Which person do you like most?’
 b. Shenme-dongxi_i/Na-dao-cai_i [ta mei chi *t*_i]?
 What-thing which-CI-dish he not eat
 ‘What/Which dish didn’t he eat?’

The third phenomenon is the object preposing mechanism which is quite contrary to the *wh*-movement. That is, while English tends not to prepose its objects as in (8) and (10), Chinese is free to do so as in (9) and (11). The preposing can be further distinguished according to the landing site. (9) targets the IP-internal, preverbal position while (11) targets the IP-external, CP-peripheral position.

IP-internal preposing

- (8) a. *He the book_i returned *t*_i.
 b. *He even the book_i returned *t*_i.
 (9) a. [_{IP} Ta shu_i [_{VP} huan *t*_i] le].
 he book return Perf.
 ‘He returned the book.’

- b. [_{IP} Ta lian shu_i dou [_{vP} huan *t*_i] le].
he even book all return Perf.
'He even returned the book.'

IP-external preposing

- (10) a. ?The book_i, he has returned *t*_i.
b. ??Even the book_i he has returned *t*_i.
- (11) a. [_{CP} Shu_i [_{IP} ta huan *t*_i le]].
book he return Perf.
'The book, he has returned (it).'
- b. [_{CP} Lian shu_i [_{IP} ta dou huan *t*_i le]].
even book he all return Perf.
'Even the book he has returned (it).'

The aim of this paper is to suggest that the above paradigm is not coincident and can be reduced to general conditions on agreement and movement. Specifically, following Miyagawa (2010), I will show that the topic/focus feature plays a crucial role with respect to EPP licensing in the agreementless languages such as Chinese, in contrast to the phi-features in the agreement languages.

2 **Deriving Definite/Focus Interpretation**

It is well-known that being an agreementless language Chinese typically has to resort to discourse context to recover its empty subjects/objects.

- (12) a. Speaker A: Zhangsan lai le ma?
Zhangsan come Perf. Q
'Has Zhangsan come yet?'
b. Speaker B: *e* lai le.
 come Perf.
'[He] has come.'
- (13) a. Speaker A: Na-ben shu zhide du le.
that-Cl book worth read Perf.
'That book is worth reading.'
b. Speaker B: Wo yijing huan *e* le.
I already return Perf.
'I've already returned [it].'

In other words, their referents must be "old", presupposed, or "given" in the discourse or commonly assumed in the knowledge background. They are definite

or specific.¹ Therefore, in a scenario where speaker A and speaker B are talking about a painting in an art exhibition, a following out-of-the-blue utterance like (14a) is weird.

- (14) a. Speaker A: #Lai le.
 come Perf.
 ‘[He] came.’
 b. Speaker B: Shenme?
 what
 ‘What?’

One way to test its definiteness/specificity is via a certain modal construction. In Chinese when the modal construction involves an indefinite subject as in (15a), the subject is exclusively interpreted as nonspecific (Tsai 2001). Therefore, a follow-up null subject utterance in (15b) is awkward.

- (15) a. San-ge ren tai-de-chi yi-tai gangqin.
 three-Cl person lift-DE-up one-Cl piano
 ‘Three (nonspecific) men can lift up one piano.’
 b. #e yiding hen qiangzhuang.
 must very strong
 ‘[They] must be very strong.’

Syntactically, the definite reading can be derived from the functional layers above ν P--either somewhere between IP and ν P as in (16b), or in the CP domain as in (16c) (or InnerTopP for the former and OuterTopP for the latter, Paul 2002). Note that the bare NP in the canonical object position in (16a) can be interpreted as either definite or indefinite, whereas when preposed it must be interpreted as definite as in (16b, c).

- (16) a. Ta huan shu le.
 he return book Perf.
 ‘He returned a/the book.’
 b. [_{IP} Ta shu_i [_{ν P} huan t_i] le]. (=(9a))
 he book return Perf.
 ‘He returned the book.’
 c. [_{CP} Shu_i [_{IP} ta huan t_i le]]. (=(11a))
 book he return Perf.
 ‘The book, he returned (it).’

¹ We do not intend to distinguish definiteness from specificity in this study. As long as the referents are prominent and can be restored from the context, the null subjects/objects can be licensed.

Even the overtly moved wh-items as in (7) denote similar D-linked interpretation.

Meanwhile, Chinese subjects tend to have a strong definite/specific reading. The bare NP subjects in the following examples are always interpreted as definite.

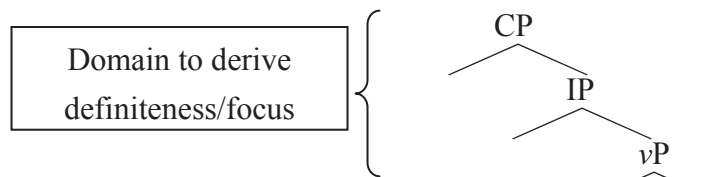
- (17) a. Ren lai le.
person come Perf.
'The person has come.'
b. Gou zai jiao.
dog Prog. bark
'The dog is barking.'

Turning to the focus construction, we observe a similar pattern. In Chinese, when an immediate, overt focus marker is attached to the object phrase, the object phrase must undergo obligatory fronting to either somewhere between IP and vP as in (18a), or in the CP domain as in (18b) (Qu 1994, Shyu 1995, 2001, Zhang 1997, Paul 2002, 2005). Without overt movement, the sentence is bad (18c).

- (18) a. [_{IP} Ta [_{lian} shu]_i dou [_{vP} huan *t_i*] le]. (= (9b))
he even book all return Perf.
'He even returned the book.'
b. [_{CP} [_{Lian} shu]_i [_{IP} ta dou huan *t_i* le]]. (= (11b))
even book he all return Perf.
'Even the book he has returned (it).'
c. *Ta [_{vP} huan lian shu] le .
he return even book Perf.
'He returned even the book.'

In this sense, the domain to syntactically derive the definiteness/focus interpretation is the functional layers above vP as shown in (19) (cf. Diesing 1992). I will show that this domain plays a crucial role in licensing the paradigm exhibited in the previous section.

(19)



3 Null Subjects

In this section, I will concentrate on the null subject and show that since it is

highly discourse-oriented and definiteness-related, it must have something to do with the CP domain. More specifically, I will show that it is licensed by the [*u*Top] feature at the matrix C-head which in turn needs to be checked/valued in the Minimalist term (Chomsky 1995).

3.1 The Categorical Status of Null Subject

Huang (1984:556) proposes that the null subject in Chinese can be either a variable when A'-bound or a *pro* when A-bound. Therefore, in the following example (20) when the null subject co-indexes with a discourse topic (which can be empty), it is a variable; when it co-indexes with the matrix subject, it is a *pro*.

- (20) Zhangsan_i suo *e*_{i/j} hui lai.
 Zhangsan say will come
 'Zhangsan_i said [he *e*_{i/j}] would come.'

However, in (21) the null subject is co-indexing with the topic phrase, so it should in principle be a variable like a *wh*-trace. Yet, this would wrongly rule out the sentences since the null subject is embedded within a complex NP island. Huang (1984, 1989) suggests that the null subject here is more like a pronominal, hence getting rid of island effects.

- (21) a. Zhangsan_i (a), [DP xuduo [CP *e*_i xie] de shu] dou mai de hen hao.
 Zhangsan Top many write DE book all sell DE very well
 'Zhangsan, many books that [he_i] wrote sell very well.'
 b. Zhangsan_i (a), [DP [CP *e*_i xihuan nanren] de yaoyan] man-tian fei.
 Zhangsan Top like man DE rumor full-day fly
 'Zhangsan_i, the rumor that [he_i] likes men spreads everywhere.'

Nevertheless, an interesting observation from the minimal pair of (21) suggests just to the opposite. (22) in the following is only minimally different from (21). Yet, unlike (21), when no overt topic phrase is available in (22), these sentences turn out to be awkward. This shows that the null subject here must be a variable, like a *wh*-trace, which is sensitive to island effects.

- (22) a. *[DP xuduo [CP *e* xie] de shu] dou hen changxiao.
 many write DE book all very sell.well
 'Many books that [he] writes sell well.'
 b. *[DP [CP *e* xihuan nanren] de yaoyan] man-tian fei.
 like man DE rumor full-day fly
 'The rumor that [he] likes men still spreads everywhere.'

More examples are given below with the adjunct island. Once again, with a topic

phrase, the sentences are fine (23); without it, they are not (24).

- (23) a. Zhangsan_i (a), yinwei e_i mei lai shangxue,
Zhangsan Top because not come go.to.school
laoshi_j hen shengqi.
teacher very upset
Lit. 'Zhangsan_i, because [he_i] didn't come to the school, the teacher_j
was very upset.'
b. Zhangsan_i (a), meidang e_i du shu shi,
Zhangsan Top whenever read book then
qitade ren_j dou bu neng chu sheng.
other people all not can make noise
Lit. 'Zhangsan_i, whenever [he_i] is studying, the other people_j cannot
make noise.'
- (24) a. *Yinwei e_i mei lai shangxue, laoshi_j hen shengqi.
because not come go.to.school teacher very upset
'Because [he_i] didn't come to the school, the teacher_j was very upset.'
b. *Meidang e_i du shu shi, qitade ren_j dou bu neng chu sheng.
whenever read book then other person all not can make noise
'Whenever [he_i] is studying, the other people_j cannot make noise.'

We know that empty topic is possible as in (1a), and long distance binding is also fine as in (20). Why, then, (22) and (24) are out? Why must the null subject in (22) and (24) be a variable whereas in (21) and (23) it must be a *pro*.

Before we move on, let's recapitulate what we have explored so far: 1) Chinese null subjects need to be licensed by discourse; 2) they are definite (or at least specific); 3) the functional layers above νP is strongly related to definiteness/specificity; 4) with an overt topic phrase (in the same sentence), the null subject behaves like a pronominal which is insensitive to island effects; 5) without an overt topic phrase, it behaves like a variable which is sensitive to island effects.

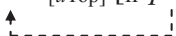
3.2 Licensing Null Subjects

In a similar vein of Miyagawa (2010) I assume the existence of a topic/focus feature at C. In the Minimalist term (Chomsky 1995), the topic feature [$u\text{Top}$] at C is presumably uninterpretable and is pending for valuation. I further propose that the null subject in Chinese is licensed by this [Top] feature at C.

There are basically two ways to check/value the [$u\text{Top}$], i.e., Merge and Move. When an overt topic phrase with interpretable [$i\text{Top}$] feature is available, it directly merges to C and checks/values the [$u\text{Top}$] feature at C as (25) shows.


- (25) [CP TopicP_[iTop] C_[uTop] [IP *pro* ...].

When the overt topic is not available, the uninterpretable [*uTop*] feature at C probes into the lower domain to find the subject *pro* and attracts it (or a certain feature of it).

- (26) [CP C_[uTop] [IP *pro* ...]
- 

This directly accounts for the contrast with respect to island effect between (21) and (22), and (23) and (24) respectively. In this sense, Huang's (1984) categorization on the dual status of the null subject is now recast with the criterion of movement which is determined by the checking/valuation of the uninterpretable [*uTop*] feature at C.

One way to test whether the movement in (26) really exists is via intervention effects. Originally, the intervention effect can serve as a diagnostics on LF-movement (or feature movement) (see, for example, Beck 1996, Beck & Kim 1997, Pesetsky 2000).

- (27) * [... *wh_i* ... [QP ... [*t_i*^{LF} ...]]] (adapted from Beck 1996)
- 

In the spirit of Rizzi's (2004, 2006, Endo 2007) Revised Relativized Minimality, we may extend the intervention effect to the blocking of LF-/feature movement of the same sort. We start from the topicalization in (28). In (28b) the embedded object is topicalized to the embedded CP and the sentence is fine.

- (28) a. Zhangsan shuo [Lisi du-guo yuyenxue].
 Zhangsan say Lisi study-Exp. linguistics
 'Zhangsan said Lisi studied linguistics before.'
 b. Zhangsan shuo [CP yuyenxue_k [Lisi du-guo *e_k*]].
 Zhangsan say linguistics Lisi study-Exp.
 'Zhangsan said Lisi studied linguistics before.'

When the embedded subject is missing as in (29a), it can be co-indexed either with the matrix subject Zhangsan as indexed by *i* or the discourse topic, say, Lisi (person name), which is empty in the sentence and is indexed by *j*. Let's focus on the index *j*. Now, when an intervening topic phrase appears at the embedded CP in (29b) the co-indexation of *j* is blocked. Only the *i*-reading surfaces.

- (29) a. Zhangsan_{*i*} shuo [*e_{i/j}* du-guo yuyenxue].

- Zhangsan say study-Exp. linguistics
 ‘Zhangsan_i said [he_{i/j}] studied linguistics before.’
 b. Zhangsan_i shuo yuyenxue_k, [e_{i/*j} du-guo e_k].
 Zhangsan say linguistics study-Exp.
 ‘Zhangsan_i said [he_{i/*j}] studied linguistics before.’

This is directly explained by the intervention account. As illustrated in the structure of (30), an intervening TopicP blocks the LF-/feature movement from the embedded subject, triggering intervention effects. This confirms our assumption in (26).

- (30) *_{[CP1 C_[uTop]... [CP2 TopicP [IP_{pro} ...]}
- ↑
-----↓

Moreover, when an overt topic phrase is present as in (31), the awkward indexation (the *j*-reading) between the empty subject and the topic phrase is remedied again. This is also predicted by our assumption in (25) above. The structure is illustrated in (35).

- (31) Lisi_j (a), Zhangsan_i shuo yuyenxue_k, [e_{*i/j} du-guo e_k].
 Lisi Top Zhangsan say linguistics study-Exp.
 ‘Lisi_j, Zhangsan_i said [he_{*i/j}] studied linguistics before.’

- (32) _{[CP1} $\overline{\text{C}}_{[uTop]}$, [IP ... _{[CP2 TopicP₂ [IP_{pro} ...]}
- ↑
TopicP₁[_TTop]

4 Topic/Focus-of vs. Subject-of

In Chomsky’s (2005, 2008) recent works, syntactic operations are assumed to be driven by phase heads, i.e., C, and *v**, instead of T or V. The apparent phi-features on T are in fact inherited from C, a phase head. The T-head then probes into the *v*P domain to find its matching Goal, the subject NP, to substantiate the Probe-Goal relation (or Agree) and attracts it to the Spec of TP as a requirement of EPP.

On the other hand, Miyagawa (2005, 2010) suggests that the notion of phi-feature agreement should be more abstract in the discourse configurational languages and can be reinterpreted as topic/focus agreement which triggers movement equivalent to the phi-feature agreement. He provides two examples to support his idea. The first one is from the focus movement. Focus in Japanese functions in the same way as the phi-features in the agreement languages (Miyagawa 2010). Take the Japanese example in (33) as demonstration. The *mo*

‘also’ phrase bears focus stress and is exclusively interpreted as taking scope over negation. Miyagawa suggests that the *mo*-phrase in Japanese should undergo A-movement to Spec,TP because it lacks reconstruction effect (Hasegawa 2005, Miyagawa 2007) and Weak Crossover effect. He then suggests that focus in Japanese functions in the same vein as the phi-features in the agreement languages (for details see Miyagawa 2010).

(from Miyagawa (2010:63) due to Hasegawa (1991, 1994, 2005))

- (33) John-mo ko-nakat-ta.
 John-also come-NEG-PAST
 ‘John (in addition to someone else) did not come.’
 *not>also, also>not

The second example comes from the topic movement (object scrambling). Miyagawa (2010) suggests that the topic movement exhibits a similar trait of A-movement as the focus movement (cf. Saito 2010). He shows that the scrambling example in (34) is in fact a case of topic movement driven by the topic feature. In (34a) the subject universal phrase scopes over negation whereas in (34b) when the object phrase is scrambled to precede the subject, the subject can take scope under negation. Miyagawa assumes that the reason why it is so is simply because the scrambled object takes the Spec,TP position while the subject universal phrase is forced to remain in *v*P, hence taking scope under negation.²

- (34) a. Zen’in-ga siken-o uke-nakat-ta.
 all-Nom. test-Acc. take-NEG-PAST
 ‘All did not take the test.’
 *not > all, all > not
 b. Siken-o_i zen’in-ga t_i uke-nakat-ta.
 test-Acc all-Nom. take-NEG-PAST
 ‘All didn’t take the test.’
 not > all, all > not

Chinese is even more transparent in topic and focus movement (see (9) and (11) above). Yet, unlike Japanese, the topic/focus movement does not target Spec,TP/IP. Two tests may be adopted to locate the positions that the topic/focus movement targets. The first one is the anchoring test. Heejeong Ko (2005) points out that downward entailing (DE) subjects like *hensao-ren* ‘few people’ and *meiyou-ren* ‘nobody’ in Chinese can’t undergo topicalization, hence being able to mark the canonical subject position, Spec,TP/IP (for details see Ko 2005). When it occurs with the object preposing (topic/focus movement), the relative positions

² The other reading where the subject still scopes over negation is derived from further movement. For details, please see Miyagawa (2010).

of the preposed object can, then, be easily located. As exhibited in (35b,c) the object preposing targets somewhere lower than the DE subject, which suggests that the object targets somewhere below IP. On the other hand, in (36) the object targets somewhere above IP, i.e., CP. On the other hand, in (36) the object targets somewhere above IP, i.e., CP.

- (35) a. Hensao-ren/Meiyou-ren mei du-guo na-ben shu.
Few-people/nobody not read-Exp. that-Cl book
'Few people/Nobody didn't read that book.'
few/none > not; *not>few/none
- b. [_{IP} Hensao-ren/Meiyou-ren na-ben shu_i mei [_{vP} du-guo *t_i*]].
few-people/nobody that-Cl book not read-Exp.
- c. [_{IP} Hensao-ren/Meiyou-ren [_{lian} na-ben shu_i] dou mei [_{vP} du-guo *t_i*]].
few-people/nobody even that-Cl book all not read-Exp.
- (36) a. Na-ben shu_i [_{IP} hensao-ren/meiyou-ren mei du-guo *t_i*].
that-Cl book few-people/nobody not read-Exp.
few/none > not; *not>few/none
- b. Lian na-ben shu_i dou [_{IP} hensao-ren/meiyou-ren mei du-guo *t_i*].
even that-Cl book all few-people/nobody not read-Exp.
few/none > not; *not>few/none

The second test is the scope test. As exhibited in (36), the subject always scopes over negation. This is different from the Japanese case (cf. (34b)). Following Miyagawa's (2010) reasoning, the scope test here shows that the IP-external movement here should target CP, instead of IP/TP.

To sum up, following Miyagawa (2005, 2010) I assume that the topic/focus feature has a direct bearing on the topicalization and focus fronting in Chinese. The IP-internal movement targets somewhere between TP/IP and vP and is triggered by the [Top/Foc] feature since the preposed object is either definite or focus. The IP-external movement targets CP, triggered by the same feature.

In other words, the "subject-of" function of the phi-features on T in the agreement languages is reinterpreted as the "topic/focus-of" function of the topic/focus feature in Chinese. This explains the reason why Chinese allows the object preposing mechanism freer than English as in (9) and (11). It also explains why the proposed object is interpretation-driven, i.e., being definite/specific or focused. Meanwhile, given the above demonstration, it follows that the object preposing is less acceptable in English since its phi-features on T works exclusively for the subject and have little to do with [Top/Foc] feature.

5 *Wh*-construal

Let's turn to the last issue, *wh*-construal. This issue has been well studied in the linguistic literature. I will limit the discussion to one approach that fits our purpose here. Tsai (1994) suggests that *wh*-construal should involve two parts—the Q-operator and the *wh*-variable. In English, these two parts stick to each other in the lexicon and the whole chunk then moves to CP to check the Q-feature at C as shown in (37a). In Chinese, however, these two parts are separated from each other. The Q-operator itself can check the Q-feature at C, leaving the *wh*-residue in-situ as shown in (37b). This explains the contrast between English and Chinese in terms of *wh*-movement.

(adapted from Tsai 1994, see also Aoun & Li 1993, Reinhart 1998)

- (37) a. English type: $[_{CP} \text{Op}_x\text{-wh}(x) [_{IP} \dots t_i \dots]]$
 b. Chinese type: $[_{CP} \text{Op}_x [_{IP} \dots \text{wh}(x) \dots]]$

On the other hand, the *wh*-fronting mechanism in Chinese is more of interpretation-driven in the sense that it is triggered by the [Top/Foc] feature (see also Wu 1999), which is akin to the case of object preposing. The fronted *wh*-item in (7) is either D-linked or contrastive focused. It presupposes a particular set of things/people that the *wh*-item questions into. They either serve as the common presupposition background that the speaker and the hearer hold unto (for the D-linked interpretation) or they serve as members of the alternative set that the contrastive focus dwells upon (for the contrastive focus interpretation). Either way, they are different from the Q-/wh-feature checking that the normal *wh*-item involves since the *wh*-fronting in Chinese is overt and is encoded with a strong D-linking or contrastive focus reading.

6 Concluding Remarks

This paper investigates three well-known yet peculiar and seemingly unrelated constructions in Chinese and shows that they involve at least three types of (non-)movement, i.e., overt movement, LF-/feature movement, and non-movement, as illustrated in the following table.

(38)

	<i>[Top/Foc] feature checking</i>
<i>Overt movement</i>	Object preposing (including <i>wh</i>)
<i>LF-/feature movement</i>	Null subject (w/o an overt topic)
<i>Non-movement</i>	Null subject (with an overt topic)

Further, it suggests that these constructions are not coincident and can be subsumed into general conditions on agreement and movement in a parametric way. That is, the three types of (non-)movement can all be subsumed into the checking of [Top/Foc] feature, a prominent feature in the agreementless, discourse-configurational languages such as Chinese. In this sense, we seem to be able to bridge some gaps between the agreement and agreementless languages and bring a step closer to the understanding of typological differences between these languages.

References

- Aoun, Joseph, and Audrey Li. 1993. Wh-elements in situ: Syntax or LF. *Linguistic Inquiry* 24:199-238.
- Beck, Sigrid, and Shin-Sook. Kim. 1997. On wh- and operator scope in Korean. *Journal of East Asian Linguistics* 6:339-384.
- Beck, Sigrid. 1996. *Wh-constructions and transparent Logical Form*. PhD diss., University of Tuebingen.
- Chomsky, Noam. 2001. Derivation by Phase. In Michael Kenstowicz, ed., *Ken Hale: A Life in Language*, 1-52. Cambridge, Mass.: MIT Press.
- Chomsky, Noam. 2005. Three factors in language design. *Linguistic Inquiry* 36:1-23.
- Chomsky, Noam. 2008. On phases. In Robert Freidin, Carlos Otero, and Maria-Luisa Zubizarreta, eds., *Foundational issues in linguistic theory*. 133-166. Cambridge, Mass: MIT Press.
- Diesing, Molly. 1992. *Indefinites*, Cambridge, Mass: MIP Press.
- Endo, Yoshio. 2007. *Locality and information structure: A cartographic approach to Japanese*. Amsterdam: Benjamins.
- Qu, Yanfeng. 1994. *Object noun phrase dislocation in Mandarin Chinese*. PhD diss., University of British Columbia.
- Hasegawa, Nobuko. 1991. Affirmative polarity items and negation in Japanese. In Carol Georgopoulos and Roberta Ishihara, eds., *Interdisciplinary approaches to language: Essays in honor of S.-Y. Kuroda*, 271-285. Dordrecht: Kluwer.

- Hasegawa, Nobuko. 1994. Economy of derivation and A'-movement in Japanese. In Masaru Nakamura, ed., *Current topics in English and Japanese*, 1-25. Tokyo: Hituzi Syobo.
- Hasegawa, Nobuko. 2005. The EPP materialized first, Agree later: Wh-questions, subjects and mo 'also'-phrases. *Scientific Approaches to Language* 4:33-88.
- Huang, C.-T. James, 1984. On the distribution and reference of empty pronouns. *Linguistic Inquiry* 15:531-574.
- Huang, C.-T. James. 1989. Pro-drop in Chinese: a generalized control theory. In Osvaldo Jaeggli and Kenneth Safir, eds., *The null subject parameter*, 185-214. Dordrecht: Kluwer.
- Ko, Hee-jeong. 2005. Syntax of wh-in-situ: Merge into [Spec, CP] in the overt syntax. *Natural Language and Linguistic Theory* 23:867-916.
- Miyagawa, Shigeru. 2005. On the EPP. In Norvin Richrads and Martha McGinnis, eds., *Proceedings of the EPP/Phase workshop, MIT Working Paper in Linguistics*.
- Miyagawa, Shigeru. 2007. Unifying agreement and agreementless languages. In Meltem Kelepir and Balkiz Öztürk, eds., *MIT Working Papers in Linguistics 54: Proceedings of the Workshop on Altaic Formal Linguistics II*, 47-66. Cambridge, Mass: MITWPL.
- Paul, Waltraud. 2002. Sentence-internal topics in Mandarin Chinese: the case of object preposing. *Language and Linguistics* 3.4:695-714.
- Paul, Waltraud. 2005. Low IP and left periphery in Mandarin Chinese. *Recherches Linguistiques de Vincennes* 33: 111-134.
- Qu, Yanfeng. 1994. *Object noun phrase dislocation in Mandarin Chinese*. Doctoral dissertation, University of British Columbia, Vancouver.
- Reinhart, Tanya. 1998. Wh-in-situ in the framework of the minimalist program. *Natural Language Semantics* 6(1): 29-56.
- Rizzi, Luigi. 2004. Locality and left periphery. In Adriana Belletti, ed., *Structures and beyond: The cartography of syntactic structures*, Vol. 3, 104-131. New York: Oxford University Press.

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- Rizzi, Luigi. 2006. On the form of chains: Criterial positions and ECP effects. In L. Cheng and N. Corver, eds., *Wh-movement: Moving on*, 97-133. Cambridge, MA: MIT Press.
- Saito, Mamoru. 2010. Semantic and Discourse Interpretation of the Japanese Left Periphery. In Nomi Erteschik-Shir and Lisa Rochman, eds., *The Sound Patterns of Syntax*, 140-173. Oxford: Oxford University Press.
- Shyu, Shu-ying. 1995. *The Syntax of Focus and Topic*. PhD diss., University of Southern California.
- Shyu, Shu-ying. 2001. Remarks on Object Movement in Mandarin SOV Order. *Language and Linguistics* 2(1): 93-124.
- Wu, Jianxin. 1999. *Syntax and semantics of quantification in Chinese*. PhD diss., University of Maryland at College Park.
- Zhang, Niina. 1997. *Syntactic Dependencies in Mandarin Chinese*. PhD diss., University of Toronto.
- Barry C.-Y. Yang
National United University
Dept. of Applied Foreign Languages/Language Center
1 Lienda, Miaoli City
36003, Taiwan
barryyang@nuu.edu.tw

**PARASESSION:
LANGUAGE, GENDER AND SEXUALITY**

The Purview Effect: Feminine Gender on Inanimates in Halkomelem Salish¹

DONNA B. GERDTS
Simon Fraser University

1 Introduction

Halkomelem is a Central Salish language spoken by around sixty elders in southwestern British Columbia, Canada. The data used in this study are based on fieldwork with speakers from the Island dialect, Hul’q’umi’num’, whose territory extends from Nanoose to Malahat on Vancouver Island and to the neighboring small islands. Halkomelem has been described as having a natural gender system: singular female humans take feminine determiners and other nouns take masculine determiners. However, feminine gender “leaks” onto hundreds of inanimate nouns, especially if they fit into certain semantic categories, as discussed in section 2. Interestingly, feminine gender is optional for feminine inanimates as they often also appear with masculine determiners. This raises the question: when will an inanimate appear in the feminine gender?

Research based on texts and elicitations has revealed three factors that affect gender choice. The first is the sex of the speaker, as discussed in section 3. The second is the sex of the possessor of a noun, as discussed in section 4. The third is the cognitive setting in which the NP occurs, as discussed in section 5. The Halkomelem data show that NPs that come into the feminine purview are more likely to appear with feminine determiners.

2 Halkomelem Gender

Morphologically, Halkomelem has two genders—masculine and feminine. Halkomelem encodes gender on determiners (articles and demonstratives) and the pronouns and auxiliaries formed from them. For simplicity, we limit examples in

¹ Thanks to the Halkomelem speakers who provided data for this project, especially Ruby Peter, Bill Seward, and the late Margaret James. Thanks to Zoey Peterson and Charles Ulrich for editorial assistance. Funding was provided by SSHRC, SFU, and Jacobs Research Fund.

this paper to NPs with determiners. The masculine and feminine forms of the proximal and distal articles in the Cowichan sub-dialect are given in Table 1:²

Table 1. Masculine versus feminine articles

	MASCULINE	FEMININE
PROXIMAL	t ^θ ə	θə
DISTAL	k ^w θə	lə

The use of gender is illustrated in the following table giving the articles used with proximal human NPs:

Table 2. Proximal articles and gender of animates

	MALE	FEMALE
SINGULAR	t ^θ ə swəy̌qeʔ ‘the man’	θə slɛniʔ ‘the woman’
PLURAL	t ^θ ə səw̌əy̌qeʔ ‘the men’	t ^θ ə slɛnɛniʔ ‘the women’

The feminine determiner θə is used with singular female nouns, and the masculine determiner t^θə is used elsewhere, including with nouns referring to plural females. Thus, the masculine serves as the default gender in the sense of Corbett (1991:205).³

Halkomelem has been described as having a natural gender system: singular female animates take feminine determiners, and other nouns take the default determiner (Galloway 1993, Suttles 2004). This generalization seems to be supported by data in which inanimate nouns appear with masculine determiners:⁴

- (1) ʔəwe:č q̌^waq^w-ət t^θə θqet ʔə t^θəñ sqəməľ,
NEG.2SG.SUB hit-TR DT tree OB DT.2POS paddle
ʔəw̌ hak^w-əš č ʔaľ t^θə šq̌^wq̌^wəm.
LNK use-TR 2SG.SUB MIT DT axe
‘Don’t hit the tree (M) with your paddle (M)! Just use the axe (M)!’⁵ (BS)

² The Cowichan sub-dialect is spoken in the vicinity of Duncan, British Columbia. The form of determiners vary from village to village in Halkomelem and is one of the main shibboleths used to identify where a speaker is from.

³ Most languages with two-way systems are like Halkomelem in that, when there is convergence, the masculine serves as the default gender Corbett (1991:195).

⁴ The following abbreviations are used in glossing the data: 1: first person, 2: second person, 3: third person, AUX: auxiliary, DIM: diminutive, DT: determiner, F: feminine, FUT: future, IMP: imperative, LCTR: limited control transitive, LNK: linker, MIT: mitigative, N: nominalizer, NEG: negative, OB: oblique, PERF: perfect, PL: plural, POS: possessive, PRFX: prefix associated with fluids, PRO: pronoun, REFL: reflexive, SG: singular, SUB: subject, TR: general transitive.

⁵ Note, to aid in following the discussion, I have placed an (M) for masculine or an (F) for feminine after the translations for some of the relevant nouns.

However, our data show that feminine gender “leaks” onto hundreds of inanimate nouns, for examples the words for ‘car’, ‘house’, ‘coat’, and ‘fire’:

- (2) $\text{h}i\dot{q}\text{-t}$ $\theta\dot{a}\dot{n}$ $sn\dot{a}x^w\dot{a}l$ $ʔ\dot{a}$ $\theta\dot{a}$ $le\dot{l}\dot{a}\dot{m}$!
 move-TR F.DT.2POS canoe OB F.DT house
 ‘Move your car (F) closer to the house (F)!’ (RP)
- (3) $ne\dot{m}$ $l\dot{a}$ $\dot{s}em\text{-}\dot{a}t$ $\theta\dot{a}\dot{n}$ $k\dot{a}pu$ $ʔ\dot{a}$ $\theta\dot{a}$ $h\dot{a}y\dot{q}^w$!
 go IMP dry-TR F.DT.2POS coat OB F.DT fire
 ‘Go and dry your coat (F) by the fire (F)!’ (RP)

As Gerdtz (2009) elaborates, feminine gender forms a complex semantic network, selecting objects on the basis of their size, shape, and function. Most feminine inanimate nouns fit into the following semantic categories: buildings, containers, small round objects, flexible objects, fluids and abstract objects associated with the metaphor of flowing (*song*, *story*, *dance*), and forces of nature.⁶ So, for example, the following inanimates are feminine:

- (4) $\dot{s}x^wimel\dot{a}$ ‘store’, $sme:nt$ ‘rock’, $c\dot{a}lqamaʔ$ ‘raspberry’, $l\dot{a}pat$ ‘cup’,
 $tel\dot{a}$ ‘money’, $stek\dot{a}n$ ‘sock’, $q^w\dot{l}\dot{a}y\dot{s}\dot{a}n$ ‘shoe’, $\dot{s}ya\dot{l}\dot{q}^w\dot{s}\dot{a}m$ ‘facecloth’,
 $sʔi\dot{t}^{\theta}\dot{a}m$ ‘dress’, $l\dot{a}\dot{x}^wt\dot{a}n$ ‘blanket’, $\dot{x}^wi\dot{l}\dot{a}\dot{m}$ ‘rope’, $s\dot{a}m\dot{s}a\theta\dot{a}t$ ‘sun’

In contrast, most objects—especially those referring to long, large, flat, or rigid objects—are masculine, for example:

- (5) $\dot{s}\dot{q}^wq^w\dot{a}m$ ‘axe’, $\dot{q}^waq^w\dot{a}st\dot{a}n$ ‘club’, $\dot{q}\dot{a}\dot{w}\dot{a}$ ‘cane’, $s\dot{q}\dot{a}m\dot{a}l$ ‘paddle’,
 $\theta q\dot{e}t$ ‘tree’, $l\dot{a}pl\dot{a}\dot{s}$ ‘board’, $\dot{x}\dot{a}l\dot{t}\dot{a}n$ ‘pencil’, $\dot{s}ew\dot{a}q$ ‘carrot’,
 $l\dot{a}tem$ ‘table’, $\dot{s}\dot{c}e\dot{n}\dot{a}ct\dot{a}n$ ‘chair’, $\dot{l}\dot{a}m\dot{a}n$ ‘wall’, $t\dot{a}m\dot{a}x^w$ ‘ground’

An added degree of complexity to the gender system is that inanimate NPs show a great deal of fluidity in how they are marked for gender. In neutral situations, masculine nouns do not appear with feminine determiners.

- (6) $t^{\theta}\dot{a}/*\theta\dot{a}$ $t\dot{a}m\dot{a}x^w$
 DT/F.DT ground
 ‘the ground’

In contrast, inanimate feminine nouns regularly appear with determiners of either gender.

⁶ Thus, Halkomelem is fairly typical of languages that have semantic gender systems (Lakoff 1987).

- (7) t^θə/θə snəx^wəɬ
DT/F.DT canoe
'the canoe'

In fact, the occurrence of feminine determiners with inanimate nouns is relatively rare, especially for some speakers. It is thus worthwhile to approach the issue from the point of view of actual usage of determiners in texts. For example, in four hours of recorded stories, Samuel Tom used feminine determiners on inanimate nouns only eight times and on only four different nouns, each of which also appeared with masculine determiners.⁷

Table 3: Masculine vs. feminine for four nouns in Samuel Tom's texts

		MASCULINE	FEMININE
sme:nt	rock, mountain	10	3
t ⁱ wi'əɬ	church	3	1
telə	money	2	3
həyq ^w	fire	1	1
TOTAL		16	8

In sum, inanimate nouns can be classified as masculine or feminine according to which determiner they appear with in neutral situations. However, the issue of gender is complicated by the fact that feminine determiners are not obligatory for feminine inanimates, which often appear with masculine determiners instead. Furthermore, sometimes inanimates that test to be masculine in neutral situations appear with feminine determiners. This raises the question: when is an inanimate likely to appear in the feminine gender? The following sections provide some observations on this issue.

3 Sex of the Speaker

One important factor in determining the use of gender on inanimates is the sex of the speaker. Anecdotally, speakers mention that use of feminine on inanimate nouns is something that women speakers tend to do. Text counts show that female speakers do use more feminine determiners than males. For example, we can contrast the overall use of masculine versus feminine determiners in four hours of texts by Samuel Tom with four hours of texts from Ruby Peter.⁸ These results show the preponderance of masculine determiners and the relative rarity of

⁷ Wayne Suttles recorded Samuel Tom of Malahat in 1962, when Mr. Tom was 102 years old. Ruby Peter and Donna Gerdt transcribed and translated these texts in 2004. Thanks to Sarah Kell for her help with this project.

⁸ Ruby Peter of Quamichan has recorded many hours of texts and I just randomly selected four hours of them in order to compare her speech to Samuel Tom's.

feminine determiners for both male and female speakers. Nevertheless, the female speaker used feminine determiners in 15% more cases.

Table 4: Gender of determiners in four hours of texts

	MASCULINE		FEMININE		TOTAL
Samuel Tom	1256	95%	72	5%	1328
Ruby Peter	1390	80%	340	20%	1730

Turning specifically to the topic of inanimates, we can see a difference when we compare the use of determiners with inanimates by Samuel Tom, see Table 3 above, and Sophie Micheal.⁹ In thirty-four minutes of texts, Mrs. Micheal used feminine determiners on five inanimate nouns, and one of them, *həyq^w* ‘fire’, did not appear with a masculine determiner.

Table 5: Masculine vs. feminine for five nouns in Sophie Micheal’s texts

		MASCULINE	FEMININE
<i>leləm</i>	house	1	3
<i>həyq^w</i>	fire	0	5
<i>šyamtən</i>	belt	2	1
<i>sk^weyəl</i>	day	1	3
<i>stīləm</i>	song	2	1
TOTAL		6	13

Even though Sophie Micheal’s recordings are one-twelfth the length of Samuel Tom’s, she used more feminine inanimate nouns.

In sum, text counts support the impression that female speakers use feminine gender more often than males do. Thus, Halkomelem appears to be another Native American language exhibiting sex-based inflectional differences, like Koasati (Haas 1944, Kimball 1990), Yana (Sapir 1949), Gros Ventre (Flannery 1946), Lakota (Trechter 1996), and Mexicano (Hill 1987). In particular, Munro (1998) reports sex-based differences in uses of gender on inanimates in Garifuna.

4 Inanimates and Possession

Another factor influencing the use of gender on inanimates is the sex of the possessor of the noun. For example, the abstract noun *sne* ‘name’ appears in the masculine gender if the possessor is male:

⁹ Sophie Micheal’s texts were also collected by Wayne Suttles in 1962.

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- (8) niɬ kʷθə/*ɬə sne-s nə-s-ʒiʔ kʷənəs təɬ-nəxʷ.
 3PRO DT/F.DT name-3POS 1SG.POS-N-want DT.1POS.N know-LCTR
 ‘I’m trying to remember his name.’ (RP)

However, if it is possessed by a female, then it can appear with a feminine determiner:

- (9) niɬ kʷθə/ɬə sne-s nə-s-ʒiʔ kʷənəs təɬ-nəxʷ.
 3PRO DT/F.DT name-3POS 1SG.POS-N-want DT.1POS.N know-LCTR
 ‘I’m trying to remember her name.’ (RP)

The long object *ʒəptən* ‘knife’ appears only with masculine gender when possessed by a male:

- (10) niʔ ʔəncə kʷθə/*ɬə ʒəptən-s tʰeɣ swiʷləs?
 AUX where DT/F.DT knife-3.POS DT boy
 ‘Where is that boy’s knife?’ (MJ)

However, when the possessor of the knife is female, it can appear instead with a feminine determiner:

- (11) niʔ ʔəncə kʷθə/ɬə ʒəptən-s tʰeɣ ɣəmiʔ?
 AUX where DT/F.DT knife-3.POS F.DEM girl
 ‘Where is that girl’s knife?’ (MJ)

It is clear that it is the sex of the possessor, not the speaker, that is relevant because both examples (10) and (11) were uttered by the same female speaker (Margaret James). Furthermore, we can rule out the possibility of a copying rule whereby the gender of the possessor is copied onto the head noun, since we also see the same effect in examples with first and second person possessors:

- (12) niʔ ʔəncə kʷθə-nə/*ɬə-nə ɕqʷalstən?
 AUX where DT-1SG.POS/F.DT-1SG.POS fork
 ‘Where is my fork?’ (BS)
 [male speaker/possessor]

- (13) niʔ ʔəncə kʷθə-nə/ɬə-nə ɕqʷalstən?
 AUX where DT-1SG.POS/F.DT-1SG.POS fork
 ‘Where is my fork?’ (RP)
 [female speaker/possessor]

- (14) niʔ ʔəncə kʷθə-nə /*lə-nə səwələmʔ?
 AUX where DT-1SG.POS/F.DT-1SG.POS toy
 ‘Where is your toy?’ (RP)
 [female speaker, male addressee/possessor]
- (15) niʔ ʔəncə kʷθə-nə /lə-nə səwələmʔ?
 AUX where DT-1SG.POS/F.DT-1SG.POS toy
 ‘Where is your toy?’ (RP)
 [female speaker, female addressee/possessor]

Thus, we see that some erstwhile masculine nouns can appear with feminine determiners when possessed by a female person.

To my knowledge, the phenomenon of the possessor determining the gender of the head has not been reported for other languages of the world. The converse—the possessor agreeing with the head—is fairly common cross-linguistically.

5 Cognitive Setting of the Noun

We have also observed the same speaker using both masculine or feminine gender on the same noun, even within the same section of narrative, depending on the way the speaker perceives the object. The speaker uses feminine gender on a noun if a particular setting highlights an aspect of the noun that is associated with feminine gender, e.g. its smallness, roundness, fluidity, etc.

Thus, for example, we see a table, being wide, hard, and rigid, is masculine, but a diminutive table is marked feminine:¹⁰

- (16) nem ceʔ ʔaθ tʰə lətem ʔə θə ʔəxʷin lələtem.
 go FUT lengthen DT table OB F.DT little table.DIM
 ‘You will lengthen the table (M) by adding the small table (F).’ (RP)

The word for ‘road’ is canonically masculine, since it is conceived of as long, thin, and rigid (17), but it can also be marked feminine when a road is being described as unusually curvy (18):

- (17) ʕəlīm ʔəw sθəθekʷ tʰə/*θə ʃel.
 really LNK straight DT/F.DT road
 ‘The road (M) is very straight.’ (RP)

¹⁰ French grammarians have noted associations between the size of an object and its gender in sets of related terms such as *la chaise* (‘chair’)/*le fauteil* (‘armchair’), *la maison* (‘house’)/*le masure* (‘mansion’), *la route* (‘road’)/*l’autoroute* (‘highway’), where the feminine member is smaller than the masculine one (Romaine 1999:82).

- (18) naʔət x^wiʔ pay-θət t^θə/θə šeɫ.
AUX.DT unusual bend-REFL DT/F.DT road
'The road (M/F) is unexpectedly curved.' (RP)

Water when it is contained is marked masculine (19), but, when it is running water acting as a force of nature, it is marked feminine.

- (19) naʔət wəl x^w-čiməm t^θə ɪəməwɫəč ʔə t^θə qaʔ.
AUX.DT PERF PRFX-full DT tub OB DT water
'The tub is almost full of water (M).' (MJ)

- (20) ʔeʔəθ wəl hiḱ^w θə qaʔ wəl q^wəlq^wəl t^θə q^wəq^wiliʔ.
AUX.F.DT PERF flood F.DT water PERF drift.PL DT log.PL
'The high tide (F) has drifted the logs to shore.' (RP)

In sum, a Halkomelem speaker uses either masculine or feminine gender on the same noun, even within the same section of narrative, depending on the cognitive setting.¹¹

6 Conclusion: The Purview Effect

Halkomelem gender is somewhat unusual in that inanimates exhibit fluidity of gender marking, unlike European languages where “the gender of a noun, qua lexical item, is decided once and for all, rather than on each occasion when the noun is used” (Dahl 2000:110).¹² Halkomelem nouns in the feminine purview can be marked feminine. These include (i) nouns referring to singular female humans, (ii) nouns referring to inanimate objects that are semantically feminine (based on their size, shape, or function), (iii) nouns that appear in a context that is feminizing, i.e. cognitively perceived as being feminine in size, shape, or function, (iv) inanimate objects that belong or relate to a female, and (v) feminine inanimate nouns spoken by a female.

References

- Corbett, Greville G. 1991. *Gender*. Cambridge: Cambridge University Press.
- Dahl, Östen. 2000. Animacy and the Notion of Semantic Gender. In Barbara Unterbeck et al., eds., 99–116.

¹¹ Payne (1998) classifies Maasai nouns into three types—masculine, feminine, and those that swing either way depending on “the speaker’s construal of the intended referent”.

¹² Algonquian languages also show some fluidity in gender agreement; see Dahlstrom (1995), Dahl (2000), Goddard (2002), and references therein.

- Dahlstrom, Amy. 1995. Motivation vs. Predictability in Algonquian Gender. *Papers of the Thirty-Third Algonquian Conference*, 52–66. Winnipeg: University of Manitoba.
- Flannery, Regina. 1946. Men's and Women's Speech in Gros Ventre. *International Journal of American Linguistics* 12:133–35.
- Gerdts, Donna B. 2009. Women, Fire, and Not So Dangerous Things: Explorations in Halkomelem Gender. Presidential Address, Annual Meeting of the Society for the Study of the Indigenous Languages of the Americas, San Francisco, California.
- Goddard, Ives. 2002. Grammatical Gender in Algonquian. *Papers of the Thirty-Third Algonquian Conference*, 195–231. Winnipeg: University of Manitoba.
- Haas, Mary. 1944. Men's and Women's Speech in Koasati. *Language* 20:142–49.
- Hill, Jane H. 1987. Women's Speech in Modern Mexicano. In S. U. Philips, S. Steele, and C. Tanz, eds., *Language, Gender, and Sex in Comparative Perspective*, 121–160. Cambridge: Cambridge University Press.
- Kimball, Geoffrey. 1990. A Further Note on 'Men's' Speech in Koasati. *International Journal of American Linguistics* 55:158–161.
- Lakoff, George. 1987. *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind*. Chicago: University of Chicago Press.
- Munro, Pamela. 1998. The Garifuna Gender System. In J. H. Hill, P. J. Mistry, and L. Campbell, eds. *The Life of Language: Papers in Linguistics in Honor of William Bright*, 443–462. Berlin: Mouton de Gruyter.
- Payne, Doris L. 1998. Maasai Gender in Typological Perspective. *Studies in African Linguistics* 27:2, 159–175.
- Romaine, Suzanne. 1999. *Communicating Gender*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Sapir, Edward. 1949 [1929]. Male and Female Forms of Speech in Yana. In D. G. Mandelbaum, ed., *Selected Writings of Edward Sapir in Language, Culture, and Personality*, 206–212. Berkeley: University of California Press.

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Trechter, Sara. 1996. *The Pragmatic Functions of Gender Deixis in Lakota*.
Ph.D. dissertation, University of Kansas.

Unterbeck, Barbara, Matti Rissanen, Terttu Nevalainen, and Mirja Saari, eds.
2000. *Gender in Grammar and Cognition*. Berlin: Mouton de Gruyter.

Donna Gerdts
Dept. of Linguistics
Simon Fraser University
Burnaby, British Columbia
Canada V5A 1Sb

gerdts@sfu.ca

Gender and the Social Meaning of Non-Modal Phonation Types

ROBERT J. PODESVA
Stanford University

1 Introduction

Although sociophoneticians often remark on the dearth of linguistic research on voice quality, the last decade has witnessed a significant increase in the number of studies examining variation in voice quality (Stuart-Smith 1999, Lefkowitz and Sicoli 2007, Mendoza-Denton 2007, Szakay 2008, Nielsen 2010, Yuasa 2010, Sicoli 2010, Chun and Podesva 2010, Lopez 2010). While the term *voice quality* is used to refer to various articulatory configurations of the larynx, velum, tongue, and lips – with consequences for phonation, nasality, and tenseness – I limit my scope to the *laryngeal* properties of voice quality. By *phonation*, I refer to the configuration of the vocal folds during speech.

Much of the literature on phonation has linked specific non-modal phonation types to gender, which will be my primary concern in this paper. The proposed connections between particular phonation types and gender have been both direct and indirect. For example, a number of scholars have found creaky voice to predominate among male speakers, as reported by Stuart-Smith (1999) in Glasgow, Esling (1978) in Edinburgh, and Henton and Bladon (1988) for speakers of RP and ‘Modified Northern’ English. The creaky voice pattern may arise from iconic associations between creaky voice and masculinity – the low pitch characterizing creaky voice is interpreted as resembling masculinity, due to gross tendencies for men to have lower pitched voices than women. This indexical association can be recruited to link creaky voice to stances conventionally associated with men, like toughness, at higher orders of indexicality. For instance, Mendoza-Denton (2007) has reported high rates of creaky voice among Latina gang girls when telling fight narratives, a linguistic practice associated with toughness. Similar ideological processes link falsetto, and its characteristically high pitch, to femininity. Blount and Padgug (1976), for example, report that English-speaking mothers are more likely than fathers to address their children in falsetto. In an earlier study on intraspeaker falsetto variation patterns (Podesva

2007), I argue that a conventionalized link between falsetto and expressiveness is what enables one gay man's use of falsetto to be interpreted as sounding gay.

Many of the links I have been discussing find roots in what Ohala (1994) has termed the *frequency code*, that is the association of high frequency with smallness and low frequency with largeness. High frequency sounds are iconic of the small vocal folds and small resonating cavities that produce them, while low frequency sounds likewise signal the large vocal folds and vocal tracts from which they emerge. Sex-based meanings stem from sexual dimorphism and the recognition that men tend to be larger than women. In a recent experimental study by Katherine Geenbergh (2010), speakers asked to tell a stuffed pig toy how cute she was elevated both their fundamental frequency and second formants. Higher f_0 levels are iconic of smaller vocal folds and higher F2 levels are similarly iconic of smaller vocal tracts; both suggest that adults draw on the frequency code in accommodating to the smallness of the addressee.

In spite of strong associations between particular phonation types and gender, associations that are facilitated by the frequency code, there seem to be some notable exceptions. For example, creaky voice – in spite of its low fundamental frequency – has been noted has been in the speech of young women. Lefkowitz (2007) found creaky voice to be prevalent in the speech of college-aged women in Virginia. In one of the most quantitative studies on creaky voice, Yuasa (2010) reports that young Californian women use creaky voice significantly more often than their male counterparts. Another exception appears to be that falsetto – in spite of its high fundamental frequency – has been widely observed in the speech of African American males (Alim 2004, Lopez 2010, Nielsen 2010). For example, Alim (2004) discusses his own use of falsetto when engaged in the discursive practice of 'battlin,' an important mode of interaction both in Sunnyside, where he conducted his fieldwork, and in the Hip Hop community more broadly.

The study I am going to discuss today will bring to light two additional phonation patterns that cannot be explained straightforwardly by the Frequency Code. My point is not that the code is flawed – it is clearly not a coincidence that so many cross-linguistic trends follow its predictions. Rather, I want to argue that we need to attend to the culturally specific ways in which it is interpreted and plays out. Ideology underlies even highly iconic interpretations of linguistic features of the sort I have discussed here. Irvine and Gal (1999) emphasize the importance of analyzing the ideological processes that lead us to naturalize the form-meaning connection. I stress that in spite of robust correlations between phonation patterns and identity categories, the social meanings of particular phonation types are culturally specific and should not be reduced to purely iconic or unanalyzed associations to either gender or race.

In what follows, I describe and discuss the significance of phonation variation patterns among African American and white residents of Washington, DC. In addition to exploring the nature of the connection between phonation and gender,

I show that gender and race cannot be analyzed as independent social factors. As a secondary goal, I aim to identify some prosodic and discourse constraints on phonation, since previous sociophonetic work devotes little attention to the linguistic factors that structure variation patterns in phonation.

2 Study

This phonation study is part of a larger project, Language and Communication in the Washington, DC, Metropolitan Area (LCDC). Even though the Washington Metropolitan area, which includes surrounding counties in Maryland and Virginia, is the ninth-largest in the United States, it is seriously understudied from a sociolinguistic perspective. The only large-scale variationist study conducted on the region to date is Fasold's study of tense marking among DC African Americans in the late sixties. The DC speech community is noteworthy in part because of its racial composition, with over half of its residents identifying as Black or African American. The remainder of the population is primarily white, at around 36% of the total population. There are also small but growing Hispanic and Asian American populations.

For this project targeting voice quality in particular,¹ the speech of 32 speakers, half African American and half white, was examined. Within each racial group, half of the speakers are male and half female, and we consider an array of evenly distributed ages within each group. Participants ranged from 18 to 75 years old.

Data are taken from a database of nearly 150 sociolinguistic interviews conducted by graduate students in the Georgetown sociolinguistics program. Given the potential for wide variation across topics, we considered only talk about the local community. This topic was not only discussed, but discussed at length, in all interviews. For each speaker, we divided all talk about the local community into intonational phrases, totaling nearly 10,000.

We coded each syllable auditorily -- totaling over 55,000 -- for the realization of phonation type, drawing six distinctions in phonation: modal (unmarked voicing), creaky voice (produced with relatively compressed and thick vocal folds, resulting in slow vibration, hence low fundamental frequency (f_0), and low airflow rates), falsetto (produced with stretched and adducted vocal folds, which give rise to rapid vocal fold vibration, hence high f_0), breathy voice (produced by keeping the glottis open along most of its length, vibrating without ever fully closing, typically with high airflow rates), whispery voice, and harsh voice (produced with a high degree of laryngeal tension, and acoustically characterized by jitter, or aperiodicity in f_0). As Laver (1980) notes, although breathy and whispery voice are articulatorily distinct, their auditory differences are less

¹ This study was conducted in collaboration with Sinae Lee at Georgetown University. We owe thanks to Hannah Yates, Chris Reid, and Elizabeth Ballance for their assistance with coding.

pronounced, as both are characterized by audible friction. We operationalized the distinction as one of voicing, with whispery voice being voiceless. Harsh voice was very rare in our data. Waveforms, spectrograms, and pitch tracks were displayed to search for acoustic evidence of auditory labels, and playback of data was conducted in Praat to facilitate repeated listening of isolated syllables. The coding was double-checked by a second researcher.

Data were coded for the social factors sex, race, age, and individual speaker. We also examined the effects of several linguistic factors, such as whether or not the IP contained constructed dialogue (or reported speech), the distance from the beginning and end of the IP (both in terms of number of syllables), and the length of the IP (also measured in number of syllables).

The percentage of each phonation type produced in each IP was calculated. For example, if a particular IP was 9 syllables long and 3 of those syllables were creaky, that IP would be 33% creaky, 67% modal, and 0% percent of the other phonation types. We then performed a mixed effects linear regression for each phonation type. The social factors age, sex, and race – which were factorially crossed – and the linguistic factors of whether the phrase contained constructed dialogue, and how long the IP was (in numbers of syllables) were included as fixed effects, and individual speaker was treated as a random effect.

We then conducted another series of binomial regressions treating each syllable – rather than each IP – as a token, so that we could examine the effect of prosodic position within the IP. We operationalized phrase position as the distance (in number of syllables) from the initial and final IP boundaries.

3 Results

3.1. Overall Frequencies

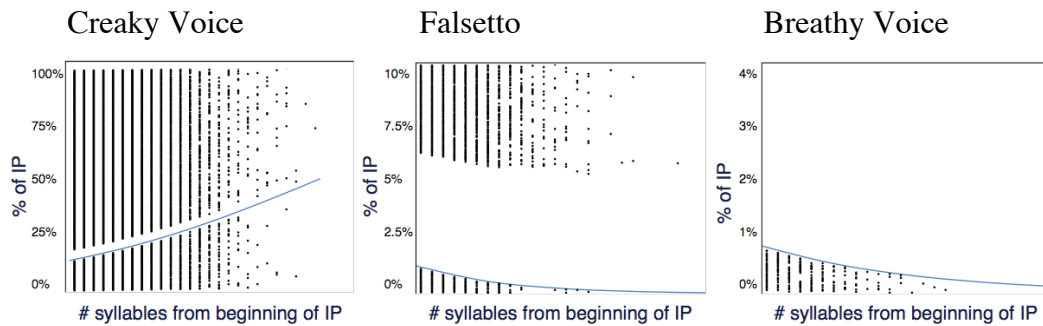
Unsurprisingly, modal voice occurred more commonly than any other phonation type, occupying nearly 79% of the IP on average. Creaky voice was the most common non-modal phonation type, occurring nearly 19% of the time. The remaining non-modal phonation types each accounted for less than 1% the IP on average: falsetto (.86%), breathy voice (0.71%), whispery (0.58%), and harsh (0.08%). The remainder of the analysis will focus on the four most common non-modal phonation types: creaky, falsetto, breathy, and whispery voice.

3.1 Linguistic Factors

Beginning with the linguistic factors that influenced the realization of non-modal phonation, the results reveal several effects of phrase position, as shown in (1). Creaky voice is more likely to occur toward the end of the intonation phrase (IP) ($p < 0.0001$). This finding, previously been reported by Henton and Bladon

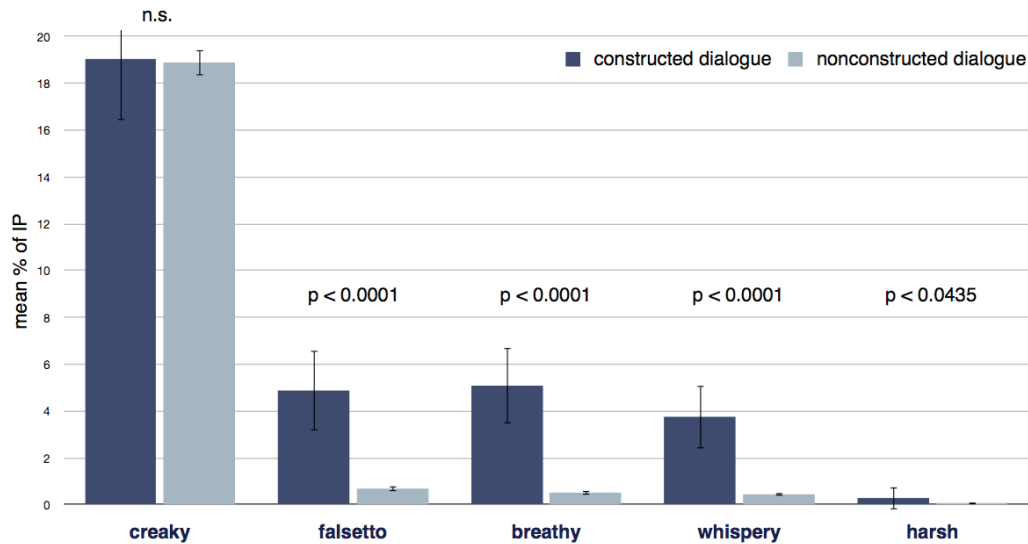
(1988), may relate to declination, whereby fundamental frequency gradually diminishes over the course of an utterance. Creaky voice appears at the ends of utterances when favorable aerodynamic conditions for modal voicing have faded. It may be also be a means of organizing breath groups, or viewed from an interactional perspective, serve as a means of marking the end of one's turn, as Ogden (2001) has found for Finnish. Falsetto shows the opposite pattern, as it is less likely to occur as one moves away from the beginning of the IP ($p < 0.0001$). This pattern may similarly relate to declination, or falsetto could be a phonatory means of realizing IP-initial high boundary tones. Finally, breathy voice is less likely to occur as the number of syllables from the beginning of the IP increases ($p < 0.0003$). Catford (1977) has noted the difficulty associated with sustained breathy voice due to the relatively high rate of airflow required to produce it. Thus, as airflow diminishes over the course of an utterance, it becomes progressively more difficult to phonate in breathy voice.

(1) Effects of phrase position on non-modal phonation rate



A second linguistic factor that strongly conditions the use of non-modal phonation is whether or not the IP contains constructed dialogue, or reported speech. Following Tannen (2007) [1989], we use the term 'constructed dialogue' rather than 'reported speech' since these representations of speech are very often not verbatim but are instead approximations of speech or thought. In (2), the bars on the left of each pair represent mean non-modal phonation rates in constructed dialogue, while the bars on the right represent non-modal phonation rates in other types of discourse. Although there is no significant difference for creaky voice, we see that all other non-modal phonation types occur much more commonly in constructed dialogue than elsewhere.

(2) Non-modal phonation rates according to discourse type



We suggest two primary reasons for why non-modal phonation predominates in constructed dialogue. On the most basic level, a shift into non-modal voicing marks a shift in footing, where the speaker distinguishes his or her voice in the present interaction from that of either another speaker or a past or future self. In other words, non-modal phonation is a means of ‘othering’ one’s voice. In (3), Cassius (a 29-year-old African American male) recounts the first day of a new job. Herein, creaky voice is indicated in transcripts with underscores. Here Cassius is reporting the words, actual or approximate, of his superiors at work and uses non-modal voicing to mark a shift from his own voice to those of his superiors. To use Goffman’s terminology, the vocal shift enables Cassius to indicate that he is simply animating the words of some other author.

- (3) First day, for about half an hour, they had me mopping up floors. And after that, they was like, “Cassius, you don’t have to mop floors no more.”

A second function of non-modal phonation in constructed dialogue is to convey a stance relating to the quotation itself, its speaker, or the event being narrated. In other words, I could not only be saying that these aren’t my words, but that I disagree with the words, that I don’t like the speaker, or that I’m not happy about what happened. An example of this function appears in (4), in which Carla (a 37-year-old white female) talks about taking her mother out for her seventieth birthday. Strikethrough text is used to indicate breathy voice. In this particular case, it is possible that Carla is distinguishing her speech in the interview from her words in the story world, but it is more likely that she never

actually uttered the words, “That’s insane.” The constructed dialogue here – and her shift in phonation – are instead marking her oppositional stance toward the expensive dinner.

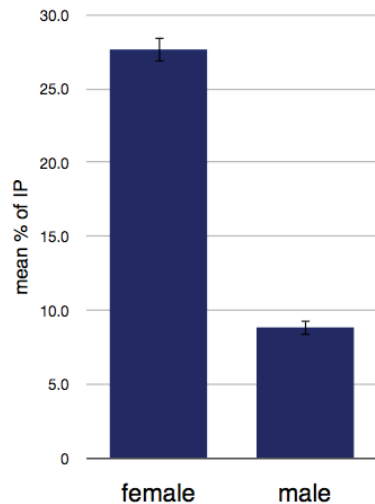
- (4) It was three hundred dollars a person for dinner to start with. And I was like, “That’s insane.”

3.2 Social Factors

The linguistic factors identified in the previous section were included in the regression analyses used to determine the effects of the social factors gender, race, and age. Interestingly, age was not selected, on its own or in interaction with any of the other social variables, for any of the phonation types considered. Gender and race, however, had a significant effect on a number of our phonation variables.

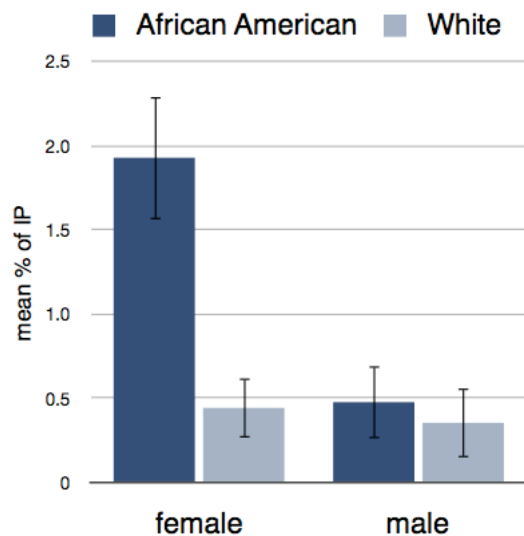
Beginning with creaky voice, females use considerably more creaky voice than male speakers ($p < 0.0003$), regardless of race, as shown in (5). This is an interesting finding in light of the previous quantitative work reviewed above reporting the prevalence of creaky voice among men, though it is consistent with more recent reports of women’s high rates of creaky voice.

- (5) Effect of Gender on Creaky Voice



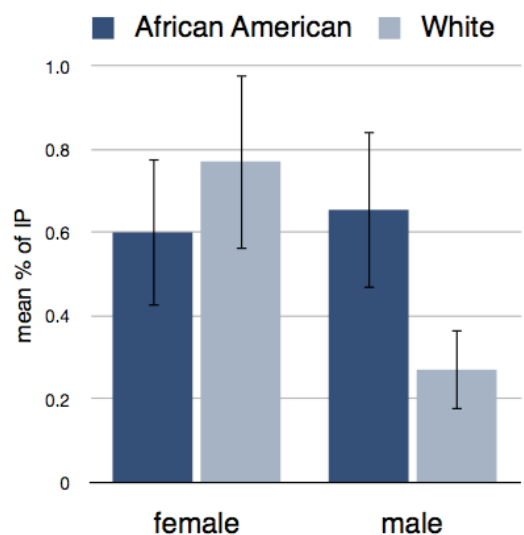
The results also show that females use falsetto more than males ($p < 0.0297$), but a gender*race interaction showed that this pattern was attributable to especially high rates of falsetto among African American women ($p < 0.201$). As illustrated in (6), falsetto accounted for approximately 2% of African American women’s IPs, while this value was less than 0.5% for each of the other groups.

(6) Effect of Gender and Race on Falsetto



A gender effect is also evident for whispery voice, as shown in (7). Just as Stuart-Smith (1999) found that women were more whispery than men in Glasgow, we see here that white females are more whispery than white males ($p < 0.0362$), though there is no difference among African Americans.

(7) Effect of Gender and Race on Whispery Voice



Regarding the other remaining phonation types, neither breathy voice nor harsh voice was influenced by gender, race, or their interaction.

4 Significance of Gender Patterns

4.1 Whispy Voice and White Men

In this section, I discuss the significance of the three main findings for the social factors, beginning with the pattern for whispy voice, as illustrated in (7). An interaction between gender and race revealed that white men use less whispy voice than all the other groups. This pattern is noteworthy because it illustrates that white men diverge from the norm established by the three other groups. Here, I want to stress the importance of including a diverse speaking population in investigations of phonetic variation. Had we considered the pattern for white speakers only, we would see that (white) women use more whispy voice than (white) men, a finding reported previously in at least one study (Stuart-Smith 1999). This finding establishes only that white women and men use significantly different rates; it does not reveal which pattern should be considered marked. But as Henton and Bladon (1985) have pointed out, the female pattern in such cases would often be characterized as marked, as if the default pattern were no whispy voice at all. However, when we also consider the whispy rates of African American speakers, we see that in fact it is the white male pattern that is marked. That is, the white men in the DC corpus use relatively little whispy voice, with African American men, and both white and African American women using similar rates as one another. Thus, it is not the case that whispy voice indexes femininity, or even white femininity. Rather, low rates of whispy voice characterize the speech of white men. I do not mean to suggest that low rates of whispy voice “mean” white masculinity, though the data are more consistent with that interpretation than one linking whispy voice to femininity.

4.2 Creaky Voice and Women

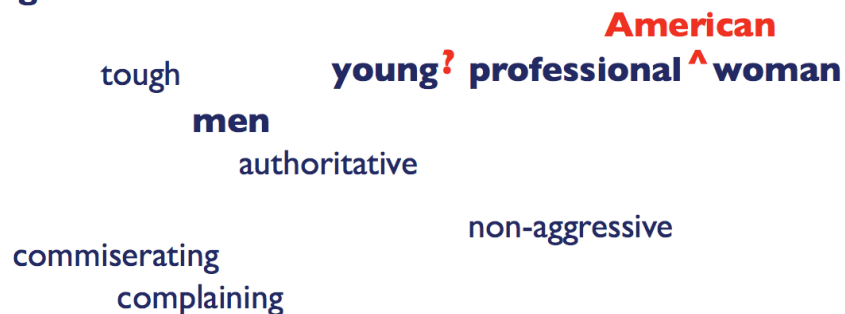
The second gender pattern I want to discuss is the prevalence of creaky voice among women, as shown in (5). That creaky voice is so strongly represented in the speech of the women in our study is evidence that the conventional association between creak and masculinity has been weakened, at least in the community under investigation here.

The question now is what does creaky voice mean? A handful of studies have examined this question, and proposals are widely divergent. In reviewing previous proposals, I will assemble a preliminary indexical field for creaky voice in (8). As Eckert (2008) proposes, an indexical field is a representation of the range of social meanings, as well as their inter-relations, that can be activated in the social contexts in which variables are used. Importantly, indexical fields collocate different classes of meaning that can range from fleeting interactional stances (like ‘emphatic’ or ‘careful’), which are indicated in plain text in the indexical

field, to more enduring personas (like divas or nerds), which are indicated in bold text. At the interactional level, Brown and Levinson (1987) have proposed that creaky voice can be used to commiserate or complain. Dilley et al. (1996) found that creaky voice is frequent in the speech of female radio newscasters and suggest that creak can be used to take an authoritative stance. Lefkowitz (2007) provides further support for this proposal. He found that college-aged women used creaky voice most often when taking authoritative stances. Tannen (unpublished) argues that creaky voice enables female speakers to be authoritative without being overly aggressive. Mendoza-Denton (2007) discusses a rather different meaning of creaky voice – toughness. She reports that Latina gang-affiliated girls in Northern California use creaky voice most often when telling fight stories. Most recently, Yuasa (2010), who found high rates of creaky voice among young Northern Californian women, proposed that creaky voice indexes a new upwardly-mobile, or professional, female persona. Over 56% of her respondents judged creaky voice to sound what Yuasa labels urban-oriented and upwardly mobile, using descriptors like ‘professional,’ ‘graduate student,’ and ‘urban.’ She speculates that creaky voice enables women to index ‘the image of educated urban professional women capable of competing with their male counterparts.’ According to this interpretation, then, the social meaning of creaky voice is rooted in its resemblance to men’s voices.

(8) Indexical field for creaky voice

gang-affiliated Latina



The current study sheds some light on the configuration of the indexical field for creaky voice. One question is how widely does the professional young woman persona circulate? On the one hand, the DC data suggest that it circulates widely, since it appears that women in both DC and Northern California phonate extensively in creaky voice. It may not extend far past the East Coast, however. Yuasa reports on Pennock-Speck’s (2005) finding that American actresses use significantly lower rates of creaky voice when playing British characters. The professional young woman persona may therefore be a distinctly American one. Issues of geography aside, can we be sure the professional woman persona is young?

The participants in Yuasa's study were all under the age of 34. In the DC study, we found that younger women were no more likely to use creaky voice than older women, as age had no significant effect.

4.3 Falsetto and African American Women

I devote the remainder of the paper to the final gendered phonation pattern – that falsetto was used most in the speech of African American women, as shown in (6). This finding is noteworthy because falsetto has been described in particular as a feature used by African American males (Alim 2004, Lopez 2010, Nielsen 2010). Of course, previous scholars have noted African American men's use of falsetto, precisely because the pattern bucks conventional associations between high pitch and femininity – an association that may in fact only be at play among white speakers. However, even though falsetto may be culturally licensed for African American men, they do not use it as often as the African American women represented in our data, nor do they use it more than the white speakers, male or female, in the DC corpus. Noting the use of falsetto among African American men is on the one hand empowering to African Americans because it brings to light a non-hegemonic, and culturally important, form of communicative practice. Yet on the other hand, it runs the risk of representing the use of falsetto by African American males as an African American practice more generally. In so doing, it erases the experience of African American women, when it is in fact they who use the feature the most.

Before I address why African American women use falsetto the most, I want to be clear that I am not claiming that falsetto should not be viewed as a feature of African American English. Speakers' metalinguistic talk indicates that falsetto is viewed as a feature of at least some African American ways of speaking. In the extract in (9), Zara (a 21-year-old African American woman) describes distinctive African American cultural practices in lines 1-9. In what follows Zara introduces and performs a speech style that she views as a distinctively African American way of speaking. Falsetto is marked here in italics, and descriptions of non-speech sound appear in angled brackets. We know from line 3 that Zara is exemplifying elements of African American culture in this extract, and we know from her use of first person plural pronouns in lines 7 and 8 that the speech she produces in her performance is not her idiolect, but rather a more general style shared by African Americans. Before entering the performance frame, Zara uses habitual *be* in line 11, and then draws attention to her use of this distinctively AAVE feature in line 12 because it foreshadows the dialect performance she's about to produce. In the performance itself in lines 14-15, Zara begins with suck-teeth, which Rickford and Rickford (1976) and Alim (2004) describe as a discursive feature of African American English, Caribbean creoles, and several African languages. In line 15, Zara's utterance is incomprehensible to start, but it is clearly produced in falsetto.

Here, the content of the utterance is incidental to the way it is realized. Zara is producing an African American style, and falsetto at least partly constitutes that style.

(9) Falsetto as a feature of African American English

- 1 you know
- 2 like slavery and oppression has like messed us up
- 3 (but) we have never lost our culture
- 4 like it's- it's different
- 5 but it's still there
- 6 like the way we practice religion
- 7 the way we talk to our friends
- 8 even- even in the way we talk
- 9 like I was telling my mom how she used to
always get on me for how I talked
- 10 cos I talk like this when I'm at home
- 11 and I be talking to my dad like
- 12 see "I be talking"
- 13 I be talking to my dad like
- 14 "<suck-teeth> I mean, da:d."
- 15 "<incomprehensible> I don't understand"
- 16 you know

I would therefore argue that one of the social meanings of falsetto is 'African American,' but what are the others? In a paper on a gay man's intraspeaker falsetto patterns (Podesva 2007), I argued that the core social meaning of falsetto is 'expressive.' Expressiveness is recruited in various ways to do many kinds of interactional work. For example, Goodwin et al. (2002) argue young Latina girls use falsetto to take an oppositional stance when playing games. The gay man I studied used falsetto for still other purposes, such as expressing excitement and entertaining his interlocutors. For these and other reasons, I argued that falsetto was used as a linguistic element of the gay man's diva persona.

In spite of good reasons for thinking that the indexical field for falsetto presented in (10) may circulate across very different kinds of communities, it is important to understand that in the situated use of a variable, only a limited subset of the variable's meanings are activated. Studies concerned with the social meaning of variation have devoted little attention to this issue. Such studies deal a fair amount with how social meanings relate to one another, and in particular with how stances build up into personas. But we pay less attention to the fact that not every speaker necessarily shares all these meanings, and that many of these meanings are not relevant in particular contexts. I turn now to consider the

situatedness of linguistic features. The instances of falsetto under discussion are on the one hand situated in a particular speech community – that of Washington, DC. They are also situated in talk about the local community; recall that we limited our analysis to talk about this topic. Finally, falsetto is situated in particular discourse contexts, in moments of interaction. Examining how falsetto is used at these moments, I argue, sheds valuable light on the social meanings of falsetto in the local DC context. In particular, it may illuminate the stance-based meanings of falsetto.

(10) Indexical field for falsetto

African American

oppositional

Gay Diva

expressive entertaining
excited

While definitions of stance vary widely, common to all of them is the notion that stance refers to speakers' evaluations (Clift 2010:518). We are adopting Du Bois' (2007) framework for stance, what he terms the stance triangle. According to the framework, a stancetaking subject (which forms one corner of the triangle) evaluates a stance object (at another corner), thereby positioning him/herself with respect to that object. The same stance object is understood to position another stancetaking subject (at the third corner of the triangle), which also evaluates the stance object. That both stancetaking subjects are evaluating the same object creates an alignment (or disalignment) between them.

To pursue an analysis of stance-taking in our data, we decided to narrow our scope to stretches of speech containing the most highly falsetto utterances. Working under the assumption that the most telling examples of falsetto would be the ones in which it lasted for long stretches of time, we ruled out IPs with two or fewer syllables of falsetto. We further assumed that isolated IPs bearing falsetto would be less informative than stretches of speech containing more than one falsetto-carrying IP. We therefore considered only those examples of falsetto where two IPs containing three or more falsetto syllables occurred in the same turn. These rather strict criteria yielded 17 "highly falsetto" turns for deeper analysis. We could have used more permissive criteria in selecting utterances for coding, thus increasing our N, but we wanted to ensure that the utterances we were examining were phonetically comparable. It is not necessarily the case that extreme instances of falsetto, like those we're examining, would function the same way as instances in which it occurs on isolated syllables. In spite of the

small number of discourse segments we examined – which is a well-recognized hurdle in attempts to combine conversation analysis and phonetic variation – a few noteworthy trends emerge.

The most striking pattern we found was that in all 17 instances, speakers used falsetto when negatively evaluating the stance object. This pattern is consistent with previous claims by a number of researchers, such as Goodwin et al. (2002), Alim (2004), and Nielsen (2010). The ‘oppositional’ meaning of the indexical field in (10), then, appears to be a highly conventionalized meaning of falsetto that recurs across communities. It is important to note, however, that falsetto does not always express an oppositional stance, as illustrated by several examples in Podesva (2007), in which falsetto is used to positively evaluate stance objects.

In addition to the question of what kinds of stances are being taken when using falsetto, we might ask who in particular is engaged in negative evaluation via falsetto. Out of the 17 disalignments expressed with highly falsetto utterances, 13 were produced by African Americans, and of these, 10 were produced by women.

Finally, we can consider what African American women are negatively evaluating when they use falsetto. An analysis of the stance objects reveals that 5 are about the same topic: gentrification. As discussed by Williams (1988) and Modan (2007), gentrification is one of the most salient socioeconomic issues in DC. Of course, gentrification also a racial issue, frequently described by our interviewees as a phenomenon whereby whites are driving African Americans out of traditionally black neighborhoods into more affordable housing in the suburbs. On a related note, an additional 3 of the examples from African American women are about racism.

It is important to note that the data under analysis cover a number of other topics apart from racism and gentrification, but it is these topics in particular that inspire speakers – African American women, in particular – to use highly falsetto speech. None of the white speakers use falsetto to take a stance against gentrification or racism; they talked about local issues in their interviews, but they oriented to them differently.

To better understand how falsetto functions in these data, consider the example in (11). In this excerpt, Mona (a 40-year-old African American woman) has just been asked whether she sees the gentrification process around her neighborhood, where the interview was taking place. Falsetto is indicated in italics, as in previous examples, and the maximum pitch level is indicated in the following parentheses. The stance object to which Mona is orienting is gentrification. She evaluates it negatively, given that it is driving up taxes, leaving some people unable to pay them. Her use of generic second persons in lines 4-7 indicates that the problem is not her individual problem, but one that several members of the community are facing. Her negative evaluation of gentrification positions her in opposition to gentrifiers, or those who are making gentrification “happen on

purpose.” Mona first asserts that gentrifiers are not intentionally driving out longstanding inhabitants of the community in line 11, but she expresses a slight change in her position in line 13. Not coincidentally, she reaches her peak f0 for the entire turn – at 543 Hz – in this final stretch of falsetto.

(11) Use of falsetto to negatively evaluate gentrification

- 1 the property taxes are going up
- 2 and people are on their fixed incomes
- 3 and
- 4 you can't *afford* (502 Hz)
- 5 to repair your house
- 6 and pay your taxes
- 7 so you just kind of have to *choose* (407 Hz)
- 8 which one
- 9 so
- 10 I *think it's* (470 Hz) happening
- 11 but I *don't think it's* (392 Hz) happening all of the time on purpose
- 12 I think in some of the communities
- 13 I *think it does* (543 Hz) happen on purpose

To address why African American women, like Mona, are using falsetto more than African American men, I appeal to intersectionality theory. The concept of intersectionality, coined by legal scholar Kimberlé Crenshaw (1989), emphasizes the fact that intersecting dimensions of identity do not simply amount to the sum of the component identities. Thus, to be an African American woman is not equivalent to being African American plus being a woman, because such a view does not capture all dimensions of oppression that multiply marginal people experience. Wong (2010) points out that intersectionality theory encourages us to ‘take seriously the lived experiences of those we study.’

So what are the local power dynamics that position African American women in DC? If we look more closely at the four most vociferous falsetto users (those that produce the greatest number of highly falsetto utterances) we see that they all live, work, and study in their local communities. Zara, for example, is a student at Howard University, a historically black university in the district. Howard is located in the Shaw neighborhood, which borders on the U Street corridor, the epicenter of gentrification in the district where over 2,000 luxury condos have been built in the last 10 years. Carrie works as an audio technician at a radio station just blocks away from her home in Northeast DC. In fact, she claims that she took her job in response to the encroachment of the large satellite radio station. In her words, “I’m getting a piece of it.” Mona works for a local non-profit organization, and Olivia is the president of the neighborhood association.

All four are strongly tied to their communities, and none of their traditionally black communities are immune from the gentrification that puts their socioeconomic vitality at risk. None of these women explicitly comment on the gender inequalities they experience. But their use of falsetto, I would argue, is motivated not so much by their gender identities, but rather by the locally oriented positions they occupy in DC. For them, falsetto is a linguistic act of resistance to the sometimes hostile environment in which they live and work.

5 Conclusion

To conclude, I want to step back and consider the two main gendered phonation patterns I have addressed. First, I reported that creaky voice is most commonly used in the speech of women. Second, falsetto occurred most commonly in the speech of African American women. Neither pattern is straightforwardly explained in terms of the Frequency Code. The creaky voice pattern is noteworthy because creak is characterized by low f_0 , which is not a typical characteristic of women's voices relative to those of men. Of course, there is another possible sound symbolic explanation here, too. The elongated closed phase of the phonatory cycle that characterizes creaky voice gives the impression of discontinuous speech – which has led Tannen (unpublished) to hypothesize that creaky voice can be used to place limits on how authoritative one sounds. The falsetto pattern is noteworthy for two reasons. First, if falsetto is gendered as female, then we would expect it to predominate in both African American and white women's speech, when in fact it is African American women only that use it a lot. The other point worth drawing attention to is that falsetto was used as a form of resistance, as a linguistic form of power. Here, too, we might appeal to a sound-symbolic explanation. Specifically, even though falsetto is characterized by high pitch, it can also vary in terms of pitch dynamism or intensity, and it may well be one of these dimensions that conveys its powerfulness. This interpretation would be consistent with what Gussenhoven and Chen (2000) call the Effort Code.

In both of these cases, I have drawn attention to the phonetic multidimensionality of voice quality. Frequency is only one of the phonetic dimensions that characterizes phonation. It is likely that different phonetic dimensions of phonation index different meanings. Decomposing the phonetic dimensions of particular voice qualities will facilitate the semantic decomposition of the meanings they convey.

The research presented here can be extended in a number of directions. First, given that the racial composition of DC differs considerably from that of many other American cities, it would be interesting to compare the findings I have presented here to those in communities with different race dynamics. Another useful extension of this project would be a deeper phonetic analysis. Although I have focused on the categorical realization of phonation types, we may find that

examining the phonetic character of particular non-modal phonation types may uncover additional systematic patterns of variation in measures like H1-H2. Surprisingly, we found that age did not influence patterns of variation for any of the phonation types, in spite of claims that creaky voice is gaining in its use. Participants in the LCDC project are in the process of digitizing Fasold's data from 40 years ago, which will enable us to investigate the issue of language change in greater detail. In particular, we can address Yuasa's (2010) conjecture that recent high rates of creaky voice among women is a consequences of pitch lowering. Third, even though we have identified a number of linguistic constraints on particular phonation types, there are likely to be others. We could consider whether there is a connection between creaky voice and (-t) glottalization, for example. Eddington and Taylor (2009) and Eddington and Channer (2010), for example, found that women glottalize (-t) more than men, which is what we found for creaky voice. A preliminary analysis of word-final (-t) glottalization in the speech of 48 speakers in DC reveals that women glottalize more than men. Thus it appears that in DC, women use more creaky voice and glottalize (-t) more than men, which may be indicative of a more general pattern of greater laryngeal activity. Finally, this project would benefit from drawing on alternative methods for studying social meaning. I have taken an approach centered on locating strong falsetto in its discourse contexts because I was interested in the locally significant cultural value of falsetto. In the future, it would be worthwhile to use more controlled perceptual methods in a matched guise-style study. While the synthesis of phonation can be challenging, there are promising strategies for resynthesizing creaky voice and falsetto from utterances originally spoken in modal voice.

I hope to have shown here that voice quality, especially as it is used in constructed dialogue, is a rich site of sociolinguistic investigation. In addition to examining how constructed dialogue is introduced, which is one of the most studied sociolinguistic variables in recent years, we can examine how dialogue is constructed. The content and function of constructed dialogue or reported speech has traditionally fallen under the purview of discourse analysis, but I believe variationists can contribute new insights, as well.

The results I have presented here underscore the importance of including a diverse speaker sample when examining phonetic variation. Had I not sampled African American speakers, for example, I might have concluded that women use high rates of whispery voice and that gender had no effect on the use of falsetto – neither of which is true in DC. Ideally, speaker samples will reflect the important axes of social differentiation in the communities under investigation.

Finally, we saw that the social meanings of phonation types are culturally specific and should not be reduced to purely iconic or unanalyzed associations with either gender or race. The frequency code underlies a great deal of linguistic practice, but it plays out differently in different cultural contexts. The high pitch characterizing falsetto can be interpreted as small or weak in some contexts, but

as large, resistant, and powerful in others – as in the case of the African American women that I have discussed here.

References

- Alim, H. Samy. 2004. *You Know My Steez: An Ethnographic and Sociolinguistic Study of Styleshifting in a Black American Speech Community*. Durham, NC: Duke University Press.
- Blount, Ben G. and Elise J. Padgug. 1976. Mother and father speech: Distribution of parental speech features in English and Spanish. *Papers and Reports on Child Language Development* 12:47–59.
- Brown, Penelope and Stephen Levinson. 1987. *Politeness: Some Universals in Language Use*. Studies in Interactional Sociolinguistics 4. Cambridge: Cambridge University Press.
- Catford, J.C. 1977. *Fundamental Problems in Phonetics*. Edinburgh: Edinburgh University Press.
- Chun, Elaine and Robert J. Podesva. 2010. Voice quality and indeterminacies of social meaning in constructed dialogue. Paper presented at Sociolinguistics Symposium 18, Southampton.
- Clift, Rebecca. 2010. Review of Alexandra Jaffe, ed. 2009. *Stance: Sociolinguistic Perspectives*. Oxford: Oxford University Press. *Journal of Linguistics* 46:518-522.
- Crenshaw, Kimberlé. 1989. Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine, feminist theory, and anti-racist politics. *Chicago Legal Forum* 1989:139-167.
- Di Paolo, Marianna and Alice Faber. 1990. Phonation differences and the phonetic content of the tense-lax contrast in Utah English. *Language Variation and Change* 2:155-204.
- Dilley, L., S. Shattuck-Hufnagel, and M. Ostendorf. 1996. Glottalization of word-initial vowels as a function of prosodic structure. *Journal of Phonetics* 24:423-444.

- Du Bois, J.W. 2007. The stance triangle. In Robert Englebretson, ed. *Stancetaking in Discourse: Subjectivity, Evaluation, Interaction*, 137–182. Amsterdam: Benjamins.
- Eckert, Penelope. 2008. Variation and the indexical field. *Journal of Sociolinguistics* 12:453–476.
- Eddington, David and Michael Taylor. 2009. T-glottalization in American English. *American Speech* 84:298–314.
- Eddington, David and Caitlin Channer. 2010. American English has goʔ a loʔ of glottal stops: Social diffusion and linguistic motivation. *American Speech* 85:338–351.
- Esling, John. 1978. The identification of features of voice quality in social groups. *Journal of the International Phonetic Association* 8:18–23.
- Ferrara, Kathleen and Barbara Bell. 1995. Sociolinguistic variation and discourse function of constructed dialogue introducers: The case of be+ like. *American Speech* 70:265–290.
- Geenberg, Katherine. 2010. ‘Poor baby, you got a boo-boo!’ Sound symbolism in adult baby talk. Paper presented at New Ways of Analyzing Variation, San Antonio.
- Goodwin, Marjorie Harness, Charles Goodwin, and Malcah Yaeger-Dror. 2002. Multi-modality in girls’ game disputes. *Journal of Pragmatics* 34:1621–1649.
- Gussenhoven, Carlos and Aoju Chen. 2000. Universal and language-specific effects in the perception of question intonation. *ICSLP-2000* 2:91–94.
- Hall, Kira. 1995. Lip Service on the Fantasy Lines. In Kira Hall and Mary Bucholtz, eds. *Gender Articulated: Language and the Socially Constructed Self*, 183–216. New York: Routledge.
- Henton, Caroline and Anthony Bladon. 1985. Breathiness in normal female speech: Inefficiency versus desirability. *Language and Communication* 5:221–227.
- Henton, Caroline and Anthony Bladon. 1988. Creak as a sociophonetic marker. In Larry Hyman and Charles N. Li, eds. *Language, Speech, and Mind*, 3–29. London: Routledge.

- Irvine, Judith. 2009. Stance in a colonial encounter: How Mr. Taylor lost his footing. In Alexandra Jaffe, ed. *Stance: Sociolinguistic Perspectives*, 53-72. Oxford: Oxford University Press.
- Irvine, Judith and Susan Gal. 1999. Language ideology and linguistic differentiation. In Paul V. Kroskrity, ed. *Regimes of Language: Ideologies, Politics, and Identities*, 35-84. Santa Fe, NM: School of American Research Press.
- Jaffe, Alexandra. 2010. Review of Robert Englebretson, ed. 2007. *Stancetaking in Discourse*. Amsterdam: John Benjamins. *Journal of Sociolinguistics* 14:399-403.
- Knowles, Gerry. 1978. The nature of phonological variables in Scouse. In Peter Trudgill, ed. *Sociolinguistic Patterns in British English*, 80-90. London: Arnold.
- Ladd, D. Robert. 1984. Declination: A review and some hypotheses. *Phonology Yearbook* 1:53-74.
- Laver, John. 1980. *The Phonetic Description of Voice Quality*. Cambridge: Cambridge University Press.
- Lefkowitz, Daniel. 2007. Creaky Voice: Constructions of Gender and Authority in American English Conversation. Paper presented at American Anthropological Association. Washington, DC.
- Lopez, Qiwana. 2010. 'I Ain't Lying' The Role of Voice Quality in Constructing (in)Authentic Identity. Paper presented at New Ways of Analyzing Variation. San Antonio.
- Mendoza-Denton, Norma. 2007. Creaky voice in gang girl narratives. Paper presented at the Annual Meetings of the American Anthropological Association, Washington, DC.
- Modan, Gabriella. 2007. *Turf Wars: Discourse, Diversity, and the Politics of Place*. Malden, MA: Blackwell.
- Niemelä, Maarit. 2005. Voiced direct reported speech in conversational storytelling: Sequential patterns of stance taking. *SKY Journal of Linguistics* 18:197-221.

Gender and Non-Modal Phonation Types

- Ogden, Richard. 2001. Turn transition, creak, and glottal stop in Finnish talk-in-interaction. *Journal of the International Phonetic Association* 31:139–152.
- Ohala, John. 1978. Production of tone. In Victoria Fromkin, ed. *Tone: A Linguistic Survey*, 5–39. New York: Academic Press.
- Ohala, John. 1994. The frequency code underlies the sound-symbolic use of voice pitch. In Hinton, L., J. Nichols, and J. Ohala eds. *Sound Symbolism*, 325–347. Cambridge: Cambridge University Press.
- Pennock-Speck, Barry. 2005. The changing voice of women. In Juan José Calvo García de Leonardo et al. *Actas del XXVIII Congreso Internacional de AEDE-AN*, 407–415. Valencia: Dept. de Filologia Anglesa i Alemanya, University of Valencia.
- Podesva, Robert J. 2007. Phonation type as a stylistic variable: The use of falsetto in constructing a persona. *Journal of Sociolinguistics* 11:478–504.
- Rickford, John R. and Angela E. Rickford. 1976. Cut-eye and suck-teeth: African words and gestures in New World guise. *Journal of American Folklore* 89:194–309.
- Sicoli, Mark. 2007. Tono: A Linguistic Ethnography of Tone and Voice in a Zapotec Region. Ph.D. thesis. University of Michigan, Ann Arbor, MI.
- Sicoli, Mark. 2010. Shifting voices with participant roles: Voice qualities and speech registers in Mesoamerica. *Language in Society* 39:521–553.
- Stuart-Smith, Jane. 1999. Voice quality in Glaswegian. *Proceedings of the International Congress of Phonetic Sciences* 14:2553–2556.
- Stuart-Smith, Jane. 1999. Glasgow: Accent and voice quality. In Paul Foulkes and Gerard Docherty, eds. *Urban Voices: Accent Studies in the British Isles*, 203–222. London: Arnold.
- Szakay, Anita. 2008. Ethnic variation in voice quality in New Zealand English. Paper presented at New Ways of Analyzing Variation 37, Houston.
- Tagliamonte, Sali and Alexandra D’Arcy. 2007. Frequency and variation in the community grammar: Tracking a new change through the generations. *Language Variation and Change* 19:199–217.

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- Tannen, Deborah. 2007 [1989]. *Talking Voices: Repetition, Dialogue, and Imagery in Conversational Discourse*, 2nd edition. Cambridge: Cambridge University Press.
- Trudgill, Peter. 1974. *The Sociolinguistic Differentiation of English in Norwich*. Cambridge: Cambridge University Press.
- Williams, 1998. Brett. 1988. *Upscaling Downtown: Stalled Gentrification in Washington, D.C.* Ithaca, NY: Cornell University Press.
- Wong, Andrew. 2010. Intersectionality Theory: What it is and why it matters to variationists. Plenary presented at New Ways of Analyzing Variation. San Antonio.
- Yuasa, Ikuko Patricia. 2010. Creaky voice: A new feminine voice quality for young urban-oriented upwardly mobile American women? *American Speech* 85:315-337.

Robert J. Podesva
Department of Linguistics
Building 460, Margaret Jacks Hall
Stanford, CA 94305-2150

podesva@stanford.edu

Gender and /aɪ/ Monophthongization in African American English¹

JULIA THOMAS

University of Chicago

1 Introduction

Monophthongization of /aɪ/ in specific phonetic environments is widely recognized as a characteristic of AAE and Southern English, which differentiates these dialects from the Standard American English (SAE) spoken by White, middle-class speakers in Northern Cities (Bailey and Thomas 1998, Rogers 2000, Anderson 2002). In Northern cities, monophthongal /aɪ/ is used exclusively by African American speakers, and is therefore a marker of ethnic cultural heritage. It may be used as a positive in-group solidarity marker within the Black community, and speakers who identify with or are isolated within the Black community may be more likely to use the monophthongized variant (see Edwards 1992 and Rahman 2002). Seminal investigations on style and identity provide evidence that speakers deliberately employ different phonetic variants to convey social and stylistic information (Campbell-Kibler 2007, Podesva 2007, Eckert 1989, Labov 1966). Social pressure along with a speaker's desire to foster a certain identity may lead him to use an AAE dialectal feature to a greater or lesser extent in different situations or with different interlocutors. The formality of the task or conversation can impact the likelihood and degree of monophthongization, and the ethnicity of the speakers' audience may also be a factor, though the current study is not designed to examine this variable. For instance, Hay, Jannedy, and Mendoza-Denton (1999) find that Oprah is twice as likely to use monophthongal /aɪ/ when addressing an African American guest on her show than when addressing a White guest.

1 Special thanks to Holly Craig at the University of Michigan and Jeffrey Grogger at the University of Chicago for graciously allowing me to access their data for this project and for providing feedback on the analysis. Thanks also to Salikoko Mufwene and Alan Yu for advising and supporting the project.

In addition to style, phonetic environment is crucial in understanding speakers' variable realizations of /aɪ/. Previous studies are in conflict, however, over the role of phonetic environment in monophthongization. Moreton (2004) proposes the Pre-Voiceless Hyperarticulation Hypothesis observing that cross-linguistically diphthongs tend to have a lower F1 and higher F2 before voiceless codas than before voiced ones. In his word-list task experiment, the diphthong /aɪ/ shows the most robust difference in the two environments. Prior analyses of /aɪ/ by Anderson (2002) for Detroit speakers and Fridland (2003) for Memphis speakers suggest that monophthongization of /aɪ/ has been extended from the pre-voiced and final position phonetic environments to the pre-voiceless environment. Anderson (2002) suggests that this change may be occurring in AAE for speakers in other Northern Cities like Chicago and Buffalo. For White speakers in Texas, Oxley (2009) finds both phonetic environment and task variables related to formality to be significant predictors of monophthongization. Gender and a subset of age are also significant predictors in her analysis, with middle-aged White women showing the greatest monophthongization, correlated with the most favorable ratings of their community.

The current study describes the extent of /aɪ/ monophthongization for AAE speakers in Chicago and identifies predictors for use of the dialectal variant. Gender differences are highlighted by examining speakers' deliberate usage of this sociophonetic variable with respect to their local communities. Phonetic context is found to be the best predictor of monophthongization: the pre-voiceless environment serves to preserve the diphthong, while pre-voiced and word-final environments facilitate monophthongization. However, speaker gender is found to play a sizeable and significant role in predicting monophthongization. Females produced tokens with greater diphthongization than males, meaning their realizations of /aɪ/ are more similar to canonical /aɪ/ in SAE. Women also show greater variation and dynamicity across distinct phonetic and conversational environments than men. Rather than making claims about whose speech is more standard, the current study views the local conditions as fundamental to understanding how gender groups pattern differently in terms of the identities they construct (Eckert and McConnell-Ginet 2003). In this light, the differences between men and women in this community suggest greater social mobility for females and greater in-group pressure among men resulting in a divergent use of monophthongal /aɪ/.

2 Methodology

2.1 Data Collection and Processing

The data were collected via recorded interviews at a shopping center in Calumet City, Illinois. Data collection took place in November of 2009. Calumet City is

part of the Greater Chicago Metropolis. The 2000 census recorded 39,071 inhabitants, yielding a population density of 5,378.0 people per square mile. The city shows considerable ethnic diversity with a reported majority of African Americans (52.91%), followed by Whites (38.74%) and Hispanics/Latinos (10.86%). The median income for a household in the city was \$38,902 and the per capita income was \$18,123. It is estimated that about 12.2% of the population were below the poverty line.² Data were collected from African American shoppers ranging from 20 to 30 years of age. One field interviewer, a middle-aged African American female, conducted the interviews. Subjects received \$20 after completing the interview. Interviews were recorded on small handheld audio recorders.

The interview was designed to elicit speech on a variety of subjects ranging in degree of formality such as music and sports interests in contrast with career skills. The categories are similar to those identified by Labov (2001) as careful and casual speech. The experimental design was concerned primarily with the effect of formality, rather than the effect of audience or speaker identity. Discussion topics designed to elicit formal speech include questions about career/job-search and health-related matters. The topics designed to elicit informal speech included questions about sports, music, television and popular culture.

2.2 Acoustic and Statistical Analysis

The sound files for each individual interview were played using PRAAT. Using spectrographic displays, the segment /aɪ/ was manually labeled and coded for phonetic and conversational environment. The sound files yielded approximately 685 tokens, realized variably, but canonically identified as /aɪ/ for speakers of Northern Cities White English. A PRAAT script was then used to calculate the frequency of F1 and F2 at the onset, midpoint, and endpoint of a segment and to write this information to a text file.

The metric for the presence or absence of diphthongization is a central consideration for this study. Acoustically, /aɪ/ is characterized by formant changes during the production of the vowel and by the relative positions of its formants. In its “purest” form, /aɪ/ entails a shift from some variant of the low, back vowel /ɔ/ to the high front glide or vowel /i/, though for some speakers it may more realistically be a shift from a more fronted vowel (/a/ or /æ/) to /i/. This means a sharp rise in F2 and a drop in F1 over the course of the segment, resulting in a much greater distance between F2 and F1 at the offset than at the onset. Therefore, three metrics were selected to measure the degree of diphthongization for each token of /aɪ/:

2 http://en.wikipedia.org/wiki/Calumet_City,_Illinois

- 1) $\Delta F1 = (F1_1 - F1_3) / \text{Duration}$
- 2) $\Delta F2 = (F2_1 - F2_3) / \text{Duration}$
- 3) F1-F2 distance at offset = $F2_3 - F1_3$

None of these metrics alone is able to capture the presence or absence of diphthongization. These metrics are adopted from Oxley 2009 which seeks to establish more gradient acoustic measures for monophthongization than simply impressionistic auditory binary classification for /aɪ/. The statistical model for F1-F2 distance proved more powerful than those for $\Delta F2$ and $\Delta F1$, which corresponds with observations in Moreton (2004) about differential predictive power between F1, F2, and F1-F2 distance. Due to limited space, only the results from F1-F2 distance at offset will be presented in depth here.

The statistical analysis was performed using R statistical analysis software. The analysis was carried out independently for each of the metrics: $\Delta F1$, $\Delta F2$, and F1-F2 distance. For each metric, a mixed-effects linear regression was used to model the effects of all fixed variables independently plus all random variables such as idiosyncrasies attributable to individual speakers or lexical items. The potential predictors were selected based on factors that had been identified in the literature on /aɪ/ as having an effect on monophthongization. These included linguistic variables such as phonetic environment and lexical item as well as social variables like education, age (within a narrow range), and gender. Factors not reaching statistical significance in terms of a main effect were double-checked for significant interaction with other variables. Because the factor “topic” was of special interest for the purpose of this paper, it was exhaustively checked for interaction with other variables where data sufficiency allowed. Additional factors were checked for interactions if prior literature gave cause to suggest that might be interdependent (especially for the phonetic variables “duration” and “phonetic environment”). The model listing the factors independently was then compared by an ANOVA to the model in which the variables were given the possibility of interacting. If the interaction resulted in a significantly better model, the interaction was retained. Using this methodology, once established that a variable showed no main effect and no significant interactions for a given metric, this variable was removed from the model. This resulted in three potentially distinct models for $\Delta F1$, $\Delta F2$, and F1-F2 distance.

In addition to the mixed-effects models, data points were also graphed by individual speaker for each of the three metrics. This sheds light on the inter- and intra-speaker variation for the factors that proved to be significant predictors in the models and this visualization allows for comparison across one speaker’s realizations of /aɪ/ in different environments and conversational contexts. Likewise, it allows for visualization of trends and outliers examining all speakers across the sample.

3 Results

3.1 Mixed-Effects Linear Regression Model for F1-F2 Distance

When all factors were modeled as possible predictors of F1-F2 distance, the factors age and education were not included because they showed no effect at all on F1-F2 distance, and their inclusion made no improvement to the model's predictive power. Significant interactions were found between environment and duration as well as between topic and sex.

F1-F2 Distance = environment * duration + topic * sex + (1|lexeme) + (1|subject)

The baseline F1-F2 distance is 1045.88Hz for /aɪ/ in final position spoken by a female discussing career.

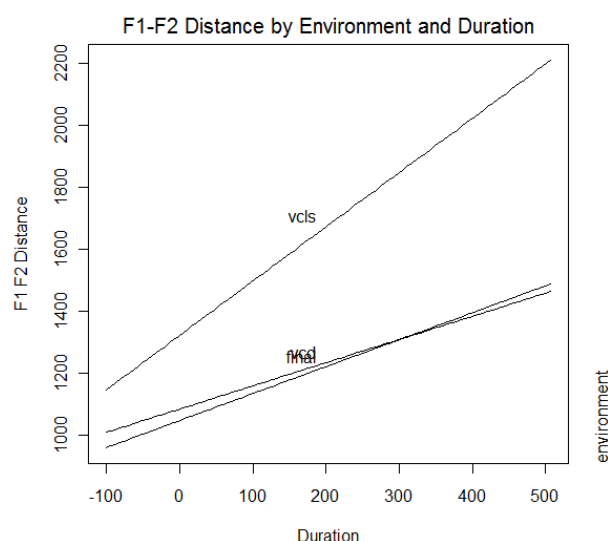


Figure 1: Interaction of duration and environment on F1-F2 distance

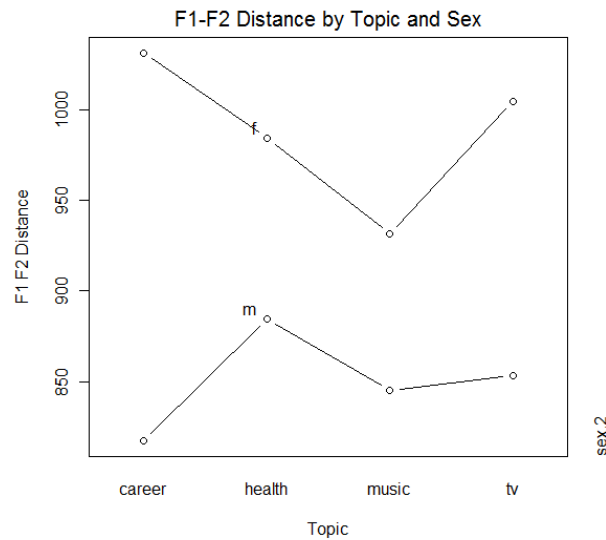


Figure 2: Interaction plot for effect of speaker sex and topic on F1-F2 Distance

The interaction plot in Figure 1 shows the striking effect of phonetic environment and duration on F1-F2 distance. The interaction was statistically significant for the pre-voiceless environment (see table 1 below). Diphthongal tokens of /aɪ/ will have a greater F1-F2 distance at offset, while monophthongal realizations will show a smaller distance between F1 and F2. The positive slope for each line suggests that for all phonetic environments, F1-F2 distance increases as duration increases. For the pre-voiced and final tokens /aɪ/, the trajectory looks nearly identical, while the pre-voiceless group stands apart. For short to average tokens of /aɪ/, the F1-F2 distance for pre-voiceless /aɪ/ is only about 100-200 hundred Hertz greater than the pre-voiced and word-final distances, but for longer tokens, the pre-voiceless environment tends to have F1-F2 distances that are substantially greater than those for /aɪ/ in other environments. For the longest tokens of /aɪ/ in the data set, those in pre-voiceless environment show an F1-F2 distance that approaches 2000Hz, while long tokens before a voiced consonant maintain an F1-F2 distance that is near 1000Hz.

Figure 2 shows the interaction between speaker sex and topic and highlights differences between males and females in the data set. For males, the reduction in F1-F2 distance for the health and music topics was significant (see table 1 below). The figure clearly shows the tendency for females to have a greater F1-F2 distance than men; the F1-F2 distance for women is near 1000 Hz across the data set, while it is closer to 850Hz for men. The plot also reveals that the F1-F2 distances for male speakers and female speakers follow different trajectories from topic to topic. For instance, female speakers show a decrease in F1-F2 distance suggestive of more monophthongization when moving from a discussion about

career to a discussion about health, while men show the opposite trend. Female speakers may show more dynamic F1-F2 distances than men; the changes in females' F1-F2 distances across topics are slightly greater than for male speakers. On the whole, the trajectory for F1-F2 distance in females is somewhat unexpected as it involves a drop in F1-F2 distance for the presumably formal topic, health, as well as an apparent increase in F1-F2 distance for the casual topic, TV. This will be discussed in Section 4.

Table 1 shows the factors and interactions that have a significant effect on F1-F2 Distance. The baseline F1-F2 distance is approximately 1045.88 Hz for a token of /aɪ/ in final position spoken by a female speaker talking about career. For F1-F2 distance, main effects were found for duration, pre-voiceless phonetic environments, as well as sex and the conversational topic music. Pre-voiceless phonetic environment is the most robust effect, increasing F1-F2 distance by 275.36 Hz above the baseline. No main effect of the pre-voiced environment was found, suggesting that F1-F2 distances do not differ significantly for tokens of /aɪ/ in final position. Being male also has a significant and sizeable effect on the F1-F2 distance for tokens of /aɪ/, decreasing the distance by 213.97 Hz. This increase is presumably not due to the higher frequency formant structure for women as the metric measures only the distance between F2 and F1 for each speaker's tokens of /aɪ/. A main effect of duration was also found increasing F1-F2 distance by 0.871 Hz/ms.

The main effect of Topic: Music on F1-F2 distance is the only main effect of conversational topic found for any of the 3 metrics in the study. F1-F2 distance for tokens of /aɪ/ when talking about music were 100.01 Hz less than the baseline. In addition to these main effects, significant interactions were identified for duration and environment (pre-voiceless) as well as for males talking about health and music. Like the main effect of duration, the significant interactions involving duration were found to change F1-F2 distance by only 0.883 Hz/ms for the voiceless environment (also reflected in the interaction plot above as a greater difference between pre-voiced tokens and pre-voiceless ones for longer segments than for shorter ones). A substantial interaction did occur for males discussing two particular conversational topics: health and music. The changes brought on by these topics, however, are somewhat puzzling. For health, taken to be a formal topic, the interaction between sex and topic had the effect of increasing F1-F2 distance by 113.91 Hz, suggesting less monophthongization is taking place. What is puzzling, however, is that the interaction between sex and music revealed an even greater increase of 127.67 Hz. This does not follow the expectation created by the literature on styleshifting, nor does it correspond to the main effect. For females discussing music, the interaction again had the effect of reducing F1-F2 distance by -136.23 Hz, yet this reduced F1-F2 distance for a casual conversational topic is more in keeping with predictions made about styleshifting. These findings will be discussed in the following section.

	Estimate	MCMC mean	HPD95 lower	HPD95 upper	pMCMC	Pr(> t)
(Intercept)	1045.878	1027.609	928.521	1129.028	0.0001	0.0000
cdur	0.871	0.878	0.453	1.305	0.0002	0.0001
environme ntvcd	37.156	34.105	-61.292	131.510	0.470	0.545
environme ntvcls	275.360	300.896	203.418	391.474	0.0001	0.0000
sex.2m	-213.975	-220.133	-316.459	-121.305	0.0001	0.0000
topichealth	-46.871	-49.424	-134.048	38.890	0.257	0.282
topicmusic	-100.006	-101.129	-183.807	25.754	0.011	0.013
topictv	-26.888	-29.826	-112.539	48.296	0.464	0.527
cdur:envir onmentvcd	-0.122	0.029	-0.763	0.783	0.936	0.767
cdur:enviro nmentvcls	0.883	0.888	0.215	1.560	0.011	0.010
sex.2m:top ichealth	113.906	122.01	11.883	237.320	0.034	0.046
sex.2m:top icmusic	127.665	139.55	41.075	245.300	0.010	0.014
sex.2m:top ictv	62.565	60.83	-152.333	258.977	0.558	0.543

Table 1: Mixed-Effects Linear Regression for F1-F2 Distance. Lower, upper HPD: lower and upper bounds of the 95% Highest Posterior Density intervals for the coefficients; p (MCMC) denotes the corresponding Markov chain Monte Carlo p-value; p (t) denotes the p-value based on the t-distribution. The coefficient estimates are in Hz.

3.2 Inter- and Intra-speaker Variation for F1-F2 Distance

Inter-speaker variation was also examined for conversational topic. Figure 3 shows F1-F2 distance for male speakers by conversational topic. In each sub-graph, the x-axis moves from the more formal topics, career and health, to less formal topics, music and TV. If speakers were styleshifting using /aɪ/, it is predicted that they will use less dialectal AAE features such as monophthongal /aɪ/ for more formal topics like career and health than for less formal topics. In this case, the lines smoothing over the speakers' tokens of /aɪ/ would have a negative slope, as F1-F2 distance would be smaller when more monophthongization was occurring.

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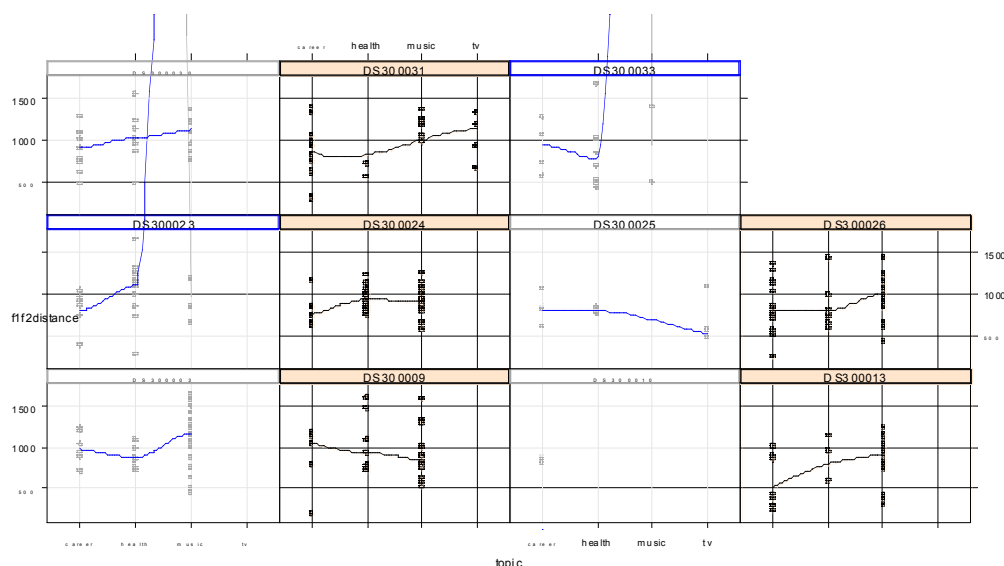


Figure 3: Individual speaker plots for male speakers showing F1-F2 distance as a function of conversational topic.

The sub-plots for individual male speakers reveal considerable variation across speakers in relation to conversational topic. While speakers DS30009 and DS300025 do show smaller F1-F2 distance (suggesting more monophthongization) for music and TV than for career and health, this pattern is by no means prevalent nor is it consistent across speakers. Speakers DS300013 and DS300026, for instance, show the opposite trend with increased F1-F2 distances for music and TV. Finally, other speakers such as DS300023 show sporadic F1-F2 distances across topics within which it is difficult to identify any trend. Examining the role of topic in intra-speaker variation, can enrich our understanding of the patterns that emerge in the mixed-effects model at the population level.

The figure below compares the F1-F2 distances for each female speaker by topic:

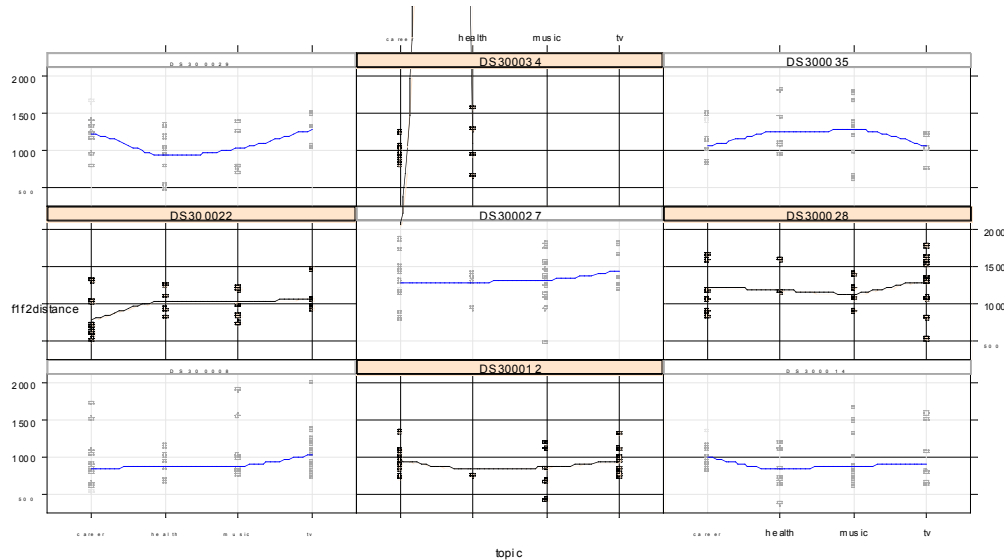


Figure 4: Individual speaker plots for female speakers showing F1-F2 distance as a function of conversational topic.

There is more consistency across female speakers in terms of their F1-F2 distances by topic than for males. This consistent trend, however, is contrary to the prediction that F1-F2 distances should decrease for less formal topics. In comparing the sub-graphs, most of the lines show a similar trajectory from the more formal to less formal topics: a small increase in F1-F2 distances suggestive of less monophthongization. Several subjects (DS300014, DS300028, and DS300029) do seem to show a dip for health or music, follow by a relative rise for their tokens in the TV discussion. Subjects DS300029 and DS300014, in particular, show a noticeable drop in F1-F2 distances between career and health, but the tendency to remain level or rise moving from health to music. This finding is unanticipated, and again, may contribute to a smaller effect of topic in the predictive model. In comparison with men, females show greater consistency within each individual as evidenced by flatter lines in each of the sub-graphs, and they also show greater consistency across individuals as evidenced by similar looking lines for all speakers.

4 Discussion

4.1 Reinforced Importance of Phonetic Environment

The role of phonetic environment is the most critical factor in predicting monophthongization. The pre-voiceless phonetic environment shows less monophthongization than other phonetic contexts as evidenced by greater F1-F2 distances, positive slopes for F2, and negative slopes for F1. The effect of

phonetic environment is not only significant; it is also large. Phonetic environment and gender predict the largest changes in the 3 metrics. For instance, the pre-voiceless environment has the effect of increasing the F1-F2 distance by 275.36 Hz above the baseline distance, while the significant effect of a music-related topic only causes a decrease of 100.01 Hz. We can conclude that some degree of monophthongization is the norm in voiced as well as word-final phonetic environments, and that resistance to monophthongization and more limited glide weakening occurs in the pre-voiceless context. These findings are supported by prior accounts of monophthongization in AAE and in other Southern dialects (Oxley 2009, Bailey and Thomas 1998), and they are also compatible with the Pre-voiceless Hyperarticulation Hypothesis presented in Moreton (2004).

The findings here do not support the hypothesis that monophthongization is being extended to pre-voiceless contexts as Anderson (1999) suggested might be the case for Chicago speakers based on her observation of Detroit speakers. Likewise, the current analysis does not confirm Edwards' (1997) finding that there is no significant difference in monophthongization between pre-voiceless and pre-voiced contexts for Detroit speakers. Neither do the findings parallel Fridland (2003)'s findings for Memphis speakers which also observed substantial glide-weakening in the pre-voiceless environment. Fridland emphasizes the importance of a gradient evaluation, acknowledging weakening of diphthongs and not only full monophthongization. She claims that Memphis speakers do have weakened diphthongs before voiceless consonants. The present analysis does not exclude the possibility that a Chicago AAE speaker has a weaker diphthong in the pre-voiceless environments than a SAE might have in this same environment; it merely concludes that there is a highly significant and substantial difference in the degree of monophthongization AAE speakers show before voiceless environments and the degree of monophthongization in pre-voiced and word-final environments. All in all, the present analysis suggests that phonetic environment remains a crucial factor in the way /aɪ/ will be realized. The maintenance of diphthongized /aɪ/ in the pre-voiceless environment may be directly related to the Pre-voiceless Hyperarticulation Hypothesis, as Moreton calls it, which argues that F1 and F2 of a diphthong become more peripheralized to signal a following voiceless segment.

4.2 Key Role of Gender

Males and females in this study were found to use monophthongal /aɪ/ differently with females more likely to produce a variant which approximates the /aɪ/ diphthong found in SAE. They were also found to exhibit greater variation and dynamicity across phonetic environments and conversational contexts than exists for male speakers. Before delving into possible accounts for gender differences in this study, it should be mentioned that the gender factor invoked here is

admittedly simplistic. As the study did not begin as a deliberate attempt to assess gender differences with respect to styleshifting, the predictor labeled “gender” here is a binary metric based on biological sex. This is precisely the type of metric Eckert cautions against. In her view, an analysis of gender should involve multiple metrics some of which may be continuous and only one of which should be biological sex. With the caveat that gender is more complex than allowed for in this study, some preliminary observations about differences in /aɪ/ realization between men and women can be made.

The discovery that women’s usage tends to fall closer to the standard than men’s is by no means new. A considerable amount of literature has observed that women tend to use standard forms more often than men and to accommodate more readily in conversational exchanges than men. Labov (1990) and Mansfield and Trudgill (1994), among others, have both proposed accounts for why this is so. Generalizations have stated that middle-class women are more likely to be conservative in their usage of stable non-standard forms than men or lower-class women, due to a desire for social mobility and an attention to “proper speech” for the purposes of child rearing. These accounts emphasize that women’s linguistic behavior is motivated by a greater attention to community norms of prestige and to greater politeness, which leads them to use more conservative forms than men. These accounts seem somewhat arbitrary and even outdated in their description of gender roles. Again, Eckert and McConnell-Ginet caution against generalizations that make polarized claims about whose speech is more standard, men’s or women’s (Eckert and McConnell-Ginet 2003). They argue that the local history and conditions are most important in understanding how gender groups pattern differently in terms of the identities they construct with respect to their communities of practice. The differences between men and women in the current study may reveal greater social mobility for females and greater in-group pressure for males. Recall that female speakers had the greatest diphthongization for the conversational topic “career” while the same category showed the least diphthongization for male speakers. Due to employment or education, females may come in contact with speakers of White English to a greater extent than males, but because information about the local histories of speakers is not available, it would be hasty to draw too many conclusions.

Motivating women’s tendency to maintain the diphthong /aɪ/ to a greater extent than men remains a challenge in this study. There are no significant differences between the groups with respect to education. One finding in particular remains to be explained: for women, the decline in diphthongization from the first formal topic discussed (career) to the second formal topic discussed (health) is not easily explained as both were intended to elicit formal speech. To add complexity, male speakers showed an increase in monophthongization for this same conversational topic. One plausible cause for this significant decline in diphthongization has to do with the speaker’s integration and participation in the

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interview. Since career was the first topic discussed, speakers may have been speaking with more emphasis, speaking more slowly or with more attention than they were the second conversational topic addressed. Despite this methodological fact, however, it is evident that male and female speakers are using /aɪ/ differently within each conversational context. As aforementioned, higher levels of diphthongization for females discussing career may be reflective of the job prestige sought or earned by the women in this study. If these women aspire to careers that involve working with an ethnically-diverse public (as is their community), and the men aspire to positions that are predominantly occupied by members of their own ethnicity, it can be expected that women are more apt to use the standard variant in their discussions about career, while men continue to use the AAE dialectal variant. In this sense, men and women's differential usage of monophthongal /aɪ/ stems from their distinct social identities within the local community.

References

- Anderson, Bridget L. (2002) Dialect leveling and /aɪ/ monophthongization among African American Detroiters. *Journal of Sociolinguistics*, 6: 86-98.
- Bailey, Guy and Erik Thomas. (1998). In Salikoko S. Mufwene, John R. Rickford, Guy Bailey and John Baugh (eds.), *African-American English: structure, history, and use*. Routledge.
- Campbell-Kibler, Kathryn. (2007). Accent, (ING) and the social logic of listener perceptions. *American speech*, 82.32-64.
- Craig, Holly K., & Jeffery T. Grogger (forthcoming, p.c.) Social and Style Constraints on Adult Usage of African American English Variants.
- Craig, Holly K., & Washington, J. A. (2006). *Malik goes to school: Examining the language skills of African American students from preschool-5th grade*. Mahwah, NJ: Erlbaum.
- Dorrill, George T. (1986). A comparison of Black and White speakers in the South. In Michael B. Montgomery and Guy Bailey (eds.) (1986) *Language Variety in the South: Perspectives in Black and White*. Tuscaloosa: University of Alabama Press.
- Eckert, Penelope. (1989). *Jocks and Burnouts: Social categories and identity in the high school*. New York: Teachers College Press.

- Eckert, Penelope and Sally McConnell-Ginet. (1992). Think Practically and Look Locally: Language and Gender as Community-Based Practice. *Annual Review of Anthropology*. 21, 461-90.
- Eckert, Penelope. (2000). *Linguistic variation as social practice*. Oxford: Blackwell.
- Eckert, Penelope and John Rickford. (2001) *Style and Sociolinguistic Variation*. Cambridge University Press.
- Eckert, Penelope and Sally McConnell-Ginet. (2003). *Language and Gender*. Cambridge University Press.
- Edwards, Walter. (1992) Sociolinguistic behavior in a Detroit inner-city Black neighborhood. *Language in Society* 21: 93-115.
- Fridland, Valerie. (2003). 'Tie, tied, and tight': the expansion of /ai/ monophthongization in African-American and European-American speech in Memphis, Tennessee. *Journal of Sociolinguistics*, 7: 279-298.
- Hay, Jennifer, Stefanie Jannedy, & Norma Mendoza-Denton (1999). Oprah and /aj/: lexical frequency, referee design, and style. In proceedings of the 14th International Congress of Phonetic Sciences, San Francisco, August 1999.
- Labov, William. *The Social Stratification of English in New York City*. Washington, DC: Center for Applied Linguistics. 1966
- Labov, William. (1972). *Sociolinguistic patterns*. Philadelphia, PA: University of Pennsylvania Press.
- Labov, William. (1990). The intersection of sex and social class in the course of linguistic change. *Language Variation and Change*, 2, 205-254.
- Labov, William (2001). The anatomy of style-shifting. In Penelope Eckert and John R. Rickford (eds.), *Style and Sociolinguistic Variation*. Cambridge University Press.
- Mansfield, Peter and Peter Trudgill (1994). A sex specific linguistic feature in a European dialect. *Multilingua*, 13, 381-386.
- Moreton, Elliott. (2004). The Realization of the English postvocal [voice] contrast in F1 and F2. *The Journal of Phonetics*, 34, 1-22.

Gender and /aɪ/ Monophthongization in African American English

- Morrison, Geoffry Stewart. (2007) Theories of vowel inherent spectral change: a review. Unpublished manuscript available online.
- Mufwene, Salikoko and John R. Rickford. (1998) African-American English: Structure, history and use. London, New York: Routledge Publishing Company.
- Oxley (2009). (ay) Monophthongization in Deer Park, Texas. M.A. thesis, University of Washington.
- Podesva, Robert. (2007) Phonation type as a stylistic variable: the use of falsetto in constructing a persona. *Journal of Sociolinguistics*, 11(4): 478-504.
- Rahman, Jacqueline. (2007). "An AY for an AH: Language of survival in African American narrative comedy," *American Speech* 82(1):65-96, Spring 2007.
- Rickford, John R. (1999). African American vernacular English : features, evolution, educational implications. Malden, Mass. : Blackwell Publishers.
- Rickford, John R. and Faye McNair-Knox (1994). Addressee- and Topic-influenced style shift: A quantitative sociolinguistic study. In Douglas Biber and Edward Finegan (eds.), *Sociolinguistic Perspectives on Register*. New York/Oxford: Oxford University Press. 235-76
- Rogers, Henry. (2000). *The Sounds of Language: an introduction to phonetics*. Pearson Education.
- Schilling-Estes, Natalie (2002). Investigation Stylistic Variation. In J.K. Chamber, Peter Trudgill, and Natalie Schilling-Estes (eds.) *The Handbook of Language Variation and Change*. Malden, Mass.: Blackwell Publishers.
- Trudgill, Peter (2000) *Sociolinguistics: An introduction to Language and Society*, 4th edn. London/New York: Penguin.

Julia Thomas
University of Chicago Classics Building
1120 E. 59th St
Chicago, IL 60637

jmthomas@uchicago.edu

The Linguistic Negotiation of Heterosexuality in the Same-Sex Marriage Movement

CHRIS VANDERSTOUWE

University of California, Santa Barbara

Introduction

The heated debate over same-sex marriage has been mired in linguistic controversy. Ideas about the importance of key words and concepts and their salience for social and political discourse have become central to the debate, even being a defining factor in constitutionality, constitutional amendments, and lawsuits and appeals nationwide. This debate is often framed in binary terms of gay versus straight. But many supporters and participants within the same-sex marriage movement are not gay or lesbian. This paper examines heterosexual participation within this movement and the ways linguistic tools are used by these individuals to negotiate their presence and participation in relation to their non-normative sexuality within this context.

1 Same-Sex Marriage in California: The Case of Proposition 8

The issue of same-sex marriage in the United States has arguably been most prominent in California. In 2000, the state's voters passed the California Defense of Marriage Act, known as Proposition 22, which amended the Family Code to prohibit the state from recognizing same-sex marriage. In protest against the law, San Francisco Mayor Gavin Newsom declared in February 2004 that same-sex marriage would be allowed within the City and County of San Francisco, but the marriages were later annulled by the California State Supreme Court, which ruled they were in opposition to state law. Later that year, Massachusetts became the first state in the nation to legalize same-sex marriages, and currently four other states (Connecticut, Iowa, New Hampshire, and Vermont) as well as Washington, D.C. have followed suit. In addition, Rhode Island, New York, Maryland, and in some cases California, recognize same-sex marriages from other states, but do not

perform them.¹

Many legal battles concerning California's Proposition 22 followed, with several same-sex couples suing the state of California over the constitutionality of Proposition 22. In early 2008, the California Supreme Court deemed the law unconstitutional, and between June 16, 2008 and November 4, 2008, same-sex marriages were legally performed throughout California. During this time, a voter initiative known as Proposition 8 was placed on the November 2008 ballot to alter the state Constitution with the exact words of Proposition 22: "Only marriage between a man and a woman is legal and recognized in California."²

On November 4, 2008, California's Proposition 8 passed by a 52 to 48 percent vote, which repealed the right of same-sex couples to legally wed in California. This created a social and political setback to the marriage equality movement and left the estimated 18,000 same-sex couples who had gotten married uncertain of the legal status of their marriages. The Supreme Court ruled that the same-sex marriages legally performed between June 16, 2008 and November 4, 2008 would still be recognized within California, though this decision is considered problematic in light of the wording of the state Constitution. In late 2009, a lawsuit was filed in the 9th Circuit Court "to determine if California's same-sex marriage ban violates the Constitution."³ In a trial in early 2010, Judge Vaughn Walker determined that Proposition 8 was in violation of the U.S. Constitution, and at the time of publication, the case was being considered by a federal appeals court. The court case is ultimately expected to reach the U.S. Supreme Court.

2 Heterosexuality in Previous Research

Same-sex marriage has direct ties to issues of not only homosexuality, but heterosexuality as well. Research in language and sexuality has tended to be concerned with non-dominant sexualities (Livia and Hall 1997; Campbell-Kibler, Podesva, Roberts, and Wong 2002), and within this body of work, research is most commonly found to study gay men. Linguistic research on sexuality that pertains to heterosexuality, though increasing in scope and interest, has been more sparse and often entails underlying questions about gender (cf. Cameron and Kulick 2003). Scott Kiesling's (2002, 2005) work among fraternity men has been important for gender and sexuality research on heterosexuality in many ways, marking a key shift away from traditional linguistic research on gender that takes male identity, masculinity, and heterosexuality as normative or unmarked. Kiesling's work compares men not to women but to each other and examines the ways a heterosexual identity may be created among men, not merely taken as a given.

¹ Source: NCSL National Conference of State Legislatures: <http://www.ncsl.org/IssuesResearch/HumanServices/SameSexMarriage/tabid/16430/Default.aspx>

² Source: California Secretary of State Website: www.sos.ca.gov.

³ Source: New York Times. *Date Set for Proposition 8 Trial Final Arguments*. April 29, 2010.

Other language-oriented research has also brought heterosexual identity to the forefront in various ways. Eliason's (2003) work on heterosexual identity formation found that a majority of heterosexuals have a marked lack of identity awareness, taking their sexuality for granted. More recent research shows the ways that heterosexual identities are constructed and negotiated through talk-in-interaction (e.g. Kitzinger 2005) and how heterosexual desire is expressed linguistically (Mortensen 2010).

Throughout such research, the focus remains on heterosexuality as a dominant sexual identity, with attention often paid to issues of heteronormativity and heterosexism. This paper expands sexuality research by focusing on heterosexual participants in an environment in which their sexual identity is non-dominant: the same-sex marriage movement. Here a unique situation arises in which the dominant social group (heterosexuals) is positioned in an environment populated and controlled predominantly by individuals who claim a minority (homosexual) identity.

While the same-sex marriage movement is primarily concerned with the lesbian, gay, bisexual, and transgender (LGBT) community, amidst shifting societal views, there is a need to understand heterosexuality and heterosexual participation in the same-sex marriage debate, as heterosexuals make up the vast majority of the population and are increasingly accepting of same-sex marriage in American society.⁴ This paper uses the tools of corpus linguistics to examine a context in which heterosexuality is non-normative by looking at how heterosexual supporters of the same-sex marriage movement discursively represent their identities and negotiate their participation as minorities in a predominantly homosexual setting.

3 Methodology and Corpus Design: The MEUSA Corpus

The data source for this study is Marriage Equality, USA (MEUSA), an organization with a longstanding presence in the movement for same-sex marriage rights. MEUSA is a non-profit grassroots organization working to legalize same-sex marriage in several states and at the federal level. Based in the San Francisco Bay Area, MEUSA has been actively involved in California's efforts to legalize same-sex marriage for many years, including working on the No on Prop 8 campaign and the subsequent legal battles that continue today. One aspect of their operation includes getting feedback on many topics related to same-sex marriage and other gay rights issues from members of the community by collecting stories, opinions, and responses through on-line survey campaigns. These surveys ask various questions pertaining to same-sex marriage in California and nationally, including personal experiences of discrimination, experiences of being married, and opin-

⁴ Source: AP-National Constitution Center Poll: <http://www.ap-gfcpoll.com/pdf/AP-GfK%20Poll%20August%20NCC%20topline.pdf>

ions about the 2008 campaign. Having worked as an intern for MEUSA, I have access to and take these survey responses as a data source, with express permission from MEUSA. I have compiled an initial corpus of many of these responses, which will continue to expand as new data is collected and processed. A corpus is not only “a collection of texts” but also a representation of elements of a language (Biber, Conrad, and Rippen 1998:246). The motivation behind this study is therefore to look at patterns of language use among respondents who are in favor of same-sex marriage, not only to add to our understanding of how language influences sexual identities but also to inform the movement and its leaders, as well as to inform future public policy and campaign decisions.

The full MEUSA corpus reports feelings, opinions, and reactions to the social issue of same-sex marriage, especially as it relates to California's Proposition 8. There are also responses and reactions to same-sex marriage as a federal issue, though this is a minority of surveys. Corpus data was collected via on-line surveys from May 2008 to the present.

Several thousand responses to the surveys were collected by Marriage Equality USA, though not all responses were included in the present corpus. To be included, responses needed to contain at least one complete clause (e.g. bullet lists and single word/phrase responses were omitted), and needed to be from a self-identified supporter of same-sex marriage, as the corpus is crucially designed to reflect the views of same-sex couples and their supporters. Although the corpus includes responses from multiple MEUSA survey campaigns, this project focuses only on a single campaign, conducted immediately after the passage of Proposition 8 in November and December 2008. As the largest single MEUSA survey campaign, it contains responses from over 3,000 respondents, primarily in California. The complete survey features nearly two dozen open-ended survey questions; responses to four of the questions are currently included in this corpus. Each of the questions was negative-leading (e.g. “During this campaign period, did you personally experience any homophobia, hate speech, threats or violence?”) and focused on harm, discrimination, or the local or federal repercussions that Proposition 8 and similar amendments had or could have on respondents.

An analysis using tools of corpus linguistics was chosen in order to focus on the use rather than the structure of language (Biber, Conrad, and Rippen 1998). These tools include the generation of frequency lists, searches for collocations and the analysis of concordance lines. Frequency lists show how often an individual word token appears in a corpus, highlighting common patterns in specific lexemes and concepts within the data. Collocations, or words that occur near other words, are useful for finding common phrases or terms that frequently appear near a specific word (or words) of interest. Concordance lines, or the contextual environments that a word is found in, are useful to find larger discourse patterns and common syntactic and semantic structures. Each of these tools builds upon the

others and creates a way to analyze large quantities of texts and data.

The corpus subset included in this analysis, which I refer to as the Prop 8 corpus, consists of 2,245 responses for a total of 122,473 words and 6,733 word types. Data processing was conducted using AntConc, a free concordance program that provides frequency lists, concordance lines, and collocate results. Taking the resulting data, I compared the responses from straight-identifying participants with those of LGBT-identifying participants in the data collected after the passage of Proposition 8.

4 Heterosexual Identity in an LGBT Movement

All responses were separated by demographic information on sexual identity (the survey options were Heterosexual or LGBT), as seen below in (1).

(1) Details of each data subset in the Prop 8 corpus:

Demographic Category	Number of Responses	% of Total Responses	Total Words	% of Total Words
Heterosexual	468	20.8%	24150	19.7%
LGBT	1777	79.2%	98323	80.3%
Total	2245	100.0%	122473	100.0%

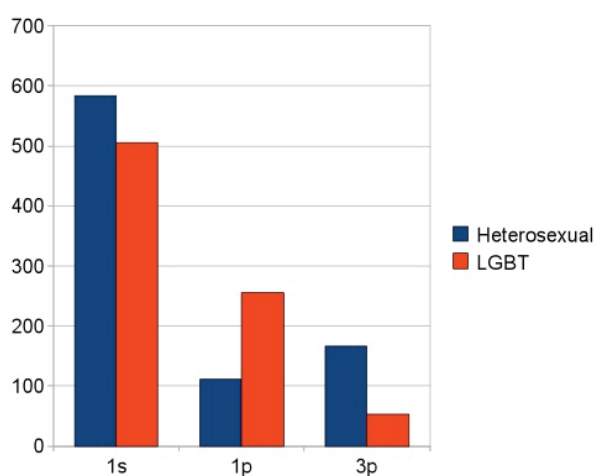
Searches were then conducted on each body of data separately. A focus was made on the collocates of present tense conjugated *be* constructions to highlight reported identities and characteristics of both the individual respondents as well as others mentioned in each response. Referencing work from Sacks (1992), Lerner and Kitzinger (2007:597) point out that “the selection of a self-reference term is intimately tied to a speaker’s situated identity because these terms reveal on whose behalf (or authority), or in what capacity, a participant speaks and thus what stance they are taking up towards the action implemented through their turn at talk.” Thus, in order to capture instances of self-reported identity, the research focus was narrowed to include only first-person singular (i.e. *I’m, I am*), first-person plural (*we’re, we are*), and third-person plural (*they’re, they are*) constructions in the present tense. This allows for an examination of individual and collective in-group identities as well as identities of the other. As a binary distinction is often present in American conceptions of sexual identity (and indeed also appears in the categorical demographic information collected in this survey), the inclusion of the third-person plural constructions was further useful in searching for patterns that may be present in the “we” versus “they” environment found in

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many same-sex marriage discourses.

To analyze the targeted pronouns, frequencies were determined and concordance lines were obtained for both full and contracted forms of all three constructions. All data has been given a normed count of instances per 100,000 words in addition to the raw counts found in the data. The graph and table below show an illustration of the proportional frequency of each of the three chosen *be* forms by identity category.

(2a) Frequency of conjugated present tense *be* forms in Prop 8 corpus:



(2b)

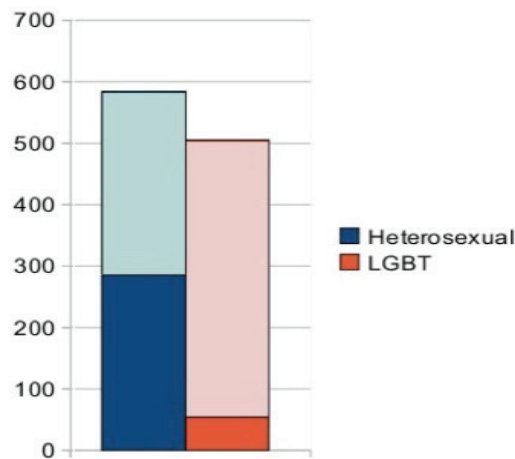
	Heterosexual		LGBT	
	468 responses 24,150 words		1777 responses 98,323 words	
<i>be</i> construction	Frequency	Normed Freq	Frequency	Normed Freq
<i>I am/I'm</i>	141	584	496	505
<i>We are/We're</i>	27	111	252	256
<i>They are/ They're</i>	40	166	52	53

As seen above, similarities and differences emerge between the two groups. Both groups use a similarly high frequency of first-person singular *be* forms. LGBT respondents, though, use first-person plural constructions over twice as often as heterosexual respondents (256 times versus 111); by contrast, LGBT respondents use third-person plural constructions less than one-third as frequently as heterosexual respondents (53 times versus 166). The subsections below consider each construction in turn to identify reasons behind these patterns and the functions of each of the constructions in context.

4.1 Functions of First-person Singular: “I am” Heterosexual

While the data in (2) above shows a relatively similar frequency of first-person singular constructions between both groups, a look at the collocates of these constructions reveals striking differences between heterosexual and LGBT respondents. Among responses including the first-person singular *I*, perhaps the most contrastive difference between the Heterosexual and LGBT responses is the frequency of overt mentions of one's sexuality, as seen in (3) below:

(3a) Mentions of sexuality in first-person singular constructions:



(3b)

Category	Normed Freq.	Normed Total	% of Total
Heterosexual	285	584	45.4%
LGBT	54	505	10.7%

As seen above, heterosexual respondents were highly more likely to make explicit mention of their sexuality or their relation to someone in the LGBT community in their responses, with the dark areas in the figure in (3a) showing the normed counts of overt mentions of sexuality as a percentage of the total frequency of first-person singular constructions, represented by the lighter shaded areas. In fact, while nearly half of the responses from heterosexual participants include an overt mention of the respondent's sexuality compared with just over 10% from the LGBT participants, many other heterosexual respondents make indirect references either to their sexuality or to their connection to the LGBT community. Examples (4) and (5) below show concordance lines of both overt

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mentions of sexuality and qualifying statements, with italics showing the construction being examined and the underlined portion showing the portion of the response that highlights the topic being addressed. Both of these strategies are used to connect the respondent to the community to which they claim to belong through participation in the marriage equality surveys:

- (4) Overt mentions of sexuality:
 - (a) *I am a straight male.*
 - (b) While *I am not gay myself*, my favorite aunt is.
 - (c) *I'm not gay* but I have a lot of gay friends.
- (5) Access to community:
 - (a) My gay cousin is deeply hurt, and *I am* furious.
 - (b) Having friends and family who are gay, *I am* very aware of the unfairness...

This pattern is in stark contrast to LGBT responses, which highlight other aspects of respondents' identities as relevant. More important to the LGBT community were mentions of one's relationship status, profession, or ethnic/regional/national identity. (6) below shows common collocate pattern groups and their frequencies in the first-person singular constructions, with concordance lines illustrating each major category in (7)-(10) below:

- (6) Collocate patterns in LGBT responses:

Category	Frequency	Total	% of 1sg constructions
Relationship Term	153	496	30.8%
Emotional Term	93	496	18.8%
Social/Political Term	57	496	11.5%
Sexual Identity	53	496	10.7%

- (7) Relationship:
 - (a) *I am married* to my wife.
 - (b) *I am* now unable to marry my partner.
- (8) Emotional:
 - (a) *I am outraged* that Prop 8 passed.
- (9) Social/Political:
 - (a) I can't believe *I am denied my rights*.

- (10) Sexual Identity:
(a) *I am* a very out and proud gay man.
(b) *I am* only a homosexual to them...

(6) above illustrates that for the LGBT respondents, their sexual identity within the community is treated a given, as it is only the fourth most common collocate category in these constructions. Instead of mentioning sexuality, many instead use the first-person singular construction to highlight other salient aspects of their personal identity, such as marriage status, or to give a personal evaluation of the situation, such as an expression of anger, hurt or outrage. Conversely, the heterosexual respondents, here seen as the out-group in a setting centered around same-sex marriage, use the first-person singular to make their sexuality explicit or justify their presence and belonging in the community.

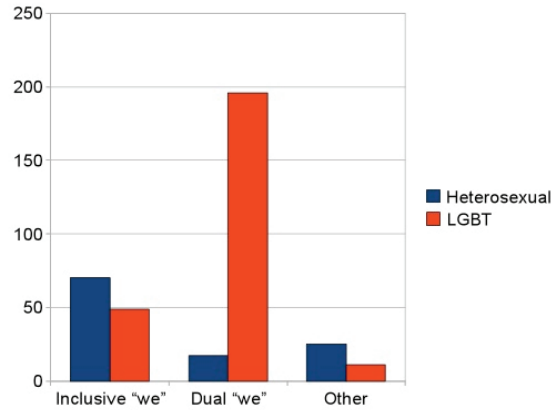
4.2 Functions of First-person Plural: “We are” a Movement

Like the first-person singular, first-person plural constructions are similarly used by heterosexual participants to signify belonging in the same-sex marriage community, but in a markedly different way. First of all, the first-person plural constructions are used nearly two and a half times as frequently by LGBT respondents compared to heterosexual respondents (256 times vs. 111 times). Furthermore, the referent of *we* is very different between the two groups. Two major referent types were seen in the data: an inclusive *we*, which references the entire group of same-sex marriage supporters or the same-sex marriage movement, and a dual *we*, which references exactly two people, typically the author and their significant other. Heterosexual participants, though using a first-person plural construction less frequently, almost exclusively use *we* to refer to the inclusive, all-encompassing group that constitutes the same-sex marriage movement. By contrast, LGBT individuals vastly preferred a dual referent, and rarely used “we” in an all-inclusive sense. (11a-b) below illustrates the difference in use by identity category, while (12) and (13) show examples of Heterosexual respondents’ use of inclusive *we* in contrast to LGBT respondents’ use of a dual *we*.

These examples show that while heterosexual participants frequently use collocates such as all with the first-person plural to create a stance of belonging and participation within the same-sex marriage movement, LGBT respondents are instead commonly highlighting their relationship status as the most salient information to report. This pattern works in some ways to reinforce the usage of first-person singular constructions that provide heterosexual respondents a chance to justify their participation in the movement by showing that they are concerned with the collective goals of the community as a whole. LGBT participants similarly reinforce their stance of individual reactions by continuing to focus on relationship status and emotional reaction to the passage of Proposition 8.

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(11a) Inclusive versus dual *we* in Prop 8 corpus:



(11b)

	Heterosexual	Total Normed Freq: 111	LGBT	Total Normed Freq: 256
Referent	Normed Freq	Percentage	Normed Freq	Percentage
Inclusive <i>we</i>	70	63.0%	49	19.0%
Dual <i>we</i>	17	14.8%	196	76.6%
Other	25	22.2%	11	4.4%

(12) Heterosexual responses (inclusive *we*):

- (a) I want my son growing up knowing that *we are all* equal.
- (b) *We are all* in a state of disbelief.

(13) LGBT responses (dual *we*):

- (a) *We are a gay couple* of 12 years with children.
- (b) *We are* fearful that *our marriage* will not remain legal.
- (c) We are in limbo because *we are married*.⁵

This focus away from the collective goals of the movement is further seen in the use of inclusive *we* in LGBT responses. Not only is there a difference between the percentage of inclusive versus dual *we* in these responses, but the times that inclusive *we* is found in LGBT responses, it is often found in contexts with negative semantics, or in ideological challenges to reality, as seen in the sentences in (14).

⁵ "We are in limbo" is another example of the first-person plural construction examined here, but is not highlighted in the example as it is not clear what the referent of *we* is until the second half of the statement.

- (14) Concordance lines of LGBT inclusive *we*:
- (a) We are all devastated in our community. (Negative semantics)
 - (b) We are still feared. (Negative semantics)
 - (c) It's about living in a country where we are all equal.
(Ideological challenge to reality)
 - (d) We are suppose [sic] to be one of the most modern civilizations
(Ideological challenge)
 - (e) Who we are is not “gross” and “unnormal” [sic]
(Negative semantics; ideological challenge)

The above examples further show the differing stances between the two groups. While heterosexual participants focus on inclusivity in the movement and the need to have a collective identity with which to move forward from the recent passage of Proposition 8, LGBT respondents focus on individualistic goals and ramifications of the same-sex marriage ban, and take a reactionary stance that removes them from the goals of the movement as a whole and focuses on the recent events and their effect on the individual lives of the members of the community.

4.3 Functions of Third-person Plural: “They are” Gay

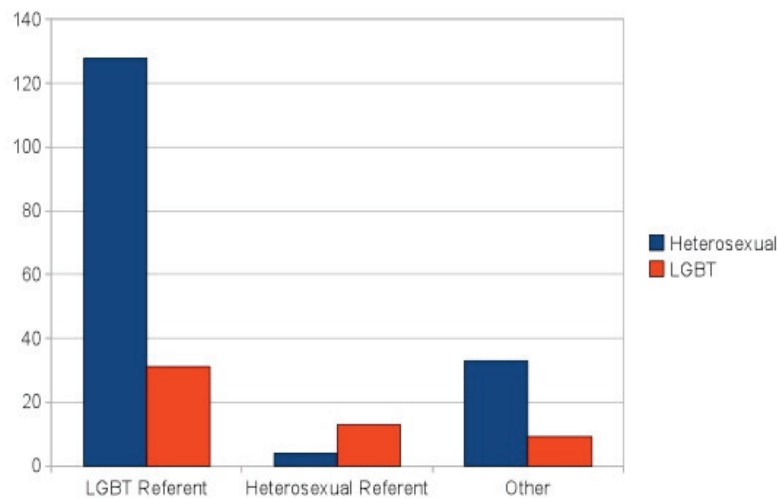
Third-person plural constructions in the data are used to refer to the identities of other groups. Heterosexual participants show a clear pattern of the expected “we” versus “they” dichotomy separating themselves as heterosexuals from the LGBT community. In normed counts, heterosexual participants are more than three times as likely to use the third-person plural constructions in their responses compared to LGBT respondents (166 times vs. 53 times) and most frequently use these constructions to reference the LGBT community, as seen below in (15).

While heterosexual participants’ use of the third-person plural constructions followed an expected “we” versus “they” distinction, with an overwhelming preference for an LGBT referent, LGBT responses did not follow a parallel pattern at all. Instead, LGBT participants also favored an LGBT referent, with the majority of these constructions referencing members of the in-group. Instances of this are seen below in (16) and (17), showing concordance lines from both heterosexual and LGBT participants.

These examples show that while heterosexual participants use the first-person constructions to align with the movement, their frequent use of this construction serves to maintain a level of separation from the core of the movement and highlight their marginal place within the larger community. As many of the survey questions from which this data stem ask about experiences of discrimination, it is likely that this distance comes from secondhand knowledge of events of discrimination that the respondents themselves did not face.

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(15a) LGBT and heterosexual referents of *they* constructions:



(15b)

	Heterosexual	Total Normed Freq: 166	LGBT	Total Normed Freq: 53
Referent	Normed Freq	Percentage	Normed Freq	Percentage
LGBT referent	128	77.5%	31	57.7%
Heterosexual referent	4	2.5%	13	25.0%
Other	33	20.0%	9	17.3%

(16) Heterosexual uses of *they*:

- (a) *They are* accepted by everyone in their families...
- (b) *They are* being denied the right to find love.
- (c) ...they feel hurt because according to California, *they are* second class citizens...

(17) LGBT uses of *they*:

- (a) ...for many of our friends, *they are* being stopped from enjoying the same respect
- (b) *they are* in a state that does not recognize same-sex marriage
- (c) Partners pay higher taxes. *They aren't* entitled to other financial benefits.

However, it also suggests an understanding that while they seek to participate and belong to the movement, they are not directly affected by the outcome of same-sex marriage bans in the same way that LGBT individuals are.

This pattern is further seen through the ways that LGBT respondents similarly use third-person plural constructions to predominantly refer to other members of

the LGBT community. Not only does this use create a marked lack of acknowledgment of heterosexual participation within the movement, but it further reinforces LGBT participants' concern with the ramifications of Proposition 8 for the relationship status of fellow LGBT community members.

5 Being Straight in a Gay Movement

When all three of these constructions are considered together, a pattern emerges showing a complex positioning by heterosexual participants through their responses to the MEUSA Prop 8 survey. Each construction functions somewhat differently to create a complete scenario in which heterosexual respondents negotiate their placement in the same-sex marriage community to highlight their marginality in the movement while simultaneously establishing and justifying their participation.

The first-person singular constructions identify the self as non-normative by revealing heterosexuals' perception of being outside the sexual norms of the same-sex marriage movement, while also providing a justification for who they are and why they are responding to a survey in support of marriage equality in the first place. First-person plural constructions expand on their identity of being in favor of same-sex marriage by reinforcing their participation and locating themselves within the larger movement. This pattern is seen through the respondents' focus on the goals of the movement as a whole and a concern for large-scale issues that relate to same-sex marriage. Finally, the third-person plural constructions work in tandem with the first-person singular constructions and in seeming contrast to the first-person plural constructions to maintain a level of distance from the movement and acknowledge the lack of direct implications of Proposition 8 on their own lives.

LGBT respondents meanwhile show a much more individualistic sense of identity within the movement, highlighting personal reactions and ramifications of Proposition 8's passage. With a focus almost exclusively on LGBT individuals, and particularly on those in committed relationships, their responses show a striking lack of consideration for the heterosexual participants within the movement, a perspective that may have led heterosexual participants to feel it necessary to justify their presence.

6 Conclusions

This paper illustrates how heterosexual participants in the same-sex marriage movement linguistically negotiate their position through identity placement and stance taking using pronoun constructions. In a situation in which heterosexuals have a non-normative sexual identity, linguistic resources become a powerful tool for negotiation within the community. These resources become especially im-

portant in this particular setting due a lack of LGBT acknowledgement of heterosexual participation within the same-sex marriage movement, despite the fact that they make up a numeric majority of voters on both sides of this social issue. As the preceding analysis suggests, it therefore becomes important for heterosexual supporters who see themselves as part of the movement to place themselves within it and become visible through linguistic means, even despite their acknowledgement of their placement on the margins of the community.

The seeming lack of attention paid to heterosexuality among LGBT individuals in the data may simply be due to the genre of these responses (reports of homophobic discrimination) and the nature of the perceived audience (the leaders of the same-sex marriage movement), though it should be noted that the lack of acknowledgement of heterosexuality continues into the third-person plural constructions, where it could be expected that heterosexuals that may be *against* the movement could be seen in the data and are not. Moreover, as shown above, LGBT participants were most concerned with their own situations and lives as a result of the passage of Proposition 8. However, lack of attention to the marginalized heterosexual participants can be damaging for the movement in the long term. Heterosexual participants, seen in the corpus to be working to negotiate their place within the movement, should be used as a resource for LGBT activism instead of being overlooked.

The results presented here also enhance language and sexuality research by expanding our understanding of heterosexual identities in situations where a normatively dominant sexual identity is not automatically seen as default. In addition, this research can serve to inform the same-sex marriage movement's organizations and leaders to consider issues of identity, language, and community participation in future policy decisions and political actions. In a movement fueled by modern technology, internet-based communication, and social networking, language use is a powerful tool for identity construction and negotiation and is especially important for marginalized groups to identify themselves and place themselves within the ranks of groups to which they are seeking to belong.

References

- Biber, Douglas, Conrad, Susan, and Randi Reppen. 1998. *Corpus Linguistics: Investigating Language Structure and Use*. Cambridge: Cambridge University Press.
- Cameron, Deborah, and Don Kulick. 2003. *Language and Sexuality*. Cambridge: Cambridge University Press.

- Campbell-Kibler, Kathryn, Podesva, Robert, Roberts, Sarah, and Andrew Wong, eds. 2002. *Language and Sexuality: Contesting Meaning in Theory and Practice*. Stanford, CA: CSLI Publications.
- Eliason, Michele. 2003. Accounts of Sexual Identity Formation in Heterosexual Students. In Karen Lovaas and Mercilee Jenkins, eds., *Sexualities and Communication in Everyday Life*, 117-128, Thousand Oaks, CA: Sage Publications.
- Kiesling, Scott F. 2002. Playing the Straight Man: Displaying and Maintaining Male Heterosexuality in Discourse. In Kathryn Campbell-Kibler, Robert Podesva, Sarah Roberts, and Andrew Wong, eds., *Language and Sexuality: Contesting Meaning in Theory and Practice*, 249-266, Stanford, CA: CSLI Publications.
- Kiesling, Scott F. 2005. Homosocial Desire in Men's Talk: Balancing and Recreating Cultural Discourses of Masculinity. *Language in Society* 34(5):695-727.
- Kitzinger, Celice. 2005. Speaking as a Heterosexual: (How) Does Sexuality Matter for Talk-in-Interaction. *Research on Language and Social Interaction* 38(3):221-265.
- Lerner, Gene H. and Celice Kitzinger. 2007. Extraction and Aggregation in the Repair of Individual and Collective Self-Reference. *Discourse Studies* 9(4):526-557.
- Mortensen, Kristine. 2010. "I'm a Decent Girl": Refusing Sexual Invitations in an Intimate Heterosexual Encounter. Paper presented at the Sixth Annual International Gender and Language Conference, September 19, 2010, Tokyo, Japan.

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Chris VanderStouwe
University of California, Santa Barbara
Department of Linguistics
3432 South Hall
Santa Barbara, CA 93106

cvanderstouwe@umail.ucsb.edu