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Foreword

We are pleased to present the proceedings of BLS 35, held at UC Berkeley in February 2009. We would like to thank the contributors to this volume and all those who attended and participated in the conference, as well as those at UC Berkeley whose generous support made the conference possible: the Office of the Dean of Social Sciences, the Graduate Assembly, the Student Opportunity Fund, and the Departments of Linguistics and Anthropology.

Iksoo Kwon, Hannah Pritchett, and Justin Spence

Volume editors

GENERAL SESSION

The Roles of Acquisition and Usage in Morphological Change*

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0. Introduction

There is a century-old question in linguistics concerning the role child language acquisition may play in language change (Jespersen 1922). Many have argued that language changes exclusively through the accumulation of errors in acquisition over many generations. Henry Sweet expressed this view in 1899: 'If languages were learnt perfectly by the children of each generation, then languages would not change...changes in language are simply slight mistakes, which in the course of generations completely alter the character of the language' (cited in Jespersen 1922:161). However, others have just as forcefully argued that 'babies and very young children are fairly irrelevant' to language change (Aitchison 2001:210), pointing to evidence that change occurs gradually among adolescents and adults.

The present paper revisits the relationship between acquisition and change, using computer modeling as an investigative tool. We focus in this study on which mechanism(s) of change best account for the well-known tendency in morphology for frequent forms to be suppletive or otherwise irregular (Corbett et al. 2001). For our present purposes, we are interested in an opposition between two hypothesized mechanisms of change, which we briefly review below: language acquisition, and language usage.

Language acquisition has assumed a central role in generative accounts of language change since the 1960s (Halle 1962). Generativists argue that acquisition must be the source of language change, because adults can make only superficial changes to their language, and cannot alter their grammar (Lightfoot 2006). This outlook is tied to evidence regarding the 'critical period,' indicating that an individual's ability to learn a language fluently declines sharply beyond childhood (Lenneberg 1967). Moreover, it is held that errors during acquisition would be unsurprising because of the 'poverty of the stimulus': children must deduce I-language (a mental grammar, with infinite capacity) on the basis of noisy and incomplete data from E-language (a finite set of actual utterances) (Chomsky 1980). Outside the domain of generative theory, the Iterated Learning Model

* The order of authors is alphabetical.

(ILM) (Smith, Kirby and Brighton 2003) has taken a different stance, while still giving acquisition a central role in language change. While leaving intact the premises of the poverty of the stimulus argument, the Iterated Learning literature argues against the nativist elements of Chomskian theory, holding instead that language adapts to be learnable in the face of a 'transmission bottleneck': the limited number of E-language utterances from which children must acquire an open-ended I-language capacity. ILM theorists argue that certain features of language, such as compositionality and regularity, are in fact adaptations by language to the fact that it is culturally transmitted across generations (Smith et al. 2003).

In contrast, language usage as a mechanism of change involves continuous, gradual adjustments to language structure across the lifespan of each individual. In usage-based theory (Langacker 1987, Bybee 2006), there is an ongoing, bidirectional influence between linguistic utterances and linguistic representations, and grammatical competence is thus not isolated from knowledge of linguistic usage. Rather than focusing only on changes in abstract grammar, usage-based approaches take an inclusive approach to change: any change in usage (including frequency of some variant) corresponds to a change in linguistic representation. Usage-based theorists acknowledge that language-learning abilities decline with age, but argue that this does not mean that adult grammar is 'frozen' (Croft 2000:58). Proponents of usage-based change point to evidence that adult speakers adopt ongoing changes in their language (Harrington 2006), that adults have innovated systematic grammatical conventions in L2 speech communities (Sankoff and Laberge 1973), and that adults most likely originate grammatical features that are acquired late by children (Bybee 2009).

For illustrative purposes, we have here presented language acquisition and language usage as qualitatively distinct, mutually exclusive mechanisms of change. However, the real-world situation is undoubtedly more subtle. There is no reason to assume that language change is driven exclusively via acquisition, or exclusively via usage. Indeed, proponents of the ILM indicate that the model may be extended to incorporate intra-generational change (Smith et al. 2003:374). Moreover, usage-based theory leaves open the possibility that acquisition plays a small role in some types of language change (Bybee 2009). Nevertheless, it is worthwhile to study the mechanisms of language change in detail, to consider which types of change are more likely to be brought about via acquisition, by usage, or both, and what the relative importance of each mechanism may be. The goal of our present project is thus to investigate such dynamics systematically using computer simulations. Computer simulations are a useful methodology in the present context, since they allow us to observe trajectories of change, and test hypotheses while controlling variables that are difficult or impossible to control in the real world (Cangelosi and Parisi 2001). With this approach, we may explore counterfactual thought experiments that are otherwise not possible. What patterns may arise if the only avenue permitted for change is via usage—if no new children are ever born, and adults can change their linguistic representations conser-

vatively? Alternately, what patterns may arise if we assume the only avenue for change is via acquisition— if no changes in representation are permitted beyond an acquisition stage?

In the present paper, we investigate these alternatives with respect to the relationship between frequency and morphological irregularity. It is well known that over time, infrequent items are more likely to undergo analogical leveling in morphology (Paul 1890, Hooper 1976, Lieberman et al. 2007), with the result that irregular morphology tends to be concentrated among the highest-frequency items of a language (Corbett et al. 2001). What causes this pattern? Some views focus on intergenerational transmission, since rare irregular items may never be encountered during acquisition, and are thus regularized to fit a more general pattern. Thus, in discussing an ILM simulation by Kirby (2001), Dowman, Kirby and Griffiths (2006:89) write that the distribution of irregular forms 'can be explained in terms of adaptation to cultural transmission. Put simply, frequent verbs can afford to be irregular, since they will have ample opportunity to be transmitted faithfully through the [acquisition] bottleneck.' In contrast, usage-based approaches focus on the varying strengths of different items in memory according to their frequency. Thus, Haspelmath (2008) writes: 'The reason why high absolute frequency favours suppletion (and irregularity more generally) has long been known: High frequency elements are easy to store and retrieve from memory, so there is little need for regularity.' (See also Hooper 1976.)

In Section 1 of this paper, we discuss the ILM simulation approach of Kirby (2001), which shows that in principle, an acquisition-driven mechanism based in sampling-error could account for the correlation between frequency and irregularity. In Section 2, we expand Kirby's (2001) model with an exemplar-based simulation that permits variation and gradual morphological change. We present two versions of this simulation, one in which change proceeds via intergenerational acquisition, and one in which change is usage-based. Our results indicate that either mechanism operating alone could, in principle, lead to the expected relationship between frequency and irregularity. In Section 3, we discuss additional factors that are relevant to the evaluation of our results.

1. Irregularity in the Iterated Learning Model (Kirby 2001)

The Iterated Learning Model views language change as the product of cultural transmission, in which information about a language is passed iteratively from generation to generation, with the possibility for error or innovation whenever transmission occurs (Smith et al. 2003). The ILM adopts the generative view that the information available to a language learner is impoverished (Chomsky 1980), creating a *transmission bottleneck* that increases the likelihood of change. This bottleneck occurs because a language learner must construct a grammar and lexicon on the basis of an incomplete sample of the language in her environment, which may by chance not include some forms. When a transmission failure occurs, information is lost about a particular item in the lexicon which then may be reconstructed on the basis of more global information available in the lexicon.

In the ILM, sampling error in acquisition accounts for the regularization of irregular morphological forms (Kirby 2001). Over many iterations of intergenerational acquisition, this model predicts that originally irregular forms will regularize probabilistically in relation to how likely they are to fail to be transmitted across generations. Assuming that irregularity is constantly introduced through other processes of change, languages will evolve toward an equilibrium in which irregulars tend to be frequent. Kirby (2001) illustrates this process using a simulation of the transfer of morphological patterns in an iterated learning paradigm. The simulation tracks the transmission of a set of bimorphemic, initially non-compositional words over the course of many generations. When a speaker needs to produce a meaning for which it has not learned a word, it reconstructs a word on the basis of any form-meaning regularities that exist among the words it has learned. In this way, any regularities that exist between words sharing meanings will spread to other words sharing those meanings at a rate proportional to their probability of loss in each iteration.

Kirby's (2001) simulation results do indeed produce the expected results: over time, the least frequent forms regularize more rapidly, leaving irregularity to the most frequent forms. However, the results in Kirby (2001) do not allow us to draw any conclusions about the potential for usage-based change, because imperfect learning through failure of transmission is the only source of change permitted in that model. In Section 2, we describe simulations that address both intergenerational and intra-generational change in a simple exemplar-based model. We find that in a model solely allowing usage-based change, recency effects in activation levels coupled with a capacity to extend existing patterns can also cause irregularity to become concentrated among higher-frequency items.

2. Exemplar Models of Vertical and Horizontal Change

In this section, we outline two new simulations which expand on Kirby's (2001) model in several ways, both using an exemplar architecture. The exemplar framework is based on evidence that across domains (including phonology, morphology, and syntax), linguistic representations are rich and detailed, and include memories of specific instances of use (Goldinger 1996, Bybee 2006). In an exemplar model, every token of experience has some impact on stored representations (often simply involving the strengthening of some category in memory), and the contributions of a particular token depend upon its recency, overall frequency, and similarity to other remembered tokens (reviewed in Pierrehumbert 2001). The shifting of perception and production behavior with experience can be modeled through storage of new exemplars of a category through experience, coupled with the slow decay of older exemplar memories.

An exemplar approach has the advantage of representing knowledge of linguistic variation. Speakers do in fact exhibit variation in morphology along with other domains, and an individual speaker understands (and may even produce) morphological 'doublets' in free variation such as *dived/dove* and *slayed/slew* (Haber 1976). In fact, competing morphological items may exist side-by-side

within a speech community for centuries (see Fehringer 2004). An exemplar approach permits each speaker's grammar to accommodate variants for a single paradigm slot, and allows usage preferences to shift gradually over time.

Below we compare the behavior of two exemplar-based models in simulation: an acquisition-driven, 'vertical transmission' model similar to Kirby's (2001) model, and an architecturally parallel usage-driven, 'horizontal transmission' model. A comparison of results between the two models illustrates how low production frequency can favor the establishment of regularity both in acquisition and in usage. In the acquisition-based model, a regular variant is produced when the corresponding form was not acquired. Similarly, in the usage-based model, we can think of a pattern-extension in a production event as occurring when the lexical entry in a paradigm slot fails to supply the learned form. In this way, each production event represents a momentary bottleneck through which only one variant can pass. Error in this process creates the potential for change in a way that is conceptually similar to change via an acquisitional bottleneck.

We first describe the acquisition-driven version of the simulation. Agents possess a semantic space which is divided into 100 word categories, where each category consists of exemplars initially coded as 'irregular.' (Because we are abstracting away from any individual form-related influences on regularization probability, we can simply code each exemplar as 'regular' or 'irregular' without including any other phonological information.) Each word category is associated with a probability of production given by its rank order in a Zipfian distribution; if a chosen word-category contains multiple exemplars, one is randomly chosen for production. The set of exemplars in a lexical category represents the set of patterns that an agent was exposed to during acquisition, where the frequency of a particular exemplar-type in a lexical category corresponds directly to the frequency with which it was heard. In the first round, the teacher-agent transmits 500 random samples of her lexicon to a naïve learner, who stores these samples as exemplars in her corresponding lexical categories. Because sampling is random, it is possible that any word category will fail to be represented in the input to the learner in any given round. This failure is much more likely for word-categories at the low end of the Zipfian probability distribution. At the end of one round, the learner becomes a new teacher, and transmits a random 500-item sample of her lexicon to a new learner, and so on. If a teacher attempts to transmit a word-category for which she has no exemplar, she transmits an exemplar coded as 'regular,' representing extension of a pattern to fill in the empty paradigm slot. Once a word category contains only exemplars coded as 'regular,' it will remain fully regular for the remainder of the simulation, because whether this category is acquired by a learner or not, only regular forms will be transmitted in subsequent cycles. In the limit then, all word categories will become regular, but lower frequency categories decay to regularity at a faster rate. Figure 1 illustrates this with the averaged result of 100 runs of the same simulation, each iterating for 100 transmission-acquisition cycles.

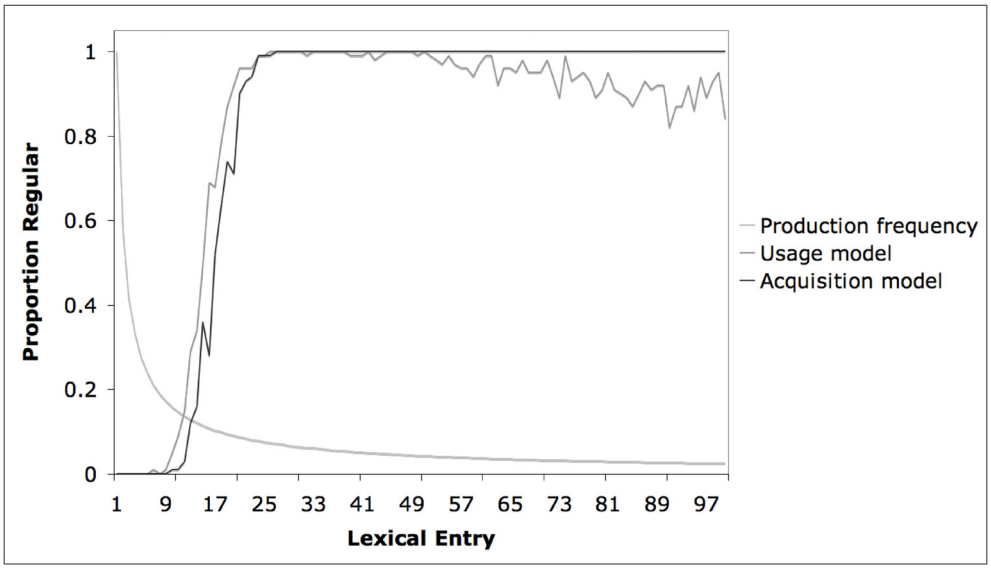
The usage-driven version of the simulation is nearly identical to the acquisition-driven simulation. When run in the usage-driven mode, a simulation begins with two agents with the same 100 word categories with the same Zipfian production-probability distribution, all initialized with exemplars coded as 'irregular.' Each exemplar starts with an activation of 1, which is decremented exponentially in each round by multiplying by 0.5. In a given round, the speaker-agent randomly chooses a lexical entry to produce in proportion to the Zipfian production probability, and then randomly chooses an exemplar from that category in proportion to activation. The listener-agent stores that form as a new exemplar in the corresponding lexical category. After 100 productions, the roles reverse. Within this usage-based model, there are two distinct pathways for regularity to emerge from irregularity. The more intuitively obvious path to regularity lies in unequal rates of regularization error in production. Given that infrequent forms are more likely to be errorfully regularized in production (Bybee and Slobin 1982) and that usage experience leaves traces in memory that may feed back to future usage behavior, usage should contribute to regularization of infrequent forms.[1] To illustrate this, we set the regularization probability per production event to be inversely proportional to production frequency within a regularization probability range of zero to 0.1. We ran 1000 cycles with 100 tokens exchanged in each production/perception round. At the end of 1000 cycles, a word category was counted as 'regular' if greater than 99% of the activation within the category derived from regular exemplars. Not surprisingly, because regularization error is greater for low frequency items, the rate of regularization for word categories under these conditions is inversely related to frequency. Figure 1 shows the results obtained by averaging over 100 such simulation runs.

The second mechanism is directly parallel to the sampling-error based mechanism of regularization in the acquisition model. All stored exemplars within a category, whether coded as 'irregular' or 'regular,' are decremented in activation identically in each round. Once a word category contains both regular and irregular exemplars, regular forms can be produced independently of error because production proceeds by choosing one of the set of extant exemplars within a category. For infrequent categories, more decay occurs between usage events, with the result that production behavior is relatively dominated by a smaller number of recent exemplars. This smaller pool of active exemplars for production makes it more likely that all irregular exemplars will be lost to decay simply through sample error in choice of templates for production. Within this simulation architecture, the contribution of sample error to regularization can be modulated by changing the exemplar decay rate – in the limit of no decay, the rate of accumulation of regular exemplars in a lexical category is simply the rate of errorfully regular production. If exemplar decay is included, as in the results shown here, the

[1] To our knowledge, there is no direct experimental evidence that use of particular *morphological* variants are primed by recent experience. However, there is evidence that recent experience primes future use of both phonetic (Goldinger 2000) and syntactic (Loebell and Bock 2003) variants, so it is plausible that the same effect will hold for morphological variants.

average rate of accumulation of regular exemplars in lexical categories is considerably faster than this. The two mechanisms together represent two intuitions about the effect of low frequency: less experience with an irregular form both makes regularization error more likely, and also increases the relative influence of recent experience on present behavior. Conversely, highly frequent irregular patterns are less likely to be regularized in production, and should also be less susceptible to destabilization by recently perceived regularization errors.

(1) Category regularity by production frequency averaged over 100 independent simulation runs.



The reduced rate of regularization seen in Figure 1 for the least frequent forms arises because within our usage-only simulation frequency is a limiting factor in the rate of category regularization: lexical items only have the opportunity to regularize when they are used, and thus extremely low-frequency items have sparse opportunities to undergo change during a simulation run.[2] This is the converse of the situation within the transmission-only model where change is driven through *lack* of usage. However, as can be seen in Figure 1, both these acquisition- and usage-based models can produce regularization in relation to production frequency. In the acquisition-driven model, regularization is favored by low frequency because low-frequency irregular forms are by chance less likely to be transmitted. In the usage-driven model, regularization is favored by low frequency both because low-frequency items are more likely to be errorfully regularized in each production event, and because the set of low-frequency

[2] We note further that in the data presented in Figure 1, we chose a very conservative regularization rate that never exceeds 0.1; this means that even for the rarest of items in the language, speakers still accurately retrieve the irregular form 90% of the time. A more pronounced error rate for very rare items would accelerate usage-driven change in this range.

irregular exemplars in a lexical entry are more likely to be lost to memory decay. The fact that both versions produced a similar regularity-irregularity boundary in the figure above is not theoretically significant because the position of the boundary depends on a number of free parameters in the models.[3] Our intended point is that both acquisition- and usage-driven change *can* potentially produce the same relationship between irregularity and frequency.

3. Discussion

The simulations described in Section 2 were intended to investigate mechanisms of change that may cause irregular forms to be overrepresented among frequent items. We find that either acquisition or usage is a conceptually viable mechanism for producing the pattern in question. In our first simulation, we replicate the result from Kirby (2001), with the enhancement of an exemplar architecture that incorporates variation. However, our second simulation investigates usage-based change which proceeds in the absence of acquisition, and arrives at a qualitatively similar result. The results from this model thus constitute a computational 'existence proof' consistent with a usage-based mechanism (paralleling a corresponding accomplishment in Kirby (2001) for an acquisition-driven approach). These results confirm that either usage or acquisition is a *theoretically* possible mechanism of change behind the distribution of irregular forms.

However, a full evaluation of these mechanisms requires that we examine additional factors, including the plausibility of certain assumptions implemented within the computer simulations. We first note that a crucial assumption in the acquisition-driven version of our simulation, as well as the ILM simulation of Kirby (2001), is that morphological acquisition is based on sparse data. Morphological change arises in these simulations only because of a transmission bottleneck: due to sampling error, particular forms may never be encountered during acquisition, requiring the learner to create those forms by reference to a general pattern. There is a long history of characterizing language acquisition input as impoverished, although such views have in fact become controversial (e.g., see Pullum and Scholz 2002). Morphology may be a particularly questionable domain in which to argue that acquisition data is highly impoverished. For morphological input, there is no 'poverty of the stimulus' in the usual Chomskian sense, because morphology does not represent the same kind of seemingly unbounded system as syntax (Spencer 2001:126).

It is indeed true that during acquisition, children do not encounter every combinatoric morphological possibility, especially in the case of languages having complex systems of inflectional or derivational morphology (Albright 2008). However, how likely is it that such acquisitional deficits account for *all* regulari-

[3] For the acquisition-driven model, these parameters are the sample-size in each transmission event and the number of such events. For the usage-driven model, the position of the boundary is influenced by the frequency of switching speaker/hearer roles, the rate of exemplar-decay, the probability of regularization in each production event, and the number of such events, i.e., usage frequency. In both versions, these factors influence the rate at which error can modify a category.

zation events over the course of language change? Even in morphologically simple languages (such as English), we see many high-frequency regular forms (e.g., past tense forms such as *wanted, asked, looked*, *played*). For such forms, it is implausible they could remain unlearned a sufficient proportion of the time to drive language change. We note that in order for our present acquisition-driven simulation to produce reasonable results, it must be set up with an extremely 'tight' transmission bottleneck. At each generation, the training set (500 tokens) is only five times the total lexicon size (100 items to express, with a Zipfian distribution), and a similar bottleneck is applied in Kirby (2001) (50 training items for 16 morphological combinations). Such tight bottlenecks clearly exaggerate the nature of data constraints on L1 acquisition. Conversely, if simulations are run with weaker bottleneck, i.e., with a high probability of exposure to medium-frequency forms in acquisition, irregularity remains the norm in all but the lowest-frequency forms.

A further point to consider is that in order for acquisition to have an effect on language change, the innovations of young children would need to persist in the population. However, when these matters have been investigated for morphology, the findings pose problems for the acquisition-driven view.[4] Bybee and Slobin (1982) studied the morphological errors of three age groups: preschool children, 8-10 year-olds, and adults. There are similarities across all the groups, since all speakers tend to regularize infrequent forms, and speakers of all ages may thus contribute to this process of historical change. However, only older children and adults produce the past tense in a way that is consistent with the ongoing pattern of change in English, namely, the regularization of *-t* and *-d* final verbs (*hit* > *hitted*). In contrast, Bybee and Slobin (1982) find that preschool children produce zero-marking errors on this same class of verbs, which is a fleeting innovation with no reflection in the current direction of change in English.

Why might it be that innovations by young children fail to take hold in a speech community? As a general rule, language changes only persist when they originate in socially influential groups, yet small children do not constitute such a group (Kerswill 1996). A lengthy acquisition process allows young learners to conform to the norms of their speech community by first converging on the speech of their parents. Sociolinguistic research finds that in-progress language change tends to be most prominent in speakers in late adolescence— not among young children as we would expect if imperfect learning were the primary mechanism of change (Tagliamonte and D'Arcy 2009). The propagation of innovation thus presents difficulties for accounts of change that are solely based on acquisition (Croft 2000). Social propagation of innovations is an important area for future enhancements of the present simulations, since as a simplification in the current model (following Kirby 2001), interactions occur only between idealized pairs of speakers rather than in a speech community.

[4] For reviews of related evidence in other domains of language, see Aitchison (2001), Croft (2000).

The foregoing concerns present significant challenges for any model that attributes morphological change principally to imperfect learning in acquisition. Instead, we suggest that distinct mechanisms of change in acquisition and usage may independently contribute to the observed concentration of irregularity among high-frequency items. As we have argued, it is unlikely that a failure to transmit items intergenerationally accounts for all instances of regularization. However, such failures clearly *do* occur with respect to the rarest items in a language. Critics of the imperfect learning model acknowledge that acquisition accelerates usage-driven change in this way, by finalizing the loss of variants that are already extremely rare (Aitchison 2003:739, Bybee 2009:349). As a consequence, it may be that analogical extension in usage may be primarily responsible for regularization in the mid- to high-frequency range, while failure in transmission may become an important source of regularization in the lowest frequency range. Future simulation research in this area will investigate more fully the interaction of usage and acquisition in morphological change.

With respect to analogical change in morphology, we have described an inclusive account in which usage is a central factor, and in which acquisition likely plays a supportive role. Yet care must be taken to avoid generalizing the details of these dynamics to *all* domains of language change. There is no requirement that usage and acquisition influence language in the same direction, and indeed their influences may often compete. It is sometimes claimed that language adapts to be learnable (Smith et al. 2003:385), but we note that certain learnability factors may be diametrically opposed to usage factors. For instance, phonetic reduction is most prominent in highly frequent units as a result of extensive articulatory practice. The resultant reduced forms may in fact be harder to learn, because they are articulatorily more complex and morphologically more opaque (see Bybee 2009). A full account of language change will thus acknowledge that the interactions between usage and acquisition are quite complex, and under different circumstances the contributions of these mechanisms may amplify or compete with one another.

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Correcting the Incorrect: Local Coherence Effects Modeled with Prior Belief Update

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0. Introduction

In the past four decades, the field of sentence processing research has generated a number of models of the incremental operation of the human sentence processor. One assumption common to most of these theories is that the difficulty of a word is determined by the possible syntactic structures of the preceding words, and thus, the difficulty of a word should be unaffected by ungrammatical analyses of the preceding words. Put formally, the difficulty of word w_n of a sentence is determined only by the grammatical syntactic structures covering the preceding words $w_1 \cdots w_{n-1} (\equiv w_1^{n-1})$. Recent results by Tabor, Galantucci, and Richardson (2004), however, appear to show evidence of a case where a syntactic structure which is not possible given w_1^{n-1} nevertheless influences the difficulty of w_n. They attribute such effects to 'merely locally coherent' syntactic structures and term such impossible structures *local coherences*. Follow-up studies by Konieczny (2005) and Konieczny and Müller (2006, 2007) provide further evidence that these impossible structures are being constructed and even semantically evaluated. These results have been taken to support a small class of dynamical systems models of sentence processing (e.g., Tabor and Hutchins 2004), in which, crucially, structures which are not possible given the current input are nevertheless constructed and compete with other, tenable structures. Unfortunately, the existing theories in this class have a large number of interacting free parameters, making interpretation somewhat difficult and leaving unspecified how to scale up such a system to make broad-coverage reading time predictions. This paper fills two gaps in the literature on local coherences. First, it demonstrates from two experiments with an eye-tracking corpus that effects of local coherences are evident in the reading of naturalistic text. Second, it describes a new computational model of local coherences that is motivated by a view of sentence processing as updating prior beliefs over syntactic structures.

0.1. Local Coherences: The Initial Result

The first study to report effects of local coherences is described in Tabor, Galantucci, and Richardson (2004). In Experiment 1, they use a self-paced reading task and materials containing relative clauses (RCs) attached to nouns in non-subject

position, as in (1).

(1) a. The coach smiled at the player tossed a frisbee by ...
b. The coach smiled at the player who was tossed a frisbee by ...
c. The coach smiled at the player thrown a frisbee by ...
d. The coach smiled at the player who was thrown a frisbee by ...

Their experimental design crossed RC reduction with verb ambiguity. RCs are either reduced (1a,c) or unreduced (1b,d), and the RC verb is either lexically ambiguous between a past tense active and a past participle (1a–b), or is unambiguously a past participle (1c–d).

Tabor, Galantucci, and Richardson point out that in one of these four conditions (1a) there is a locally coherent string *the player tossed a frisbee*. Out of context (e.g., if it were starting a sentence) this string would have a likely parse in which *the player* is the agent of *tossed* and *a frisbee* is the theme. Given the preceding context, however, *the player* is in non-subject position and thus this parse is impossible. That is, given the preceding context, *the player tossed the frisbee* must begin a reduced RC, and there is no local ambiguity. Thus, so long as ungrammatical analyses are not considered, (1a) should be no more difficult than the other examples, except insofar as ambiguous verbs are harder than unambiguous verbs, and reduced RCs are harder than unreduced RCs. That is, the prediction for reading times in the *tossed a frisbee by* region from most theories of sentence processing would be to get the two main effects of RC reduction and verb ambiguity.

Tabor, Galantucci, and Richardson, however, predict an interaction such that (1a) will have added difficulty above and beyond these two effects, because of the interference from the locally coherent parse of *the player tossed a frisbee*. Concordant with their predictions, they find an interaction in the *tossed a frisbee by* region, such that reading times for (1a) are super-additively high, suggesting that ungrammatical analyses are considered by the human sentence processor.

0.2. Local Coherences: Theories

With the results showing effects of local coherences in mind, we can ask the question of what sorts of theories predict these effects. This section briefly describes two recent examples of such theories. The first involves dynamical systems models to explain the effects, while the second uses a mathematical model of the combination of bottom-up and top-down probabilistic information.

Tabor and Hutchins (2004) describes the SOPARSE (self-organized parse) model, in which reading a word activates a set of lexically anchored tree fragments. These tree fragments then compete, spreading activation to compatible fragments and inhibiting incompatible fragments, such that the system eventually stabilizes to the correct parse. Reading times for each word can then be modeled as the time the system takes to stabilize after reading a word. Stabilization takes longer for locally coherent regions because the locally coherent parse is created and competes with the globally grammatical parses, thus nicely explaining the results on local coherences.

There are, however, unsolved issues with this model. The model has a number of free parameters, relating to the equations used for the competition, the method by which links between fragments are formed, as well as the question of precisely what tree fragments a given word will activate. While Tabor and Hutchins (2004) works out these questions in detail for the types of sentences they model, it is unclear how to scale the model up to make predictions for arbitrary types of sentences. That is, there is no principled system for setting the three types of parameters mentioned, and no clear interpretation of their values. The model put forward in this paper is an attempt to remedy this situation.

A recent proposal by Gibson (2006) can also explain some of the local coherence results. Gibson's proposal is that part-of-speech ambiguities have a special status in parsing; in effect, lexical part-of-speech ambiguities can be thought of as one-word local coherences. In this model, a lexical bias (LB) is created for each part-of-speech tag t_i of word w by multiplying together the context-independent probability of t_i given the word w (the *bottom-up* component) by a smoothed probability of the tag given the context (the *top-down* component):

(2) $$LB(t_i) = P(t_i|w)P_s(t_i|\text{context})$$

P_s is smoothed by adding .01 to the probability of every tag $t \in T$, such that it no longer sums to one, and is thus not a true probability function. Then, a true probability is calculated for each tag t_i by normalizing the LB terms:

(3) $$P(t_i) = \frac{LB(t_i)}{\sum_{t \in T} LB(t)}$$

Gibson describes two ways in which the resultant probabilities can be used to predict difficulty, one for serial and one for parallel models. For serial models, the parser stochastically selects a part-of-speech for the current word from the $P(t)$ distribution. When the part-of-speech it selects cannot be integrated into the current syntactic representation, difficulty occurs from reanalysis. In a parallel model, the parser maintains all possibilities for the part-of-speech of the word, weighted by $P(t)$. In cases where multiple parts of speech have positive probabilities, competition ensues.

Because the top-down probabilities are smoothed to allow for all possible parts-of-speech, any word which is lexically ambiguous will be more difficult to process, regardless of whether it is ambiguous or not in its context. This can thus explain some of the difference between the ambiguous and unambiguous verbs in Tabor, Galantucci, and Richardson (2004). It is not clear, however, under such a model why the super-additive interaction would obtain. Furthermore, such a theory cannot at all explain the semantic effects of local coherences, such as those described in Tabor, Galantucci, and Richardson's (2004) Experiment 2, or the visual world results of Konieczny and Müller (2006, 2007). In addition, Gibson's model is a bit underspecified: he does not discuss how the top-down probabilities are calculated, nor

what the precise linking hypothesis is between the final $P(t)$ and reading times. Finally, it is not at all clear why the top-down expectations should be smoothed, since the smoothing actually has negative consequences on the processor's performance.

0.3. Goals

The goals of this paper are twofold. The first goal concerns the empirical status of effects of local coherences. All of the extant results on the phenomenon involve controlled experiments, most of which crucially involve very rare types of constructions. For example, the result of Tabor, Galantucci, and Richardson (2004) relies on reduced relative clauses formed from a passivization on the recipient of a ditransitive construction. Such a type of sentence is quite rare in English, and thus might not give useful insight into the normal operation of the sentence processor. This paper presents the results of two experiments with a corpus of eye-tracking data from the reading of newspaper articles demonstrating effects of local coherences in the reading of naturalistic sentences. This establishes the ecological validity of the study of local coherences, and underscores the need for a theory of local coherences which makes broad-coverage predictions. The second goal of this paper is to present a model of the effects of local coherences that combines the strengths of Gibson's (2006) and Tabor and Hutchins's (2004) models. This model accounts for phrasal-level effects of local coherences (as Tabor and Hutchins), but does so using general quantities that can be calculated for any sentence type (as Gibson) by using a general probabilistic parser that can operate on any SCFG. The remainder of this paper is divided into four sections. The next two sections present the two corpus experiments. Following that, we present our model and conclude.

1. Experiment 1

The basic strategy of the two corpus experiments is to build a regression model of the reading times on each word in an eye-tracking corpus. Included in the regression model for each experiment is a factor quantifying the occurrence of local coherences. Establishing that local coherences have an effect on reading times is then merely a matter of assessing the significance of the local coherences factor in the model, and assessing the size of that effect is merely a matter of inspecting the coefficient estimate.

The local coherences factor in Experiment 1 is meant to start simple by measuring the effect of one-word local coherences. Although *prima facie*, one-word local coherences do not seem to look much like the materials in Tabor, Galantucci, and Richardson (2004), the reasoning for calling them local coherences is as follows: we take the definition of a local coherence to be a string of words w that out of context would suggest one very likely parse, and that parse is impossible (or at least highly unlikely) in context. We can scale this down to the case where w is a string of size 1; that is, out of context, a word w suggests a very likely parse (e.g., a part-of-speech tag) that is very unlikely or impossible in context. Because a word only has one part-of-speech in a given sentence, this means we can invert this statement to say that a one-word local coherence occurs when the only possible part-of-speech tag

for the word in context is highly unlikely out of context. By making the assumption that the only possible part-of-speech tag for a word in context can be approximated by the actual part-of-speech tag the word has in the sentence, we can calculate our one-word local coherence factor to be an estimate of the context-independent probability of the actual part-of-speech tag t_i for a word w_i given just the word $P(t_i|w_i)$. This factor will thus be low when there is a strong one-word local coherence.

This particular type of one-word local coherence is predicted to have an effect by both Gibson's (2006) and Tabor and Hutchins's (2004) models. This probability is actually one of the components in the Gibson theory, which would predict that – all else being equal – a word w_i would be read more slowly as $P(t_i|w_i)$ decreases. Just as Gibson's theory would predict, this factor would assign lower probability to *tossed* tagged as a past participle than it would *thrown* tagged as a past participle. A dynamical systems model such as Tabor and Hutchins's makes the same prediction if we assume that the strength of the lexically-anchored tree fragments corresponding to each part-of-speech vary in strength in proportion to $P(t_i|w_i)$, which seems to be a reasonable interpretation of what their model would involve. Of course, this factor doesn't capture local coherences at a phrasal level, as Tabor and Hutchins would predict. The next experiment remedies this situation somewhat by scaling up this factor by conditioning on two words, and the model given in the paper's next section completely eliminates this objection by specifying a theory predicting phrasal-level local coherences of an arbitrary length.

1.1. Methods

1.1.1. Data

This experiment makes use of the Dundee corpus (Kennedy and Pynte 2005) of eye-movement data from 10 participants reading 51,000 words each of *The Independent* (a British newspaper). To get part-of-speech tags for the corpus, we parsed it using the Charniak parser (Charniak 2000). From the eye-tracking record given in the corpus, we calculated our dependent measure of first pass times for each word, defined as the total duration of all fixations on a word prior to having fixated anything to its right.

1.1.2. Model

We tested the local coherence factor in a linear mixed-effect model (Pinheiro and Bates 2000; for a psycholinguistic introduction see also Baayen, Davidson, and Bates 2008) of the first pass times on each word, containing 11 fixed effect control factors and participant as a random effect, as in Demberg and Keller (2008). Coefficient estimates and significance levels were estimated by Markov chain Monte Carlo (MCMC) sampling (Baayen, Davidson, and Bates 2008).

1.1.3. Control Variables

We took our control factors from Demberg and Keller (2008). They included linguistic properties such as word length in characters, the logarithm of word frequency per million as estimated from the British National Corpus (BNC), bigram probability ($P(w_i|w_{i-1})$; also estimated from the BNC), and position in the sen-

tence in words. In addition, they included lexicalized and unlexicalized syntactic surprisal ($-\log P(w_i|w_1^{i-1})$), as well as eye movement properties such as the landing position with respect to the word, the number of characters between last fixation and current fixation, and whether the previous word was fixated.

1.1.4. Factor Estimation

For each word-tag pair in the Dundee corpus, we estimated $P(t_i|w_i)$ from a Charniak-parsed version of the BNC. We used two versions of the factor: P_m was the maximum likelihood estimate (MLE) and P_s was a smoothed version. P_s was calculated by smoothing the MLE with a type-averaged distribution over part-of-speech tags. Specifically, a type-averaged distribution P_{pr} was calculated for a given tag t_i as

$$P_{pr}(t_i) = \frac{\sum_w P_m(t_i|w)}{|w|} \tag{4}$$

where w ranges over word types (as opposed to tokens). The smoothed probability P_s of a tag t_i given a word w_i is then calculated to be

$$P_s(t_i|w_i) = \frac{c(t_i, w_i) + \beta(P_{pr}(t_i))}{c(w_i) + \beta} \tag{5}$$

where $c(t_i, w_i)$ returns the count of w_i tagged as t_i in the corpus, and β is set to minimize Dundee corpus perplexity.

1.1.5. Log Transform

In addition to the probabilities themselves, the base-2 logarithms of both versions of the factor, P_m and P_s, were also entered into the regression.

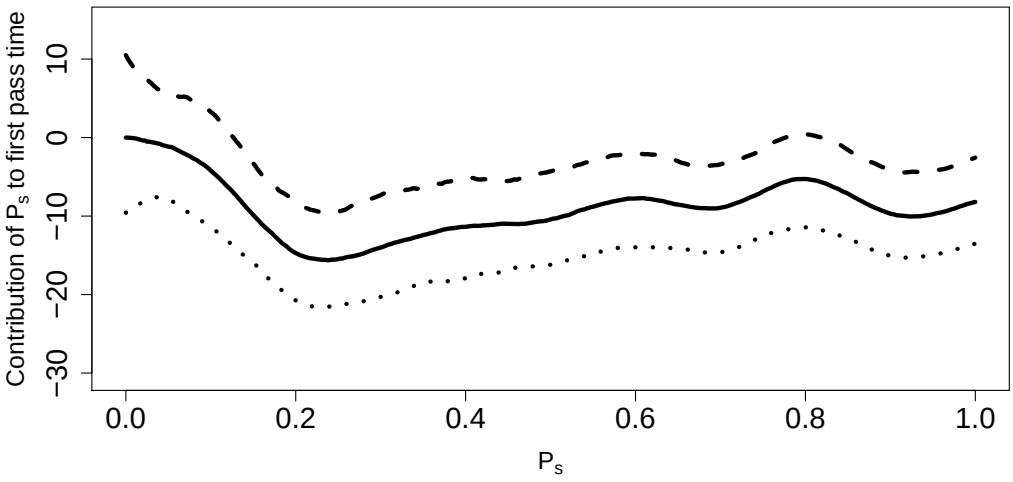
1.1.6. Data Selection

We excluded from the analysis any word in the Dundee corpus that had punctuation, contained numbers, did not contain letters, occurred as the first or last word of a line, or that did not occur in the BNC. In addition, we excluded the first-pass times on any word which had a first-pass time of zero.

1.2. Results

The better fit to the data was achieved by the log-transformed versions of the factor. The $\log P_m$ factor had a coefficient estimate of -0.71 ($p < .0001$), and the $\log P_s$ factor had a coefficient estimate of -0.80 ($p < .01$). By contrast, the linear fit version of P_m had an insignificant coefficient estimate of -0.84 ($p = .42$), and P_s had a coefficient estimate of -2.31 ($p < .05$). To better visualize the results, a natural spline regression was performed on P_s with 11 equally spaced knots. The result is shown in Figure 1 with bootstrapped 95% confidence intervals.

Figure 1: Natural spline regression on $P_s(t_i|w_i)$ with 11 equally spaced knots. 95% confidence intervals are bootstrapped.



1.3. Discussion

Since the better fit was achieved using the logarithmic version of the factors, we focus here on their interpretation. For both P_m and P_s, doubling the probability of a tag reduces the first-pass time by about 7 or 8 tenths of a millisecond. Looking at the spline regression in Figure 1 reveals that most of the differences it is accounting for exist for probabilities under 0.2. While this seems to be a somewhat small effect, the significance levels of these factors reveal that the effects are reliable. This provides the first evidence for the effects of local coherences (albeit local coherences consisting of one word) in the reading of naturalistic text.

2. Experiment 2

The second experiment is very similar to the first. In this case, however, we test for effects of two-word local coherences, again at the part-of-speech tag level, using as our factor an estimate of $P(t_i|w_{i-1}^i)$. To see how this factor is a measure of two-word local coherences, consider again the definition of local coherence effects we used above: a string of words w that out of context would suggest one very likely parse which is impossible (or at least highly unlikely) in context. If we again invert that definition, because part-of-speech tags are mutually exclusive, we see that local coherence effects occur when the only possible part-of-speech tag for a word in a sentential context is highly unlikely out of that context. Once again, we are using the actual part-of-speech tag of a word as a crude estimate of the only possible part-of-speech tag.

Take as an example a two-word sequence from Tabor, Galantucci, and Richardson, *player tossed*. Out of context this string is likely to have a parse where *tossed* is a past tense verb and very unlikely to have a parse where *tossed* is a past participle. Thus, this factor would predict reading *tossed* as a past participle to be especially difficult given that the previous word was *player*. Dynamical systems theories such

as Tabor and Hutchins (2004) would also predict a word to be read more slowly as the $P(t_i|w_{i-1}^i)$ decreases, since the lexically-anchored tree fragments for the two words should cooperate to cause a large amount of interference to the globally correct parse. While Gibson's theory would not predict the previous word to have an effect, this model still looks very similar to the sort of integration process he proposes, and may be one natural way to scale his theory up to the multi-word case.

2.1. Methods

2.1.1. Data, Model, and Control Variables

The data, model, and control variables used for Experiment 2 are the same as for Experiment 1.

2.1.2. Factor Estimation

For each word-word-tag triplet in the Dundee corpus, we estimated $P(t_i|w_{i-1}^i)$ from the Charniak-parsed BNC. As in Experiment 1, we used two versions of the factor: P_m was the maximum likelihood estimate (MLE) and P_s was version smoothed from the MLE using the same method as in Experiment 1.

2.1.3. Log Transform

As before, the base-2 logarithms of P_m and P_s were also entered into the regression.

2.1.4. Data Selection

As in Experiment 1, we excluded from the analysis any word in the Dundee corpus that had punctuation, contained numbers, did not contain letters, or occurred as the first or last word of a line. Words were also excluded when the bigram of that word and the previous word did not occur in the BNC. In addition, as in Experiment 1, we excluded the first-pass times on any word which had a first-pass time of zero.

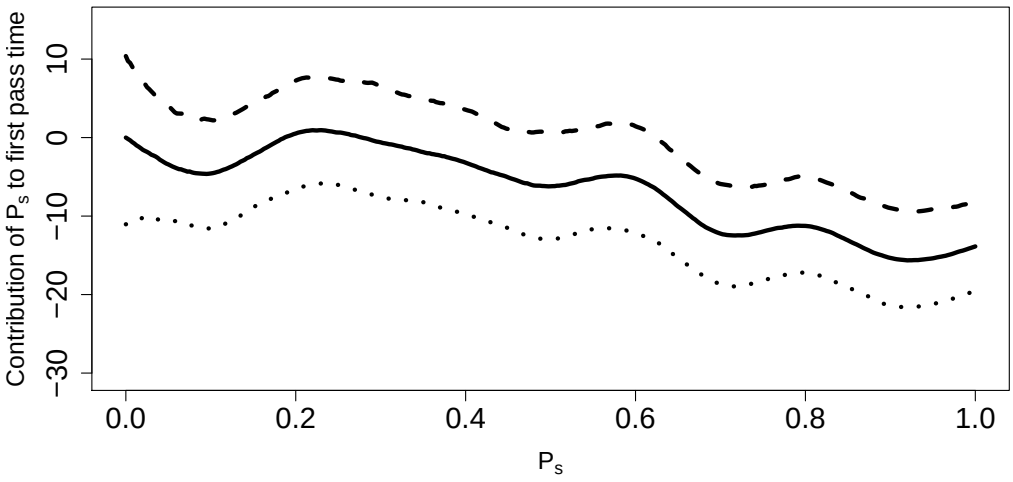
2.2. Results

As in Experiment 1, the better fit to the data was achieved by the log-transformed versions of the factors. The $\log P_m$ factor had a coefficient estimate of -0.43 ($p < .0001$), and the $\log P_s$ factor had a coefficient estimate of -4.10 ($p < .0001$). The linear fit version of P_m had a coefficient estimate of -2.94 ($p < .05$), and P_s had a coefficient estimate of -17.56 ($p < .0001$). As before, a natural spline regression performed on P_s is shown in Figure 2 with bootstrapped confidence intervals.

2.3. Discussion

Inspecting the coefficients for the better-fitting logarithmic versions of the factor reveals that this factor has a much larger effect that of Experiment 1. The coefficient estimate for the smoothed version indicates that doubling the probability of a tag reduces first-pass time by only about 4 tenths of a millisecond. The reason that this coefficient is even smaller than in Experiment 1 is probably simply because the probability function we are estimating is much more sparse than before, and thus smoothing is necessary. The coefficient estimate for the smoothed version of the factor indicates that doubling the probability of a tag reduces the first-pass time

Figure 2: Natural spline regression on $P_s(t_i|w_{i-1}^i)$ with 11 equally spaced knots. 95% confidence intervals are bootstrapped.



by over 4 ms. Inspecting the results of the spline regression in Figure 2 indicates that this trend is true across the range of probability. Again, the significance levels indicate that this effect is highly reliable in this dataset. This provides evidence for effects of multi-word local coherences in the reading of naturalistic text, and, because of the effect size, suggests that such effects are an even more important part of sentence processing than effects of single-world local coherences.

3. The Model

The demonstration in Experiment 2 that the effects of multi-word local coherences appear in the reading of naturalistic text underscores the need for a theory of phrasal-level local coherences which can make broad-coverage predictions. This section presents one such model. The basic intuition behind it is that incrementally processing a sentence can be conceptualized as a process of updating one's beliefs. Such an analogy has been used to motivate surprisal-based theories of sentence processing (Hale 2001; Levy 2008), where beliefs about the structure of a sentence after seeing the first $i-1$ words in the sentence w_1^{i-1} are updated upon encountering w_i. In this case, the *surprisal* of a word ($-\log P(w_i|w_1^{i-1})$) is equivalent to the Kullback-Leibler divergence of the beliefs after w_i from the beliefs before (Levy 2008). Our model focuses on another belief-update process in sentence processing: updating beliefs about the structures that a string of words is likely to have independent of context to beliefs about what structures it is likely to have in context.

A bit more formally, it views the process of integrating a string of words w_i^j into a sentence as beginning with a 'bottom-up' prior distribution of syntactic structures likely to span w_i^j and integrating that with 'top-down' knowledge from the previous words in the sentence w_1^{i-1} in order to reach a posterior distribution conditioning on w_1^j over which structures actually can span w_i^j. This belief update process can be viewed as a rational reconstruction of the Tabor and Hutchins (Tabor and

Hutchins 2004) model, where – instead of the system dynamics of competition between arbitrary tree fragments – differences between prior and posterior probability distributions over syntactic structures determine processing difficulty.

More formally still, when integrating w_i^j into a sentence, for each syntactic category X, we can define the prior probability conditioned only on w_i^j that w_i^j will form the beginning of that category, i.e., that an X exists which begins at index i and spans at least through j:

(6) Prior: $P(X_i^{k \geq j} | w_i^j)$

It is important to note here that this prior probability is conditional only on the value of w_i^j and not the values of i or j; that is, in the prior probability, i and j should be interpreted merely as a way to coindex the start and end points of the string of words being integrated with a category X potentially spanning them, and not as making reference to position in the full sentence string.

For each category X, this prior probability will be updated to the posterior probability of that category spanning w_i^j given all the words seen so far:

(7) Posterior: $P(X_i^{k \geq j} | w_1^j)$

In the equation for the posterior, of course, the indices i and j are positions in the sentence string, and not merely coindices.

Given these prior and posterior beliefs, we predict difficulty to arise in cases where the prior requires substantial modification to reach the posterior, that is, cases in which the prior and posterior make substantially different predictions for categories. A strong local coherence will have sharply different prior and posterior distributions, causing difficulty. We measure M_{ij}, the amount of modification required, as the K-L divergence of the prior from the posterior summed over syntactic categories. That is, if N is the set of non-terminal categories in the grammar, the size of the belief update is modeled as

(8) $$M_{ij} \stackrel{\text{def}}{=} \sum_{X \in N} D\left(P(X_i^{k \geq j} | w_1^j) \,||\, P(X_i^{k \geq j} | w_i^j) \right)$$

In Bicknell and Levy (2009), we show how to compute M_{ij} by using Bayesian inference on quantities calculated in ordinary probabilistic incremental Earley parsing with a stochastic context-free grammar (SCFG). Furthermore, we present the results of a computational experiment showing that our model makes the correct predictions on the original local coherences experiment of Tabor, Galantucci, and Richardson (2004).

4. Conclusion

This paper has made two contributions to the study of local coherences: a set of corpus experiments and a new model. The two novel corpus experiments showed evidence that effects of local coherences consisting of one or two words occur in the reading of naturalistic text. The first experiment showed a reliable effect of single-

word local coherences, such as those predicted by the model of Gibson (2006), and compatible with dynamical systems models such as that of Tabor and Hutchins (2004). The second experiment showed an even larger effect of two-word local coherences, such as those predicted by dynamical systems models such as Tabor and Hutchins (2004). Such results give ecological validity to the study of local coherences and demonstrate that they are not merely artifacts in the processing of very rare sentence types. Furthermore, the results suggested that two-word local coherences appear to be stronger than single-word coherences.

This latter observation led to the description of a mathematical model predicting where effects of local coherences will occur in arbitrary sentences. The fundamental insight of this model is that effects of local coherences can be described in terms of updating prior beliefs about the structures a new string of words is likely to take independent of context into posterior beliefs about what structures it is likely to take given contextual information. This model predicts local coherence effects to occur whenever prior and posterior beliefs are substantially different.

In contrast to Gibson's model, this model can account for all existing results on phrasal-level local coherences. In contrast to the dynamical systems models, it does not require assuming a rather arbitrary parsing mechanism with a large number of free parameters, but rather is described in terms only of probabilities in a grammar (which can be estimated in a principled and straightforward way). Future work will test that model's predictions on the reading of naturalistic text in a similar way to Experiments 1 and 2.

Acknowledgments

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Promiscuous Modification and Cross-Categorial Scale Structure

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0. Introduction

I use the term "promiscuous modification" to refer to the two-fold properties of certain proportional modifiers in English and other languages: first, they are able to modify various syntactic and semantic categories; second, they appear to be able to modify at a distance. That is, while they can adjoin to one constituent syntactically they appear to modify another semantically. The focus of this paper is the modifier *half* in English, which indeed fits the description of promiscuous modification. First, it can appear with a wide range of syntactic categories, such as adjectives in (1), partitives as in (2), and verb phrases as in (3):

(1) The cake is half baked.
(2) Half of the books are on the table.
(3) The girls half washed the dishes.

Second, *half* has the ability to modify at a distance. For instance, the sentence in (1) has two distinct readings. On one reading it describes a situation where the cake is half-way through the process of baking, in which case we can say that *half* is modifying the adjective *baked*, in particular the scale associated with the adjective *baked* (see Kennedy and McNally 2005). On the second reading, (1) describes a situation where half of the cake is fully baked and the other half is not baked at all. For example, it might be the case that a cake is too large to fit into an oven and must be divided into two halves that are baked separately. In this case *half* appears to be modifying *the cake* at a distance, in that it names the proportion of the cake that is baked. However, there are constraints on these long-distance effects. Notice that in (3) a long-distance reading is possible where *half* appears to be modifying the object *the dishes* at a distance, although there is no reading where *half* modifies the subject *the girls* at a distance.

The focus of the present paper will be to argue for an account of these long-distance effects based on argument structure and event structure of the verb phrase. I will propose a scalar-based semantics for *half* that allows for and explains the cross-categorial nature of *half*. In particular I claim that the promiscu-

ous behavior of *half* is the result of its scalar meaning, and that the successful application of this modifier simply relies on its input being associated with an appropriate scale over which *half* can operate. In section 1 I argue that *half* is a modifier at the VP level (contra Piñón 2005) and that the long-distance effects can be explained in terms of argument selection. Section 2 is devoted to showing that *half* is a modifier of telic event descriptions. In section 3 the semantics of the VP use of *half* is fleshed out in more detail. Section 4 concludes and offers proposals for future extensions of this work.

1. Verb Phrase Modification and Argument Structure

One possible explanation of the long-distance effects associated with *half* is to say that this is an instance of floating quantification (see, e.g., Sportiche 1988). The idea would be that in (1) *half* and *the cake* form a constituent at some level of underlying representation and *the cake* undergoes leftward movement, leaving the quantifier behind. This line of argumentation has been used to account for the synonymy of (4a) and (4b), where *all* as a floating quantifier forms a constituent with *the girls* at an underlying level:

(4) a. The girls all washed the dishes.
b. All the girls washed the dishes.

However, such an account cannot be the right analysis for *half*. First, replacing *all* with *half* in (4) leads to sentences that are no longer synonymous. Indeed, as has already been observed in (3), *half* cannot modify *the girls* at a distance in this environment, and furthermore *half* is able to modify *the dishes* at a distance, but a corresponding reading is unavailable for *all* in (4). Second, while *all* is able to float through auxiliaries with ease, this is not the case for *half* as shown by the contrast between (5) and (6):

(5) The dishes {all} must {all} have {all} been {all} washed.
(6) The dishes {*half} must {*half} have {?half} been {half} washed.

Based on this evidence, *half* should not be treated as a floating quantifier on par with *all*.

Instead, I propose that the facts can best be dealt with by analyzing *half* as a VP modifier. In particular, the long-distance effects associated with *half* are sensitive to the distinction between a verb's internal and external arguments. Kratzer (2003) provides extensive evidence exposing asymmetries between a verb's external and internal arguments (also see Tenny 1994). Without going into too much detail, I will briefly review a couple of Kratzer's arguments here. The first piece of evidence comes from deverbal nominalizations that require a verb's internal argument to be realized. Compare (7a) with (7b):

(7) a. *The constant assignment is to be avoided.
b. The constant assignment of unsolvable problems is to be avoided.

The ungrammaticality of (7a) is due to the fact that the internal argument of the verb *assign* must be realized within the nominalization. However, since the verb's external argument is not (overtly) required in its nominalization, this means that it does not have the same effects on verb phrase meaning as the internal argument does.

The second asymmetry between internal and external arguments comes from constructions that allow or disallow self-action readings. Comparing the adjectival passive in (8a) and the verbal passive in (8b), we notice that while neither explicitly realizes the verb's external argument, only the adjectival passive is compatible with a reading where the climbers secured themselves; this reading is unavailable with the verbal passive:

(8) a. The climbers are secured with a rope.
b. The climbers are being secured with a rope.

Kratzer argues that in verbal passives, the external argument, while not overtly expressed, is still present as a silent pronoun, which accounts for why (8b) is incompatible with a self-action reading. In contrast, the adjectival passive in (8a) allows a self-action reading, which means that the external argument of the verb can be missing altogether. This contrast is taken as further evidence that the external argument does not serve the same function in verb phrase meaning as the internal argument, and therefore these two types of arguments are not associated with the verb in the same way. In fact, this evidence is taken to suggest that the external argument is not even a real argument of the verb.

These and other arguments show not only that the internal and external arguments of a verb need to be treated differently, but that the external argument is not even part of the verb phrase. Kratzer argues that this treatment of the external argument is necessary both at the level of logical representation and in the syntax. The proposal, then, is that instead of being introduced with the verb phrase, the external argument enters the syntax inside a voice (little *v*) projection. This analysis explains why adjectival passives and some nominalizations there is no external argument present: these are derived from VP only, which contains only the verb and its internal argument but crucially not the external argument.

Returning to the discussion on *half*, recall the contrast between (1) and (3), repeated here as (9) and (10):

(9) The cake is half baked.
(10) The girls half washed the dishes.

Earlier it was noted that sentences like (9) allow a reading where *half* semantically modifies the subject, but sentences like (10) do not allow this option. This

difference in behavior can now be explained if we take *half* to be a modifier at the VP level. If the adjectival passive in (9) is derived from a VP structure, as Kratzer argues, then *the cake* is actually the internal argument of the verb *bake*. In contrast, the external argument *the girls* in (10) is introduced outside the VP. In that case, if *half* is a VP modifier, then this explains its inability to modify *the girls*: this argument is introduced outside the VP, and is therefore unavailable for modification by *half*. This prediction is indeed borne out in nominalizations and adjectival passives with *half*:

(11) the half washing of the dishes (by the girls)
(12) The dishes are half washed.

In (11) the external argument *the girls* is optional and is introduced with a *by* phrase and there is no reading available where *half* semantically modifies this constituent. In (12) there is no external argument present, but there is a reading where *half* appears to modify *the dishes*, which is the internal argument of *wash*.

Analyzing *half* as a modifier at the VP level easily accounts for the asymmetries observed between (9) and (10) with respect to long-distance effects with *half*. (9) is derived from a VP structure where *the cake* is the internal argument of the verb *bake*, which is under the scope of *half*. In (10) *the dishes* is the internal argument of *wash* and thus under the scope of *half*, while *the girls* is introduced into the syntax and semantics outside of VP and outside the scope of *half*. Thus, the first piece of the puzzle with respect to long-distance modification is solved. A verb's internal argument may be targeted for modification by *half*, but its external argument may not. The semantics of *half* that allow it to access the internal argument for modification are discussed below in section 3.

2. Modifying Event Descriptions

I have just shown that long-distance effects associated with *half* (or lack thereof) can be explained by analyzing *half* as a modifier of the verb phrase. However, *half* is not able to modify just any VP. Compare the sentences in (13), which seem odd (on the relevant reading), with those in (14):[1]

(13) a. ?? Alana half ate pancakes.
b. ?? Keelin half swam.
c. ?? Taylor half pushed the cart.
(14) a. Alana half ate a stack of pancakes.
b. Keelin half swam around the lake.
c. Taylor half pushed the cart to the store.

[1] The sentences in (13) do have interpretations where *half* is used to make an evaluative statement about the quality of the event named by the verb, and result in atelic interpretations only. I set aside this reading for now, but see Bochnak (2009) for discussion.

While the sentences in (14) denote telic eventualities, those in (13) have atelic interpretations. Telic events are those that make reference to a particular endpoint, whereas atelic eventualities are those that do not. In particular, telicity has been construed as being related to the boundedness or measuring out of an event (Krifka 1992, 1998). An event may be interpreted as telic if it references a bounded, or "quantized" incremental theme, as argued by Dowty (1991), Krifka (1992), and others. An incremental theme is one whose parts are incrementally affected through the duration of the event. Classic examples of bounded incremental themes are *an apple* in *John ate an apple* and *a circle* in *John drew a circle*. In the case of *an apple* for example, it is typically the case that over the course of an event of eating an apple, pieces of the apple are consumed in succession until the entire apple is consumed, or at least the relevant parts. That is, there is a mapping from sub-events to parts of the incremental theme, and also a mapping between the parts of the incremental theme and sub-events. This intuition is captured by Krifka's object-event homomorphism. Thus, while in (14a) *a stack of pancakes* corresponds to a bounded incremental theme that gives rise to a telic interpretation, *pancakes* in (13a) is an unbounded quantity, thereby resulting in an atelic interpretation. In (13c) the theme argument *the cart* does not give rise to a telic interpretation because it is not an *incremental* theme - the entire cart is affected throughout the duration of the event. In addition, a telic event may also be interpreted as bounded by naming a bounded path, as argued by Jackendoff (1996). Thus (14b-c) have telic interpretations thanks to the bounded path arguments, *around the lake* and *to the store*, respectively, while (13b-c) can only have atelic interpretations.

Sentences with incremental themes or bounded paths where *half* modifies the VP do indeed denote telic events, as evidenced by their acceptability with *in* adverbials and their oddity with *for* adverbials:

(15) Alana half ate a stack of pancakes in 10 minutes / ?? for 10 minutes.
(16) Keelin half swam around the lake in 10 minutes / ?? for 10 minutes.
(17) Taylor half pushed the cart to the store in 10 minutes / ?? for 10 minutes.

Thus the application of *half* as a VP modifier results in telic interpretations when there is a bounded incremental theme or bounded path argument that measures out the event. The result is a reading where *half* identifies the proportion of the event that is completed. When applied to atelic events *half* only has an evaluative reading, and not one associated with measuring out events. In the next section I show how bounded themes and path arguments relate to telicity with *half*.

3. A Semantics for VP *half*

3.1. Telicity and Maximalization

Taking the notion of telicity via boundedness one step further, Filip (2008) argues that telicity is the result of a maximalization operation over events. Filip's proposal is that telicity as a property of the VP relies on the application of a maxi-

malization operator over events MAX_E that maps sets of partially ordered events onto sets of maximal events. This covert operator requires an incremental theme to provide an ordering criterion for events; that is, this operator depends on the object-event homomorphism described above. Filip's notion of incremental theme is taken in a wide sense, including not only theme arguments, but also bounded paths as well as implicit bounded "themes" that are available from the context of utterance or world knowledge. The ordering criterion based on the bounded incremental theme induces a closed scale of objects along which events are ordered, thanks to the object-event homomorphism. The MAX_E operator selects the endpoint of the closed scale, resulting in a telic interpretation.

The connections between telicity, boundedness and the MAX_E operator should by now be apparent. Without a bounded theme argument, the scale of objects would have no upper endpoint for MAX_E to pick out, resulting in an atelic interpretation. This is why unbounded themes such as bare mass or plural nouns result in atelic interpretations - the corresponding scale of objects is an open scale without a maximal value and so does not license the application of MAX_E. Scale closure is also crucial for the successful application of *half*. As has already been shown, a telic interpretation of a verb phrase modified by *half* relies on the presence of a bounded incremental theme or path argument. Given that the restrictions on *half* mirror those of MAX_E with respect to bounded themes and telicity, I propose that *half* is in fact an overt counterpart to Filip's MAX_E operator that relies on the presence of a closed scale of objects induced by a bounded incremental theme. Whereas MAX_E selects the endpoint on the scale, *half* selects the midpoint and results in a telic interpretation relative to that midpoint on the scale.

Let us consider a couple of examples to see exactly how this works:

(18) a. The girls washed the dishes.
b. The girls half washes the dishes.
(19) a. The cake is baked.
b. The cake is half baked.

In (18a) the MAX_E operator selects the endpoint of the scale of objects associated with the bounded incremental theme *the dishes* and the result is a telic interpretation with respect to the amount of dishes in the denotation of *the dishes*. Likewise in (18b) *half* selects the midpoint on the scale of objects and results in a telic interpretation with respect to half of the amount of dishes in the denotation of *the dishes*. Similarly (19a), being derived from a VP (see section 1), is interpreted as maximal with respect to the quantity of cake, while (19b) is maximal with respect to half of that quantity. Thus, the application of *half* results in a telic interpretation by maintaining an upper bound against which the event is measured, and that upper bound is the midpoint on the closed scale of objects.

3.2. Scales and *half*

The idea that *half* operates over a closed scale is also proposed by Piñón (2005), and is reminiscent of the scalar treatment of *half* as a modifier of gradable adjectives by Kennedy and McNally (2005). Kennedy and McNally argue that different adjectives are associated with different scale types (open, closed, partially closed) and that *half* can only modify those adjectives that are associated with fully closed scales. This analysis straightforwardly derives why *half* is acceptable with adjectives like *full*, *open* or *baked*, which are all associated with fully closed scales, but infelicitous with adjectives like *tall*, *old* or *expensive*, which are associated with open scales:

(20) a. The glass is half full.
b. The door is half open.
c. The cake is half baked.

(21) a. ?? The building is half tall.
b. ?? The man is half old.
c. ?? This car is half expensive.

The fact that *half* can only apply to adjectives with fully closed scales provides us with some insight into the cross-categorial nature of this modifier. Given its distribution with both adjectives with fully closed scales on one hand and VPs associated with fully closed scales of objects on the other hand, we can say that *half* is able to modify both adjectives and VPs so long as they are associated with the appropriate type of scale.

We are now in a position to posit a semantics for the VP use of *half*. Let F be a set of event descriptions associated with a fully closed scale of objects S_F, and let **meas**[α,β] be a function that returns a measurement of a closed interval $I \subseteq S_F$ with endpoints α and β. The meaning of *half* is given as follows:[2]

(22) $[\![\textit{half}]\!] = \lambda F \lambda e.\exists p[\textbf{meas}[\min(S_F),p] \geq \textbf{meas}[p,\max(S_F)] \wedge F(e)$ w.r.t. $p]$

In prose, *half* takes a set of event descriptions F as its input and returns another set of event descriptions that are maximal with respect to the midpoint p on the scale of objects induced by the theme in F. This analysis explains how we are able to get the long-distance readings with *half*: the scale of objects is induced by the incremental theme argument but is available for modification at the VP level because it provides the basis for marking telicity, which is a property of the VP. Therefore, both syntactically and semantically, *half* modifies the VP, but we are able to get readings where *half* appears to be semantically modifying the theme at

[2] In (22) I give the literal meaning of *half* as *at least half*, following the 'classic' neo-Gricean view of the meaning of scalar and number terms (see, e.g., Levinson 2000), but nothing in my analysis really hinges on this assumption. See Ionin and Matushansky (2006) and especially Geurts (2006) for arguments in favor of giving number terms a meaning of *exactly n*. I leave open the question of whether *half* should be treated as a number term or a scalar term.

a distance because the theme is responsible for inducing the scale of objects over which *half* operates. This also explains why certain readings are unavailable. For example, in sentences like (18b), *half* is not able to semantically modify the DP subject *the girls* because it is the external argument, which is introduced outside the VP and does not induce a scale of objects at the VP level over which *half* can operate. In addition, when there is no internal argument present, there is no longer a telic reading associated with *half* due to the lack of a scale of objects from within the VP, and so we only get the evaluative reading in these cases.

To see the meaning of *half* in action, consider the following derivation for *half wash the dishes* (ignoring tense):

(23) a. [[*wash the dishes*]] = $\lambda e.$**wash**(*the.dishes*)(*e*)

b. [[*half*]] ([[*wash the dishes*]])

$= \lambda F \lambda e.\exists p[$**meas**$[\min(S_F),\text{p}] \geq$ **meas**$[\text{p},\max(S_F)] \wedge F(e)$ w.r.t. $p]$
$(\lambda e'.$**wash**$(the.dishes)(e'))$

$= \lambda e.\exists p[$**meas**$[\min(S_{w.t.d.}),\text{p}] \geq$ **meas**$[\text{p},\max(S_{w.t.d.})] \wedge$
wash$(the.dishes)(e)$ w.r.t. $p]$

In (23b) the scale targeted by *half* is the scale of objects made available by the presence of the incremental theme *the dishes*. Since *the dishes* is a bounded, or quantized, incremental theme, the corresponding scale of objects is closed, a prerequisite for the successful application of *half*. Again, this analysis explains why VPs with unbounded or non-quantized incremental themes (e.g. *dishes*) cannot be modified by *half* - the scale of objects they induce are also unbounded, i.e. open, and thus are inappropriate targets for *half*. It should also be clear from (23) why *half* cannot target the external argument of the verb. Since the external argument is not a lexical argument of the verb and is introduced into the syntax and semantics above VP, the event description modified by *half* makes no reference to the external argument, leaving it unavailable for modification. I assume that adjectival passives such as (19b) are derived from an unaccusative syntax where *the cake* is the internal argument of *bake* (see section 3.1). Thus, the derivation of (19b) proceeds in exactly the same way as in (23), and existential closure of the event argument yields the event state described by the adjectival passive (taking states to be a type of event).

3.3. Abstract Events

The meaning for *half* in (22) relies on making reference to the point $\max(S_F)$ on the scale of objects, which is the maximal endpoint of the scale that is targeted by Filip's MAX_E operator. However, making reference to the maximal endpoint should not presuppose the existence of a maximal event in the first place. Indeed, the sentence *The girls half washed the dishes* does not entail that all the dishes were eventually washed. This observation does not pose a real problem for this analysis, however. The point $\max(S_F)$ just makes reference to a maximal event, which remains abstract and possibly unrealized. This view is similar to an idea by

Moltmann (1997) that adverbs of completion (such as *half*, *mostly*, *completely*) actually denote relations between abstract and concrete events. Piñón (2005) in his analysis of adverbs of completion also makes reference to abstract maximal events embedded under a possibility operator. This idea perhaps suggests a possible intensional analysis for *half* and similar modifiers, but this idea will not be explored here.

4. Concluding Remarks

I have shown that the use of *half* as a modifier of verb phrases has a scalar meaning parallel with its use as an adjectival modifier as discussed by Kennedy and McNally (2005). This analysis explains the property of *half* that it appears to be able to modify certain constituents at a distance while in the syntactic position of modifying VPs that denote telic event descriptions. These long-distance effects are in fact an illusion since they ultimately derive from local modification at the VP level. VP event descriptions are associated with scales that are induced by the incremental theme argument. Since it is the theme argument that provides the scale targeted by *half*, this gives rise to the illusion of long-distance modification when in fact modification is strictly local at the VP level.

For now, the question of exactly how the scale of objects induced by the theme argument gets passed up to the VP level in the first place remains a mystery. Filip (2008) seems to hint that it has something to do with the object-event homomorphism, but provides no formal details. In Bochnak (2009) I suggest that part of the VP meaning is a degree argument that needs to be saturated in order to arrive at an event description. Thus, *half* supplies the degree argument with the value of the midpoint on a scale associated with the VP, i.e., the scale of objects. Likewise, Filip's MAX_E operator saturates the degree argument by supplying it with the maximal value on the scale.

In addition, a scalar meaning for *half* provides a starting point for explaining the modifier's cross-categorial promiscuity. Since both gradable adjectives and event-denoting VPs are associated with scales, *half* is able to appear as a modifier of either of these categories, so long as the scales being targeted are fully closed. Further discussion of this matter in Bochnak (2009) extends the scalar analysis of *half* to its use in partitives and its evaluative use. In particular, it is argued that *half* also targets fully closed scales in these contexts as well, which accounts for the modifier's promiscuous behavior across various syntactic and semantic categories.

This scalar analysis of *half* as a VP modifier may be helpful to account for other puzzles that have surfaced in the literature. For example, as noted by Morzycki (2002) there is a series of other proportional modifiers that result in "ambiguities" due to perceived long-distance modification effects:

(24) a. The campus is completely nauseating.
b. Oklahoma is wholly Republican.

In (24a) *completely* can be construed as either modifying the parts of the campus that are nauseating, or the degree to which the campus induces nausea, i.e., the scale of *nauseating*. Similarly in (24b) the use of *wholly* can either make a comment about the parts of Oklahoma that are Republican, or the extent to which the state is Republican. Treating these modifiers as parallel with *half* with respect to this behavior provides further evidence for their status as VP modifiers and not as floating quantifiers, notably because the modifiers in (24) are morphosyntactically marked as adverbs. While *half* has the same phonological shape no matter which category it modifies, these other modifiers are clearly marked as adverbs in (24), making it difficult to argue for an underlying representation where *completely* and *wholly* directly modify *the campus* and *Oklahoma*, respectively. Instead, if we analyze these modifiers as modifying the VP and having access to the scale of objects induced by the internal argument, we can easily account for the multiple readings of the sentences in (24) without having to posit underlying structures where DPs are syntactically modified by adverbs. Again, like the long-distance effects associated with *half*, those in (24) are actually derived from local modification of a VP that is associated with a scale of objects thanks to the verb's bounded incremental theme argument. (Although the categorical status of *Republican* as being derived from a verb is at best questionable, assuming that all adjectival passives are derived from an unaccusative syntax still yields the desired results for the perceived long-distance effects).

In addition, the counterparts of *half* in other languages have been shown to behave in similar ways with respect to multiple available readings. For example, Moltmann (1997) provides the following example from German:

(25) Der Baum ist halb vertrocknet.
'The tree is half dried out.'

According to Moltmann this sentence has two readings: one in which the tree has reached the half-way point on the scale of dryness, and another in which only half of the tree is fully dried out. Moreover, as has been pointed out by Doetjes (1997) French *beaucoup* shows similar properties, displaying what she refers to as "quantification at distance:"

(26) Jean a beaucoup lu de livres.
Jean AUX a.lot read of books
'Jean read a lot of books.'

In (26), the most salient reading is one where *beaucoup* quantifies over the number of books read and does so at a distance, although there is also another reading where *beaucoup* quantifies over the number of book-reading events. Given the parallels between the available readings for sentences with *half* discussed in this paper and those for the sentences in (24)-(26), it seems likely that a unified analysis that treats all these modifiers as VP modifiers alongside *half*

would be able to account for the relevant facts, both in English and cross-linguistically. However, I leave this question to further study.

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As Long As You're not Effeminate and Fat: Perpetuating the Heteronormative Discourse in Personal Ads of Serbian Gay Youth on the Web

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0. Introduction

Sociolinguistic investigation of questions related to gender and sexuality has recently gained much scholarly attention. The novel poststructuralist voices have brought some significant changes in the field, including the shift away from the concept of binary differences and the adoption of a wide range of third-wave feminist and queer stances.

Research on language and sexuality has mainly focused on sexually marginalized groups and their stigmatization in the heteronormative society. In response to this tendency, the present paper aims to explore the discursive manifestations of the marginalization of effeminate gay men within the gay community itself, a phenomenon which has received less attention in research. The relations of language and sexuality, such as described in this paper, should at the same time be viewed as indicative of a more general relationship between language and social meaning. I show how Serbian gay teenagers draw on shared cultural knowledge and ideological resources available in their community to construct sexual and social identities modelled on the basis of socially desirable masculine identities. The study reveals how hegemonic discourses of masculinity and heterosexuality are perpetuated, rather than challenged, through linguistic practices that index personal and group identities. At a broader level, I argue that it is in this way that a subordinated culture allows dominant discourses to survive and its own marginality to be upheld.

1. Sexuality, Identity, Language

Within the past two decades, the field of language and sexuality has emerged as a significant area of inquiry in socioculturally oriented scholarship. In earlier gender research sexuality was mainly subsumed into gender, but it has more recently come to be recognized as a separate theoretical concept (Bucholtz and Hall 2004). The two concepts are, nevertheless, intricately related, sexuality being closely tied

to prevalent ideas of masculinity and femininity. Research on language and sexuality mainly deals with sexually marginalized groups (e.g. gay, transgender), exploring identities largely ignored in the existing literature. Rather than describing any predefined gay or lesbian language, it investigates the multiplicity of ways that such groups use language to construct various identities

A recent approach to the investigation of language and sexuality is known as queer linguistics (Barrett 1997, 2002; Livia 2002). The approach combines insights and models from sociolinguistics, anthropology, queer theory, postfeminist gender theory and many other linguistic and non-linguistic disciplines, although its agenda and methodology are yet to be fully defined. Importantly, queer linguistics draws on one of the paramount assumptions in Queer Theory, the idea that meaning is unfixed and constantly subject to reformulation. As Barrett (2002) points out, such a notion contributes to linguistic investigation in general, by recognizing categories as ideological constructs that are produced by social discourse and not extant *per se*. This could clearly benefit research in sociolinguistics, by revealing how the relation between particular variables and social meaning is formed, instead of presenting catalogues of correlational facts, which is coming to be viewed as one of the principal weaknesses of traditional sociolinguistic approaches. Moreover, the approach allows for the introduction of gender identities that have been neglected in traditional approaches and subsumed into the binary sex and gender models (Barrett 2002).

Questions of identity have been of primary interest in the development of queer linguistics. This approach rejects the essentialist views of identity as a fixed and predefined psychological construct. Rather, identity is seen in light of social constructionism, as a fluid and ever-changing process that takes place in concrete interactional situations. In the creation and negotiation of identity, language plays a key role; the centrality of language in the study of identity has nowadays been firmly established in fields as diverse as anthropology, sociology, linguistics, literature and history (De Fina et al. 2006). Discussing the relationship between language and sexual identity in this paper, I adopt the social-constructionist conceptions of identity and focus on its discursive manifestations in local contexts, rather than its relations to any predefined 'gay language.'

A central notion in the study of identity is the semiotic concept of *indexicality*. Indexical signs are linguistic structures that index (or point to) aspects of the social context. Linguistic resources are usually not directly correlated with social categories, but index them indirectly, through some other social meaning (Ochs 1992). For example, a particular linguistic form may index stances of politeness or deference, which are in some communities ideologically associated with female identity. Thus, in the relationship of language and social identity there is no simple direct mapping; rather, the relationship is mediated by indexicality, as particular social identities come to be ideologically associated with particular linguistic forms.

Importantly, then, indexicality involves the ability of linguistic resources to evoke entire systems of meaning such as ideologies, social representations and

social roles (De Fina et al. 2006) as well as discourses shared within a culture. The framework is of great significance in queer linguistics, as it allows for the discovery and fuller understanding of pre-existing norms and expectations about sexual identity. An important question for queer linguistics is how the construction and negotiation of nonhegemonic sexual identities is affected by social discourses and how it reflects social discourses. This inevitably involves the study of power relations. Bucholtz and Hall (2004) note that a significant feature of queer linguistics is that it allows the exploration of sexual ideologies, practices and identities while keeping in mind the power relations in which they are embedded. Pertaining to issues of normative sexuality, the term 'hegemony', rather than direct 'power', seems more appropriate. As Kiesling (2006) points out, drawing on Gramsci (1994), hegemony allows dominant social institutions to survive through less obvious means, such as controlling the underlying ideologies in a society. The hegemony of masculinity and heterosexuality, though in many cultures not overtly expressed or imposed, lives on through discourses that are produced and re-produced in a community.

In this paper I am interested in hegemony and power relations within the gay community itself, among its very members, and the ways in which such relations are linked to the dominant social and cultural notions about sexuality. I demonstrate how power relations centred around the concepts of appropriate masculinity exist here as well, reflecting the predominant views among Serbian youth of what it means to be a man.

2. GaySerbia

The data used in this study consist of 140 personal ads from the GaySerbia web portal. The study focuses on gay youth identities, so only ads written by young men aged 16 to 19, mostly high-school students, were considered. The ads were collected during the first part of 2008, though many might have been posted on the website some months earlier.

GaySerbia is the most popular dating website of the Serbian LGBT community. Apart from the personal ads section, visitors can communicate in a chat room and on the forum. The site also offers news and articles on current events or curiosities related to queer issues. The ads, however, are among the central elements of the site and even graphically take a particularly prominent place on the home page.

Given the situation in Serbia, the internet offers a safe and significant site of communication for gay men. Despite certain changes that have taken place in the past ten years, public discourse in Serbia still abounds in homophobic prejudice, leading to discrimination of these groups, as well as to physical danger. Judging by the number of the ads on the portal, people of the studied age are among the most frequent visitors of the site, which is not surprising given the predominant attitude towards homosexuality in the youth culture in Serbia. High-school environment tends to embrace the traditional values of masculinity and toughness in men, and the practice of occasional 'pairing off' in heterosexual couples is a

prerequisite to gaining acceptance and social status. Open statements of homosexuality normally result in social exclusion, stigmatization and physical abuse by peers. In such circumstances, the Internet provides a safe environment in which to freely express one's identity and search for solidarity, affiliation or relationships.

However, the internet offers a specific place for identity construction, especially when teenagers are concerned. What is attractive for young people in computer-mediated communication is that they can establish online identities that reflect their desired personae and the ways in which they *wish* to be perceived by others. Moreover, the possibility of staying anonymous makes the online space much more suitable for exploring one's sexuality and some issues that would probably never be raised in face-to-face communication. This growing medium of communication is changing the ways we view interaction and will possibly have some impact on identity scholarship as well, as identity becomes more veiled online, with notions of fluidity and performativity even more emphasised.

3. Upholding Hegemonic Masculinity

One aspect of identity that a large majority of the ad writers commonly orient to is possession or appreciation of the typical masculine traits. Masculinity tends to be stressed as the primary quality possessed and searched for in the ideal partner:

(1) *Virag91: Osim što sam zgodan, inteligentan sam, duhovit, otvorenih shvatanja i totalno nefem. Tražim muškarca koji dobro izgleda, koji nije feminiziran i promiskuitetan već pravi muškarac sa svim macho osobinama.*
'Virag91: Apart from being handsome, I am intelligent, funny, open-minded and totally non-fem. I am searching for a man who is good-looking, who is not effeminate and promiscuous, but a real man with all the macho qualities.'

This is a typical example of a GaySerbia ad. After a brief self-description, the author goes on to list the desired qualities of a partner, primarily centred around good physical appearance and masculinity, while effeminacy is directly excluded. By describing his preferred partner as 'a real man with all the macho qualities', Virag relies on shared cultural knowledge that he assumes must allow the readers to understand what phrases like *a real man* and *macho qualities* signify and what their social meaning is.

Discourses of masculinity have been widely studied in the past two decades. The notion of hegemonic masculinity, first introduced by Connel (1987, 1995) has prompted much research on power relations and gender ideologies. However, most studies observe men and masculinities in sexually dominant (heterosexual) groups, men who claim the right to masculinity as an expected aspect of their identity. This paper, conversely, analyzes the discourses of masculinity present in the construction of sexually marginalized (homosexual) identities, showing how the construct of hegemonic masculinity is perpetuated here in similar ways.

Sexual and gender presentations in the ads project the ideology and expectations of the Serbian high-school community. Traces of the heteronormative discourse can thus be observed even within this gay community. The common apologetic stance with which the ad writers repeatedly stress that they are 'sane' and 'normal men' *although* they prefer partners of the same sex, solidifies the idea that heterosexuality is unquestionably the norm, while homosexuality is a marked category that needs to be accounted for. It is not uncommon for the authors to directly define themselves as *normal* because of having had heterosexual relationships, as illustrated in the following ad:

(2) *Miško: Normalan sam dečko, imao sam devojke, ali bih voleo i ovako nešto da probam. Nikad nisam probao ali me zanima.*
'Miško: I'm a normal guy, I've had girlfriends, but I would like to try something like this as well. I have never tried it but I am interested.'

Formulating the ad in this way, Miško accepts the view of heterosexuality as the norm, against which nonnormative identities have to be negotiated.

The concept of masculinity, however, cannot be understood on its own and is fundamentally relational (Coates 2003). Masculinity is mainly posited as the direct opposite of femininity and is socially meaningful only when understood in relation to femininity. The construction of hegemonic categories crucially relies on such processes of opposition and differentiation (Kiesling 2006). Ads such as (1) reveal how dominant masculinities are constructed in the very gay community, by drawing on the opposition to subordinated categories of effeminate gay men.

The analysis of the GaySerbia ads suggests that language is here used to create a cohesive community in which masculinity is prized and effeminacy othered and stigmatized. Marginalization of effeminacy is effected through various linguistic means, while also echoing traces of the heteronormative discourse. The following sections describe the linguistic practices used to this effect.

3.1. Discourse Features and Lexical Choices

In the wording of the ads, the group's ideology of desirable masculinity is produced and reproduced stylistically. The process is essentially indexical, as the writers construct their identities drawing on discourse features and lexical choices that are ideologically associated with masculinity. This is not to say that any such features are distinctively masculine, but they index masculinity via stances such as directness, assertiveness or forcefulness, that have ideologically acquired the social meaning of masculinity. The following ad is a typical example:

(3) *Caza: Treba da izgledaš kao muško, a ne kao pička, još bolje da nemaš iskustvo jer ga nemam ni ja...bez lažova i starijih, pošto ovde slabo zalazim javite se na mail ili msn.*

> 'Caza: You should look like a man and not like a sissy, it is even better if you are inexperienced because so am I…no liars or older guys, as I don't come here often contact me by email or msn.'

Caza is very direct and factual in describing what he wants. He starts his ad with a direct reference to masculine appearance and discourages non-masculine people from responding, using a value-laden word *sissy.* His ad is composed in a way that aligns him with the norms prescribing 'acceptable maleness' (Coates 2003), while non-masculine men are constructed as inferior and undesirable.

Moreover, masculinity is here also indexed indirectly, by the choice of lexis and discourse features. In this ad, as in the majority of other ads on the site, the discourse style is non-expressive and non-cooperative. It involves no emoticons, such as smilies, so frequent in computer-mediated communication; no capital letters for shouting, no multiple punctuation marks, no trace of expressiveness in writing that tends to be associated with the feminine style. The style is also notably non-cooperative. The language of inclusion that draws on assumed shared knowledge and experiences, sometimes described as typical in gay speech (Leap 1996), is almost entirely absent here. There are generally no references to gay culture, and humorous remarks are very uncommon. The ads typically contain no hedges and very scarce discourse markers that would facilitate communication. One discourse marker that does, however, appear in several ads is *brate*, similar in meaning to the English *dude,* which is again traditionally associated with hetero-sexual masculinity. Also, bad words and swearing, which seem to have a stereo-typical association with masculinity (Mills 2008), are fairly common in the ads.

3.2. Negation

One direct way of distancing from the homosexual stereotype is effected through the use of negation. Apparently, this is nothing surprising, but what makes it worth mentioning is its consistency: in the entire corpus, lexical elements denot-ing effeminacy and lack of masculinity are always used in the negative form, never in the positive. The following are just a couple of random examples:

(4) *Niki: Normalan sam, nisam feminiziran, volim sex sa starijim momcima, i intimno druženje.*
'Niki: I am normal, not effeminate, I like sex with older guys and intimate friendship.'

(5) *Sladakk: Tražim momka do 20g s kim bih prvi put probao seks sa muškar-cem. Samo da nisi feminiziran i debeo. Piši na mail-*
'Sladakk: Looking for a guy up to 20 years of age, with whom I would have sex with a man for the first time. As long as you're not effeminate and fat. Email me at-'

In fairly concise ads, both writers stress non-effeminacy in self-description or the description of the ideal other. What is more, examples like (4) suggest that being

not effeminate is in this community directly related to being *normal*, an adjective repeatedly used in descriptions.[1]

3.3. Coordination

The analysis of lexical elements used in coordination can also reveal prevalent ideologies of the ad-writers. It has been noted before that analyzing collocations of words can yield social information, as the company that words keep can have an indirect effect on the meaning of these terms (e.g. Mills 2008, Romaine 2001). Hunston (2002) notes that collocation can convey meaning implicitly and even be at odds with what is expressed overtly. Romaine further argues that:

> "[...] connotations of words do not arise from words themselves but from how they are used in context. The meanings of words are constructed and maintained by patterns of collocation. Collocations transmit cultural meanings and stereotypes which have built up over time" (Romaine 2001:160, cited in Mills 2008).

One common form of collocation is coordination, although, as a separate process, it has received comparably less attention in this kind of research. Coordination, especially conjunction, involves an even firmer associative relationship between the elements. Generally speaking, in these constructions, coordinated elements tend to get the same evaluative judgement. More importantly, repeatedly occurring and almost fixed coordinate phrases, such as the ones found in the ads collected, may reflect cognitive associations that exist in a particular culture. As such, coordination can feature as a useful instrument in discursive construction of social groups.

The analysis of coordination in the corpus gives a clear insight into the dominant values of the personals. *Effeminate*, for instance, is typically coordinated with negative physical attributes, but also with undesirable psychological traits. Looking more closely at the coordinate elements occurring with the properties of being effeminate or non-effeminate, we find an invariable formula: words denoting effeminacy are consistently coordinated with negative traits, while those denoting non-effeminacy coordinate with positive traits. The following examples offer some illustration:

(6) *SM: Što se izgleda tiče, mogao bih da kažem da sam zgodan i nefeminiziran, mada mi izgled i nije toliko bitan. [...]*
'SM: As far as looks are concerned, I could say that I am handsome and non-effeminate, though looks don't matter that much to me. [...]'

(7) *Ivannn: […] Ne nekog perverznog, feminiziranog, lažljivog, prevrtljivog, vec šarmantnog, slatkog i veselog.*

[1] 'Normal' in Serbian primarily means 'mentally healthy' and does not contain the English meaning 'usual, typical'.

'Ivannn: […] Not someone perverted, effeminate, lying, cheating, but someone charming, cute and cheerful.'

(8) *Shvrle: […] Tebe zamišljam kao lepog mladog i pametnog dečka koji nije feminiziran ili isfoliran, koji zna šta hoće.*
'Shvrle: […] I imagine you as a handsome, young and smart guy who is not effeminate or fake, who knows what he wants.'

As the examples show, associations go beyond physical attributes to include a whole range of other traits. Effeminacy, a property mentioned in nearly all the ads collected, gets associated with lexical fields of various negative terms. Table 1 below lists the five properties that are by far most commonly associated with the words *effeminate* and *fem*, along with some expressions that were actually used (the Serbian words used are given in their approximate English translation, for the purpose of visual clarity):

Table 1: top five properties coordinated with *effeminate*

1. insane	*insane, deranged, disturbed, crazy, mad, lunatic*
2. unattractive	*bad-looking, ugly, scag, fat*
3. promiscuous, perverted	*promiscuous, perverted, pervert, kinky*
4. insincere, dishonest	*dishonest, lying, cheating, liar, fake*
5. dirty	*dirty, filthy*

Interestingly, the top of the list is not even *unattractive*, but *insane*. At first glance it appears hard to see the common semantic relationship between the given adjectives, namely how being effeminate relates to properties such as perversion or dishonesty. However, the instances of coordination are far from accidental. These are precisely the most common accusations directed against homosexuals by the public in Serbia, or even by the church - those related to perversion and insanity are actually common arguments of the Serbian orthodox church. In the discourse of church officials gay men tend to be constructed as mentally ill, in need of help to be cured and returned to the right paths of fatherhood and family life. Issues of sexuality also resonate in nationalist discourses, with political or religious leaders drawing on them in order to solidify their credibility as keepers of traditional values of the nation.

Coordination can thus reflect such culture-specific associations, reproduced in the construction of sexual and social identities. Its patterns of usage index, albeit indirectly, traces of the heteronormative discourse, together with notions of appropriate masculinity. Furthermore, coordination here reveals one subtle strategy by which the stigma associated with homosexuality is in this community shifted only to one its subgroup, effeminate homosexuals.

3.4. Slang

Slang is present to a great degree in the ads as a productive means of constructing identity through language. On one hand, these slang words have a unifying function, indexing a stance of modernity, coolness and involvement in the global youth culture. On the other hand, slang is a means of social differentiation, serving as an in-group marker (Bucholtz 2006). Many of the slang terms used here would be completely incomprehensible to people outside of this community, especially those related to sexual practices and sex roles.

A significant property of slang in general is that it is highly value-laden, commonly involving forceful stance-taking such as positive or negative evaluation (Bucholtz 2006). In the personal ads analyzed, this property is evident mainly in the ways writers draw on it as a resource for ridiculing effeminacy and celebrating masculinity, which also enables them to align with the locally constructed values. We come across a myriad of derogative names for the effeminate gay men which stylistically reproduce the group's ideology. A substantial number of these terms encompasses derivatives produced from the stem word *fem*, a term that features as the most common slang word in the ads. Morphological processes often involve derivation using suffixes that add diminutive or pejorative meaning (e.g. *femiša, femko, femonja*, all roughly translatable as *femmy*). Others correspond to the English value-laden terms like *sissy*, and are commonly used in opposition to words denoting masculinity, as was shown in (3).

An interesting mechanism employed here is semantic narrowing, the narrowing of meaning of particular insulting slang terms for homosexuals. The most common example is the word *tetka*, similar to the English *auntie*, as well as several other common derogative words meaning "gay". As part of this process, the scope of reference is narrowed to denote only effeminate homosexuals, while the new meaning remains just as value-laden as the original one. This mechanism also illustrates the shifting of stigma from the community as a whole only to its effeminate members.

Ad-writers can thus draw on slang strategically in order to achieve particular social goals and display desired sexual and social identities. In the example (9) below, PejaXX uses a lot of modern slang words associated with youth and coolness. He then goes on to say that he is "not *fem* and hates that." This lexical choice enables him to affirm his identity as someone enculturated with the community and familiar with its vocabulary. Furthermore, his statement involves direct stance-taking towards effeminacy.

(9) *PejaXX: Izgled mi nije primaran ali u najmanju ruku je potrebno da si prosek jer ni ja nisam gabor. Takodje ne podnosim iskompleksirane tipove i degene koji su utripovani a ne znaju ni nos da obrišu. Nisam fem i to mrzim... Trenirao sam tenis 8 godina...čisto da spomenem to i ovde.*

'Peja XX: Looks aren't crucial, but you should at least be average, because I'm not a dogface either. I also can't stand self-hating dudes and wankers

> who are stuck up but can't even wipe their own noses. I'm not fem and I hate that ... I played tennis for 8 years ... just thought I should mention it here.'

The ad adequately illustrates the multiple social purposes for which slang is used among these adolescents. It is possible to identify its three basic functions here: signaling belonging to the youth culture in general, signaling belonging to the gay subculture, and last but not least, asserting a negative stance towards effeminacy.

Importantly, apart from the fairly original *fem*-derivatives, the slang terms used here for effeminate gay men are the same as those used in heterosexist discourses for describing any men deviating from the prescribed notions of masculinity. Slang thus still features as a resource for legitimating particular social identities while marginalizing others. As such evaluations are repeated, discourses of heteronormativity are reworked within the very gay community.

4. Discussion and Conclusions

The present study has explored some aspects of language and teenage identity online, and showed how group ideology can be produced stylistically - through discourse features and lexical choices, grammar and slang. A central process in the creation and performance of identities is that of indexicality, which in most cases operates indirectly, mediated by highly local processes of shared representations. The online material has proved fruitful for investigating such indexical relations. It has shown that most prominent local values of the teenage ad-writers involve masculinity, while effeminacy is excluded and marginalized. Thus, in the wording of the GaySerbia ads not only sexual, but also sociocultural identities are displayed, together with the entire complex web of stances, styles, identities and social representations. The ads also indirectly reveal the ways in which sexuality is regulated by hegemonic heterosexuality and normative ideologies, which points to the need for studying sexuality as a wider sociocultural phenomenon.

The study supports the view of language as ideologically marked. It shows that patterns in language use can reveal ideological constructs, pointing to attitudes and social representations that may not be expressed overtly. However, the analysis also demonstrates that language does not figure only as a tool for reproducing reality, that it is also *constructive* of social reality. As associations between concepts are built, new discourses and new identities are constructed. The repetition of the two most frequently encountered coordinate phrases, *non-effeminate and handsome* and *normal and non-effeminate*, for instance, leave the teenage ad-writers or readers habituated to certain ways of talking or thinking that they can rely on, consciously or not, in constructing their own identities. It is in this way that the identity of a 'masculine and non-effeminate gay man' emerges as unquestionably desirable and worth striving for. As the described images are evoked repeatedly, discourses and identities are reworked within the community.

One of the underlying concepts evoked through the linguistic practices analyzed is that of hegemony. Rather than representing a challenge to normative

heterosexuality and concepts of masculinity, the young gay community in Serbia appears still structured by the hegemonic discourses of masculinity and heterosexuality. The ads illustrate the Gramscian concepts of hegemony as a process of leadership through which subordinate groups consent to their own subordination, adopting the imposed external values. This raises the more general questions of the maintenance of power in contemporary society. Distinct from the past state-legislative or police intervention, hegemony operates in more subtle ways, by controlling the ideologies and discourses extant in society. Consequently, norms are internalized as given and no longer recognized as culturally produced. The GaySerbia ads are illustrative of the process, showing how discourses of masculinity and heteronormativity are re-made within the gay community. Constructing effeminate gay man as 'the other' is a discursive strategy that allows the ad-writers to position themselves as dominant and closer to the accepted ideals of masculinity. However, by perpetuating the normative discourses, the gay culture ultimately allows its own marginality to be maintained.

All this has some implications for sociolinguistic study of sexuality and gender. It is evident that 'sexuality is not just about sex' (Eckert 2002:109), but is socially structured and as such should be observed as imbricated in cultural norms and power relations.

Importantly, the analysis of GaySerbia ads problematizes the concept of a singular Gay Speech, as well as the concept of a pre-defined social category 'gay' that can be observed in correlationist studies. The findings demonstrate the ways that the young ad-writers use linguistic resources to construct identities *in opposition to* the stereotypical features ideologically associated with gay speech and gay behaviour. This points to the importance of distinguishing between ideology and practice in studies of identity and avoiding the tempting tendency to simplify a sociolinguistic field. For instance, arguing that Gay Men's English is based on principles of cooperative discourse (Leap 1996) is bound to fall short of capturing the multifaceted nature of gay styles. Findings in this study actually suggest the very opposite: the discourse style of the analyzed personal ads is notably non-cooperative. This points to the need to explore the ideological processes through which the relation of certain linguistic features with particular social groups is formed, rather than simply correlate variables with reified social categories.

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Multi-frame Semantics, Metaphoric Extensions and Grammar

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0. Introduction

The French verbs *casser, briser* and *rompre* all translate into English most neutrally by *break*. And yet they are not simply tidy subcategories of the larger semantic class covered by *break*. We shall argue, indeed, that the oppositions between the three French verbs are shaped crucially by foregrounding or profiling of particular frames. Some of these are subsets of the BREAK frame (e.g. shattering into small bits vs. large distinguishable pieces), some partially correlated with it (e.g., non-functionality of a complex functional object correlates significantly with breaking it or some part of it), and some more orthogonal (shape of the object, possible volitionality oppositions). We argue that frame semantics needs to bring to the fore the realization that more than multiple frames are normally in play, in the semantics of a single lexical item, and the profiling of different frame oppositions may make the crucial difference in the choice between semantically close words.

It is well recognized that a wide range of lexical items and constructions evoke *frames* which shape the interpretation of the utterances in which they occur. Frames (Fillmore 1982, 1985, Fillmore and Atkins 1992) are structured correlations extracted from experience, often structured as dynamic scenarios with slots for participants or frame elements. Cognitively, they have a "gestalt" character: That is, evocation of any one part of the frame (e.g., the element MENU) tends to activate the rest of the frame and its elements (RESTAURANT, WAITER). It has been argued that it is frame elements (or semantic or thematic roles) which are in turn mapped onto syntactic slots in constructions. Thus, as Fillmore notes, if an agent is mentioned in a description of a BREAKing event, it will take the subject slot, while the theme will be the direct object (*Sue broke the bowl*); if no agent is mentioned, the theme will be the syntactic subject (*The bowl broke*). And, as Sullivan (2007) has pointed out most clearly, metaphoric mappings involve mapping roles in one frame onto roles in another frame. As we shall argue later, this means that the choice of a particular target domain may entail mapping different roles from the source domain frames – and different syntactic options for

expressing the metaphoric meaning of "breaking" a marriage or a silence or a secret.

Of course, not all of the frames evoked in any sentence come only from the verbs. It is well established that nouns and other lexical items evoke frames – and that constructions themselves evoke frames (Goldberg 1995, 2006). In *give her a book*, the major action frame is provided by the verb GIVE; in *give her a kiss* the major action frame is provided by the apparent direct object noun KISS; and in *break one's way through the snow*, the construction [X break one's way through Y] provides a frame wherein the BREAK activity is interpreted as the means of creating a path or way through the snow, which is interpreted as the resisting medium. What we wish to show, however, is some of the complexity of the frame structure within the lexical semantics of the individual verbs *casser, briser* and *rompre*.

1. *Casser, briser* and *rompre*

English *break* and French *casser, briser* and *rompre* all involve the BREAK frame, as we shall call it. This is a subcase of the broader class defined by a SEPARATION frame; it involves an integral theme entity which becomes non-integral during the event of SEPARATION, and may also involve other participant roles such as agent and instrument. SEPARATION verbs have been studied in detail, and we follow in particular the crosslinguistic work of Bowerman and colleagues (Majid, Boster, and Bowerman 2008, Bowerman 2007). The BREAK frame involves a theme which is a solid, rigid object, or a flexible object under tension. The event of BREAKing takes away the integrity of this object, which becomes more than one piece. The theme cannot be liquid or mushy, nor can it be paper or cloth (*cut* and *tear* would then apply, but not *break* or its French translations); and the separation cannot be achieved by use of a sharp blade as an instrument (*slice, cut*, etc. would then be more appropriate). Thus a soup-bowl, a mirror, a branch, a stick, a cube of ice, a loaf of bread, a chain, a wire, and a thread can all be *broken* in English – but a t-shirt or a handful of oatmeal or a postcard cannot.

In approaching *casser, briser* and *rompre*, we made use of the FRANTEXT (ATILF-CNRS, Nancy Université) literary corpus (1980-2007), the *Le Monde* 2002 corpus (search engine Le Migou, OLST Université de Montreal), various on-line newspapers including *Libération*, and Google. Using Google data on French presents all the expected difficulties for any on-line "world language" data: Canadian, North African and other French varieties are present (unsignaled) alongside hexagonal French; and a worldwide community of non-native users of French contribute to the French internet world. However, our other corpora are more restricted both in size and in genre, and Google allows a unique viewpoint into uncensored current usage. We are also working on a parallel project involving English verbs of BREAKing, for which the British National Corpus and UKWAC (Sketch Engine, LEXCOM) are our major sources alongside Google and on-line journalistic data.

We begin by mentioning three clear overlaps in context between *casser, briser* and *rompre* – all cases where English *break* might well serve as a translation.

(1) a. *Casser/briser/rompre les os* 'break bones'
b. *Casser/briser/rompre un fil* 'break a thread/yarn/wire/string'
c. *Casser/briser/rompre un mariage* 'break a marriage'

We find frequent Google citations of all three verbs with the objects "bones," "thread/wire…" and "marriage"; and in some cases there is clear overlap between the actual physical circumstances described. Real physical bone-breaking done to a victim by an attacker can be expressed by all three verbs; breaking of a wire in an electronic or electrical system can also be expressed by all three verbs; we shall return to metaphoric marriage-breaking.

When we closely examine the data, however, new regularities are visible. The first 200 examples of *rompre* on FRANTEXT involve only four direct object NPs representing physical objects (the rest are metaphoric, like *rompre le silence* 'break the silence'). The four object NPs in question are *un pain* '(a loaf of) bread,' *un croissant* 'a croissant,' *les os* '(the) bones,' and *les tendons* '(the) tendons.' Neither on FRANTEXT nor on Google do we find a single example of *rompre une tasse* ('break a cup') or *rompre une soupière* ('break a soup-bowl'), although there are frequent Google instantiations of *briser* and *casser* with these object NPs. Add to this the fact that many dictionaries appear to start their entry for *rompre* with the examples *rompre une branche* ('break a branch') and *rompre un bâton* ('break a stick'). We also searched WSE to determine the most frequent NPs referring to physical objects, as direct objects of *rompre*. The top five are in order *bâton* 'stick,' *chaine* 'chain,' *pain* 'bread,' *digue* 'dike' and *cou* 'neck.' Searching for subjects of intransitive *rompre, bâton* comes in first, followed by *pain* and then a range of abstract nouns such as *équilibre* 'equilibrium,' *harmonie* 'harmony' and the largely abstract *lien* 'link.' We therefore suggest that *rompre* involves more specific frames than the BREAK frame; in particular, the center of the semantic category *rompre* involves cases where:

(2) a. the thing broken is a long thin object and
b. the result is that there is no single whole anymore; breakage affects the whole.

Breaking a stick or a loaf of bread in half means that there is no longer *a* stick or *a* loaf of bread; breaking off the end would just mean there was a shorter stick or loaf.

Secondly, there is an added correlated frame where the long thin thing which is broken CONNECTS two other things, which are thus disconnected from each other by the breakage. Breaking a wire, for example, not only results in lack of integrity of the previously whole length of wire, but also could (if the wire were part of a larger system) disconnect a power source from an appliance, for exam-

ple, even though neither the appliance nor the power source is itself "broken" or damaged. Breaking a tendon disconnects the two locations in the body which were previously held together by the tendon. In this regard, it is interesting to notice the etymological link between *rompre* and *interrompre* 'interrupt.'

And finally, there seems to be a specific sub-frame associated with *rompre*, involving the breaking of bread. *Rompre* is the idiomatic way to say 'break' bread in French (expressing also contexts such as hospitality and breaking of the Eucharistic bread); it is also true that French bread loaves tend to be long and thin, so it is possible that this frame is linked to the frame involving long thin objects.

We thus have two claims on the floor. One, there are at least some cases of close synonymy between *casser, briser* and *rompre*; and two, *rompre* has a very different overall profile of usage from *casser* and *briser*. You would get the impression from a dictionary that *rompre* could refer to the breakage of a teacup – but it never does, as far as we can tell.

2. *Casser/briser/rompre un fil*

Actual breakdown of the Google examples of *casser/briser/rompre un fil* shows both overlap and contrasts. A crucial fact here is that the French word *fil* translates into English variously as 'thread, yarn, wire, string, rope' – so not every scenario involving a broken *fil* is necessarily the same. The 6,430 Google examples of *rompre un fil* and *rompre le fil* were almost entirely divided between breakage of wires (attested predominantly on do-it-yourself repair websites and on-line user instructions for appliances), and metaphoric breakage (e.g. *rompre le fil du discours* 'break the thread of the conversation'). *Casser* brought up numerous sewing and knitting websites, with instructions as to how to deal with broken threads and yarns, alternating with some metaphoric examples, and a few cases of broken wires. And *briser* gave us a real mixture of broken wires, broken threads, and metaphoric cases.

Threads and *wires* both fit the basic BREAK frame; they're under tension. But a broken wire (as opposed to a thread broken while sewing) specifically disconnects a power source from a machine, not just one half of the wire from the other. So it is not surprising that *rompre* is significantly favored for broken wires. For 'break one's neck,' *se rompre le cou* is very common, but we also find *se casser le cou* (Google 10,200,000) and *se briser le cou* (Google 1,680,000). Again this is expected, since a neck is both a long thin connector (fitting the specific frame of rompre) and an instance of the general BREAK frame. We found no instances of *rompre la cheville* 'break one's ankle' but *casser* and *briser* are common in this context. Breaking the spinal cord at the neck disrupts the connection between the head and the body, not just the two halves of the spinal cord; breaking an ankle makes no such larger disruption in the system.

Casser, on the other hand, has its own individual frame associations. The most salient of these is the correlation between the BREAK frame and the frame of a complex functional object becoming non-functional when it or one of its pieces is broken. Neither *briser* nor *rompre* is tightly associated with the French

version of this RENDER NONFUNCTIONAL frame. Google gave 1,420 hits for *ordinateur cassé* 'broken computer,' often in contexts where it is clear that nonfunctionality is the basic problem; people are trying to diagnose a (non-visible) problem, or to sell or give away a device to someone else who may be able to restore its functionality. *Ordinateur rompu* was unattested on Google, and *ordinateur brisé* occurred 178 times, some of which were clear references to physical smashing of computers (including videos of computer destruction). The same holds for televisions, cell phones and bicycles. Google had 1,950 examples of *casser la télé* 'break the television,' many of them clearly cases where the writer is wondering why the television has become nonfunctional; *briser la télé* turned up 8 examples, all clearly physical smashing (including statements that a particular show makes the writer so mad that he wants to *briser* his television). *Vélo cassé* 'broken bicycle' gave 1,620 hits including many inquiries as to how to get nonfunctional derailleurs back to working; but *vélo brisé* gave 74 results including some clear examples of physical smashing, and there were no attested examples of *vélo rompu*.

From this concept of complex functional physical objects becoming non-functional, *casser* is extended to abstract complex entities becoming nonfunctional. We also found instances of *fichier cassé* 'broken/damaged (computer) file,' and an inquiry as to whether a virus can *casser un disque dur* 'break/damage a hard disk' – clearly a virus could cause non-functionality but not physical breakage of the disk. And one advice-seeking user inquires *Est-ce un problème de logiciel cassé, ou c'est le matériel qui s'est usé?* 'Is it a problem of broken software or is it the hardware that's worn out?'

Casser also, like *rompre*, has a specific association with a food-breaking frame – in this case, eggs. *Casser un oeuf* is the normal way to say 'break an egg,' with 5,860 Google hits to 108 for *brise*r and 1 for *rompre*; a number of the examples with *briser* appeared to involve chicks breaking shells from the inside, rather than people breaking eggs.

Briser, on the other hand, is associated with a particular sub-frame of BREAKing, which we shall call the SHATTER frame. In this frame, an object not only becomes non-integral, but is reduced to many small (perhaps indistinguishable) shards or pieces, rather than being broken in half, for example (typical with *rompre)*. Google turned up 37,500 references for *miroir brisé* 'broken mirror' including many modified by *en morceaux* ('into pieces') or *en mille morceaux* ('into a thousand pieces'); crafts sites also explain how to cover objects in *miroir brisé* (small bits of broken mirror). *Miroir cassé* (certainly predicted, particularly given the loss of functionality of a broken mirror) had 9,440 hits, and *miroir rompu* 45. Secondly, it is noticeable that *briser* need not signify destruction of the whole or affect the full volume of the theme, unlike *rompre*. Google turns up cooking sites mentioning events such as *briser l'exterieur du gâteau* 'break the outside of the cake.' And things can be *un peu cassé* 'a little broken' (a chipped cup, for example), or *un peu brisé*, but no instances of objects being described as *un peu rompu* were found.

Notice that it is not the object per se which seems to determine the choice of a verb, but the profiled frame. In the case of *un peu cassé* for instance the NONINTEGRAL frame is profiled, explaining the modifier *un peu* (a chipped, slightly *damaged* cup may still be entirely *functional)*, rather than the RENDER NONFUNCTIONAL frame present in 'ordinateur cassé.'

3. Metaphoric Mappings

Cognitive metaphor theory (Lakoff and Johnson 1980, 1999) argues that metaphoric linguistic usages are the linguistic manifestation of cognitive mappings between a Source domain and a Target domain. Thus, in *sunny personality*, the abstract target domain of personality is being construed in terms of a source domain of physical sunny-ness (as in *sunny room*). As Sullivan (2007) points out, we can often predict metaphoric usages, by looking closely at the source-domain usages of the relevant words; basically we need to precisely identify which frame is being mapped onto which frame. A case in point, discussed by Sullivan, is the interesting fact that one can refer to an intelligent student as a *bright student* or a *brilliant student* but not as a **sunny student*; and on the other hand, a cheerful person may have a *sunny disposition*, or be *bright and cheery*, but not **brilliant and cheery*. Sullivan points out that in attested literal usages about light, *brilliant* refers specifically to the light-emission sub-frame (e.g., *a brilliant light-bulb*), while *bright* can refer either to light-emission or ambient illumination (*a bright light-bulb, a bright room*), and *sunny* can only refer to ambient illumination (*sunny room, *sunny light-bulb*). It turns out that not light, but specifically the light emission frame, is what maps onto intelligence – hence *bright/brilliant/ *sunny student*. And ambient light level, but not light *emission*, maps metaphorically onto cheerfulness: hence *sunny disposition,* but not **brilliant disposition*.

We might therefore expect that to the extent to which *casser, briser* and *rompre* are associated with different literal breaking frames, they would be mapped onto abstract domains in correspondingly different ways. And indeed we find that (1) the metaphoric uses of these three verbs show quite different profiles, and (2) some of the differences correspond predictably to mappings from the literal senses.

As a first example, a Google search for *rompre un lien, casser un lien*, and *briser un lien* ('break a link') shows 1,960 hits for *rompre*, 1,020 for *briser*, and only 241 for *casser*. Many of the relevant hits refer to metaphoric internet links, others to metaphoric "links" such as the connection between prices and rents. In this case, we would expect *rompre* to be the favorite, because a link is being primarily metaphorically understood in terms of a physical tie (rope, chain, etc.) – a long thin thing which connects two other objects, and whose breaking disconnects them. The surrounding language clearly shows this, using the same valence as for a physical connector (it is *entre X et Y*, 'between X and Y,' for example, just like a physical link). And interestingly, the profile here is very similar to that for *rompre/briser/casser un fil* 'break a thread/wire,' discussed earlier, where

again *rompre* dominated, *briser* followed, and *casser* came in with a much smaller representation.

We should also note that metaphoric mappings may sometimes fail to map aspects of frame structure from the source domain, when they lack a counterpart in the frame of the target domain. *Rompre les ponts* ('break the bridges,' Google 92,400) is used idiomatically in French to mean 'break off a social relationship in a final way, irreversibly.' In this sense, it is quite close to synonymous with *couper les ponts* (literally, 'cut the bridges,' Google 691,000) – and in English, there is a corresponding idiom *burn one's bridges*. Now, as we have said, in literal uses, *rompre* and *couper* are largely non-overlapping: Just as with English *break* and *cut*, you can only *cut* with a sharp-edged instrument, while *break* cannot be done with such an instrument. But in the metaphoric domain of ending relationships, there is no frame role corresponding to an instrument. Thus the near synonymy of *couper les ponts* and *rompre les ponts*: In each case, assuming the relationship is construed as a bridge connecting the relevant people or social entities, physical division of the bridge maps onto disconnection between the two social entities (This 'disconnection' frame is also relevant in other "couper" meanings: *Couper l'eau/l'electricité* 'cut off water/electricity' *couper la route à quelqu'un* 'cut off someone's path'). With no mapping of instrument or manner, basically identical inferences are mapped from cutting or breaking (or for that matter, burning) onto the target domain of definitively ending a relationship. (*Casser*, incidentally, lacks such a metaphoric usage; all of the 1,850,000 Google uses which we have checked so far refer to literal physical bridge destruction.)

Metaphoric topic "threads" of discourse or thought or conversational interaction can also be metaphorically either cut or broken in French. *Le fil est coupé* and *Le fil est rompu* are both frequent. And note that the French verb *interrompre* 'interrupt' (as in *La conversation est interrompue*, 'the conversation has been interrupted'), actually contains *rompre*. A university e-mail of February 13, 2009 was headed *Le dialogue est rompu avec les syndicats*, 'the dialogue (of the government) with the unions is broken off' – neither *casser* nor *briser* can appropriately replace *rompre* here.

4. "Breaking" Marriages

We mentioned at the start that marriages are an example of something which can be (metaphorically) described as *cassé, brisé*, or *rompu* – all three verbs are possible. Does this mean that there are no differences between these different metaphoric construals? We shall show that there are such differences. But first of all, we need to be clear about the fact that a marriage (independent of its termination or breaking) can be understood metaphorically in more than one way. Naomi Quinn has argued that Americans understand marriage as (among other things) a BOND or LINK BETWEEN THE TWO PARTICIPANTS, a COMPLEX OBJECT MADE UP OF THE TWO PARTICIPANTS, and AN OBJECT OR STRUCTURE BUILT JOINTLY BY THE TWO PARTICIPANTS (Strauss and Quinn 1997, ch. 6 and 7). French speakers also seem to have these multiple

construals, among others. And different BREAK verbs would be appropriate to the different construals: For example, as discussed above, *rompre* would be particularly appropriate to the BOND or LINK metaphoric construal of marriage, *casser* or *briser* perhaps to the other models.

And indeed, the three ways of saying 'break a marriage' in French have quite different distributions. *Rompre un mariage* (Google 2,930; *rompre le mariage* 'break the marriage' 5,850) refers to legally ending a marriage, and is the primary verb used to refer specifically ending a *religious* marriage. This phrase is regularly accompanied by other phrases such as *rompre le lien sacré* 'break the sacred bond/link,' which allow us to gather that at least many of the construals of marriage involved are indeed shaped by the MARRIAGE IS A LINK/BOND metaphor.

Casser un mariage, on the other hand, is the standard usage to refer to marriage by legal divorce in civil court (Google *casser un mariage* 398, *casser le mariage* 2,510). The internet usage of this phrase is not accompanied by vivid "bond" metaphors; and we can remember that *casser* is the unmarked choice to refer to any complex entity becoming non-functional, which may be the most relevant issue at stake in these cases. The marriage goes from being a functioning legal entity to not being a functioning legal entity.

And finally, *briser un mariage* (Google 224*, briser le mariage* 1,080) appears to refer specifically to the action of a third party who exerts outside sexual attraction on one of the partners in the marriage, thus "breaking up" the marriage. The internet is full of examples like *Jared Leto veut briser le mariage de Scarlett Johansson!* (www.eparsa.fr/people/index.php?2009), 'Jared Leto wants to break up Scarlett Johansson's marriage.' Further research would be needed to know more precisely what metaphoric construals of marriage are involved here; but as with English *break up*, there seems no particular indication of the BOND/LINK model in these website passages – and *briser*, as we have seen, is focused not on long thin connecting entities, but (among other frames) on the SHATTER frame of a single entity "breaking up" into pieces which can't be reassembled.

Perhaps a more complex and puzzling abstract case is the possibility of using all three French BREAK verbs to refer to "breaking a strike." There is a clear preference for different contexts. *Casser une grève* clearly tends to occur with agents like the government or the army, referring to external forces of authority bringing an end to a strike. *Briser une grève*, on the other hand refers either to the action of outside authority or that of workers who work in violation of the strike; and *rompre une grève* refers primarily to the action of the union in calling off its own strike. More work would be needed to understand these uses, but it is interesting to note that with respect to both marriages and strikes, the agent of *briser* is an outside party, while the agents of *rompre* are internal to the social unit in question.

Particularly interesting metaphoric uses of French BREAK verbs are found in the idioms *ils ont cassé* and *ils ont rompu*, both meaning 'they ended a romantic or sexual relationship between them' (similar to English *they broke up*). Given the

metaphoric models of relationships discussed above, one would expect both of these verbs to be possible in describing metaphoric breakage of relationships. What is rather more surprising is that the syntax of these idioms is inexplicable by reference to the syntax of literal *casser* and *rompre*. Given *La tasse s'est cassée* and *Il a cassé la tasse* ('the cup broke' and 'he broke the cup'), one would expect *Le mariage s'est cassé* or *Ils ont cassé leur mariage* 'the marriage broke' or 'they broke their marriage,' and at least the latter is possible. However, one cannot say in French * *L'anse et la tasse ont cassé* to mean 'the handle and the cup broke (apart from each other),' using a transitive verb with a plural subject referring to the two eventually broken-apart pieces. So why is it possible to say 'they (the two romantic partners) broke' to mean that they broke apart from each other metaphorically?

The syntactic puzzle is pretty simply explained, however, by parallelism to *Ils ont divorcé*, 'they divorced (each other), they got divorced.' This is another case of mutual or reciprocal abstract action, ending a relationship – so it is definitely in close semantic neighborhood to the "break up" examples. The interesting point here is that only after "breaking" is being metaphorically used to talk about reciprocal relationship endings, can the "mutual" intransitive construction appropriate to *divorcer* be accessible to *casser* or *rompre*.[1]

A similar case of "attraction" into a syntactic construction via metaphoric semantic construal can be seen with the French SEPARATION verb *éclater* 'burst.' This is used intransitively in French (*le pneu a éclaté*, 'the tire burst'). This is the syntax shown predictably in metaphoric *éclater de rire* 'burst out laughing.' However, the reflexive form in the more recent idiom *s'éclater* 'have a great time, have a lot of fun' would not be predicted from literal uses of this verb. It is, however, motivated by the syntax of semantically related idioms in the metaphoric target domain of having fun. Other French idioms meaning 'have fun' include *se marrer, se distraire*, and *s'amuser* (and colloquially *se bidonner, se poiler* – though the very common *rigoler* is non-reflexive) all reflexives more literally translatable as 'enjoy oneself.' The reflexive syntactic construction is not characteristic of the literal French description of bursting events, but is very typical of French psychological predicates of amusement and indeed common over a broader range of French psychological predicates (*se douter* 'suspect,' *s'étonner* 'be surprised,' *se demander* 'wonder'; the reflexive construction covers "middle" semantics in French as well as core reflexive meanings). Once the verb *éclater* had been extended (frame-metonymically) from referring to physical laughter to referring to psychological states of amusement, those new uses were in a semantic neighborhood which made reflexive/middle syntax accessible to them.

[1] One might ask, why not borrow a reflexive form, used quite commonly for reciprocal actions in French, rather than a transitive form? *Se séparer*, 'to separate (from each other)' should in principle be a potential syntactic model here, given the semantic proximity. However, the reflexive *se casser* at least already has a different idiomatic meaning, namely 'leave' – in harmony with the reflexive *s'en aller* ('go away' – literally 'go oneself from t/here').

5. Conclusions

Casser, briser and *rompre* do all share association with the BREAK frame structure – but they also have characteristic associations with other quite distinct frames, such as NONFUNCTIONALITY, SHATTERING, LONG THIN OBJECTS, or DISRUPTED CONNECTION. These frames are sometimes correlated in the world with instances of the BREAK frame, and with each other, but are not necessarily correlated: *Une télé brisée* 'a smashed television' would necessarily be non-functional as well as in pieces, while *un pain rompu* 'a broken bread-loaf' may still be functional (edible) but is now non-integral and perhaps used to be long and thin. A given verb's semantics is a complex of interrelated frames – and this multiframe semantics is quite distinct for *casser, briser* and *rompre*.

Semantic frames are mapped in turn onto syntactic constructions. Therefore, as others have noted (Levin and Rappaport Hovav 2005), syntactic options shift as semantic construal shifts. Metaphoric construal of laughter as an explosion (*éclater de rire*) followed by frame-metonymic construal of laughter as "having fun" replaces the original explosion frame by an "having fun" frame with quite different semantic roles (Experiencer, rather than Theme). That frame in turn has its own conventional mappings onto syntax, allowing reflexive *s'éclater* rather than intransitive *éclater*, in the sense of 'have fun.'

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English Adjectives Expressing "Type-Anaphora" in Indefinite Noun Phrases

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0. Introduction

The analysis put forward in this article is framed within the current functional and cognitive approaches to the English noun phrase (henceforth NP). These analyses share the tenet that the main function of NPs is to denote entities and make them available as discourse topics, i.e. referents, for speaker (S) and hearer (H) to talk about (see e.g. Bache 2000:159). Specifically in Cognitive Grammar (Langacker 1991), a referent is conceived of as an instance of a type, e.g. *Peter's cat* denotes one specific instance of the type cat, the one that belongs to Peter. In order to turn entities into discourse topics, Langacker argues that S and H have to be able to establish **joint mental contact** or "coordination of reference" with them:

> the speaker (S) and hearer (H) who jointly form the ground (G), face the task of coordinating their mental reference to some instance t_i of type T […]. When both S and H make mental contact with t_i, full coordination of reference is achieved (Langacker 1991:91, see also Diessel 2006).

Information about the identification of the instance is conveyed in the NP by determiners. These divide into two basic types: definite determiners, e.g. definite article *the*, possessives, demonstratives, and indefinite ones, including the indefinite article *a*, *some*, zero article, *every*, *no*. While definite determiners indicate that the instance is identifiable, indefinite determiners have traditionally been defined negatively as signalling non-identifiability of the instance. Recent cognitive approaches (Langacker 1991, 2004; Gundel et al. 1993; Davidse 2004) have amended this interpretation of indefinite determination and drawn attention to the **positive cognitive processes** involved. They argue that indefinite determiners signal that although the identity of the instance denoted is presumed unknown, the **type** which it instantiates **is identifiable** – Gundel et al. (1993:275) characterize the cognitive state required by indefinite determination as "type-identifiability". This means concretely that the H can establish mental contact with the instance *as*

'an instance of this type'. That is, indefinite determiners denote unidentifiability of the instance but identifiability of the type.

In this paper, I will specifically be concerned with a particular mechanism of identification in the NP, that of phoric relations. These are identificational relations between the NP and another discourse referent (Martin 1992:82), called its "antecedent".[1] The prototypical phoric relation is co-referentiality signalled by definite NPs: the referent of the NP and the antecedent are one and the same entity, e.g. in *A nurse brought me **some bread** and coffee, but **the bread** was stale and the coffee tasted of soap* (Macmillan English Dictionary 2002:1486), *the bread* is identified as the bread mentioned earlier, in the NP *some bread*.[2] In examples such as this one, the relation of co-referentiality is expressed only by the definite article *the*. Alternatively, a strategy can be used to lexically instruct the H to set up a relation of co-referentiality, that is addition of an adjective which functions as a secondary determining element or 'postdeterminer' to the existing definite article and which expresses 'identity of reference', e.g.,[3]

(1) If a house sells for 150,000 dollar and the owner pays a 6 percent brokerage fee, lenders don't care. But if **the same house** sells for 146,000 dollar, […] (CB)[4]

(2) 100 Percent Philosopher Alan Watts once said that the sun would not be "bright" were it not for human eyes; thorns would not be "prickly" if skin were not soft; rocks would not be "hard" or "heavy" if muscles did not exist; and so on. "Bright", "prickly", "hard", and "heavy" are

[1] Martin (1992:98) introduces the terms "phoric" and "phoricity" as a cover term for the traditional relations of anaphora, in which the antecedent is found in the preceding text, cataphora, in which it is part of the following discourse, and other specific types of phoric relations such as exophora and homophora (see Halliday and Hasan 1976:31f). I use the term antecedent as cover term for antecedents in the strict sense as well as 'postcedents,' as the former clearly constitute the prototypical case.

[2] It has been argued that the definite article carries co-referentiality as a default implicature concerning the identification of the instance (e.g. Lyons 1999).

[3] The prototypical use of adjectives in the NP is to attribute a lexically specified property to the denoted instance. This is the **attribute use** as in *The girl was wearing a very pretty blue ribbon in her hair (CB)*. Some adjectives have a different use in the NP as secondary determiners or **postdeterminers** (Halliday 1994, Sinclair et al. 1990, Breban 2008a). Their function is to supplement the information given by the existing determiner in order for S and H to achieve joint mental contact. Secondary determiners do not convey a property but a more schematic concept such as 'identity of reference,' 'arbitrariness of reference' (*women of a certain age (CB)*), 'actualization of the instance' (*a possible agreement (CB)*). Structurally, they cannot be graded by degrees of comparison or submodifiers such as *very*, *rather*, *quite*, e. g. *women of a *more/most/rather certain age*, nor do they allow alternation with predicative construal, e.g. *women of *an age which is certain*. They typically occupy the position directly following the determiner in the NP string: *women of a certain advanced age vs. *women of an advanced certain age* and *the identical three boys* vs. **the strong three boys*.

[4] The examples marked 'CB' are extracted from the COBUILD corpus, which is a 56 million word selection of the Bank of English that can be accessed via the Collins Wordbanks*Online* service, and reproduced here with the kind permission of HarperCollins Publishers.

> definable only by reference to our own senses. A century earlier Ralph Waldo Emerson arrived at **the identical idea**. We habitually attribute too much to the world, he observed, and not enough to ourselves. (CB)

While co-referentiality is the main phoric relation that has been discussed in the literature so far, Davidse (1999:228, 2001) put forward the hypothesis that it is also possible for a postdeterminer to express "type-anaphora", i.e. phoric identification of the type instantiated, in indefinite NPs. Take for example,

(3) It was alleged he struck one prison officer with a pipe and hit **another officer** on the head with his fist. (CB)
(4) If you have problems once you arrive at the cottage, the agency may be able to move you to **a different house** or solve the difficulty; (CB)

In these examples, the adjectives *other* and *different* function as postdeterminers to the indefinite article. They convey that the identity of the instantiated type, which is presented as known to H by the indefinite determiner, is phorically retrievable in the same way as the identity of the instance itself was in definite NPs with postdeterminers *same* and *identical* in (1) and (2). Davidse (1999:288, 2001) does not further develop her hypothesis, nor has it been taken up in other research.

The aim of this paper, is to substantiate, further develop and illustrate Davidse's notion of type-phoricity on the basis of a detailed corpus studies of nine adjectives that were found to have a postdeterminer use expressing type-anaphora in Breban and Davidse (2008), i.e. *other*, *different*, *additional*, *further*, *new*, *fresh*, *similar*, *comparable* and *identical*.[5] I will provide a more detailed definition of type-phoricity (section 1.1) and present a fine-grained analysis of the semantics and typical uses of the nine adjectives expressing type-phoricity (sections 1.2, 1.3, and 1.4). Section 2 sums up the main arguments and proposes some theoretical generalizations.

1. Corpus Studies of Nine Adjectives Expressing Type-Phoricity in NPs

The following discussion is based on the qualitative analysis of contemporary corpus material from the 56 million words portion of the Bank of English (1995 until present) which can be accessed via the Collins Wordbanks*Online* service. The data samples used for the present paper consist of 400 examples per adjective extracted by using the adjective itself as query (see Breban 2002, 2006) for all adjectives except *other*, *new* and *fresh*. For *other*, an equivalent set of 400 random data was compiled using 'another or other' as query (also Breban 2002, 2006).

[5] Breban and Davidse (2008) give, on the basis of corpus investigation, an overview of the main adjectives that are used as postdeterminers supplementing the indefinite article in present day English.

For *fresh* and *new*, the discussion is based on new extractions of 100 examples made using the more specified queries 'a fresh', 'a new'.

1.1. Type-Phoricity

Type-phoricity means that the instantiated type, e.g. the type *officer* in (3) reproduced here as (5), can be identified on the basis of a phoric relation of identity.

(5) It was alleged he struck <u>one prison officer</u> with a pipe and hit **another officer** on the head with his fist. (CB)

In other words, type-phoricity means that the type is already present in the discourse or the discourse situation and postdeterminers such as *other* give the instruction for H to retrieve the type from this earlier mentioned instance. More specifically, the type is present in the form of other instances, the 'one prison officer' in (5) or 'the US' in (6).

(6) Mr Rosbrook said he was attracted to MBE because it was a unique concept with proven success in <u>the US</u> and **other countries**. (CB)

When postdeterminers such as *other* in (5) and (6) express type-phoricity, they set up a phoric relation with an antecedent NP but instead of instructing H to retrieve the identity of the instance itself (i.e. co-referentiality), they convey that the relation of identity does not pertain to the actual instance but to the type it instantiates. The semantics of type-phoricity can be paraphrased as create 'a new/different instance of the same type as the antecedent instance'. Type-phoricity thus constitutes a **complex phoric relation** combining phoric identity on the type-level with phoric non-identity on the instance-level.

As I will show in the next sections, the different postdeterminers that express type-phoricity allow the S to express slightly different meanings with regard to the type to be identified. Some postdeterminers (*other*, *different*, *additional*, *further*, *new* and *fresh*) merely signal identity between the type descriptions of the NP and the antecedent NP, e.g. *officer* in (5). Postdeterminer *other* also has a second meaning, in which it sets up a phoric relation and indicates that the new NP provides the "name" for the type, e.g. in (6) the noun *countries* lexicalizes the type instantiated by the antecedent NP *the US*. The postdeterminers *similar*, *comparable* and *identical*, finally, instruct H to "enrich" the type description with information from the context. In (7), for instance, the type *satellite* has to be enriched with the information provided in the restrictive relative clause *that could act as an early warning system for Earth-bound comets, rather like spy satellites that spot the exhausts of intercontinental ballistic missiles*.

(7) <u>The ISO satellite</u>, launched yesterday by Ariane 4 rocket, is as big as a 50-seat coach, and weighs 2.5 tonnes. […] Professor Roger Bonnet of the European Space Agency believes ISO might become a blueprint

for a network of **similar satellites that could act as an early warning system for Earth-bound comets, rather like spy satellites that spot the exhausts of intercontinental ballistic missiles**. (CB)

I will discuss these three semantic subtypes in turn in sections 1.2 to 1.4 respectively.[6]

1.2. Postdeterminers Expressing Basic Phoric Retrieval of the Type

The postdeterminer that is most frequently used to express type-phoricity is ***other***. When *other* combines with the indefinite article, *an* and *other* are orthographically a single unit, *another* (see (5)). Semantically, *other* focuses on the relation of non-coreferentiality between the new instance and the earlier mentioned instance. For example, in (5) the officer is not the prison officer mentioned earlier. Huddleston and Pullum (2002:391) point out that postdeterminer *(an)other* has two submeanings. In examples such as (8), *other* has an **alternative meaning** paraphrasable as 'a different', 'not the same'.

(8) Soviet President Mikhail Gorbachev today removed the general in charge of the army and replaced him with **another general** who refused to deploy his troops in support of the attempted coup. (CB)

In examples such as (9), other expresses an **additive meaning** paraphrasable as 'an additional' or 'a new'.

(9) *You* can eat walking along the street, you know, you can stuff your face with hot dogs and then follow them by a giant coke and then perhaps **another hot dog**. (CB)

In these examples, *(an)other* introduces a new instance in a series of instances (In the case of two instances, i.e. one antecedent instance and the new instance, *another* can be paraphrased by 'a second' (see also OED s.v. *another*)). Of these two, the additive meaning is the most frequent one in my corpus sample. (see also Macmillan 2002 s.v. *another*). In contrast to the alternative meaning, the additive meaning often does not require the presence of a previous instantiation in the text, rather it implies previous instantiation, i.e. the instance is 'a new instance of a type of which S and H know previous instances' or 'previous instantiations are part of the knowledge S and H share'.

[6] I would like to emphasize that all three types of postdeterminers express that the type is available in the discourse. They are hence different from secondary determiners such as predeterminer *such* and postdeterminers *usual*, *kind of*, which instruct the H to "create" a type, e.g.

(i) We don't need such a man here (Lyons 1999:40)
(ii) Then there will be the usual Christmas lunch. (CB) (Breban 2008b)

(10) On talkback radio and in letters to the editor Leunig was accused of laying **yet another guilt-trip** on working mothers. (CB)

In (10), the fact that a series of instances is involved is also signalled by the adverbial *yet*. Finally, I should be noted that The additive meaning has a specialized variant in which *(an)other* does not signal a new instance being added but the **addition of a quantified set** to previous sets:

(11) McClellan is pulling no punches when he talks of his knockout record. He dispatched 55 opponents to the canvas as an amateur, followed by **another 29 pro victims** in the ring and three outside it. (CB)

In (11) the NP *another 29 pro victims* adds a new set of 'victims' to a previously mentioned set, *55 opponents*. The other adjectives expressing type-phoricity as such, *different*, *additional*, *further*, *new* and *fresh* are less frequently used as postdeterminers than *other* (see Davidse and Breban 2003; Breban 2008c). Compared to *other*, their meaning is typically more specific; they express either the alternative or the additive meaning or another related meaning.

Postdeterminer ***different*** is restricted to the **alternative meaning**, i.e. 'not the same instance', and does not express the additive meaning, e.g. (12).

(12) If you have problems once you arrive at the cottage, the agency may be able to move you to **a different house** or solve the difficulty; (CB)

One context in which *different* is preferred over *other* to convey the alternative meaning is formed by data in which the antecedent is part of the discourse situation (exophoric reference), as in (13).

(13) Are you in any way worried about going to Germany? Not just about doing the programming but just going across to Germany and living in **a different country**" (CB)

The antecedent of *a different country* is the country that the H is living in at the moment of the utterance.

The postdeterminers ***additional*** and ***further*** only express the **additive meaning**: they indicate the addition of a new instance to a series of instances, e.g. (14) and (15).

(14) So far, he'll be on the ballot in Kentucky, Wyoming, Tennessee, Utah, Delaware and Maine. On Friday, Perot plans to address supporters in **six additional states** simultaneously by satellite television, both to mark the completion of petition gathering in those states and to demonstrate his idea of an electric town hall. (CB)

(15) CONNOLY MOSCOW **A further indication of the split** within the Soviet communist party has come with the sharp criticism by the Soviet Foreign Minister Shevernadze, of certain senior army officers. (CB)

Like *other*, both adjectives can also be used when the additive relation pertains to quantified sets rather than instances, as illustrated in (16) and (17).

(16) Rolf Borjesson, chief executive of PLM, the Swedish packaging company, will succeed David Lyon as managing director and chief executive in July. Mr Lyon will continue as a director for **an additional 12 months**. (CB)

(17) NEWSDESK TOMLINSON MIAMI The diplomatic tension between Cuba and Spain is rising, following the incident on Friday when **a further nine Cubans** broke into the Spanish embassy in Havana. They said they were seeking sanctuary, like nine other Cubans already in the building. (CB)

In contrast to *other*, however, their strongest semantic emphasis is on the quantitative aspect of the additive meaning: they always invoke a sense of accumulation. Because of this emphasis, *further* and *additional* in NPs with uncount and plural count head, (18) and (19) respectively, are paraphrasable by 'more'.

(18) Establish whether traffic delays are expected on the day anywhere along the route to the place of marriage. If this is the case, allow **additional time** for travel. (CB)

(19) The result was dampened by news this morning that the city had slipped another three-million pounds towards a deficit with the cancellation of the land deal. That brought a warning from Mr Rimmer that **further job cuts** might be necessary. (CB)

The data also reveal that *further* frequently occurs in NPs with singular head noun; in particular in binominal NPs of the type *a further sign, example, round of* N, e.g. (20).

(20) A statement issued from the Foreign Office in the last few minutes reads as follows: "We totally regret the Iraqi note as **a further example of blatant Iraqi disregard for international law.**" (CB)

The postdeterminers ***new*** and ***fresh*** can express both the alternative and the additive submeanings, but also convey yet another meaning that incorporates elements of both meanings, **replacement of the antecedent instance** by the denoted instance, e.g.

(21) The European Court case arose after Bosman, a Belgian player with RFC Liege completed a two-year contract. He was offered **a new deal** at a quarter of his previous salary and, when he denied, was prevented from leaving by the price the club put on his head. (CB)

(22) Family busses on the move By motoring writer STUART SCOTT People movers, multi-passenger vehicles, mini busses, people carriers whatever the name, they're on the way back. **A fresh breed of family wagon** is about to take Australia by storm as new makers enter the field with fresh designs at attractive prices. (CB)

In example (21), *new* implies both that the deal denoted is "an additional" deal following the two-year contract and that it is *ipso facto* "a different" deal. Yet, the most central idea that *new* conveys seems to me that the new deal replaces an earlier deal, viz. the antecedent referent *the two-year contract*. The replacement meaning moreover occurs with a typical range of collocations, head nouns denoting something that is typically replaced, such as *a fresh/new generation* of N, *a fresh/new range of* N, *a fresh/new breed of* N, *a fresh/new series*, see (22). Similar to the additive meaning, in most of the data in which *new* expresses the replacement meaning, the antecedent is not lexically present, but it is considered part of the shared knowledge of S and H or its existence is merely implied. Take for instance (23),

(23) UGANDA REBELS A Ugandan government newspaper has reported that a number of rebels belonging to the Ugandan People's Army (UPA) have been killed following **a new offensive in Serere and Kasilo counties in the East of the country**. (CB)

For *new*, the replacement meaning is clearly the most frequent one. *Fresh*, by contrast, most frequently conveys the additive meaning illustrated in (24).

(24) Good morning. The allied forces have begun **a fresh wave of bombing raids** against Iraq and occupied Kuweit. (CB)

Like the replacement meaning, the additive meaning of *fresh* occurs in a particular set of binominal collocates such as *a fresh wave/bout/round of* N.

1.3. Postdeterminer *Other* Naming the Type of the Antecedent

In some corpus examples, the function of *other* is not only to introduce or add a new instance of the same type of the antecedent. *Other* also "names" the type. That is to say, the NP with *other* actually **supplies the lexicalization of the type.** Two further subtypes can be distinguished. In a first set of examples, the antecedent NP does not have a (separate) type description. This is amongst others the case when the antecedent head noun refers to the instance as such and not to the

type it instantiates, as in (25), or when the antecedent is a stretch of text (a "text referent" (Willemse 2005:93f)), as in (26).

(25) With the Columbia grounded for the time being, NASA is moving ahead with launch plans for **two other shuttles**. (CB)

(26) The Australian Medical Association president yesterday claimed an increase in thyroid cancer in Australia was directly linked to nuclear tests. However, one of the authors of a new study was more cautious saying simply that there was **no other reasonable explanation** for the increased cases. (CB)

In a second set of examples, the NP with *other* "changes" the type and provides a new, unexpected type description, which often conveys the S's opinion about or interpretation of the categorization/description of the instance, e.g. (27).

(27) Today Gen Smith travels to Bosnian Serb headquarters in nearby Pale to resolve the airport stand-off and **other sticking points between the United Nations and the Serbs**. (CB)

In the literature, this process has been called "reclassification" (Salmon-Alt 2001) or "redescription" (Modjeska 2003).

1.4. Postdeterminers Enriching the Type Description

The postdeterminer uses of the adjectives *similar*, *comparable* and *identical* do not focus on the fact that a different or an additional instance is being denoted. Instead they draw attention to the type description. They focus on the second phoric dimension in indefinite NPs, viz. type-identity, rather than instance non-identity. More specifically, they convey that the new instance, despite being a different instance, shares the features that make up the type of the antecedent instance.

(28) Of the 202 complaints which the tribunal did act on, 36 related to fees and charges. "In some cases, the complaint is linked to alleged agent misrepresentation if the complainant believes that fees, charges or commissions were not accurately explained prior to the sale of super-annuation policy," the report said. **A similar common complaint** was that people were sold policies which were not suited to their needs. (CB)

(29) Who is likely to take serious notice of subtle discrimination, as in the example of the small boy and the ice cream? But each patient's therapy reveals endless **comparable examples**. (CB)

(30) An 18-truck convoy carrying 23 tons of aid left Sarajevo to make the 90-mile trip. At the town of Vildeja, it ran into an organized demon-stration of 150 women and children blocking the road. They said they

> would not allow food to pass through to their enemies. Then they demanded half the food on board the convoy for themselves. The convoy leader, Larry Hollingworth, told them this was an attempt to hijack a relief convoy and he refused. He turned back and tried another route only to find his path blocked by **an identical demonstration**, this time orchestrated by two Serb women in uniform. (CB)

As the examples show, the postdeterminer uses signal type-phoricity in contexts that imply a more elaborate type specification than that provided by the head noun of the NP (and the antecedent NP) alone. They signal that the type description has to be "enriched" by features from the context. In examples such as (28) and more clearly (31) below, the additional features are expressed in the elaborate pre- and postmodification found in the NP itself.

(31) I'd love to visit the house in Scotland or, even better, love to read about **similar stately homes cared for in such a way**. (CB)

In examples such as (30), the features constitute the entire preceding discourse. The third possibility, illustrated in (29), is that they are only implied.

2. Conclusion

In this paper, I have fleshed out Davidse's (1999:228, 2001) proposal that indefinite determiners, which signal type-identifiability, can be supplemented by a special set of postdeterminers that further clarify that the type is phorically retrievable in the form of an antecedent instance. This proposal was innovative in the literature on phoricity, which mainly focused on co-referentiality as prototypical phoric relation. First, I have refined Davidse's description of the notion of type-phoricity as a complex phoric relation encompassing both non-identity on the instance-level and identity on the type-level. Secondly, I have provided a detailed semantic study of nine adjectives that express type-phoricity in English and the subtle, but important, meaning differences between them. Viewed in a theoretical light, the analysis of type-phoricity presented here has shown that the mechanisms of indefinite determination and of phoric relations in the discourse are more complex than traditionally assumed. It also provides further support for the cognitive grammar tenet that the instance and type specifications are of equal importance in the identification of NP referents.

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Span of High Tones in Hong Kong English*

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0. Introduction

The English spoken by Hong Kongers (typically called Hong Kong English, henceforth HKE) has a distinct tonal quality (Luke 2000, Wee 2008).[1] The key data are shown in (1)-(3), where syllables with high tones are marked with acutes "á", low tones with graves "à" and falling tones with caps "â".[2] Mid tone syllables are left unmarked, and bold typeface indicates stressed syllables.

(1) Words with a sequence of high tones
  a. **ín**fór**má**tiòn b. **é**dú**cá**tiòn
  c. **bé**né**fí**ciàl d. i**dén**tífi**cá**tiòn

(2) Words without a sequence of high tones
  a. lo**cá**tìon b. par**tí**cipàte
  c. ir**ré**gulàr d. **C**á**n**adà

(3) Words with falling tones
  a. b**â**ll b. p**î**nch

Stress can be located by standard diagnostics which for length considerations shall not be discussed here. The above data allows the following characterization of HKE.

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[1] Regardless of HKE's language status, the fact that it has an identifiable accent would warrant serious phonological study (Hung 2000).

[2] Words were uttered in isolation; only content words are considered in this research. Recordings were sampled at 22050Hz from one primary informant and two secondary ones for convergence.

(4) Characterization of HKE
   a. A stretch of high tones spans the first stress-bearing syllable and the last stress-bearing syllable inclusive;
   b. Multi-syllabic words with only one stress have only one high tone;
   c. Monosyllabic words have falling tones; and
   d. Final syllables always contain a low tonal element.[3]

Evidently the span of high tones is a derivative of stress (not vice versa). Stress placement in HKE is, however, beyond the present scope; I shall assume it is calculable from generalizations in Hung (2005).

This paper aims to account for the tonal patterns in HKE, and makes the arguments listed below:

i. The sequence of high tones is best represented as the multiple association of a single high tone autosegment with all syllables within the domain defined by the first stressed and last stressed syllables;
ii. Falling contour in monosyllabic words is the result of associating a high tone (H) and a boundary low tone (L%) with that syllable;
iii. Remaining syllables are toneless phonologically, but surface as mid tones as a phonetic default.

The next section presents an acoustic analysis of the tonal contrasts in HKE. Subsequent sections provide phonological analysis before ending with a conclusion.

1. Phonetic Bases

Although tones are common in Chinese languages, their presence in English would be somewhat unexpected. However, since HKE arose out of the contact between Cantonese and English, transference is likely. In any case, the presence of tonal contrasts can be easily verified through acoustic analyses, as presented in (5).[4]

The pitch tracks clearly show the tonal distinctions, matching those tonal transcriptions given in (1)-(3).

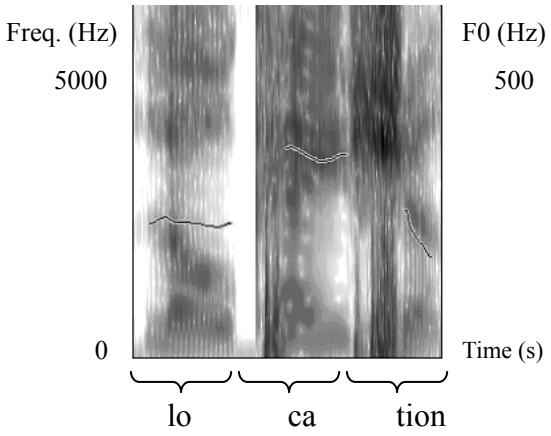
For the most part, the tones consist of level high or mid tones, as in (5a) and (5b). There are however two things that deserve special mention. Firstly, final syllables appear to be somewhat inconsistent in whether they are low level tones like (5c) or low falling ones like (5a). Secondly, the penultimate syllable has a falling pitch contour (indicated by the circle, (5c)).

[3] The characterization here is in fact only for one variety of HKE, which like other new Englishes, exhibits variation across speakers. Another variety will be discussed later in section 4.

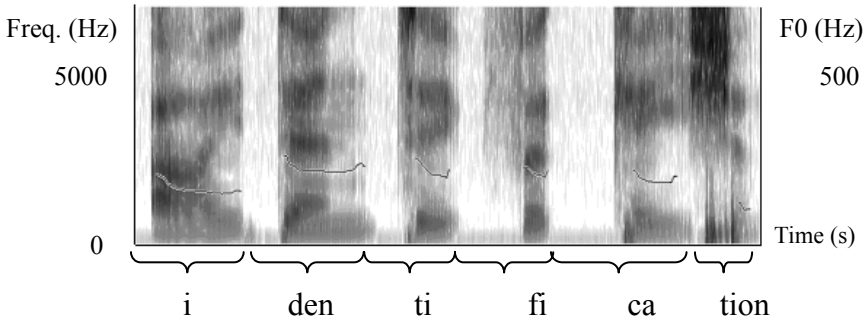
[4] All spectrograms and pitch tracks in this paper are generated using Praat (ver. 5.0.06, Boersma and Weenink 2008).

(5) Spectrograms showing pitch tracks

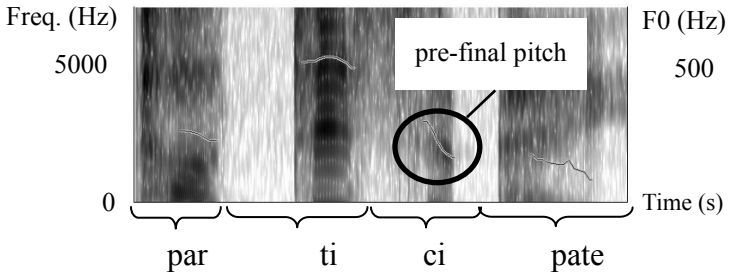
a. lo**cá**tion



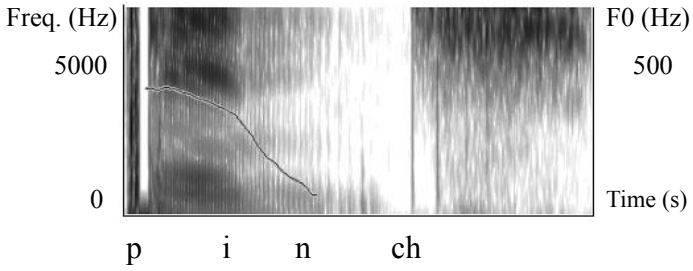
b. i**dén**tífi**cá**tiòn



c. par**tí**cipàte

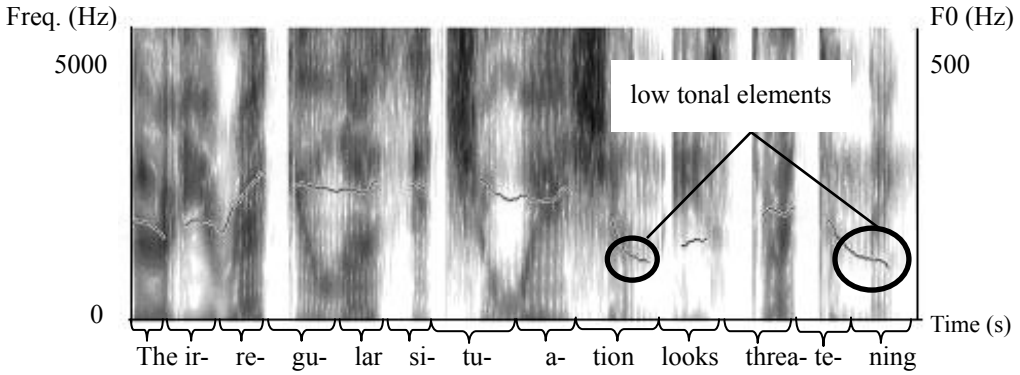


d. pinch



Common to all the cases shown in (1) – (3) is a low tonal element at the rightmost edge. Evidently, this is a boundary tone, and indeed there is evidence for that interpretation. For instance, consider a HKE utterance of the sentence *The irregular situation looks threatening*. The attested tonal pattern is: The ir**ré**gúlár **sí**tú**á**tìon l**ó**oks **thréa**tenìng, (6).

(6) Pitch tracks of *The ir**ré**gúlár **sí**tú**á**tìon l**ó**oks **thréa**tenìng*



As shown in (6), low tones are only realized at the final syllables of *situation* and *threatening* suggesting that it is a boundary tone of a certain domain, in this case, a Phonological Phrase (PhP, Inkelas and Zec 1990, Nespor and Vogel 1986, and Selkirk 1984, 1986). I will use L% as a symbol to indicate this low PhP boundary tone. The fact that the final syllable of *irregular* in (6) does not have a low tone supports the argument for the L%.

With L% at the end of a PhP, the falling pitch of monosyllabic words like *pinch* in (5d) would be explained as a H-L% sequence. It also follows that the falling contour of the pre-final syllable in (5c) is a transitional fall from H towards the phrase final L%, similar to the falling tone of monosyllabic words.[5] This suggests that pre-final unstressed syllables are phonologically toneless, the pitch being solely determined by an interpolation from H to the target L%. Consequently, one could explain why the final pitch in (5a) is low falling and in (5c) low leveled. In (5a) H immediately precedes L%, but in (5c) H and L% are separated by an unstressed (hence toneless) syllable.

Implicit in the account of the effects of L% above is the notion that phonologically toneless syllables are articulated in any pitch that occurs in the transition of one toned syllable to another, in this case as H makes a transition to L%. If the assignment of H tone is determined by stress (specifically by the domain defined by the edgemost stresses), then by the same logic, syllables that precede the initial stressed syllable would also be phonologically toneless. However, initial syllables

[5] Contrary to Luke (2000) who described non-high penultimate syllables as L, a description inconsistent with the evidence obtained here.

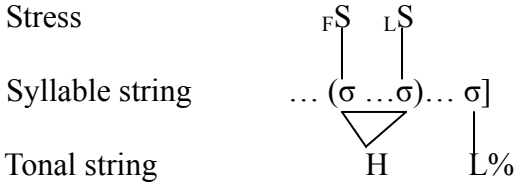
would surface with mid-range pitch as a phonetic default with minimal articulatory effort.

With the phonetic correlates of tone in place, the next section moves on to an autosegmental study.

2. Autosegmental Analysis of Tones in HKE

The span of H tones that coincides with the domain defined by the edgemost stresses appears to be exactly the kind of phenomenon expected in an autosegmental conception of tone. In fact, the tonal generalizations identified in the previous section for HKE can be captured in autosegmental terms (Leben 1973, 1978 and Goldsmith 1976), as depicted in (7).

(7) Association of tone autosegment in HKE



] indicates the right edge of a phonological boundary

FS: First stress LS: Last stress

The span of high tone syllables is likely to be the result of having only one H autosegment associated with all syllables between the edgemost stress-bearing syllables, inclusive. For convenience, I shall refer to the domain defined by the edgemost stress-bearing syllables as the stress domain, indicated with a pair of parentheses (σ…σ). This association of a single H to all syllables in the stress domain would be the simplest analysis in terms of explaining why the span is not broken (more discussion on NOGAP in section 3.1) and with maximal adherence to the Obligatory Contour Principle (OCP, Leben 1973, more in section 3.1).[6]

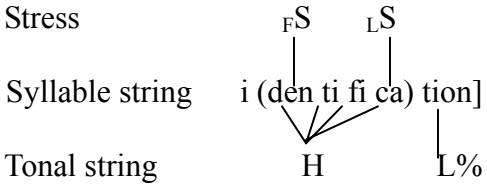
When there is only one stressed syllable in the PhP (as in cases like (2a)), the stress domain would consist of only one syllable. Beyond the stress domain, any remaining syllables that are neither associated with H nor L% (dots outside the stress domain) are toneless and surface with whatever pitch the phonetics demands, falling if transitional between H and L% or M otherwise. The phenomenon of toneless syllables surfacing as mid tones follows from the markedness constraints of tones in standard Optimality Theoretic accounts, inherited from the general theory of feature underspecification and defaults (Pulleyblank 1992, Steriade 1995, and Myers 1998), in turn grounded in physiological ease.

[6] For convenience, a tone is associated with a syllable in this paper. Properly speaking, the tone-bearing unit (TBU) for HKE is probably the mora. Consider *cat* which only has a H tone and *pinch* which has a HL% sequence.

It should be noted that for the purpose of illustration, I have specified H and L% on the tonal tier. However, since these two tones are predictable and derivable, they do not need to be stipulated underlyingly and in fact should not be, since as mentioned earlier, tones are derivates of stress in HKE, and stress is by and large calculable.

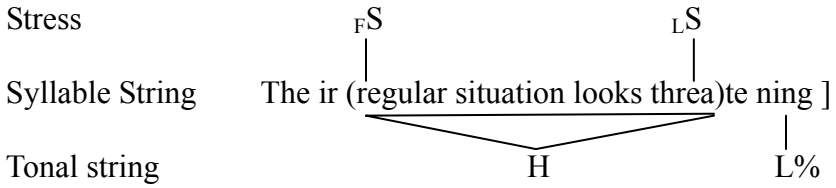
With the idea of autosegments in place, (8) illustrates the span of H tones in actual HKE cases, $_{F}$S and $_{L}$S indicating first stress and last stress within the PhP respectively.

(8) Association of tone autosegment in ***iden**tifi**ca**tion* (cf.(1d))



The schema in (8) also correctly predicts the tonal patterns of HKE beyond the word level such as the sentence in (6), repeated below with an illustration on tonal associations in (9).[7]

(9) Association of tone autosegment in sentence (6)



3. An OT Analysis

Given the autosegmental account of the tonal distributions in HKE in section 2, the next step would be to account for why the tones of HKE pattern the way they do. For instance, why is it that a stressed syllable is associated with H but not L? In Optimality Theory (OT, Prince and Smolensky 1993/2004), these questions could be answered by the interactions of a set of universal constraints that come into play.

3.1. An OT Account for Multiple High Tone Association in HKE

Recall that H is always associated with a stressed syllable in HKE. In fact, this is found to be unmarked in many tonal languages (such as Lithuanian and Mixtec) and it could be stated in terms of the following markedness constraints established in de Lacy (1999, 2002).

[7] There are exceptional cases. For instance, instead of *ir**ré**gúlár ló**cá**tìon, we only got ir**ré**gúlár lo**cá**tìon. The tone of the initial syllable "lo-" in *location* is expected to be H given that the syllable is within a stress domain, but it turns out to be M. At this stage, it remains uncertain if cases like 'location' are lexical exceptions, thus will have to be left for future exploration and investigation.

(10) HD/H
A prosodic head prefers a high tone.
NON-HD/H
A non-prosodic head does not prefer high tones.

Following standard assumptions, the HKE prosodic head is a stressed syllable (indicated with **σ** throughout) and a non-head an unstressed syllable. Thus candidates that have H associated with the stressed syllables would satisfy this constraint. Together with NON-HD/H, this would ensure that unstressed syllables which are outside the stress domain would not have high tones. However, these two constraints themselves are insufficient to make the case for the high tone spreading in HKE. HD/H is neutral to whether H is multiply linked to a number of stressed syllables or whether there are many Hs to be linked to the syllables. In effect, HD/H does not trigger spreading and it does not prevent more Hs from being present either. However, there are other established constraints that would step in to yield the effect of spreading one H to all the syllables in the stress domain. These constraints are listed in (11).

(11) Constraints triggering multiple high tone association
NOGAP (Kiparsky 1981, Yip 2002:84)
Mutliply linked tones cannot skip syllables.[8]
OCP-H
Two adjacent identical tones are prohibited in the tonal tier.

To see how (11) works, and to find the ranking required of these constraints, consider a set of possible candidates for an input in (12).

(12) Input: **σσσ**σ] (cf. (1a) ***in****for****ma****tion*)[9]

Relevant Candidates

a. **σσσ**σ]
H

b. **σσσ**σ]
H

c. **σσσ**σ]
HHH

d. **σσσ**σ]
H H

e. **σσσ**σ]
H

Notice that the input in (12) does not assume any underlying H. This is crucial because, as mentioned in the introduction, tones are computed out of stress in

[8] Cf. footnote 6.
[9] For convenience, the inputs here are assumed to be a parsed string of syllables with stresses and a PhP boundary indicated. However, syllable structure, stress and PhP boundary are derivable from other constraints, omitted here in the interest of focus.

HKE, and stress placement alternates with suffixation, thus H cannot be stipulated in the input. Also, HD/H would ensure H epenthesis anyway, making stipulation redundant.[10] The effect of multiple high tone association could be achieved by ranking HD/H, NOGAP and OCP-H all above NON-HD/H, as illustrated in Tableau (13).

(13) Evaluation of high tone spreading

σσσσ]	HD/H	NOGAP	OCP-H	NON-HD/H
(12a)	*!			
(12b)		*!		*
(12c)			*!*	
(12d)			*!	
☞ (12e)				*

In (13), candidate (12a) is ruled out by the fatal violation of HD/H since the first stressed syllable is not associated with a H tone. Candidate (12b) fatally violates NOGAP because the associations skip the second syllable. This leaves us candidates (12c-e). Both candidates (12c) and (12d) are eliminated for their violations of OCP-H. Candidate (12e) turns out to be the optimal output despite its trespass on NON-HD/H.

3.2. Default Tones and L%

The fact that default tones surface on toneless syllables which are outside the stress domain can be easily captured by the universal markedness constraints on tones, and likewise for the boundary L%:

(14) *H
No high tones
*L
No low tones
ANCHOR L%-RT
The right edge of PhP must have a L%.

With *H and *L, mid-tones (M) are really just phonetic implementation of phonologically toneless syllables. ANCHOR L%-RT would ensure L% at the right edge of a PhP in HKE.

Although there are no ranking arguments with respect to ANCHOR L%-RT, *H, or any of the constraints in (10) and (11), ANCHOR L%-RT must be ranked higher than *L as shown in (15).

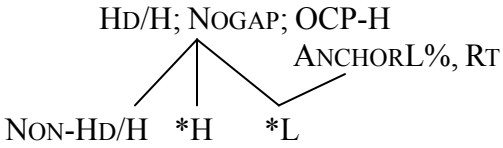
[10] Though no input H is assumed here, the account presented here would nonetheless predict the correct output for potential inputs that have stipulated H, as required by Richness of the Base. Thanks to John McCarthy for pointing this out to me.

(15) Ranking argument for ANCHOR L%-RT and *L

σ] (cf. (3a))	ANCHOR L%-RT	*L
☞ a. **σ**] H L%		*
b. **σ**] H	*!	

As an interim summary, (16) below provides the constraint ranking hierarchy.

(16) Constraint Ranking Hierarchy



4. Factorial Typological Predictions

Like most contact languages, HKE, which is a hybrid of Cantonese and English, is not homogenous across speakers. Other than the variety presented in the preceding sections, there is another variety which I shall call HKE′. How HKE′ compares with HKE can be seen from the data in (17).

(17) Key data from HKE′

a. b**â**ll	b. p**î**nch	cf. (3)
c. lo**cá**tion	d. par**tí**cipàte	cf. (2a-b)
e. **in**for**má**tiòn	f. i**den**tifi**cá**tiòn	cf. (1a), (1d)

Key: **Bold** = stress

From (17), it is evident that HKE′ and HKE share a number of characteristics. Both varieties have (i) falling tones for monosyllables, (ii) high tones for stressed syllables and (iii) L% in the rightmost edge of the word/utterance. However, unlike HKE, HKE′ has only one H on the surface, corresponding to the syllable that carries the main stress.

The difference between HKE and HKE′ can be captured with the same set of constraints using a different ranking, such as that in (18).

(18) Constraint ranking hierarchy for tonal patterns in HKE′
NON-HD/H ; NOGAP ; OCP-H » HD/H

The ranking hierarchy in (18) shows only those constraints relevant to the distribution of high tones. This illustrates that HKE′ is actually predicted by the

factorial typology of the constraints used in the account for HKE. The applicability of the same set of constraints across both varieties argues for the essential validity of the analysis presented in the preceding sections of this paper.

5. Conclusion

This paper explains that the patterns of tones in HKE arise out of a single H multiply-linked to all the syllables in the stress domain of the PhP. Any residual syllables outside the stress domain are phonologically toneless and surface by phonetic defaults.

The HKE PhP has a L% at the right boundary, which is responsible for the presence of falling tones in monosyllabic words and transitional mid tones between the final syllable of a stress domain and the final syllable of a multi-syllabic word. The presence of tones in HKE as discussed here is not committed to establishing if HKE is a tonal language or tone accent language like Japanese, though it is hoped that this study would open up these doors for research.

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Temporal Interpretation and Tenselessness: The Case of Tagalog

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0. Introduction

One of the tasks required to understand narrative discourse is ordering events described by the sentences in the narrative. Previous research has claimed that at least three factors affect the way the order of events is determined. One of these factors is the "anaphoricity" of tense, which means that the tense of a sentence refers back to the time just after the event described by the previous sentence, or that it refers back to the time at which the state that is described by the previous sentence holds. This view was first proposed by Partee (1973) and further developed in Partee (1984). To illustrate, consider (1).

(1) Sheila had a party last Friday and Sam got drunk.

Partee argues that most uses of tenses are referential. In the second sentence in (1), the past tense does not refer back to any random time before the time of utterance. Rather, it refers back specifically to the vicinity of the time in which the state that is described by the previous clause holds. This analysis, which posits that tenses refer back to some other time that is given by previous event and state descriptions, is the main gist of models of discourse interpretation that make use of the notion of temporal anaphora. Discourse interpretation models such as Discourse Representation Theory have made use of the notion of temporal anaphora in explaining the temporal relationship of events and states in narrative discourse (Kamp & Reyle 1993). Through temporal anaphoricity, the temporal ordering of events is established.

Another possible factor that affects the interpretation of event order is world knowledge. Speakers usually have knowledge of how the world operates and functions; i.e., they know that certain events tend to trigger other events, e.g., an event involving a barking dog may be followed by an event of a running cat. Speakers usually have knowledge of the cause-and-effect relations that hold between different events in real life. Speakers may use this world knowledge to determine the temporal order of events described by sequences of sentences. To illustrate, consider (2) and (3).

(2) The baby cried. Bill pinched him.
(3) The baby cried. Bill consoled him.

Most speakers would assume that pinching a baby would most probably cause the baby to cry and infer a cause-and-effect relation between the two events. And speakers would also reason that causes happen before their intended effects, therefore, in (2), the event described by the second sentence occurs before the event described by the first sentence, resulting in an event ordering that is the reverse of the sentences' order. On the other hand, a crying event could also probably trigger a consoling event. Therefore, in (3), based on one's knowledge of the world, the event described by the first sentence would be interpreted as happening before the event described by the second sentence.

A third factor that influences the temporal interpretation of narrative discourses is the presentational order of sentences. For example, consider the discourses in (4) and (5).

(4) John and Mary got married. Mary moved into John's house.
(5) Mary moved into John's house. John and Mary got married.

In both examples, there is a tendency to interpret the sequence of events as identical to the order in which they are presented. In other words, the first sentence corresponds to the first event, and the second sentence corresponds to the second event. Thus, the order of presentation matters, since the temporal ordering of the two events differs as a function of the order of presentation. In this study, discourse which receives a temporal interpretation identical to the order of presentation will be labeled as "canonical order" discourse, while those which receive a temporal interpretation in which the order of presentation and event order do not match will be labeled as "non-canonical order" discourse. If a language does not have tense, it may be the case that non-canonical order is more frequent than in tensed languages, since the second sentence's temporal interpretation is not tied to the first sentence's temporal interpretation via a DRT-style interpretation of tense. Lack of tense may result in a less frequent iconic interpretation of events in discourse.

The lack of tense may also cause other factors such as aspect marking to have a larger role in the temporal interpretation of discourse. Aspect refers to the "different ways of viewing the internal temporal constituency of a situation," as defined in Comrie (1976). Aspect marking can signal whether an event is ongoing (progressive), completed (perfective), or about to occur (prospective). The fact that a sentence marks the described situation's aspect can also be a source of information when locating a certain event in time.

This study aims to see what the factors are that affect temporal interpretation if a language lacks tense, and therefore notions of temporal anaphoricity are not applicable. I investigate how other factors such as world knowledge, presentational order of sentences, and aspect marking contribute to the task of the tempo-

ral interpretation of narrative discourse, and try to present a model of other elements that come into play if tense is unavailable as a resource for temporal interpretation. It is hypothesized that in a tenseless language, aspect markers can act as sources of temporal information without invoking anaphoricity *per se*. It is also hypothesized that the available factors in a tenseless language do not contribute equally to the task of temporal interpretation. Specifically, it is hypothesized that in a tenseless language, world knowledge may play a larger role in determining how events are ordered with respect to each other, due to the fact that lack of tense blocks a temporal interpretation as posited by Discourse Representation Theory (Kamp and Reyle 1993:497). To test these hypotheses regarding temporal interpretation in a tenseless language, I conducted an experiment on Tagalog, a tenseless language, which manipulated three factors: aspect marking, presentational order, and world knowledge.

1. Experiment

The experiment consisted of a norming study conducted with English speakers, and a main experiment conducted with Tagalog speakers.

1.1. Norming Study

Prior to conducting an experiment with Tagalog speakers, a norming study was conducted with English speakers, in order to determine the event-order bias of the stimulus sets. The norming study measured the likelihood of events happening before or after another event. It was conducted with English speakers, while the experiment was conducted with Tagalog speakers, assuming that the relevant portions of the world in an English-speaking area behave similarly to corresponding portions of the world in a Tagalog-speaking area.

For the norming study, participants evaluated the likelihood that one event will happen before or after another event in a two-event discourse. For example, in (6), one set of participants were asked to rate the likelihood that the event described in the sentence *Bill pushed John* preceded the event described in the sentence *John fell*, while another set of participants were asked to rate the likelihood that the event described in the sentence *John fell* preceded the event described in the sentence *Bill pushed John*. This was done in order to classify stimuli as to whether they had a preferred order of interpretation or not.

(6) Bill pushed John. John fell.
(7) John fell. Bill pushed John.
(8) John sliced the pizza. Mary poured the drinks.
(9) Mary poured the drinks. John sliced the pizza.

A total of 154 test items were constructed. Each of these test items consisted of two sentences, marked A and B. Each of the 154 test items had two versions as all test items were presented in canonical and non-canonical order. “Canonical order” here refers to stimuli in which the event that has a high probability of

occurring first is described in the first sentence, as in (6), while "non-canonical order" refers to stimuli in which the event that has a high probability of occurring first is described in the second sentence, as in (7). Half of the stimuli were predicted to involve a preferred order of interpretation, such as (6) and (7), while the other half of the stimuli were predicted to have no preferred order of interpretation, such as (8) and (9).

The norming study consisted of two lists each: 24 participants rating the likelihood of the event described in the first sentence as happening before the event that is described in the second sentence, with test items presented in canonical and non-canonical order; and 24 participants rating the likelihood of the event described in the second sentence as happening before the event that is described in the first sentence, again with test items presented in canonical and non-canonical order.

The participants rated the likelihood of the sequences of events using a 7-point scale. Half of the participants rated how likely it is that the event described in the first sentence happens before the event described in the second sentence, by ranking the likelihood on a scale between 1 to 7, 1 being highly likely, and 7 being highly unlikely. The other half of the participants on the other hand rated how likely it is that the event described in the second sentence happens before the event described in the first sentence. The norming procedure was done this way in order to see whether there is symmetry in the preferred order of interpretation: if a stimuli with a high event-order bias has the probable cause appearing in the first sentence, then participants would rate it highly likely that the event described in the first sentence occurs before the event described by the second sentence. Likewise, the other participants would then rate it highly unlikely that the event described in the second sentence occurs before the event described by the first sentence. This mirror-effect is not predicted to occur in stimuli that have a low event-order bias, since those stimuli consist of events that are plausible in either order.

Based on the results of the norming data, a total of 96 stimuli were chosen for the Tagalog experiment. 48 of these were deemed to have a high probability of one described event to occur before the other (having a high event-order bias), while the other 48 were deemed to have no preference for one event occurring before the other (having a low event-order bias). These stimuli were then translated into Tagalog.

1.2. Tagalog Experiment

The Tagalog experiment had three experimental factors: perfective or prospective aspect marking on each verb in a pair of sentences; canonical or non-canonical presentational order; and high or low event-order bias. Only the first two factors listed above were crossed within items, resulting in a stimulus set in which half of the items consisted of two-sentence discourse items that had a high event-order bias, and the other half of the items consisted of two-sentence discourse items that had a low event-order bias.

Aspect marking was crossed with two possible (canonical or non-canonical) presentational orders. In high event-order bias stimuli, the event that is likely to happen first is described in the first sentence for canonically ordered stimuli, but it is described in the second sentence for non-canonically ordered stimuli. In low event-order bias stimuli, variation or presentational order is irrelevant due to the fact that there is no preferred order of the events in the discourse.

In total, each of the 96 stimuli had 8 different versions, depending on the two verbs' aspectual combination and what order the sentences were presented in. The aspectual marking combinations were fully crossed with presentational order. Eight lists of 96 sentence pairs were created, each list with only one version of each 8 stimulus pairs. Each of the 72 native Tagalog participants was assigned to one of the lists and only saw one version of any given stimulus pair.

Each list had between 8 and 10 participants. Participants were instructed to diagram the possible interpretations of the different stimulus pairs by placing the events on a time line. For each stimulus pair, they were given diagrams as in (10).

(10) ----------|---------- ----------|----------
N **N**

Participants were asked to say in what order they thought the events described in the sentence pair occurred by drawing vertical lines corresponding to the events described by the sentences, either before or after the vertical line for **N** (signifying the time of utterance **NOW**). They were given clear examples of the procedure.

If they interpret the first sentence as happening before the second sentence, then they would put A before B on the timeline. If they interpret the first sentence as happening after the second sentence, they would put B before A on the timeline. Participants were also asked to diagram where the two events are located with respect to the time of utterance. Participants thus had to make three independent judgments: 1) the order of the event described in the first sentence with respect to the time of utterance; 2) the order of the event described in the second sentence with respect to the time of utterance; and 3) the order of the events described in the first and second sentences with respect to each other.

It is worth pointing out that participants had the option to indicate multiple possible interpretations for any given stimulus. Thus, if the stimulus allowed for more than one possible interpretation, they were told to indicate alternative interpretations as well. Participants also had the option to indicate ungrammaticality or infelicity for any given stimulus. If they judged a stimulus as wrong or uninterpretable in any way, there was a way for them to indicate it. All the participants' answers were then summed up, based on the type of stimulus and the participants' judgments.

2. Results and Discussion

Even though there is no tense marker in Tagalog, aspect markers receive default temporal interpretation. In other words, sentences that are marked with the

perfective are more likely to be interpreted as describing events that precede utterance time than sentences that are marked by the prospective. Conversely, sentences that are marked with the prospective are more likely to be interpreted as describing events that follow utterance time (Langacker 1991). This is what is suggested by the results of a binary logistic regression analysis, with aspect of the first sentence (A), aspect of the second sentence (B), presentational order, and event-order bias as predictors. When regressing for the relationship of the event in the first sentence (A) with respect to utterance time (N), the aspect marking of the first sentence emerged as the most important predictor, followed by the aspect of the second sentence, and then presentational order. Event-order bias was found to be non-significant in predicting this relationship, as can be seen in Table 11. Running a similar test to predict the relationship of the event in the second sentence (B) with respect to utterance time (N) produced similar results, in which the aspect marking of the second sentence was the most important predictor in this relationship. Details can be seen in Table 12.

(11) Relationship of First Sentence to Utterance Time

	β	S.E.	Wald's χ^2	df	p	e^{β}
Aspect of A	-4.490	0.084	2860.126	1	0.0001	0.011
Aspect of B	-0.761	0.077	96.704	1	0.0001	0.467
Event-Order Bias	-0.092	0.077	1.425	1	0.233	0.913
Presentation Order	0.354	0.077	21.430	1	0.0001	1.425
Constant	3.009	0.096	982.850	1	0.0001	20.274

(12) Relationship of Second Sentence to Utterance Time

	β	S.E.	Wald's χ^2	df	p	e^{β}
Aspect of A	-0.921	0.075	152.070	1	0.0001	0.398
Aspect of B	-4.218	0.079	2839.351	1	0.0001	0.015
Event-Order Bias	-0.054	0.073	0.545	1	0.46	0.947
Presentation Order	-0.727	0.075	94.247	1	0.0001	0.484
Constant	3.330	0.096	1193.757	1	0.0001	27.933

The next question to ask is whether world knowledge indeed plays a role in the temporal ordering of sentences in tenseless languages. A binary logistic regression analysis was conducted, with aspect of the first sentence (A), aspect of the second sentence (B), and presentational order as predictors. The data was separated into high and low event-order bias stimuli, and it turned out that the effect of the different predictors varies on whether the stimulus has a high or low event-order bias.

For responses to low event-order bias stimuli, both aspects of A and B equally contribute to predicting the temporal relationship of both events. Presentational order on the other hand is non-significant. This is seen in Table 13. This shows

that whenever the stimulus pairs have low event-order bias, in other words, if the events that are described by the two sentences are not likely to happen in one particular order, then the two factors that have most influence in predicting the temporal relationship of the two events are the aspect marking of both sentences, as shown by the high Wald statistics for the two aforementioned factors.

(13) Relationship of First Event to Second Event (Low Event-Order Bias)

Low Event-Order Bias	β	S.E.	Wald's χ^2	df	p	e^{β}
Aspect of A	-1.942	0.082	554.399	1	0.0001	0.143
Aspect of B	1.955	0.082	563.091	1	0.0001	7.063
Presentation Order	-0.095	0.072	1.724	1	0.189	0.910
Constant	0.378	0.066	32.864	1	0.0001	0.685

(14) Relationship of First Event to Second Event (High Event-Order Bias)

High Event-Order Bias	β	S.E.	Wald's χ^2	df	p	e^{β}
Aspect of A	-1.912	0.128	222.997	1	0.0001	0.148
Aspect of B	1.851	0.126	215.072	1	0.0001	6.368
Presentation Order	4.606	0.142	1045.670	1	0.0001	100.105
Constant	-2.184	0.119	337.413	1	0.0001	0.113

On the other hand, for responses to high event-order bias stimuli, presentational order is the most important predictor, followed by the aspect values of both A and B. In other words, the significance of the various predictors change, depending on whether the stimuli are high or low event-order bias discourses (c.f. Table 14). Thus, event-order bias determines how important each of the other predictors is in establishing the temporal relationship of the two events in the discourse. If a narrative discourse has a low event-order bias, the most important source of temporal interpretation is the aspect marking on the verbs in both sentences. However, if the narrative discourse has a high event-order bias, then aspect marking takes on a smaller role in temporal interpretation. Instead, world knowledge matters more and therefore is the major factor in interpreting the relationship of the two sentences. For high event-order bias stimuli, the Wald statistic for the aspect marking of the two sentences are not as high as the low event-order bias stimuli. Instead, presentational order receives a high Wald statistic, suggesting that speakers tap on to their knowledge of the world and use this knowledge to interpret the discourse's temporal relationship based on that information.

If a stimulus pair has a low event-order bias, then the only cue that influences the temporal relation between events described by the first and second sentence are their aspect markings. However, if a stimulus pair has a high event-order bias, then speakers would compute the probability of the two events happening with respect to each other and interpret events that are probable causes as happening before events that are probable effects, regardless of which event is presented first.

For stimuli that have a low event-order bias, ordering does not produce a difference in interpretation, due to the fact that neither of the two events has a high probability of occurring before the other event. However, for high event-order bias stimuli, one of the two events has a high probability of occurring before the other, since it may be a probable cause of the other event. If the probable cause is presented as the first sentence, then the stimuli is presented in the canonical order. On the other hand, if the probable cause is presented by the second sentence, then the stimuli is presented in the non-canonical order. Therefore, if the stimuli were presented in the non-canonical order, speakers used their world knowledge to aid in the temporal interpretation and interpreted the second sentence as preceding the first sentence.

3. Theoretical Implications

3.1. Temporal Anaphoricity

Kamp and Reyle (1993) argue that temporal interpretation involves anaphoricity in tensed languages. This means that the temporal interpretation of events described by sentences is partly influenced by the context in which these sentences occur. They provide as examples the sentences in (15) and (16).

(15) Last week Fred bought his ninth cat. He paid 75 ECU for it.
(16) Bill left the house at a quarter past five. He took a taxi to the station and caught the first train to Bognor.

They argue that the second sentences in these two discourses are interpreted as describing events that occurred in the vicinity of the event described in the first sentence. According to their model, the interpretation of events and states that are described by the subsequent sentences are dependent on the events or states that are described by the previous sentences. A subsequent state overlaps with the time of the previous event or state, while a subsequent event, as seen in examples (15) and (16), is interpreted as occurring in a certain time, which is in turn interpreted as occurring after the time of the preceding events or states. In other words, without the use of explicit temporal adverbials, time always moves forward in this analysis.

However, the analysis of Kamp and Reyle is not directly applicable to Tagalog, since the language has no tense in the first place. In fact, it is not true in the case of Tagalog that the event described by the second sentence refers back to the time of the event described by the first sentence. This is illustrated in the example in (17):

(17) Na-tumba si Juan. T<in>ulak ni Bill si Juan.
PERF-fall SUBJ John <PERF>push NSUB Bill SUBJ John
'John fell. Bill pushed John.'

In the Tagalog example in (17), it is most likely that the event described in the second sentence is interpreted as happening before the event described in the first sentence. This runs contrary to Kamp and Reyle's analysis. The net effect of

Kamp and Reyle's view is that the temporal interpretation of discourse is iconic; time always moves forward. Unless there is an explicit signal that the temporal order of the described events is reversed, the second sentence is interpreted as following the first sentence, and the third sentence is interpreted as following the second, and so on. This prediction is not supported by the experimental data from Tagalog, however.

If it were true that temporal interpretation is dependent on anaphoricity, then it should be the case that the event that the second sentence describes is always interpreted as occurring after the event that the first sentence describes. However, we saw that the interpretation of the temporal relationship between A and B is dependent on other factors aside from presentational order. These other factors include event-order bias, and the aspect marking of the individual sentences themselves. It cannot be argued that anaphoricity effects are still present in an otherwise tenseless language, due to the fact that not all stimuli are interpreted in a canonical order; non-canonical interpretation is possible, which is triggered by the other factors mentioned above.

As explained earlier, speakers use their knowledge of the world to evaluate the relationship of two events in a discourse. For low event-order bias stimulus pairs, the most important factors in temporal interpretation are the aspect marking of both sentences. For high event-order bias stimulus pairs on the other hand, the speakers' knowledge of the world is the most important factor in temporal interpretation, since depending on which order a given stimulus is presented in, the speakers will evaluate differently how the two events are related, i.e., probable causes will be interpreted as happening before probable effects. Thus, world knowledge plays a factor in temporal interpretation as well, overriding the information given by aspect marking.

Therefore, it is not true that anaphoricity always plays a role in the temporal interpretation of ordered sentences. If anaphoricity was the main component in temporal interpretation, then there would be no cases of non-canonical interpretation of discourse. Regardless as to whether the stimuli has a high or low event-order bias, the second sentence would always be interpreted as occurring after the first sentence, since the interpretation of the second sentence is dependent on the first. However that is not always the case. Instead, what we can see here is that world knowledge plays the most important role in the temporal ordering of sentences for tenseless languages, a fact that contradicts the anaphoricity hypothesis. If world knowledge does not provide cues, as in the case of low event-order bias pairs, then it is aspect markers that are present in the sentences and their default tense interpretation that are the source of information for temporal interpretation. And if the aspect markers are the same in low event-order bias pairs, then the interpretation would be based solely on presentational order; i.e., the event described by the first sentence is interpreted as occurring before the event described by the second sentence.

3.2. The Role of World Knowledge

It has been claimed early on by Dowty (1986) that temporal interpretation depends on three different factors: 1) a semantic analysis of *Aktionsarten* using interval semantics, as expounded in Dowty (1979); 2) a single principle for the interpretation of successive sentences in a discourse, which does not make reference to *Aktionsarten*; and 3) Gricean conversational implicatures and "common sense" reasoning based on world knowledge. He then presents an interpretation principle for temporal discourse, which takes into account the type of *Aktionsart* the predicate has, and the type of (grammatical) aspect that they are marked for. Using these pieces of information, he posits the Temporal Discourse Interpretation Principle (Dowty 1986).

According to the interpretation principle, it is only possible to have reverse temporal interpretation when definite time adverbials are used that would explicitly signal reversal of temporal interpretation. Dowty admits that the principle has to be modified to explain elaborating narratives and he also mentions that world knowledge is essential, but he does not describe how it affects temporal interpretation.

More recently, numerous scholars have suggested that world knowledge, in the form of coherence relations, play a role in ordering events in discourse. A model of temporal relations as a by-product of reasoning about coherence relations has been put forward in Lascarides and Asher (1993) and Asher and Lascarides (2003). Kehler (2002) on the other hand puts forth an account of temporal ordering that combines tense information and coherence relations. An important question to ask then is to what extent coherence relations influence temporal ordering.

In the experiment that I conducted, the stimuli were designed so that half of them would be high event-order bias stimuli, and the other half low event-order bias stimuli. If coherence relations play a part in temporal interpretation, there should be an observable difference in how described events are ordered between these two groups.

It was seen that participants were sensitive to world knowledge of cause and effect for high event-order bias stimuli. Aspect marking is still significant, but if one looks at the Wald statistic for aspect marking on high event-order bias pairs in Tables 13 and 14, it is clear that it is not as significant as aspect marking for low event-order bias pairs. If sensitivity to the knowledge of probable causes and probable effects matters highly for this type of stimuli, it suggests that speakers use their world knowledge information to determine what type of coherence relation can be established, and then the temporal relation between events. Crucially, this analysis of temporal ordering does not depend on temporal anaphora, since reversal of reference time ordering is possible. Theories of temporal anaphora seem irrelevant to handle ordering of events in Tagalog.

4. Conclusion

This paper has shown that in a tenseless language such as Tagalog, different factors influence the temporal interpretation of discourse. A three-factor experi-

ment was conducted to test and see which factors make a larger contribution to the task of temporally ordering events described by pairs of sentences. The results of the experiment show that there are more factors that are involved in interpreting the temporal relationships that exist between events. Aside from aspectual information that is explicitly marked in the predicates, world knowledge influences temporal interpretation as well.

It was shown how world knowledge and coherence relations are only part of what determines temporal interpretation. The data support the claim that coherence relations play a role in temporal interpretation. However, it was also pointed out that temporal constraints put forth by coherence relations can be overridden, as when the information coming from aspect markers contradicts the possible coherence relation that can be established between the two events, and when some participants ignored the constraints that coherence relations provided. Coherence relations most frequently dictate what the available temporal interpretation is, but not always.

In conclusion, the results of the Tagalog experiment suggest that there is a hierarchy of importance of the different factors that influence temporal interpretation. Lack of tense in Tagalog paved way for other factors to play a role in temporal interpretation. Coherence relations constrain the possible temporal interpretations of a given discourse, depending on their aspect marking. Finally, if coherence relations do not make a prediction, one can assign default tense interpretations to aspect marking, which can be a source of the temporal interpretation as well, as long as the coherence relation does not contradict the default interpretation.

We cannot generalize the findings of this study to other tenseless languages. Further experimental research must be done in other tenseless languages to see whether the same conclusions attained by examining the Tagalog data hold, since the pattern exhibited here may not be true to other tenseless languages. In addition, an experimental comparison between tensed and tenseless languages must also be done.

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Pitch Height vs. Contour in Tonal Perception in Fuzhou

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0. Introduction

The goal of this paper is to investigate the degree to which the slight tonal contour of the three phonologically level tones plays a role in the perception of these tones. First I introduce the tones in Fuzhou, identifying the tones that are under study. Next I outline the method used to create the synthetic tones as well as the perception study. Finally I present the results and discuss the significance of the F0 contour in Fuzhou.

1. Fuzhou

Fuzhou, a Min dialect spoken in north-eastern Fujian province, China, has seven citation tones. A detailed description of these tones based on auditory impressions is given in Figure 1 (Donohue, to appear).

Figure 1. A description of the citation tones in Fuzhou

Tone 1	High level with a slight rise
Tone 2	Mid level with a slight fall
Tone 3	Low level with a slight fall
Tone 4	Low rising stopped tone (final glottal stop)
Tone 5	High fall, starting higher than the high level tone
Tone 6	Low rise-fall
Tone 7	High stopped tone (final glottal stop), notably shorter than the others

Earlier phonological work addressing Fuzhou has typically assumed that tones 1–3 are level tones (e.g. Yip 1980, Chan 1985, Jiang-King 1996, Donohue, to appear). While they are the most level tones in the set, an acoustic normalization nonetheless revealed a consistent rise for tone 1 and a consistent and similar, falling contour for tones 2 and 3 (Donohue 1992a, b).

In order to examine the role of contour vs "pitch" (F0) height, I focus on tones 1 and 2, which are the closest two 'level' tones that illustrate this difference in contour.

2. Experimental Methodology

In an earlier study, Donohue (1992a) presents a description of the quantified tones, normalizing across 4 speakers. The starting point for this experiment was a set of tokens from a single speaker that most closely represented the mean normalized set of F0 contours.

In order to investigate the role of contour on the perception of these two 'level' tones, I synthesized tokens whose contour matched that of the original token, but modifying the overall F0 height as measured at the point of onset.

2.1. Synthetic Tones

I created tokens in Praat by modifying the F0 such that for each of tones 1 and 2, there would be synthetic tokens where the F0 would start at the midway point between the onset of the two tones, at three-quarters of the distances towards the other tone and at the point of onset of the other tone. That is, six synthetic tones were created and included among the non-modified tokens presented to the listeners. These tones are illustrated below in figures 2a and 2b.

Figure 2a. The synthetic tones (dashed) for tone 1 and natural tones 1 and 2.

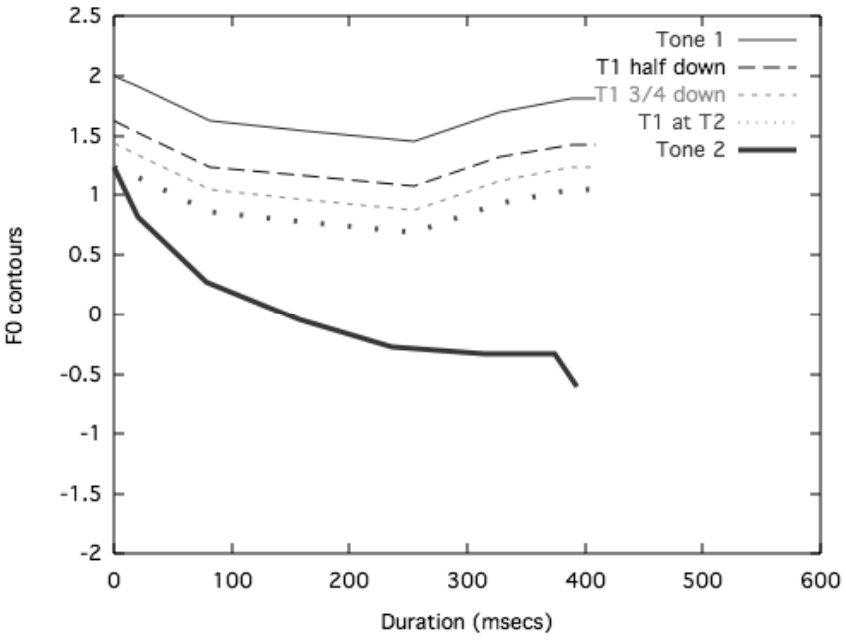
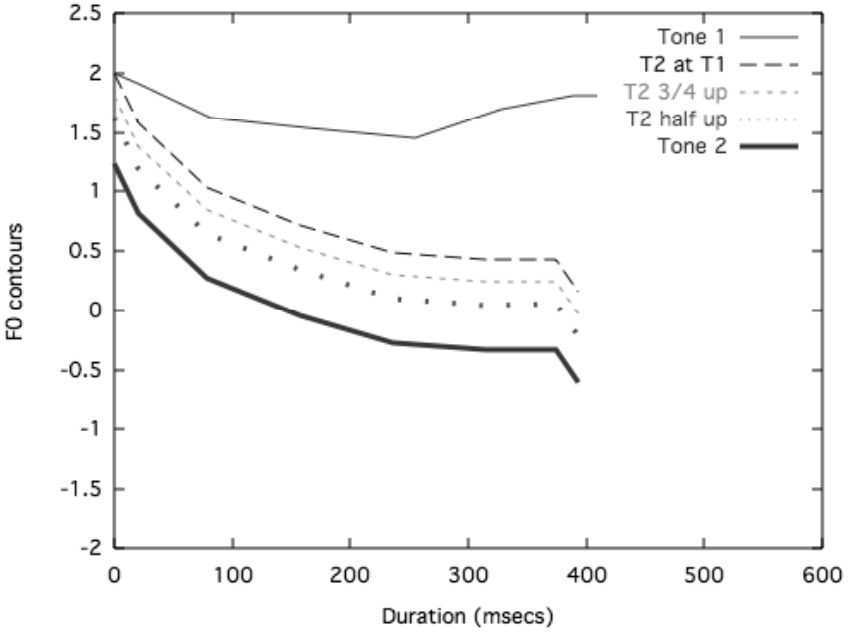


Figure 2b. The synthetic tones (dashed) for tone 2 and natural tones 1 and 2.



2.2. Perception Study

The data consisted 41 tokens, comprised of both the (target) synthetic tokens interspersed with natural tokens (of all seven citation tones). 13 native speakers of Fuzhou were given a list of seven characters and were asked to indicate when they heard a word from that list. The listeners were presented the tokens in a random order and listened to the whole set twice.

3. Results of the Experiment

The key result is the analysis of the two synthetic tones starting at the midway point between the two F0 onsets: With the same "pitch height," these tones differ only in their contour.

In order to determine the role of contour, the working hypothesis we can establish is that proportion of times, p_0, that a listener would choose the tone with the matching contour (tone 1 or tone 2) if contour did not matter would be 0.5.

To determine whether the difference between the observed proportion p and the assumed proportion p_0 is statistically significant, we can apply a Z-test for proportion. The test statistic is given in (1).

$$(1) \qquad Z = \frac{|p - p_0| - \frac{1}{2n}}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

At the midway point there are 52 data points, 45 of which correctly identify the tone. Thus, n = 52, p = 45/52 = 0.865. This yields a Z = 5.13. The critical value $Z_{0.001}$ is 3.29. We can therefore reject, with 99.9% confidence, the hypothesis that there is no difference in the proportions (i.e. that contour plays no role in tone identification). That is, contour does play a role in tonal identification for the phonologically level tones in Fuzhou.

When F0 is moved three-quarters the distance towards the other tone: The tones were correctly identified 83% of the time. Thus the F0 height has an effect, but it is a small one. Finally, when the tones are moved to the same F0 onset height as the other tone: The tones are still correctly classified 81% of the time.

4. Concluding Remarks

This study has shown that the phonologically 'level' tones crucially rely on both the slight contour and phonation change for their perception. In future work I plan to investigate the role of F0 height and its interaction with phonation in the perception of these tones as well as the concomitant vowel changes (avoided in this study) and the possible influence of duration on the perception of tones in Fuzhou.

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Single and Double Modal Syntax: A Unified Account

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0. Introduction

Double modal constructions (DMCs) such as *I **might could** go* occur in Southern and African American English. They are a challenge to traditional analyses that treat all modals as tensed and allow only one tensed element per clause. Previous analyses of DMCs thus treat only one of the modals as tensed, or treat DMs as single lexical units, and fail to account for the fact that tense-related processes apply variously to either modal, or to both. We argue that DMs consist of a P(OLARITY)-modal (e.g., *might*), which requires sentential scope at LF, and a V-modal (e.g., *could*), which undergoes overt V→T movement when tensed. Either may bear tense. When a tensed V-modal (*could*) selects an untensed P-modal (*might*), the latter left-adjoins to the former, forming a complex V-head ([$_V$[$_{POL}$might][$_V$could]]). This complex V-head moves to T, simultaneously satisfying the overt movement required by the V-modal, and bringing the P-modal to a position from which it can achieve sentential scope. In this construction, tense-related processes affect the V-head (*could*) or the complex V-head (*might could*), but not the P-modal (*might*) alone. When a tensed P-modal selects a V-modal, tense-related processes affect the former; the latter remains *in-situ*.

1. DM Syntactic Patterns and Previous Analyses

In DM varieties, DMCs (1a) occur alongside single modal constructions (SMCs) (1b). A DMC's semantic interpretation as one where the first expresses epistemic meaning (possibility, probability, or certainty) and the second conveys root meaning (ability, volition, or advisability) as in (2) (Nagle 1994, Marrano 1998):

(1) a. We **might should** go in. [Mishoe 1991]
b. We **should** go in.

(2) a. Brian **might can** visit her.
'It is **possible** that Brian **is able** to visit her.' [Turner 1981:30]
b. He **must wouldn't** steal. [Boertien 1986: 298]
'**Certainly** he doesn't **have the inclination** to steal.'

While the semantic interpretations of DMCs are largely uncontroversial, their syntax has been debated for some time and subjected to a variety of analyses.

Traditional analyses of English modal structure assume that modals are always tensed, due their lack of nonfinite forms (3a), and their complementary distribution with tense markers (3b).

(3) a. *Abelard seems **to should** work harder.
b. Abelard **should** work(***s**) harder.

Since English allows only one tensed element per clause, only one of the modals in DMC such as (1a) above can bear tense. Previous analyses of DMCs thus argue either that they involve one "true" tensed modal and one untensed, non-modal element, or that the entire DM bears tense as a single unit. However, these analyses cannot explain the distribution of the modals in (4-8).

(4) Aspectual Agreement:
a. He **may could've** been killed.
b. He **might coulda** been killed.
c. *He **might can**'**ve** been killed. [Di Paolo 1986]

(5) Aspectual Affixation:
a. We **might could've** overlooked something. [Mishoe 1991]
b. He **mighta should've** gotten home by now. [Di Paolo 1989]
c. *She **mighta could** done it.

(6) Distribution of Negation:
a. I was afraid you **might couldn't** find it [this address].
b. He **might not couldn't** refuse.
c. I **might not could** understand you. [Di Paolo 1989]

(7) Subject-Auxiliary Inversion (SAI):
a. **Should** we **might** cancel the trip*?* [Mishoe 1991]
b. **Might can** you do this later? [Boertien 1986]
c. ***Might** you **could** . . . ? [Battistella 1995]

(8) Placement of Sentential Adverbs:
a. You **might could possibly** help me, I don't know. [Mishoe 1991]
b. I've seen ones that **might possibly could** be flowers. [Di Paolo 1989]

Analyses that treat the first modal as tensed claim that the second modal is a nonfinite modal (Marrano 1998) or aspectual (Van Gelderen 2003) head. This is contradicted by the second modal's ability to participate independently in tense-related processes shown in (4a), (5a), (6a), and (7a). Others claim that the second modal bears tense, while the first is an untensed modal determiner (Turner 1981) or an adverbial adjunct (Battistella 1995). This is counter-exemplified by the first modal's ability to independently precede negation (6c) and sentential adverbs (8b). More recent analyses contend that the second modal is tensed, while the first

modal appears as either an untensed modal head or an adverbial specifier, depending on either the dialect (Close 2004) or syntactic context (Ellison 2007).[1] Such analyses allow the processes in (4-8) to apply to either modal, but fail to account for the inversion of both modals as a unit (7b), and the apparent aspectual and negative "agreement" between modals in (4b), (5b), and (6b).

Alongside accounts that treat DMC constituent modals as categorically and syntactically distinct, there are analyses that claim that the modals form a single unit. Di Paolo (1989) contends that the entire DM bears tense as a single, syntactically non-compositional unit, a view that is challenged by the separability of the modals in (6c, 7a, 8b). Other "single-unit" analyses propose that DMs are complex heads composed of two syntactically discreet constituent V- (Boertien 1986) or MOD(al)- heads (Mufwene 1994). However, these analyses fail to explain the existence of constructions in which a clearly non-auxiliary constituent intervenes between the two modals that supposedly form a single, complex head (6c, 8b).

The data in (4–8), taken altogether, present a picture not heretofore observed in any previous analysis, and clearly reveal the precise constraints on the application of tense-related processes to the constituent modals. What these data show is that such processes apply either to the second modal alone (4a–7a), or to the first and second modal together (4–7b), but not to the first modal alone, with the exception of the placement of negation (7c) and sentential adverbs (8b).

The table in (9) compares analyses of this construction that have appeared in the generative literature, grouping them on the basis of how DMs are inserted into the derivation, and where tense is claimed to reside in the DM configuration. The table also lists patterns, taken from (4-8), that each analysis cannot account for.

The pattern each of these analyses fails to capture, and which has not been observed in previous accounts, is the asymmetry in the application of tense-related processes to the constituent modals of the DM. Stepping back to the data at hand, we can make several general observations. For one thing, the second modal in a DMC can independently undergo tense-related processes (4-8a). Furthermore, the second modal is typically *could*, *can*, *would*, *should*, or *will* (Mishoe 1991; Nagle 1994). In contrast, the first modal in a DMC does **not** undergo tense-related processes independently (4c), (5c), and (7c), except as regards the placement of negation and sentential adverbs (6c) and (8b). Also, the first modal is always *might*, *may*, or *must* (Turner 1981, Nagle 1994). Section 2 presents arguments for separating this group of modals from the rest. Section 3 presents an analysis, based on this distinction, that accounts for the DMC data.

[1] Ellison argues (88-90) that the first modal is merged as a specifier in interrogative contexts (8a), where analyzing both modals as heads leads to a violation of the head movement constraint by the inversion of *could* over *might*. He insists that even when merged as a specifier, the first modal maintains it modal status, but he weakens this claim by equating the specifier position of the first modal to those posited for IP adverbs in Cinque's (1999) hierarchy (Ellison: 66-67,88).

(9) Comparison of previous analyses of DMs

Analysis	**Structural Relationship**	**Location of Tense**	**Counterevidence**
Di Paolo 1986	single lexical unit	DM as a unit	Could you might go? He might not could go.
Marrano 1998 Van Gelderen 2003	distinct constituents	1st modal	Could you might go? He might couldn't go.
Turner 1981 Battistella 1995	distinct constituents	2nd modal	He might not could go.
Close 2004 Ellison 2006	distinct constituents	depends on dialect or context	Might could you go? He mighta coulda gone.
Boertien 1986 Mufwene 1994	complex head	2nd modal both	You might possibly could go.

2. Modals, VP and POL(arity)P

In discussing the asymmetry between the first and second modals in DMCs, we note that the first modal is always *might, may*, or *must*, while the second is *can, could, would, should*, or *will*. While this division between the members of the modal auxiliary category at first seems relevant only to the analysis of DMCs, an examination of the behavior of epistemic *might, may*, and *must* in American English reveals that even in SMCs, they can be distinguished from other modal auxiliaries. This leads first to a re-categorization of modal auxiliaries, and then to a unified analysis of DMCs and SMCs. In what follows, we illustrate exceptional behaviors of epistemic *might*, *may*, and *must* in American English, and propose a new categorization of modal auxiliaries that accounts for their unique properties.

2.1. Distinguishing Properties of Epistemic *might*, *may*, and *must*

English modals are often categorized as auxiliary heads due in part to their ability to undergo subject-auxiliary inversion (SAI) (e.g., Brewer 1989), as illustrated in (10). However, in American English, not all modal auxiliaries share this property. As McDowell (1987) observes, inversion of epistemic *may* and *must* in yes-no questions is ungrammatical, and inversion of epistemic *might* is marginal (11).

(10) a. Can/may Cindy finish the project early?
b. Would/should Jeff take out a loan?
c. Will it rain tomorrow?
d. Could there be a mouse in the wall?
e. Must I write the whole paper by myself?

(11) a. *May/must it be difficult to live in the Sahara?
b. ?Might it be raining out?

These facts suggest that epistemic *might, may* and *must* in American English SMCs are subject to a constraint that does not apply to other modal auxiliaries. The constraint is also active in DMCs. As noted in (7c), the first modal in a DMC, always epistemic *might, may*, or *must*, never undergoes SAI alone in YNQs.

McDowell (1987) observes an important semantic contrast between epistemic *might, may,* and *must* and all other modals. She notes that most modal auxiliaries contribute propositional content to assertions, such that the proposition asserted by a modal sentence (12a), is not identical to the proposition asserted by its non-modal counterpart, (12b). This can be shown by the fact that it is possible to both assert the modal proposition and deny its non-modal-counterpart without any contradiction arising, as in (12c). Importantly, McDowell's observation holds regardless of whether the modal has a root (12) or epistemic (13) interpretation.

(12) a. John could run the marathon.
b. John runs the marathon.
c. John could run the marathon, but he doesn't run the marathon.

(13) This test could be difficult, but it isn't difficult.

In contrast with other modals, McDowell claims that epistemic *might, may*, and *must* contribute no propositional content, arguing that the propositional content of a sentence containing one of these modals (14a) is identical to the propositional content of its non-modal counterpart (14b). This is demonstrated by the fact that assertion of (14a) followed by the denial of (14b) yields a contradiction (14c).

(14) a. This test may be difficult.
b. This test is difficult.
c. #This test might/may be difficult, but it isn't difficult.

2.2. Distilling Two Categories of Modals

Summarizing first the status in American English of *can/could*, *will/would*, *should*, and non-epistemic *may* and *must*, we have seen that they undergo SAI and add propositional content to the sentence. Furthermore, these modals can assign subject θ–roles under some readings (Barbiers 2002), as in (15). For these reasons, we take the simplest approach to these and categorize them as verbs ("V-modals") that undergo overt V→T movement to check tense, as shown in (16).

(15) a. Mirya can (has the ability to) outrun Varden.
b. Josh won't (refuses to) come out of his room.
c. Erishka should (is advised to) study harder.

(16) We **should** go in. [$_{TP}$ We **should$_1$** [$_{VP}$ **t$_1$** [$_{VP}$ go in]]]

So what of epistemic *might, may*, and *must*? In contrast with the other modals above, they do not undergo SAI, do not add propositional content, and never assign θ–roles. These facts all lead us to want to distinguish them from true verbs.

McDowell (1987) is the first to propose a categorical distinction between epistemic *might, may*, *must* and all other modal auxiliaries. In her analysis, these three are "truth-conditional operators" ranging over propositions. This classification accords with traditional descriptions of epistemic modals as indicators of speaker certainty about a proposition's truth (e.g., Brewer 1989). (17) shows that epistemic *might* and *must* correlate with doubt and certainty, respectively, regarding the truth of a proposition. Since these modals surface inside the propositions whose truth conditions they modify, McDowell posits that they move at LF to the left periphery, where they scope over the sentential proposition as in (18).

(17) a. Jeff might be in the library (but I doubt it / #and I'm sure he is).
b. Jeff must be in the library. (I'm almost certain that's where he said he was going. / #I doubt he's there.)

(18) My luggage **may** be on the plane.
[$_{CP}$ **may$_1$** [$_{TP}$ my luggage **t$_1$** [$_{VP}$ be on the plane]]] = LF

It is notable that epistemic *might*, *may*, and *must* behave similarly to sentential negation, which has also been claimed to move at LF for scope (Butler 2003, Davis and Gillon 2004) (19a), and which cannot independently undergo SAI (19b):

(19) a. My luggage is **not** on the plane.
[$_{CP}$ **not$_1$** [$_{TP}$ my luggage is$_2$ [$_{NEGP}$ **t$_1$** [$_{VP}$ t$_2$ on the plane]]]] = LF
b. *Not my luggage is on the plane?

The similarities noted here between epistemic *might, may* and *must* and sentential negation motivate the assignment of these elements to a single category. Following Cormack and Smith 2002, we label this category POL(arity) (referring to modals in this category as "P-modals"), and situate it between TP and VP, as in (20). Under this analysis, P-modals differ from negation in that the former bear tense, while the latter do not, as indicated by their relative compatibility with independently tensed verbs (21). Although they bear tense, P-modals do not undergo SAI since they are not verbs. Rather, they move only at LF, moving from POLP, through T (checking tense), and then into CP, as in (22).[2]

[2] We remain agnostic as to the exact position of the P-modal in the left periphery; what is crucial here is the fact that the P-modal is only interpretable from a position above TP. In this and subsequent diagrams, CP is a generic label for an unspecified left-peripheral projection.

(20) [$_{TP}$ my luggage is$_1$ [$_{POLP}$ **not** [$_{VP}$ t$_1$ on the plane]]]]

(21) a. *My luggage **might/may/must is** on the plane
b. My luggage **is not** on the plane.

(22) a. [$_{CP}$ [$_{TP}$ my luggage T [$_{POLP}$ **must** [$_{VP}$ be on the plane]]]] = PF
b. [$_{CP}$ **must$_1$** [$_{TP}$ my luggage **t$_1$** [$_{POLP}$ **t$_1$** [$_{VP}$ be on the plane]]]] = LF

3. DMCs as "Adjunction-Driven" Structures

Returning to DMCs, note that the first modal in a DMC is always a P-modal (*might, may* or *must*), while the second is always a V-modal (*can*, *could*, *would*, *should*, *will*). Adopting Cormack and Smith's (2002) placement of POLP for the analysis of DMCs, one might propose for (1a) the structure given in (23). However, recall that in (5a, 6a, 7a) the second modal shows tense-like behavior. (23) fails to predict this, since the second modal (the V-modal *should*), being separated from T by the P-modal *might*, cannot interact with or move to T.

(23) [$_{TP}$ we T [$_{POLP}$ **might** [$_{VP}$ **should** [$_{VP}$ go in]]]] [=(1a)]

Given that the second modal (the V-modal) typically displays tense-like behavior in DMCs, we propose the analysis in (24), wherein the first modal (the P-modal *might*) is inserted into a position that is lower than that of the second. In (24), the complement of T is the VP headed by *should*, the complement of *should* is a POLP headed by *might*, and the complement of *might* is a VP headed by *go*.

(24) [$_{TP}$ we T [$_{VP}$ **should** [$_{POLP}$ **might** [$_{VP}$ go in]]] (before spell-out) [=(1a)]

While this structure does not reflect the overt linear order of the modals, when the inherent properties of the modals are taken into account, it leads straightforwardly to an explanation of the DMC patterns observed in (4-8).

Per the analysis in 3.2, the tensed V-modal *should* in (24) moves to T by spell-out to check tense, while the P-modal *might* moves to CP at LF for interpretation. If the tensed V-modal moved alone to T at syntax, then movement of the P-modal *might* would be blocked by the HEAD MOVEMENT CONSTRAINT (Travis 1984). With *might* stranded in an uninterpretable position the derivation in (25) crashes.

(25) [$_{CP}$ [$_{TP}$ we **should$_1$** [$_{VP}$ **t$_1$** [$_{POLP}$ **might** [$_{VP}$ go in]]]]
X ←——|

To avoid being stranded, the POL-head *might* must move out of POLP and adjoin to *should*, prior to the movement of *should* to T. The result of this adjunction, illustrated in (26), is a complex DM V-head *might should*. Since the V-head *should* must move to T in syntax, the adjunction must occur prior to spell-out. Admittedly, this movement violates LAST RESORT, since P-modals do not normally move until LF, but it does save the derivation from crashing.

(26) [$_{TP}$ we T [$_{VP}$ **[$_{V}$ might$_1$ [$_{V}$ should]]** [$_{POLP}$ **t$_1$** [$_{VP}$ go in]]]] [STEP 1]
[$_{TP}$ we **[$_{V}$ might$_1$ [$_{V}$ should]]$_2$** [$_{VP}$ **t$_2$** [$_{POLP}$ **t$_1$** [$_{VP}$ go in]]]] [STEP 2]
[$_{CP}$ **might$_1$** [$_{TP}$ we **[$_{V}$ t$_1$ [$_{V}$ should]]$_2$** [$_{VP}$ **t$_2$** [$_{POLP}$ **t$_1$** [$_{VP}$ go in]]]] [STEP 3]

The adjunction in STEP 1 yields the surface order, and produces a structure that allows both modals to undergo their required movements. In STEP 2, the complex head (*might should*) moves to T, enabling the V-modal *could* to check tense at spell-out. Once the entire DM V-head is in T, nothing intervenes between the P-modal and the left periphery, leaving the P-modal free to move to CP at LF (STEP 3). Section 4 shows how this "adjunction-driven" analysis succeeds in predicting the asymmetrical application of tense-related processes to the modals in the DMC.

4. Accounting for the DM Patterns

As observed in section 1, tense-related processes apply to the second modal alone, the first and second modal together, but not to the first modal alone. The present analysis accounts for this by positing that the DMC consists of two V-heads to which tense-related processes can apply: the simple V-modal head (27a) or the complex adjunction structure headed by the V-modal *could* (27b). Tense-related processes cannot apply to the first modal alone, (27c), since it is not a tensed V-head. Let us see next how this hypothesis accounts for the data.

(27) a. [$_{V}$ [$_{POL}$ might] **[$_{V}$ could]**]
b. **[$_{V}$ [$_{POL}$ might] [$_{V}$ could]]**
c. *[$_{V}$ **[$_{POL}$ might]** [$_{V}$ could]]

Perfective *'ve/a* is an aspectual head requiring aspectual agreement (past-tense marking) on the head of its VP complement (DM V-head). This requirement is satisfied by the V-head or the complex DM V-head, but not by the P-modal alone.

(28) a. He **may could**'**ve** been killed. [=(4)]
… [$_{ASPP}$ 've$_{[+PERF]}$ [$_{VP}$ **[$_{V}$** may$_1$ **[$_{V}$ could]$_{[+PERF]}$]** [$_{POLP}$ t$_1$ been killed]]]
b. He **might coulda** been killed.
… [$_{ASPP}$ -a$_{[+PERF]}$ [$_{VP}$ **[$_{V}$ might$_1$ [$_{V}$ could]]$_{[+PERF]}$** [$_{POLP}$ t$_1$ been killed]]]
c. *He **might can've** been killed.
… [$_{ASPP}$ 've$_{[+PERF]}$ [$_{VP}$ [$_{V}$ **might$_{1[+PERF]}$** [$_{V}$ can]] [$_{POLP}$ t$_1$ been killed]]]

Both (28a) and (28b) are grammatical, since agreement is realized on the V-modal head in (28a) and on the complex DM V-head in (28b). Evidence that the agreement feature is carried only on the V-modal *could* in (28a) comes from the fact that the non-past P-modal *may* occurs here. In (28b), the entire complex V-head carries the agreement feature, spelled out as past-tense morphology on each modal constituent. In (28c), the P-modal displays past-tense marking, but there is no V-head that agrees with the aspectual feature of *'ve*, and so (28b) is ungrammatical.

When the DM head undergoes overt V→T movement, it passes through ASPP. Here, the perfective morpheme *'ve*/*a* may attach to the V-modal alone (29a), or to the complex DM head, in which case the affix is spelled out following each modal (29b). *'ve/a* cannot attach to the P-modal alone (29c), as it is not a tensed V-head.

(29) a. We **might could've** overlooked something.
b. He **mighta should've** gotten home by now.
c. *She **mighta could** done it.

The distribution of negation in a DMC follows the same pattern as aspect. In (6), repeated as (30), NEG heads a POLP between TP and VP, the DM passes through POLP, and NEG is realized on either the V-modal head (30a) or on the complex DM head, in which case it is spelled out following each modal (30b). While the adjunction-driven analysis accounts for (30a) and (30b), it incorrectly predicts ungrammaticality for (31), where negation follows the P-modal alone.

(30) a. You might **couldn't** find it.
[$_{POL}$ [$_{V}$ [$_{POL}$ might] **[$_{V}$ couldn't]**] POL$^{0}_{[NEG]}$]
b. He **might not couldn't** refuse.
[$_{POL}$ **[$_{V}$ [$_{POL}$ might not] [$_{V}$ couldn't]]** POL$^{0}_{[NEG]}$]

(31) … I **might not could** understand you. [from (6c)]

Section 5 will argue that (31) is derived from a distinct structure. For now, we turn our attention to interrogative DMCs.

Interrogative DMCs appear to be grammatical even without adjunction. In (32a), the failure of the P-modal *might* to undergo SAI along with the V-modal *should* indicates that *might* has not adjoined to *should*. This contrasts with (32b). Although the optionality of adjunction here may seem problematic for an adjunction-driven analysis, recall that adjunction serves only to allow the P-modal to get sentential scope, which it requires to carry out its function of modifying the truth conditions of the proposition. That is, it is the **result** (not the **process)** of adjunction that renders a DMC grammatical. However, since questions (unlike assertions) do not have truth conditions for P-modals to modify, the scope of a P-modal in an interrogative DMC is irrelevant, making adjunction is unnecessary. However, optional adjunction may still occur, as in (32b) where the P-modal *might* undergoes SAI as part of the DM head.[3] Finally, as predicted by our analysis, the P-modal cannot undergo SAI alone (33), as it is not a tensed V-head.

[3] Since (32b) involves PF movement that fulfills no requirements, it is less economical than (31a). This is reflected by acceptability judgments of native DM users (Battistella 1995), who prefer interrogative DMCs where adjunction does not occur (32a) over those in which it does (32b).

(32) a. **Should** we **might** cancel the trip?
[$_{CP}$ **should$_1$** [$_{TP}$ we **t$_1$** [$_{VP}$ **t$_1$** [$_{POLP}$ **might** [$_{VP}$ cancel …]]]]
b. **Might can** you do this later?
[$_{CP}$ **[$_V$ might$_1$ [$_V$ can]]$_2$** [$_{TP}$ you **t$_2$** [$_{VP}$ **t$_2$** [$_{POLP}$ **t$_1$** [$_{VP}$ do …]]]]

(33) ***Might** you could . . .?

5. One Construction, Two Analyses

Recall our adjunction-driven analysis faces a problem in (6c) and (8b), repeated here. A constituent intervenes between the modals. In (6c), the V-modal is below negation, suggesting it has not moved from V to T. In (8b), the intervention of *possibly* between the P- and V- modals suggests the same, unless, quite improbably, the complex DM head contains an adverbial adjunct as a constituent.

(6) c. I **might not could** understand you.

(8) b. I've seen ones that **might possibly could** be flowers. [Di Paolo 1989]

To account for this, we posit that the two modals in (6c)/(8b) are inserted in reverse order, with the P-modal higher than the V-modal, and that the untensed V-modal stays in situ below NEG or the adverb, while the P-modal moves to T and then C at LF. (34) illustrates the LF representations of (6c) and (8b).

(34) a. [$_{CP}$ **might$_1$** [$_{TP}$ I **t$_1$** [$_{POLP}$ **t$_1$** [$_{POLP}$ not [$_{VP}$ **could** [$_{VP}$ understand you]]]]]]
b. [$_{CP}$ **might$_1$** [$_{TP}$ they **t$_1$** [$_{POLP}$ **t$_1$** [$_{VP1}$ possibly [$_{VP1}$ **could** [$_{VP2}$ be flowers]]]]]

Although positing two distinct DMCs seems inefficient, it is justifiable from a variationist perspective. A comparison with Standard American English (SAE) suggests differing dialectal origins for the two DMCs seen here. The underlying representation of adjunction-driven DMC (35a) is non-Standard, in that a V-head selects POLP in violation of selectional restrictions of SAE, where only T selects POLP, and POL selects VP (Wilder 1997; Butler 2003), (36).[4] In contrast, the selectional ordering of in-situ DMC (35b) mirrors that of SAE constructions (36):

(35) a. We **might should** go in.
[$_{TP}$ we T **[$_{VP}$ should [$_{POLP}$ might** [$_{VP}$ go in]]]]
b. I've seen ones that **might** possibly **could** be flowers.
[$_{TP}$ they [$_{POLP}$ **might** [$_{VP1}$ possibly **[$_{VP1}$ could** [$_{VP2}$ be flowers]]]]]

(36) a. The children **can't** do that in there.
[$_{TP}$ the children [$_{POLP}$ **not [$_{VP}$ can** [$_{VP}$ do that ...]]]]]

[4] In some analyses of negation (Holmberg 2003) PolP selects TP. But regardless of the ordering of TP and PolP, no SAE analysis allows VP to select PolP, posited for adjunction-driven DMC.

b. They **might** possibly **have** been flowers.
[$_{TP}$ they **[$_{POLP}$ might$_1$** [$_{VP1}$ possibly **[$_{VP1}$ have** [$_{VP2}$ been flowers]]]]]

While the in-situ DMC bears a close structural resemblance to the SAE SMC, its regional distribution is matches that of adjunction-driven DMC. These facts suggest that the in-situ DMC is the result of attempts by SAE speakers to interpret and acquire the non-standard adjunction-driven DMCs they encountered within the constraints of SAE, which only allows POL to select VP, and not the reverse. A fuller discussion of this dialect contact hypothesis is found in Elsman (2007).

6. Conclusion

This paper has shown that a full explanation of the syntactic patterns exhibited in DMCs cannot be obtained by forcing such constructions into traditional (one-modal-per-clause) analyses of English modal auxiliaries. Instead, we have demonstrated that in order to account for the distribution of modals in DMCs, it is necessary examine the similarities between DM constructions and SM constructions, and in doing so, we have formulated an analysis that accounts for the syntactic properties of modals in both types of constructions.

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Ethnicity and Sound Change in San Francisco English

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0. Introduction

An increasing number of studies in sociolinguistics are focusing on the intersection of regional dialect variation and ethnicity. Much of this research is in response to the claim in Labov (2001) that non-white ethnic groups will not participate in local sound change:

> All speakers who are socially defined as white, mainstream, or Euro-American, are involved in the [sound] changes to one degree or another … But for those children who are integral members of a sub-community that American society defines as "non-white" – Black, Hispanic, or native [sic] American – the result is quite different. No matter how frequently they are exposed to the local vernacular, the new speech patterns of regional sound change do not surface in their speech. (2001:506)

Since the publication of this claim, much of the current research on sociophonetics and ethnicity has considered its validity. With a few exceptions (*e.g.*, Anderson 1997), most of the relevant studies have focused on varieties of African American English (*e.g.*, Thomas 1989, Anderson 2002, Fridland 2003, Eberhart 2008, among others). With regard to Asian American English, Labov (2001) calls this an "open question" but suggests that Asian Americans in Philadelphia are not participating in local sound change. Wong (2007) found that Chinese Americans in New York City maintain a low back vowel distinction but do not acquire the local split short-a system. Wong also found that the two speakers whose social networks and lifestyle choices were more Chinese-dominant were less likely to adopt the New York City vowel features.

There are relatively few studies on Asian American English at all, and there have been no large-scale sociophonetic community studies of Asian Americans prior to the present analysis. This paper considers vocalic sound changes in progress in the speech of the residents of one Northern Californian urban neighborhood, San Francisco's Sunset District, and argues that the Asian American presence is so integral to the community under study that there is no useful distinction between an 'ethnolect' and a 'regional dialect' (*cf.* Eckert 2008).

1. The Neighborhood

The Sunset District is the largest residential neighborhood in San Francisco. It sits away from downtown, in the Western part of the city, bordering the Pacific Ocean. "The Sunset" has a population of 98,450 residents, less than half (43%) identifying as White and more than half (52%) identifying as Asian, with most of those Asians (77%) identifying as Chinese (U.S. Census Bureau, 2000). This demographic distribution makes the Sunset District a particularly apt location for an analysis of the production of sound change by Asian Americans. Furthermore, demographic change in terms of population ethnicity has come to the neighborhood relatively recently, a fact which is very salient to the community's residents and their discursive construction of local meaning.

When San Francisco joined the United States in 1848, the area of today's Sunset District was covered in sand dunes and thought to be uninhabitable. This, in addition to its Western-most location, meant that early Sunset residents had a sense of being a pioneer. This history may ground the strong neighborhood pride evidenced in current local discourse. Adding to this pioneering pride is the manner in which the neighborhood developed, through the rapid construction of affordable single-family homes. In contrast to Eastern neighborhoods, a portion of the Sunset's population has been made up of native San Franciscans moving out of apartments in the more congested areas of the city. Being a neighborhood of 2nd generation San Franciscans may also contribute to neighborhood pride and specifically to an ideology of local authenticity.

People moved into the Sunset District in two general waves. The first was predominantly Irish, and the second Chinese. Working class Irish American identity created a backdrop for the Chinese American presence today; Irish history is still a strong part of local discourse, while Chinese ethnicity has become key to local definitions of place (*e.g.,* many residents consider the Sunset to be a "new Chinatown"). This local history has created a social landscape where pride in ethnic identities may be understood as pride in the neighborhood, shaping how regional dialects become employed and interpreted in this multiethnic community.

2. Fieldwork and Social Variables

Data come from fieldwork conducted from January to June 2008, consisting of sociolinguistic interviews and participant observation. The majority of the speakers in this study were contacted through friends-of-friends and advertisement in the neighborhood community center newsletter. Most of the 88 interviews were one-on-one and lasted from 45 to 120 minutes. Interviews were either recorded in the speaker's home or office, or in a quiet office space I rented in the neighborhood. During my fieldwork, I participated in neighborhood activities and spent time with locals in public libraries, parks, and other recreational areas.

All the speakers are at least 2nd generation San Franciscan, have lived in the Sunset District since at least age 5, and have spoken English as their primary language since at least age 5. Some participants over the age of 60 also include speakers who either lived in another San Francisco neighborhood since birth and

in the Sunset for several decades and at the time of the interview, or who had grown up in the Sunset and now live elsewhere in the San Francisco Bay Area.

The phonetic analysis presented here consists of interview data from 23 of the 88 Sunset residents interviewed. Those 23 speakers were selected to satisfy demographic representation for the social variables: age, sex, and ethnicity.

Table 1: Speaker Sample

Age Group	Asian Americans	European Americans
Teens & 20s	4 F, 2 M	2 F, 2 M
30s & 40s	2 F, 2 M	2 F, 2 M
60s & 70s	2 F, 1 M	1 F, 1 M

Table 1 shows speakers divided according to the broad ethnic categories of Asian American and European American. The term *Asian American* was initially a political activist term of reference, created in the late 1960s and gaining currency in the 1980s as a term uniting Americans of various Asian backgrounds around common interests (*cf.* Espiritu 1992). Not coincidentally, this nationally recognized term was first coined at San Francisco State University, which sits directly south of the Sunset District and has been a common destination for Sunset District residents for many decades. Also, since the majority of the Asian Americans in the Sunset District are of Chinese descent, many Sunset residents use the terms *Asian (American)* and *Chinese (American)* interchangeably. However, 'Asianness' in the Sunset is certainly influenced by the presence of the 33% non-Chinese Asian heritage cultures, namely Japanese, Korean, Vietnamese, and Filipino. These distributional facts are represented in my overall sample of 88 speakers, though the subset of 23 speakers analyzed phonetically includes only 13 Asian Americans: 12 of Chinese descent and one of Japanese descent.

3. Linguistic Variables

The linguistic variables analyzed here are the merger of the low back vowels, as in *cot* and *caught*, and the fronting of the nuclei of the mid- and high back vowels, (o^w) and (u^w), as in *boat* and *boot*, respectively. All are known features of the Western U.S. English, specifically the Northern California Vowel Shift (Eckert 2008).

Tokens of the vowels /i/, (a), (ɔ), (o^w), and (u^w) were collected for all 23 speakers.[1] All vowel tokens had a minimum duration of 60 milliseconds, to avoid attributing rate of speech reduction effects to social factors or sound change. LPC measurements of F1 and F2 only were taken at the midpoint of the nucleus or steady-state of the vowel as well as the end of the off-glide (approximately three glottal pulses from the end of voicing). Measurements were made using automatic

[1] In this paper I will follow the convention of putting non-variable phonemes in slashes and sociolinguistic variables in parentheses.

extraction by *Akustyk* (Plichta 2006). Approximately 10% of each token set for each vowel for each speaker was checked for accuracy by manual LPC. In order to maintain a representative sample of vowel tokens, each vowel class set contains a minimum of five tokens per vowel class, known conditioning environment, and speaker. A maximum of five tokens per any given lexical item per speaker helps avoid lexical bias effects. All vowels preceding liquids were excluded (for the low back vowels) or labeled separately (for (o^w) and (u^w) before /l/; all were excluded before /r/) because of known phonological conditioning effects. All data was normalized for vocal tract size using the Lobanov speaker-extrinsic algorithm available through the online vowel normalization suite *Norm* (Thomas and Kendall 2007). The complete dataset over all 23 speakers and 5 vowel classes includes about 2300 vowel tokens.

3.1. Low Back Merger

The low back merger involves the backing and raising of (a), as in *cot*, and the fronting, lowering, unrounding, and/or monophthongization of (ɔ), as in *caught*, such that speakers' productions at least approach overlap in vowel space and are confusable in perception. This is a very widespread sound change, and has been analyzed extensively in dialectology (*cf.* Kurath and McDavid 1961, Labov *et al.* 2006). The Western U.S. is considered a region of merger (*cf.* Labov 1998, Labov *et al.* 2006). The Atlas of North American English (Labov *et al.* 2006) finds little production of a low back vowel distinction in the Western U.S., with the sole exception of San Francisco. In San Francisco, the merger is characterized as more transitional than complete. The status of low back merger in San Francisco is an important question for contextualizing San Francisco in relation to the rest of the Western United States.

DeCamp (1953/1971:556) first documented the beginning of the merger in San Francisco, stating, "It is possible ... that this coalescence is beginning in San Francisco. ... The entire subject needs further investigation." Moonwomon (1992:119) concluded that the merger was well advanced in San Francisco, with all of the ten younger speakers in her study showing complete or almost complete overlap (1992:203). The present analysis measures production of the low back vowel merger 17 years after Moonwomon's conclusion that the merger was approaching completion. If the merger is a well-advanced sound change, then the extent of merger is expected to negatively correlate with age, with only the oldest speakers maintaining a distinction, if at all.

In the present analysis, extent of merger for each speaker was calculated based on the distance in F2 between normalized speaker averages of the two low back vowel classes, (a) and (ɔ). A Spearman's correlation test across the entire dataset found a significant correlation between a speaker's average F2 distance between vowel classes and speaker age ($p<0.02$). No significant correlation was found with F1 distance ($p=0.2$) or Euclidean distance ($p=0.085$), though the latter, which is the diagonal distance between the two vowel class and incorporates both F1 and F2, approached significance. While the present paper relies on F2 values as the

measure of low back vowel measure, subsequent analyses will consider alternate statistical methods and normalization methods to ensure the most accurate representation of these data.

3.2. Back Vowel Fronting

The fronting of the mid- and high back vowels, (o^w) and (u^w), is widespread across North American English; there may be more regions that exhibit back vowel fronting than regions that do not. However, (o^w) and (u^w) fronting have long been particularly salient aspects of the California English vowel system since the 1980s (Hinton *et al.* 1986, Luthin 1987, Hagiwara 1997). Based on this evidence, fronting is expected to be a well advanced change, so we again expect to see that change reflected in apparent time, with fronting negatively correlating with age such that younger speakers front more than older speakers.

As in other analyses, tokens of (u^w) in this study were separated according to whether they followed alveolar consonants (Tu^w) or not (Ku^w), since preceding alveolar consonants are known to strongly condition fronting (Stevens and House 1963; Ash 1996). In addition, (o^w) has been found to resist fronting when followed by a nasal consonant (Luthin 1987), so pre-nasal (o^w) tokens, such as *home*, were excluded here. Lastly, all back vowels are known to resist fronting when followed by /l/, as in *cool* and *coal*, so these occurrences were coded separately.

Based on this known phonological conditioning, fronting was calculated based on distance in normalized F2 space between a speaker's /i/ average and a speaker's pre-/l/ average. For example, a token of (u^w) that is considered '100% fronted' is a token that overlaps in F2 space with the speaker's average /i/ (as in *beet*); an (u^w) token that is '0% fronted' is a token that overlaps in F2 space with the speaker's average (u^w) before /l/, or (u^wl). This yields the percentage of the distance of a speaker's F2 space that each particular (u^w) or (o^w) token is fronted. The equation is given in (3) for post-alveolar (u^w), and the same equation applies to 'elsewhere (u^w)' and (o^w), with (o^w) before /l/, or (o^wl) substituted for (u^wl) in (o^w) calculations.

Equation 1: Frontedness of a post-alveolar (u^w) token:

$$[(Tu^w)_{token} - (u^wl)_{avg}] \; / \; [/i/_{avg} - (u^wl)_{avg}]$$

For this analysis, calculations don't indicate the extent of unrounding, which often accompanies fronting. The position of the off-glide is also not explicitly analyzed, since all off-glides appear unsurprisingly to be more rounded than their nuclei and produced further back than their nuclei.

4. Results and Analysis

4.1. Low Back Merger

Figure 1 shows age of speaker plotted against the Lobanov-normalized log-odds values for average F2 difference: the top of the scale represents the greatest distance in F2 space (*i.e.,* the greatest amount of distinction), while the origin

represents no distance (*i.e.,* complete merger). The few speakers whose *caught* class average was actually lower and further front than their *cot* class average were given a score of zero, or complete merger.

Figure 1: Low Back Merger Data by Age and Sex

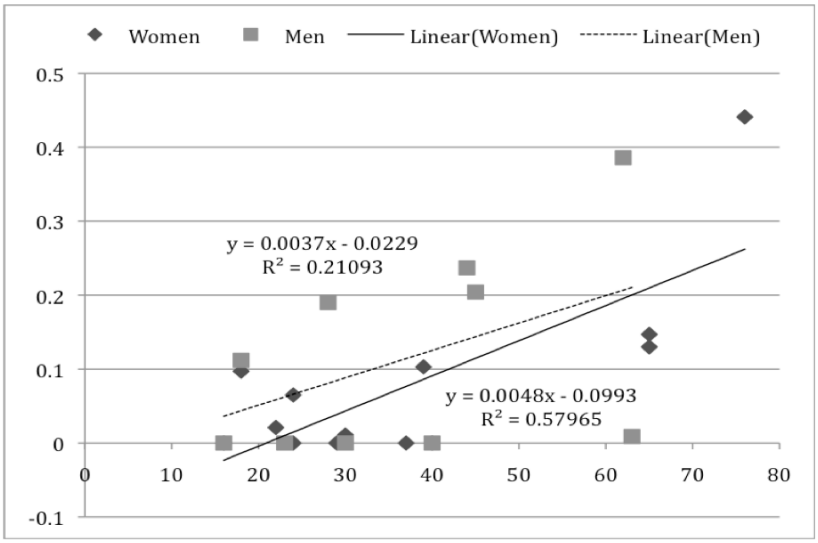
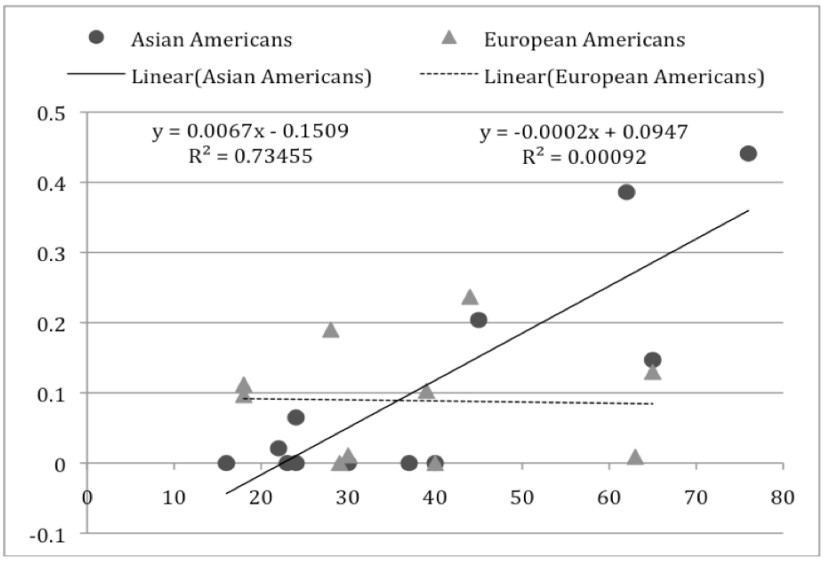


Figure 2: Low Back Merger Data by Age and Ethnicity



The results show an expected negative correlation between age of speaker and extent of low back merger ($p<0.02$). In addition, there is no significant gender difference in the realization of low back vowel merger. The most surprising result from these data is that so many speakers, particularly younger speakers, have any low back vowel distinction at all. While a speaker in their 60s may be completely merged, a 28-year-old may be producing distinct *cot* and *caught* vowel classes.

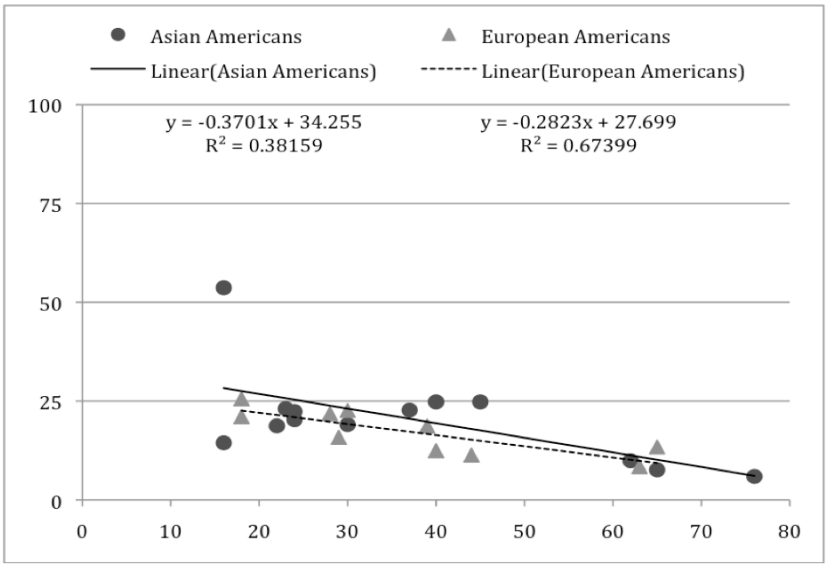
Figure 2 presents the same data but by ethnicity, showing a clear difference within ethnicity according to age. European Americans show no correlation between merger and age, indicating no change in apparent time – they appear variably stable, with some speakers producing distinct vowel classes regardless of age. The apparent time correlation is only evidenced for the Asian Americans, where it is highly significant ($p<0.01$).

The results show that some San Franciscan Sunset District residents still maintain a low back vowel distinction, regardless of age, gender. While there is no statistical difference overall between Asian Americans and European American, a view in apparent time shows that movement towards merger is an active change-in-progress among Asian Americans, but appears to be stabilized for European Americans. This could indicate a surprisingly stabilized low back distinction in among European American San Franciscans despite the move of the rest of the West and the local Asian American community towards completed merger. Such a scenario contrasts with Moonwomon's (1992) argument that the merger was well on its way to completion. Furthermore, contra Labov (2001), *White speakers appear to be more resistant to regional sound change than are non-Whites, at least in terms of this variable, in this particular community.*

4.2. (o^w) Fronting

Figure 3 presents speaker age and ethnicity against each speaker's average fronting percentage, in F2 distance, with higher values indicating further fronting.

Figure 3: (o^w) Fronting Data by Age and Ethnicity



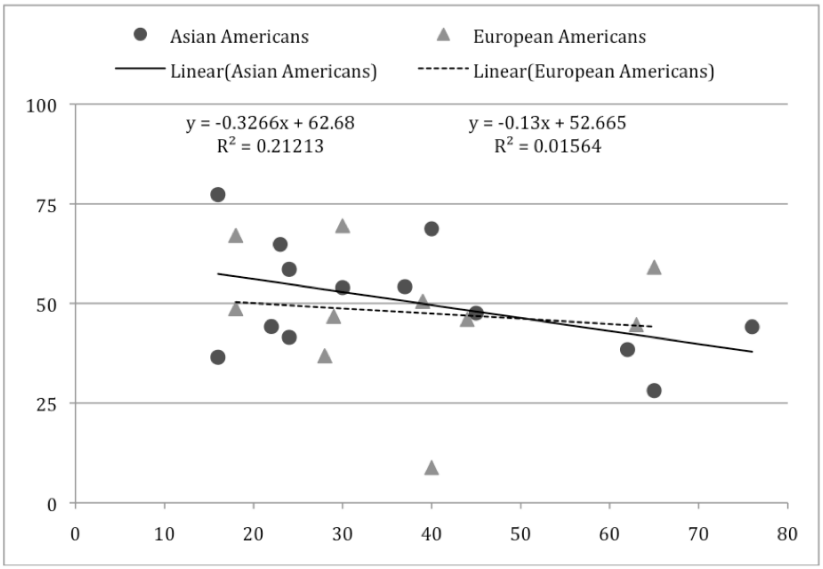
Overall, the fronting of (o^w) is not extremely advanced for these speakers. Age is a significant predictor of fronting ($p<0.01$), with younger speakers overall fronting further than older speakers. Under the apparent time hypothesis, these results support earlier studies of (o^w) in San Francisco (Hinton *et al.*, 1987; Luthin 1987)

in arguing that (o^w)-fronting is a change in progress. However, given the real time comparison with Luthin (1987), one might expect absolute values to be further fronted than they are, suggesting that the adoption of this change may be occurring at a relatively slow pace. Lastly, despite the frequent observation that females lead males in sound change, as well as Labov's (2001) claim that non-white ethnic groups resist local sound change, speaker gender and ethnicity are not significant factors in the fronting of (o^w).

4.3. (u^w) Fronting

Since preceding alveolar consonants so strongly favor the fronting of (u^w), post-alveolar production (Tu^w) is analyzed separately form production in all other phonological environments (Ku^w). Results for post-alveolar production are shown in Figure 4 and elsewhere environments in Figure 5.

Figure 4: (Tu^w) Fronting Data by Age and Ethnicity



All productions of (u^w) are generally known to front further than (o^w) in U.S. English, in contexts where the two vowels are fronting in parallel. This pattern is borne out in these data as well, with post-alveolar (u^w) overall fronting much further in F2 space than (o^w), in many cases past the middle of the speaker's vowel space. The predictions that post-alveolar (u^w) fronting leads elsewhere environments is also borne out.

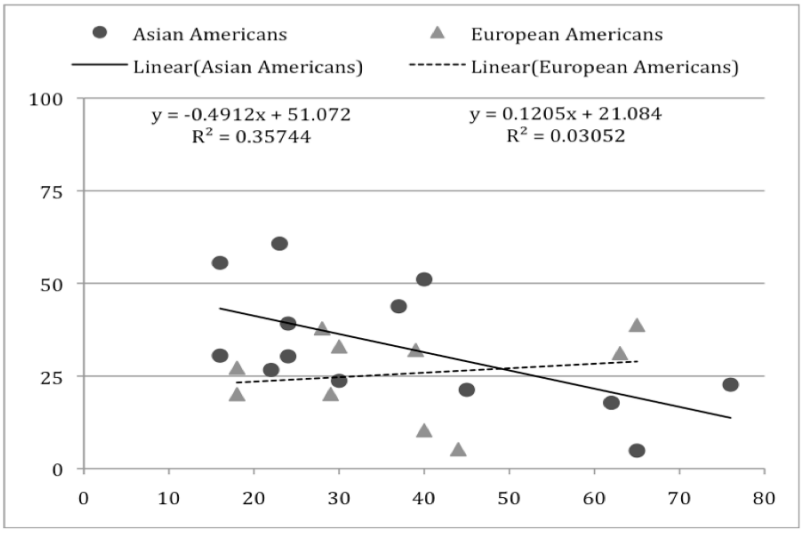
Unlike (o^w), neither case of (u^w)-fronting is significantly correlated with age: across the complete speaker set, there is no evidence of change in apparent time. In comparison to findings from Hinton *et al.* (1987) that found that (u^w) fronting was a change in progress in San Francisco, (u^w) fronting in the Sunset District overall has either slowed or stopped at a point of completion. However, while there is no significant difference between Asian Americans and European Ameri-

cans for (u^w)-fronting, among the Asian Americans, there is a trend for fronting and age of speaker ($p<0.07$), suggesting a change in apparent time among Asian Americans. In some ways, this pattern of stability among the European Americans and change in progress for the Asian Americans is similar to the findings for the low back vowel merger.

As was shown for (o^w), differences between men and women are again not significant for (u^w) production, although among post-alveolar productions there is a trend ($p<0.09$) of with women fronting more than men.

The fact that the position of (u^w) is phonetically conditioned, with preceding alveolar consonants promoting fronted productions, and vowels in other phonological contacts held further back, might suggest that (u^w) fronting is a change in progress. But the age data suggest otherwise. The picture in terms of apparent time seems to be that the (u^w)-fronting sound change is at the point of completion, at least for residents of San Francisco's Sunset District.

Figure 5: (Ku^w) Fronting Data by Age and Ethnicity



In summary, (o^w)-fronting is stratified for age and appears to still be a change in progress, whereas (u^w)-fronting appears to have stabilized at a phonologically conditioned fronted position. Neither change shows a significant distribution according to either speaker ethnicity or speaker gender, but suggestive variability along these dimensions does imply that mid- and high back vowel production may still be quite variable at the level of the broader community.

4.4. Discussion

The results show that the low back vowel classes remain distinct in the speech of all San Franciscans. As suggested by Labov, Ash and Boberg (2006), San Francisco indeed appears to be a linguistic outlier in the Western U.S., at least for this variable. In terms of ethnicity, Asian Americans exhibit a change in progress in

apparent time towards merger, while European Americans exhibit stable variation with some speakers maintaining a distinction, regardless of their age.

The results for the mid- and high back vowels show a relatively stable distribution of fronted production, with surprisingly slow change in progress toward further fronting, and no significant differences according to speaker sex or ethnicity. Despite the comparatively slow or stagnant rate of change, the results for ethnicity parallel those of Hinton, *et al.* (1987) and Luthin (1987), who also found no significant differences in vowel fronting between their majority White participants and their (few) Asian American participants.

The predictions set forth by Labov (2001) state very generally that speakers of non-Whites ethnicities avoid the adoption of local sound changes. For the low back vowels, the European Americans are the ones who appear to be resisting broader local sound change. However, for the mid- and high back vowels, the lack of ethnic difference may lead to the popular impression that Asian Americans are linguistically 'White' (*cf.* Mendoza-Denton & Iwai, 1995).

In contrast, I suggest that there is no social, historical, or ethnographic basis for White speech patterns to be the linguistic target for Sunset District residents. Ethnographic analysis, along with my concurrent work on the vocalization of coda-/l/ among these same speakers, argues that Asian American speech patterns may be acquiring prestige in the neighborhood. Models equating regional sound change with European American speech patterns cannot apply in communities like the Sunset District. Increasing signs of globalization and ethnic diversity in the United States suggest that the speech target for linguistic change will often not be a European American way of speaking.

5. Conclusion

Fought (2006) and Eckert (2008) have argued that the relationship between sound change and ethnicity is not adequately represented by perspectives such as that put forth in Labov (2001). Patterns in phonetic variation in multiethnic contexts are not just indicative of the avoidance or adoption of change. The analysis of ethnicity and sound change cannot be reduced to ethnic categories as large as 'White' versus 'non-White.' Sometimes members of non-White groups avoid sound change, but sometimes they may be the leaders of sound change. Individuals within a group are likely to participate to varying degrees, for various reasons.

Who leads and adopts linguistic change in a given community must be determined with respect to that community, through a combination of empirical and ethnographic analysis. Attention to local meaning is necessary for the advancement of theories of ethnicity and change in progress in sociolinguistics. The present study suggests that variation within Whites cannot be the assumed target of change, particularly in communities where non-White groups have acquired local prestige. As Eckert argues for the use of the California Vowel Shift among Whites and Chicanos, "one can view aspects of this shift as being propelled by identity work within and across both communities … constructed not simply in opposition to each other, but in conjunction with each other as well" (2008:41).

In the Sunset District, Asian American cultural practices have come to define the community. Chinese identities, in particular, construct the space of social meaning in the neighborhood. Regional sound changes cannot be seen as primarily White, but must be seen in relation to Asian American ethnicity. The Sunset District is just one example of how regional variation is inextricably tied to cultural variation, and how sociolinguistic analyses of regional variation must account for social circumstances at the local level.

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Event Structure Integration: Korean *-ese* Constructions

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0. Introduction

The connective verbal suffix *-ese* is very commonly recognized in Korean as establishing one of two relations between clauses: temporal sequence and forward causality, shown below, respectively:

(1) a. John-i cip-ey ka-se kongpu hay-ss-ta
John-NOM home-LOC go-ESE study do-PST-DEC
'John went home and (then) studied (there).'

b. John-i cip-ey ka-se chulswu-to cip-ey ka-ss-ta
John-NOM home-LOC go-ESE Chulsu-also home-LOC go-PST-DEC
'John went home and so Chulsu went home too.'

Although there is widespread agreement that these senses occur in near-complementary distribution—i.e. any particular instance of a *P-ese Q* construction conveys specifically one of the two senses—a descriptively adequate and explanatorily satisfying analysis has proven elusive. In this paper, I present a new approach to the analysis of multi-functional connectives based in Cognitive Grammar (Langacker 1991a), arguing that the phenomena of interest require a cognitively sophisticated semantics for an adequate treatment.

1. The Difficulty with *-ese* Constructions

Korean learning grammars tend to state conditions for the sequential reading such as, "the verb in the first sentence must be an action verb" (Ihm et al. 1988), or that when the subjects are coreferential, the meaning is sequential, otherwise, causal (Lee 1989, Rogers et al. 1992). A more comprehensive characterization is attempted in Lukoff and Nam (1982). The following is a restatement of their generalizations in terms of a *P-ese Q* construction:

(2) a. If P is negative, the sentence asserts that P caused Q.
b. If P has a stative sense, the sentence asserts that P caused Q.
c. If P and Q share the same subject, Q is understood as temporally following P, otherwise the sentence asserts that P caused Q.

These conditions are largely successful at predicting which sense arises in a given sentence. For example, statement (2c) makes the correct predictions for the sentences in (1). That these two senses of *-ese* are really complementary, as captured by the conditional statements above, is supported by examples like the following (Lukoff and Nam 1982:563-564):

(3) a. irena-se cel-ul ha-ss-ta
rise-ESE bow-ACC do-PST-DEC
'He got up and bowed.'

b. *irena-ci anh-ase cel-ul hay-ss-ta
rise-COMP NEG-ESE bow-ACC do-PST-DEC
'*Without getting up (first), he bowed.'
'*He did not get up and so he bowed.' (Implausible)

c. irena-ci anh-ko cel-ul hay-ss-ta
rise-COMP NEG-KO bow-ACC do-PST-DEC
'He bowed without getting up (first).'

According to (2a), (3b) should have only the causal reading. That reading, however, is highly implausible in Korean culture. Nevertheless, a sequence reading is unavailable, even though as (3c), which uses the *-ko* construction, shows that a reading as such is not implausible.

The characterization in (2), however, falls short for a number of reasons. First, as the authors themselves point out, there are a number of cases where the conditions make the wrong prediction. In the examples below, the P clause is neither negative nor stative, and P and Q have coreferential subjects, but the readings are causal (Lukoff and Nam 1982:569-570):

(4) cha-eyse nayli-taka nemecye-se pyengwen-ey ka-ss-ta
car-FROM descend-WHILE fall-ESE hospital-LOC go-PST-DEC
'He fell as he was getting out of the car and so he went to the hospital.'

(5) ku-nal ku-ka ilccik cip-ey ka-se hwa-lul myon hay-ss-ta
that-day he-NOM early home-LOC go-ESE disaster-ACC escape do-PST-DEC
'He escaped the disaster because he went home early that day.'

Although the conditions in (2) admit no such possibility, there are also cases where both readings are possible (Lukoff and Nam 1982:569):

(6) hakkyo aph-eyse chulswu-lul manna-se ku-yayki-lul hay-ss-ta
school front-LOC Chulsu-ACC meet-ESE that-story-ACC do-PST-DEC
'I met Chulsu in front of the school and then told him about it.'
'I told Chulsu about it because I met him in front of the school.'

There are also cases where the P and Q clauses do not share the same subject, but the reading is sequential (Lukoff and Nam 1982:569):

(7) awu-ka namwu-lul ccalla-se hyeng-i cang-ey ka-ss-ta
young-NOM wood-ACC cut-ESE older-NOM market-LOC go-PST-CONJ
phala-ss-ta.
sell-PST-DEC
'The younger brother cut the wood and then the older brother went and sold it at the market.'

In addition to being unable to account for such exceptional cases, the conditions in (2) are incomplete in that the *-ese* construction exhibits further restrictions. For example, suppose a high school student goes to his room, opens the window, and then does his homework. This perfectly plausible sequence of events can be expressed in Korean with the *-ko* construction, but not with the *-ese* construction:

(8) a. John-i changmwun-ul yel-ko swukcey-lul hay-ss-ta
John-NOM window-ACC open-KO homework-ACC do-PST-DEC
'John opened the window and (then) did his homework.'

b. *?John-i changmwun-ul yel-ese swukcey-lul hay-ss-ta
John-NOM window-ACC open-ESE homework-ACC do-PST-DEC
'*?John opened the window and (then) did his homework.'

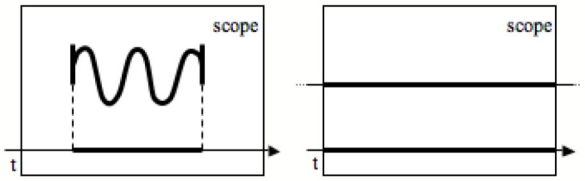
As the examples above show, the approach represented by (2) is descriptively inadequate, and furthermore, unable even to give an indication as to how to make sense of the exceptional cases.

Thus, in the remainder of this paper, I present a cognitive-functional analysis of the semantics of *-ese* constructions based on Cognitive Grammar (Langacker 1991b), combining Langacker's verbal semantic model with Narayanan (1997)'s phased aspectual structure. This model predicts behavior deemed exceptional by earlier analyses and accounts for why sequential *-ese* cannot be used to connect just any pair of plausibly sequential events. It is able also to account for why given certain variations in the connected clauses, *-ese* constructions can also convey other relations, which have largely been ignored, such as temporal simultaneity, manner of motion, instrument, and means of causation. The analysis is further supported by the pattern of interaction between the various *-ese* constructions and progressivization.

2. Event Integration Model

Cognitive Grammar models verbal predicates as processes, which are sequentially scanned complex temporal relations (Langacker 1991a,b). They are essentially conceptual models of how relations between participant entities change (or not) over time. The following diagrams, for example, represent the conceptually relevant facets of perfective and imperfective processes (Langacker 1991a:88):

Figure 1: Perfective and Imperfective Processes



According to this model, the features that differentiate perfective and imperfective processes are temporal boundedness within the scope of predication and whether the relation is dynamic or static: perfective processes are temporally bounded and dynamic, while imperfective processes are temporally unbounded and homogenous.

In addition to the process model sketched above, I adopt an aspectual model in which certain processes may consist internally of discrete phases. Narayanan (1997) develops an aspectual model computed from the same structures needed for motor control systems. The general schema, as summarized in Lakoff and Johnson (1999:41), is as follows:

Getting into a state of readiness
The initial state
The starting process
The main process (either instantaneous or prolonged)
An option to stop
An option to resume
An option to iterate or continue the main process
A check to see if a goal has been met
The finishing process
The final state

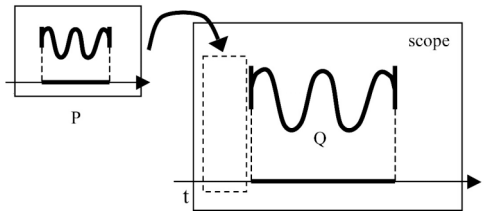
Although the precise structure of specific processes will vary, the schema above allows for processes that occur as a series of phases, in which the main phase may be preceded by a preparatory phase or followed by a finishing phase.

2.2. Sequential *-ese*

Based on the framework described above, the semantics of *-ese* constructions can be modeled as a configuration of conceptual structures. In a sequence construal of a construction *P-ese Q*, I propose that the verbal process of the subordinate *-ese* clause (P) is construed as the process-internal preparatory phase of the main

clause process (Q), such that external to the scope of Q, the resulting structure constitutes a single event. As shown diagrammatically in Figure 2, a consequential property of the integration is that process P's scope of predication must fit into Q's scope of predication and that process P's temporal profile is matched with start phase of process Q.

Figure 2: Event Integration in Sequential *-ese*



This model generates the following predictions for the behavior of sequential *P-ese Q* constructions:

(9) a. Neither P nor Q may be imperfective.
b. Process P cannot be negated.
c. Process P must share process Q's action chain.

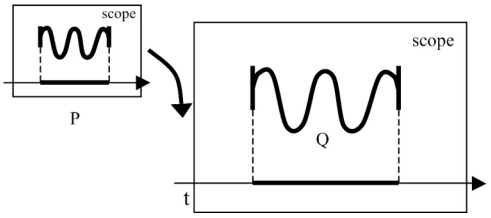
With regard to (9a), the process Q cannot be imperfective, because, as depicted in Figure 2, an imperfective process, being unbounded within its predicational scope, does not have a preparatory or finishing phase to elaborate. Because the phases of a process must be perfective (otherwise, there would be no way to delineate their boundaries), the P clause cannot be imperfective either. Since a negated process profiles the non-occurrence or absence of a temporally profiled process, a negated predication is necessarily atemporal. Thus, such a process cannot be integrated with a necessarily bounded phase within another process.

Cognitive Grammar models the dynamic relations between participants of a process as a unidirectional chain of energy transfers from entity to entity, which is called an action chain (Langacker 1991a). Semantic roles, such as Agent and Patient, are construed relative to the action chain—e.g. the source of the energy is the Agent, and the sink is the Patient. The participants within a single process's scope of predication are structured according to one and only one action chain configuration. Thus, prediction (9c) arises because process P's scope must be contained within process Q's scope, as shown in Figure 2. Processes P and Q are predicated over a single action chain determined by the participant structure of Q, and for process P to be integrated with the starting phase of process Q, it must cohere with the conceptual structure evoked by process Q. Consequently, for example, if Q's action chain defines a participant X as the Agent, P cannot be construed with an action chain such that some other participant Y is the Agent.

2.3. Causal *-ese*

When the integration represented by Figure 2 cannot apply, the sequential reading is unavailable, and conceptually there remain two distinct event predications, enabling a causal reading. For the causal sense, I propose that process P is related to process Q externally rather than internally. As such, the predicational scope of P is independent of Q's. The causal construal of *P-ese Q* is modeled in this framework as a separately predicated event P that temporally precedes and causes the event Q.

Figure 3: Discrete Events in Causal *-ese*



In the causal *-ese* construal, the P event is still subordinate to the Q event because only the Q event is grounded by tense or modality to the speech context. In addition to the temporal profiling of processes P and Q, the Cause relation between them, represented by the bold arrow, is also profiled.

2.4. Accounting for the Exceptional Cases

The predictions generated by the event integration model shown in (9) and similar to, but not co-extensive with, Lukoff and Nam (1982)'s characterization in (2). The conditions in (9) predict and explain the exceptional cases presented in Section 1. Examples (4) – (5) have the causal reading because although the P and Q clauses share the same subject, they are not predicated over the same action chain. Because the verb in the P clause, *nemeci-ta* 'to fall,' is unaccusative, the subject of P is a Patient, i.e. the tail of its action chain. In contrast, the Q clause verb is transitive, and its subject is an Agent, i.e. the head of its action chain. Since the same entity cannot be both the head and the tail of the same action chain (except perhaps in reflexive predications), (4) fails condition (10c). The same analysis applies to (5) where situation is reversed—the verb in the P clause is transitive and the verb in Q clause is unaccusative. The verb *myon ha-ta* is better translated as 'to be exempted from,' where there is no implication of agency.

The multiple interpretation example in (6) is also straightforwardly explained. The verb *manna-ta* 'to meet' has two possible construals: in the first, the meeting event is deliberately orchestrated; in the second, the meeting is accidental. On the former reading, the subject of the P clause, identified contextually, is an Agent in both the P and Q clauses, thus allowing for the sequential reading of the sentence. In the latter case, the P clause subject is not agentive, but the same entity is agentive in the Q clause, allowing for the causal reading.

The counter-example in (7) was especially compelling because of its having different subjects and yet receiving the sequential reading. On the surface, this sentence would seem to contradict the predictions of (9) as well. The crucial difference, however, is that the cognitive-functional foundation of the event integration model provides a way to approach an explanation. I suggest that the sequential reading of (7) arises because the two brothers, the respective subjects of the two clauses, are construed as co-Agents. That is, the action chain over which (7) is predicated is unusual in having two energy sources—the configuration would thus, strictly, not be a chain, but a merging Y-shaped energy flow pattern, where the two starting chains converge at the wood that is being chopped and sold.

The earlier approaches were also too permissive in that they failed to exclude cases like (8b) where a possible sequence of events could not be expressed using an *-ese* construction. Some linguists, as in Kim (1994), propose that *-ese* expresses not mere sequences, but "necessary" sequences—that is, events which whenever they co-occur, they must occur in that sequence. Although empirically, the characterization merits testing, there is no explanation for how this condition relates to the others. By this approach, the specific behavior of *-ese* constructions seems to arise as a result of an arbitrary collection of unconnected properties.

The current approach, however, is able to provide a unified explanation of the patterns including (8b). This behavior is unsurprising for the present model because *-ese* is not modeled as a connector with the semantics "P precedes Q" but rather as a conceptualization where the process P is subsumed into the process Q as its start phase. Because the scope of predication, i.e. the evoked background, is determined by the Q clause, the properties of that background determine whether a P clause can be identified as a part of that background or not. Predications in Cognitive Grammar are not references to independently existing, objective relations in the world, but rather construed relations understood relative to gestalt conceptual structures, as in frame semantics (Fillmore 1982). In (8b), the opening of a window cannot be profiled as the start phase of doing homework because there is no role in the conventional doing-homework event structure to which a window, or the opening of a window, can be mapped. As to be expected, when speakers are primed with an unconventional doing-homework frame in which the student must open the window to measure the air temperature outside, the sequential reading becomes acceptable.

3. Beyond Exceptional Cases

It turns out, in fact, that *-ese* constructions can be used to convey more than just sequential or causal relations. The following are a number of additional types:

(10) chayk-ul nwuwe-se ilk-ess-ta
book-ACC lie-ESE read-PST-DEC
'I read the book lying down.' [Temporal Simultaneity]

(11) kelu-se haykyo-ey ka-ss-ta
walk-ESE school-LOC go-PST-DEC
'(He) went to school by walking' [Manner of Motion]

(12) kempwute-lul sse-se swukcey-lul hay-ss-ta
computer-ACC use-ESE homework-ACC do-PST-DEC
'He did his homework using a computer' [Instrumental]

(13) tol-ul tunce-se changmun-ul kkayttu-ly-ess-ta
stone-ACC throw-ESE window-ACC break-CAUS-PST-DEC
'He threw a stone and broke a window (with it)' [Means of Causation]

Although earlier work has largely ignored these uses of *-ese* and provides no way of explaining if or how these relate to the sequential or causal uses, under the current model these readings can be straightforwardly accounted for as variations of the sequential event structure integration along parameters inherent to the conceptual structures.

3.1. Temporal Simultaneity and Variations

In the Temporal Simultaneity sense of the *P-ese Q* construction, process P occurs simultaneously with process Q. In some cases, there may also be the sense that the beginning of process P is before the beginning of process Q. The semantics of this construction can be modeled as a variation of the sequential model where the process P is identified with the main phase of process Q instead of the starting phase. As is the case for sequential *-ese*, because process P is identified with a phase internal to process Q, it must share Q's predicational scope. However, two additional conditions must be met for such a construal: first, the temporal profile of P must be co-extensive with that of the temporal profile of Q's main phase; and secondly, it must be possible for both processes to occur simultaneously even while the processes share a single action chain.

In order for the first of these two conditions to be satisfied, I predict that the P process in simultaneous *-ese* constructions will be limited to a type of verb described in Langacker (1991a:93) as homogeneous but occurring in "bounded episodes." Such verbs in English include *sleep*, *walk*, and *swim*, which are dynamic but cyclical, or static but maintained. They are perfective in that they are bounded within the scope of predication, but because they are internally homogeneous, their temporal extension is flexible. In simultaneous *-ese* constructions, I propose that process P is construed as bound by the start and end states of the main phase of process Q. Such homogeneous, bounded processes cannot be used as the preparatory process of sequential *-ese* constructions because they are, from an external point of view, atelic, resulting in no change of state.

Fulfillment of the second of the above conditions is dependent on the lexical semantics of the verbs in the P and Q clauses. This provides an explanation for the relatively narrow range of possibilities for such constructions. Most examples of

commonly encountered simultaneous *-ese* constructions involve posture verbs in the P clause. Such verbs are often construed with a telic starting phase in which the movement into the posture occurs, and a main phase in which the posture is maintained. In such cases, the integration can happen so that the telic start phase of P is identified with the start phase of Q, and the maintained main phase of P is identified with the main phase of Q. This yields in the intuition mentioned earlier in which in some simultaneous *-ese* usages, the P process seemed to begin slightly prior to the Q process.

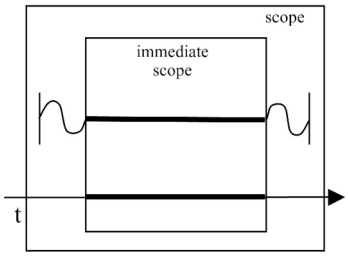
Manner of Motion *-ese* is a variation of simultaneous *-ese* where the P and Q clause verbs are related by what in Talmy (2000:49-57)'s typology of verb lexicalization patterns, is described as "Motion + Path" pattern, where the verb root expresses both Motion and Path, but Co-events, such as Manner, are encoded in a Satellite. Instrumental *-ese* is a variation of simultaneous *-ese* occurring in the limited case where the P clause verb is *ssu-ta* 'to use,' or synonymous to it.

Means of Causation is different from the other two variants in that the causative derivational suffix on the Q clause verb produces a process in which the end state is specified by the meaning of the root, but the main phase is underspecified as to how that end state is reached. The process is thus bounded but internally homogeneous, and differs from the typical simultaneous *-ese* construction in that the dynamic content—the means—is provided by the P clause process, rather than by the Q clause.

4. Support from Progressive Formation

The progressive is formed semantically by imposing an immediate scope of predication within the boundaries of a perfective process such that within that scope the process is construed homogeneously. This configuration is shown below (Langacker 1991a:92):

Figure 4: Progressive Aspect



In Korean, the progressive is formed using a verbal suffix *-ko* followed by the existential verb *iss-ta*. Adopting the approach in Narayanan (1997), I assume that progressive formation targets the main phase of the process. Based on this analysis of the progressive, the semantic interaction between *-ese* constructions and progressive formation is predicted by the model and variations presented in Sections 2 and 3.

Progressive formation in the P clause essentially causes it to become imperfective—unbounded within its scope of predication and homogeneously construed. As such, progressivized P clauses are predicted not to occur with sequential *-ese*. This prediction is born out:

(14) *John-i cip-ey ka-ko iss-ese kongpu hay-ss-ta
John-NOM home-LOC go-PRG PRG-ESE study do-PST-DEC
'*John is going home and then studied (there).'

Temporal Simultaneity, and the Manner of Motion and Instrumental, variations relied on having bounded but internally homogeneous processes in the P clause. Such processes occurred in "bounded episodes" and had flexible temporal extensions such that they could be made temporally co-extensive with the Q clause process's main phase. Applying the progressive would make them unbounded within the imposed scope of predication, destroying their ability to be matched up with a Q process's main phase. The Means of Causation *-ese* construction involved telic and perfective P clause processes, which would be rendered imperfective by progressivization. Thus, all the Temporal Simultaneity based senses are predicted to be incompatible with progressivized P clauses:

(15) *chayk-ul nwue iss-ese ilk-ess-ta
book-ACC lie PRG-ESE read-PST-DEC
'*He read while he was lying down.'

(16) *ttwi-ko iss-ese hakyo-ey ka-ss-ta
run-PRG PRG-ESE school-LOC go-PST-DEC
'*He went to school by being running.'

(17) *kempwute-lul ssu-ko iss-ese swukcey-lul hay-ss-ta
computer-ACC use-PRG PRG-ESE homework-ACC do-PST-DEC
'*He did his homework being using the computer.'

(18) *tol-ul tunci-ko iss-ese changmwun-ul kkaythu-ly-ess-ta
rock-ACC throw-PRG PRG-ESE window-ACC shatter-CAUS-PST-DEC
'*He broke the window by being throwing a rock.'

Finally, the causal reading, which allows imperfective processes in its P clause, is predicted to allow progressivized P clauses. This prediction is also born out:

(19) cip-ey ka-ko iss-ese cyenhwa-lul an pat-na-pota
home-LOC go-PRG PRG-ESE phone-ACC NEG receive-Q-CJTR
'I guess he's not picking up because he's still on his way home.'

The other set of possible constructions with progressive formation are those in which the Q clause has been progressivized. For sequential *-ese*, the present analysis predicts that the sequential meaning will be preserved and that the progressive semantics will target only the Q clause process. This is because the P clause is identified with the starting phase of the Q clause, while progressive formation targets the main phase of Q. The following example fulfills these expectations:

(20) John-i cip-ey ka-se kongpu ha-ko iss-ta
John-NOM home-LOC go-ESE study do-PRG PRG-DEC
'John went home and is studying (there).'

In (20), it is understood that the trip home was completed, and that the subsequent studying is in progress.

For the Temporal Simultaneity based variations of *-ese*, however, the expectations are different. Because for these constructions the P clause event is co-extensively matched with the main phase of the Q clause, the analysis predicts that progressive formation in the Q clause will target both processes. This prediction is born out in the following examples:

(21) chayk-ul nwue-se ilk-ko iss-ta
book-ACC lie-ESE read-PRG PRG-DEC
'He is reading while lying down.'

(22) ttwi-ese hakyo-ey ka-ko iss-ta
run-ESE school-LOC go-PRG PRG-DEC
'He is going to school by running.'

(23) kempwute-lul ssu-ese swukcey-lul ha-ko iss-ta
computer-ACC use-ESE homework-ACC do-PRG PRG-DEC
'He is doing homework using the computer.'

(24) tol-ul tunci-ese changmwun-ul kkaythu-ly-ko iss-ta
stone-ACC throw-ESE window-ACC shatter-CAUS-PRG PRG-DEC
'He is (in the middle of) breaking the window by throwing a stone.'

In each of the sentences above, both the P and the Q processes are understood as being in progress.

Finally, the present analysis predicts that the causal sense of *-ese* should be compatible with progressive formation in its Q clause:

(25) paykopha-se ramyen-ul kkuli-ko iss-ess-ta
hungry-ESE ramen-ACC boil-PRG PRG-PST-DEC
'He was making ramen because he was hungry.'

5. Conclusion

In this paper, I presented a Cognitive Grammar analysis of Korean *-ese*, a multi-functional connective whose many uses were accounted for, descriptively and explanatorily, by models defined in terms of event integration. This approach was found to predict and explain behavior deemed exceptional and mysterious in previous treatments, as well as the existence and behavior of types of *-ese* constructions heretofore largely ignored. Finally, I presented further evidence in support of this model by examining how event integration interacts with the process of progressive formation. The success of this analysis is owed largely to the cognitively sophisticated theoretical framework from which it was developed.

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Exploring Intonation in Guadeloupean Creole*

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0. Introduction

Guadeloupean Creole (GC) is spoken by 430,000 speakers on the archipelago of Guadeloupe and the island of Saint-Martin, in the French West-Indies. It belongs to the group of French-based Creoles spoken in the Caribbean and the Indian Ocean. While GC is not the most widely studied French-based creole, its grammar and lexicon have been described and documented by several authors (Bernabé 1983; Ludwig et al. 1990). However we lack descriptions and analyses of Guadeloupean dialects. The lexicon of the dialectal variety from Marie-Galante, one of the islands from the Guadeloupean archipelago, has been the object of two lexicographic projects (Barbotin 1995; Tourneux and Barbotin 1990). Also the introduction of GC in the classroom as an elective discipline in schools in the form of a *Regional Language and Culture* class in the year 2002 has stimulated more research and generated a number of pedagogical tools. Teachers, who have received the training in what we can call 'literary standard GC' face a number of challenges as they encounter regional variation in classrooms in areas of the island with which they are not familiar. There is undoubtedly an increasing need, even some urgency, to start documenting GC dialects in a systematic way.

Another area of linguistic inquiry which has remained unexplored is prosody and intonation. Matters of prosody and intonation have never been central to the study of any French-based creole. They deserve however some special attention from several points of view. The analysis of prosody and intonation will shed new light on the grammar of these languages. It will also contribute new data to the increasing body of intonation studies of various languages of the world, providing in particular data from less studied languages. Finally it is of interest to under-

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stand how creole intonation systems work, and whether there are special characteristics in their structure and formation. The question how creole intonation systems have emerged and what the underlying principles were in the formation of creole intonation systems has not been addressed as of yet.

This paper presents some results from the first systematic instrumental analysis of intonation in GC. The impact of this research is far reaching and extends well beyond providing a model of intonation in this language. The features of GC intonation will also provide insights into the organization of intonation in French creoles in general and can serve as a foundation for future contrastive analysis between Caribbean French creoles towards the description of common Caribbean French creole intonation patterns. The hypothesis underlying this research is that Caribbean French creoles share some common characteristics in their prosody and intonation. In what follows, section one will introduce the subject selection criteria during fieldwork, section two will discuss the data collection methods and section three will present the characteristics of intonation in GC declarative sentences. Finally, section four will summarize the current model of GC intonation.

1. Subjects

Data were collected on the island of Guadeloupe, which is a French territorial unit with the same status as all territorial units within continental France. The status of Guadeloupe within France is comparable with that of Hawaii within the United States. Therefore all French language and education policies apply in Guadeloupe where the only official language is French. GC, or Creole as it is referred to by native speakers, is acknowledged as a vernacular regional language. Until 2002 no formal training was offered in GC. The use of GC was prohibited in schools. The language is highly stigmatized and associated with lack of education. The majority of the population of Guadeloupe is bilingual, although the level of command of French greatly differs based on level of education, social interactions and socioeconomic status. It is still possible to find monolingual speakers. While they are generally elderly, some monolinguals can still be found among the work force on banana plantations, in the rum industry and other low skilled jobs.

Data for this analysis were collected from four subjects, three women and one man. One woman was monolingual, the others bilingual. The monolingual speaker lived with her monolingual mother, who not only did not speak French, but also did not understand it. While mother and daughter fell in the category of monolinguals, there was an important generational difference in their level of monolingualism. The mother, in her eighties, was completely ignorant of the French language. The daughter, in her fifties, however, had some limited comprehension skills and also used a few set sentences and expressions in French that allowed her to get by in an exclusively French speaking environment.

Just as monolinguals can be broken into different types, bilinguals come in various shades and types in Guadeloupe. The common feature of the bilingual speakers recruited for this study was that they had been bread up in exclusively

monolingual GC speaking households. They had acquired French only later in life through education and other social channels such as the work place. These subjects felt generally more comfortable speaking creole that was their preferred language for informal communication and around other creole speakers. However they had all earned higher education degrees, most commonly equivalent to an associate degree and spoke French with high proficiency.[1] They also used French as the main language in their work place and many other social interactions outside of the network represented by family and friends. All subjects were between 40 and 58 years of age.

2. Data Collection Methods

2.1. Some Data Requirements: Sonorant-Only Sentences

It was paramount to collect tractable data that would generate easily interpretable pitch tracks in speech processing programs. For this reason the ideal sentence was based on sonorant only sounds, which do not present any obstruction to the airflow from the lungs to the end of the vocal tract. However challenging it was to build semantically and pragmatically sound sentences with this restricted sound inventory, it was possible to forge 188 different sentences. Some sentences were exclusively sonorant, others contained a very limited number of non-sonorant sounds. Some examples of words with obstruents are: *Zannanna* 'pineapple', *manje* 'to eat', and some function words, like the negation *pa* and the conjunction *paske* 'because'.

Table 1

Female names	**Male names**	**Verbs**
Lin	*Lwi*	*vwè* 'to see'
Mawlèn	*Alen*	*hele* 'to call'
Emilyèn	*Orelyen*	*enme* 'to like/love'
		malmene 'to mistreat'

The first recording session used three male and three female names as well as four verbs organized into various combinations, listed below in Table 1. The length of the lexical items ranged from monosyllabic to trisyllabic. Combining all names in subject and object position with the four verbs yielded 72 sentences of the type illustrated in (1). This allowed controlling the alignment of pitch events relative to the number of syllables in the same syntactic position. New sentence

[1] An associate degree is earned within two years after completing high school in the French education system.

types and a larger set of vocabulary were introduced in subsequent recording sessions, as illustrated in (2).

(1) *Lin enme Alen.* 'Lynn likes/loves Alan'.
Lwi malmene Emilyèn. 'Louis mistreated Emilienne'.

(2) *Manawa la rann melon la.* 'The prostitute vomited the melon'.
Wonmyè la enme wonm. 'The boozer likes rum'.
Wonmyè la enme manman Lin ki mòl. 'The boozer is in love with Lynn's mother, who is listless'.

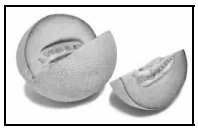
2.2. Image-based Methodology

None of the subjects had received formal education of creole spelling and reading. Some self-taught people on the island write and read Creole, but they follow different, often self-devised principles, in the absence of an official spelling convention. Those who have some exposure to written language have difficulties processing and reading spelling conventions to which they are not commonly exposed. Among the subjects who participated in the study the monolingual subject was illiterate (both in French and Creole), one speaker did not use written Creole and two had some exposure to written Creole in different settings: One regularly read and wrote creole as a language activist, the other read psalms, the Bible and brochures at her Church. For this reason the only possible unified recording method was to translate the sentences into images. Since the lexical items were handpicked in order to fulfill the sonorant-only principle, it was essential to train the subjects to match every image to a specific lexical item. Substitutions and the use of synonyms were discouraged. Figure 1 shows some correspondences between images and lexical items. While in (a) the image is the strict representation of its referent, in many cases the relationship between the image and the lexical item was rather abstract. This is the case with the representation of the verb 'to like/love' (b). Likewise, subjects had to learn that the name of the character in (c) was *Lin* and learn that *Lin* was involved in some situation every time they saw this image in a sentence. The abstract relationship between image and denomination put a higher cognitive load on subjects, and required some time before they became fluent in the use of these words within sentences.

Each recording session started with a lexical training drill, in which subjects either saw new flashcards in order to learn the new vocabulary, or reviewed the vocabulary associated to already familiar images. The more subjects saw the same image, the more comfortable they felt with the use of that lexical item. The goal was to automatically trigger the same response at the sight of given image. Figure 2 illustrates two image based sentences. The GC sentence and translation are provided only for the convenience of the reader. Notice that the subjects did not see any written text and they had to build the sentence from the string of images only. The same sentences were recorded in three different trials. Sometimes the subject repeated the same sentence a couple of times. This commonly occurred in

cases of self-correction and disfluency. While the first trial yielded number of hesitations because subjects were still trying to adjust to the images, the required vocabulary and the organization of the sentence, on the second and third trial sentences were produced fluently as a response to a question.

Figure 1: Flashcards with the corresponding lexical item in GC and meaning in English



(a) *melon* 'melon'

(b) *enmen* 'to like/love'

(c) *Lin* 'Lynn'

Figure 2: Examples of image-based sentences

(a)

Lin enme melon. 'Lynn likes melon.'

(b)

Melani hele manman Lin ki mòl.
'Melanie called Lynn's mother who is listless.'

3. Intonation in Declaratives

The analysis provided in this section is based on the examination of 1,082 declarative sentences. Intonational tones are organized in three prosodic levels, which are from the lowest to the highest, the accentual phrase (AP), the intermediate phrase (ip) and the intonational phrase (IP). The tones in the AP assign a tonal template to this level, which comprises nuclear tones and boundary tones

demarcating the end of this prosodic domain. The intermediate phrase and the intonational phrase receive boundary tones that delimit respectively the boundary between two ip's and close the intonational phrase. The following subsections examine the tonal tunes associated to the accentual phrase and the intermediate phrase that account for the tonal movements within an utterance.

3.1. Types of Tonal Movements

The pitch tracks show that tonal movements are frequent within a sentence. They occur at each lexical word. Short tonal configurations span over small domains, which are the size of a single word or a word and adjacent function words, labeled henceforth the accentual phrase. An AP can receive two different tonal patterns: (a) a rising tune which is realized as a final rise on the last syllable, labeled as 'final rise' or AP1; and (b) a falling tune which is most often realized as a fall on the penultimate syllable, labeled as 'penultimate fall' or AP2. Figure 3 illustrates these two possibilities. Regardless of length and number of syllables the same word, which forms the AP, can receive either a final rise or a penultimate fall. Monosyllabic AP's are no exception and also fall into these two patterns. The final rise appears at the end of the word after a preceding low plateau. What is realized as a 'penultimate fall' in disyllabic and polysyllabic words shows as an initial fall followed by a low plateau within monosyllabic words. Final rises are aligned with the end of the monosyllabic AP, while penultimate falls are aligned early in the beginning of a monosyllabic AP. The pattern in monosyllabic words such as *Lwi* is very similar to the tonal organization in dissyllabic words like *Alen*.

Two facts suggest that the tonal tune assignment occurs at a higher prosodic level than the word. First, the same word can receive different tonal specifications based on its position in the sentence. Therefore these tunes are not tonal templates associated with the word but rather tonal templates that are assigned based on the position within an utterance. On the other hand, the tonal tune does not encompass one word exclusively. Rather it is assigned on a lexical word and adjacent function words, as illustrated with some examples of the use of the postposed definite article *la*. Figure 4 illustrates that the word final rise moves onto the determiner in final position, suggesting that the rise is associated with the last syllable of the domain, not with the last syllable of the word. Likewise the penultimate fall moves from the penultimate syllable of the word onto the last syllable of the lexical word, which is de facto the penultimate syllable of the AP which comprises the lexical word and the determiner.

The smallest unit of GC intonation is a tune that is aligned with a lexical word or a lexical word and adjacent function word. Accentual phrases can receive either one of two tonal templates. The 'final rise' tune comprises a [L L+H-] sequence of tones. The initial L tone accounts for the low plateau in the beginning of the prosodic domain. The L+H accounts for the transition from plateau to final H. The diacritic '–' is used in order to account that this tone also demarcates a domain boundary. The sequence of tones characterizing the 'penultimate fall' is [(H) H+L L-]. The core tonal structure of this tune is [H+L L-] where H+L

indicates the fall aligned with the penultimate syllable and L- the terminal low plateau that also indicates the end of the phrase. The initial (H) represented in parenthesis is an extrapolated H tone that appears in longer AP's with three or more syllables, which is realized between the high tone of the bitonal L+H- boundary of the first phrase and the following penultimate high tone from the bitonal H+L configuration. Figure 6 in the next section provides an example of the realization of this optional high tone, whose presence is determined by domain length. In this case, the optional (H) is realized on the first two syllables in the AP ***zanna****na la.*

Figure 3

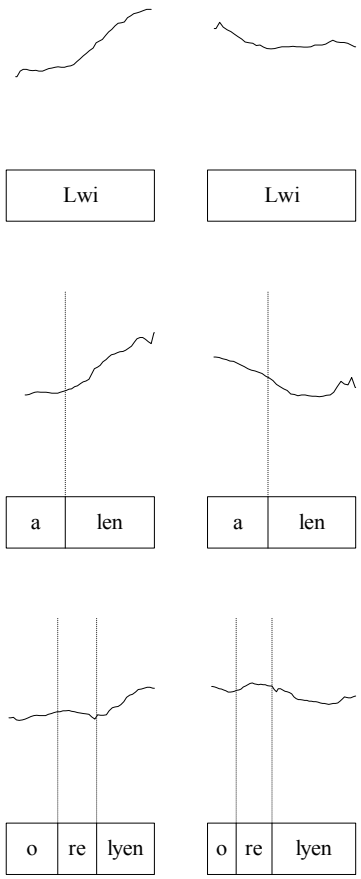
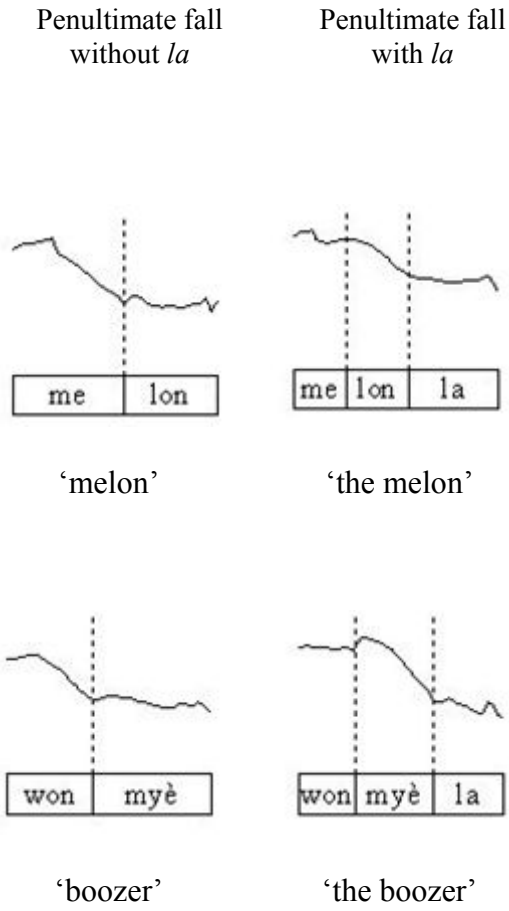


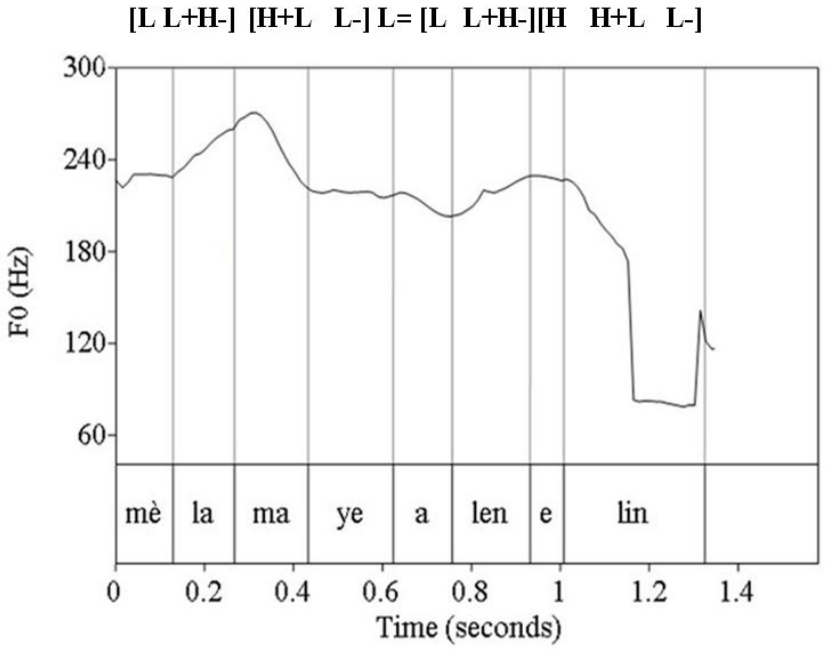
Figure 4



3.2. Tonal Units in the Utterance

The two tonal templates work independently from each other within an utterance, and can combine into different types of groupings. The common grouping in sentence initial position is a sequence of a rise followed by a fall in a cluster of [AP1 AP2]. This configuration resembles either a mound with a flat hilltop or a peak. The flat hilltop comprises the realization of two high tones next to each other. Each one of them belongs to a different accentual phrase, as illustrated in Figure 5. In this utterance made of four lexical words, therefore four tonal units, there are two sequences of rise-and-fall distributed across phrase boundaries, which are *mè* ***la maye*** and ***a*****len e l***in*. The sounds in bold are associated with high tones. There may be variations in the phonetic detail of the realization of the intonational tones. In the case of *mè* ***la maye*** a dominant peak culminates on ***ma****ye*, while for the next combination ***a*****len e l***in* a flat plateau encompasses the end of ***a*****len**, continues within ***e***, to end within the beginning of ***l*****in.** Nevertheless both mounds comprise a [[L+H-]$_{AP1}$ [H+L]$_{AP2}$] sequence with two adjacent highs across the phrase boundary. In the first case the final L+H- of the determiner ***la*** does not reach the level of the high in H+L of ***ma****ye*. This is only a phonetic difference in the realization of the rise-and-fall from the next sequence, where a high plateau is maintained over three syllables.

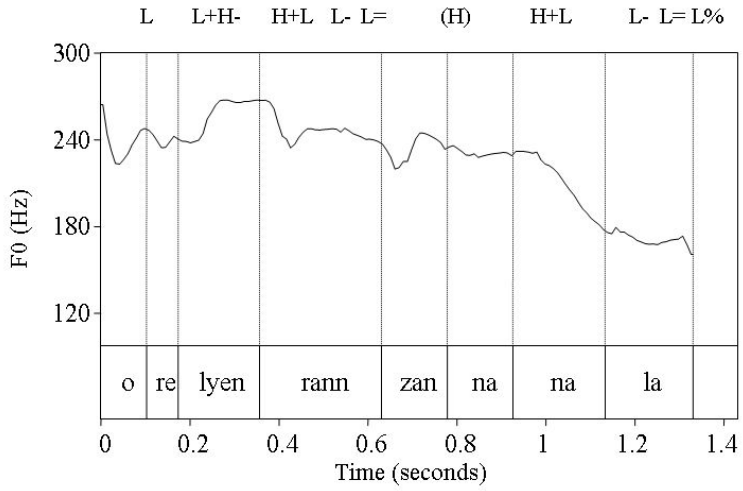
Figure 5: [[*Mè la*]$_{AP1}$ [*maye*]$_{AP2}$]] [[*Alen*]$_{AP1}$ [*e Lin*]$_{AP2}$]. (lit.: Mayor the marry Alan and Lynn.[2]) 'The justice of the peace married Alan and Lynn.'



[2] In France and its territories weddings are officiated by the mayor or the deputy mayor.

The model cannot rely on the perfect sequencing of rise-and-fall which calls for an even number of lexical words and needs to account for the realization of utterances with an odd number of AP's. The utterance in Figure 6 comprises three lexical words, which constitute three accentual phrases. The utterance initial rise-and-fall is followed by a single penultimate fall associated with *zannanna la*. Penultimate falls without a preceding rise are very common in the corpus, and they are not exclusively associated to sentences with an odd number of accentual phrases. In other words, two adjacent accentual phrases can be realized either as a cluster of rise-and-fall, or as two consecutive falls. Three principles rule the combination of rising and falling accentual phrases: (i) rise-and-fall is required in the beginning of the intonational phrase, (ii) a rising AP is always followed by a fall, (iii) all intonational phrases finish by a penultimate fall.

Figure 6: [[*Orelyen*]$_{AP1}$ [*rann*]$_{AP2}$] [[*zannanna la*]$_{AP2}$]. (lit.: Aurelian vomit pineapple the.) 'Aurelian vomited the pineapple'.



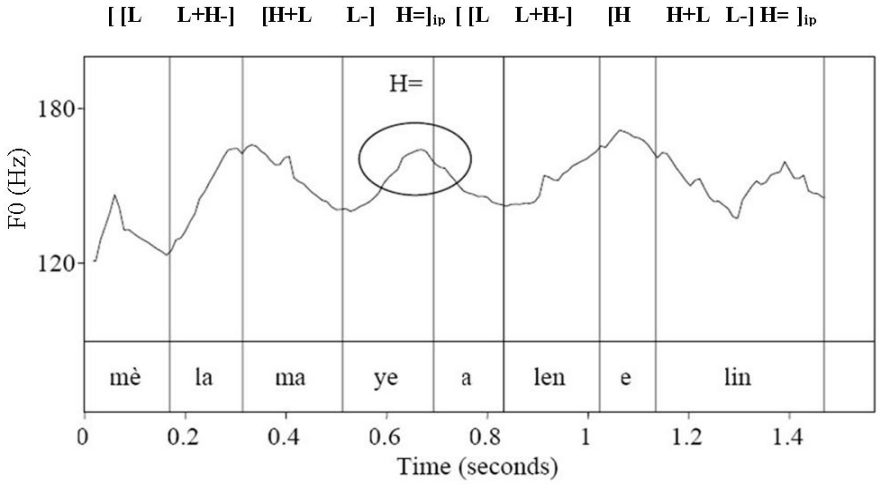
3.3. Downstep and the Realization of the Intermediate Phrase

Figure 6 illustrates another common characteristic of the system, which is down-step. The high tones in the third AP, *zannanna la*, are at a lower level than the high tones in the preceding rise-and-fall. They are also at the level of the low tones in the preceding rise-and-fall. In GC accentual phrases cluster into a larger prosodic unit, the intermediate phrase. In the data the ip can comprise one or two accentual phrases. A rise-and-fall combines within an ip. A penultimate fall can constitute an ip on its own.

The ip is closed by an edge tone, which can be high (H=) or low (L=). The diacritic '=' is not commonly used in ToBI transcription systems. However, in order to maintain the separation of levels, and before devising a synthetic transcription system for GC, it is helpful to distinguish between the edge tones of the AP, symbolized by "-," the edge tones of the ip, symbolized by "=" and the boundary tones of the intonational phrase symbolized by "%." The utterance *Mè*

la maye Alen e Lin illustrated in Figure 5 can also be uttered as in Figure 7. The only difference between the two pitch tracks is the realization of a H= at the end of *maye* in Figure 7, which is a L= in Figure 5. In Figure 5, as well as in Figure 6, the second portion of the sentence is downstepped. However, downstep does not occur in Figure 7 after a H=. In this intonation system, the L= tone that closes an ip triggers downstep in the following ip. Hence the domain of realization of downstep is the intermediate phrase. On the contrary, a H= ip boundary blocks downstep.

Figure 7: Realization of H= intermediate phrase boundary tone



One ip comprises either a sequence of [AP1 AP2], or an [AP2] alone. The former situation is illustrated in utterance initial position in all the examples, as well as in the second ip in Figure 5 and Figure 7. The latter situation is illustrated in Figure 6. The transcriptions below account for the organization of the intonational tones into the different prosodic levels. The diacritic "!" was added in front of a H tone to indicate downstep.

(3) Figure 5: *Mè la maye Alen e Lin*.
[[[L L+H-]$_{AP1}$ [H+L L-]$_{AP2}$ L=]$_{ip}$ [[L L+!H-]$_{AP1}$ [H H+L L-]$_{AP2}$ L=]$_{ip}$ L%]$_{IP}$

(4) Figure 6: *Orelyen rann zannanna la*.
[[[L L+H-]$_{AP1}$ [H+L L-]$_{AP2}$ L=]$_{ip}$ [[!H H+L L-]$_{AP2}$ L=]$_{ip}$ L%]$_{IP}$

(5) Figure 7: *Mè la maye Alen e Lin*.
[[[L L+H-]$_{AP1}$ [H+L L-]$_{AP2}$ H=]$_{ip}$ [[L L+H-]$_{AP1}$ [H H+L L-]$_{AP2}$ L=]$_{ip}$]$^{3}_{IP}$

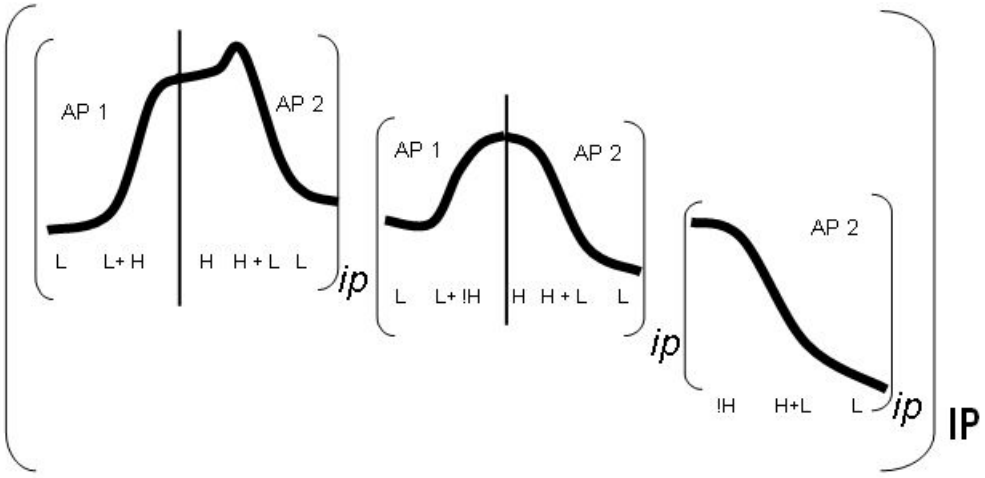
[3] The boundary tones that close the IP are intentionally omitted since this article does not discuss the tones associated to the intonational phrase.

4. Model of GC Intonation

The smallest intonation grouping in GC is the AP. An AP is of the size of a lexical word combined with adjacent function words. There are two types of accentual phrases, a rising phrase or AP1 and a falling phrase or AP2. AP1 comprises an initial L tone, and an edge marking H+L- tone. AP2 comprises a H+L fall and a L- final tone. When the AP has three or more syllables, an optional H tone is inserted in the beginning of AP2. The text-to-tune alignment is based on the position of the syllable within the AP. Besides providing different tonal specification to the phrase, AP1 and AP2 are in a dependency relationship: AP1 entails AP2, but AP2, can stand alone without AP1. Phrasing rules require that an utterance starts with a cluster of AP1 followed by AP2 and that it finishes by AP2. For this reason final rise is present at the end of every initial phrase in a sentence and a penultimate fall is found in every last lexical word of the utterance.

The two phrases combine together into a larger grouping, the intermediate phrase. As a result of the relative freedom of AP2, whenever there is AP1, the ip comprises a sequence $[AP1+AP2]_{ip}$, but when an AP2 is not preceded by an AP1 it can constitute an ip on its own. Therefore an ip is necessarily closed by an AP2. Intermediate phrases are marked by a phrasal tone, that can be either L= or H=. Intermediate phrases are the domain of downstep, and downstep is frequently found in declarative sentences in GC. When an ip follows a L= ip boundary it is downstepped. However, a H= ip boundary blocks dowsntep.

Figure 8: Model of Guadeloupean Creole intonation



The characteristics of the base model for declarative sentences in GC are summarized in Figure 8. The diagram captures the combination of AP1 and AP2 into intermediate phrases, as well as the fact that an AP2 alone can constitute an intermediate phrase on its own. Intermediate phrases are subject to downstep unless the latter is blocked by a H= tone (not represented on the diagram). Finally,

several intermediate phrases combine into an intonational phrase. A requirement of the intonational phrase is to start with an AP1 and to finish with an AP2.

5. Conclusion

The most intriguing issue in creole intonation systems is their origin and their formation. The intonation system of GC displays characteristics that are very different from standard French. This suggests one of two hypotheses. Either this intonation system reflects older stages of Colonial French intonation or it has emerged from prosodic characteristics of the substrate languages. Most likely the creolization of intonation has incorporated features from both systems. Successful understanding of the processes that took place during creolization requires two main directions for future research: The exploration of intonation systems in the Bantu languages from the Congo-Angola region (based on the demographic analysis proposed by Singler (1995)) in order to grasp the relevance of substrate languages, and the analysis of intonation in transastlantic varieties of French, with particular attention to Cajun and the Patois of St Barth, the French dialect that is considered to be the closest to Colonial French (Chaudenson 2004) in order to assess the controbution of the lexifier.

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Multidirectional Vowel Harmony in Esimbi

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0. Introduction

The theoretical literature on vowel harmony makes a distinction between stem-controlled and dominant systems. In the former, the stem is the source of the harmony, and vowels in affixes harmonize to the stem. In languages which are both prefixing and suffixing, harmony spreads linearly from the stem bidirectionally (right to left and left to right). The latter depends on a specific harmonizing feature, often present in an affix, which triggers harmony throughout the harmonic domain (Hulst and Weijer 1995). The distinction between these harmonic systems is the source. In stem-controlled harmony, the harmonic features spread from the stem, while in dominant harmony, the feature can spread from an affix vowel. Regardless of this distinction, however, both systems make use of a single source of harmony. While both of these types of harmony are well-attested, a language with multiple sources of harmony within the same harmonic domain is rare. In Esimbi (Southern Bantoid: Cameroon), the reduplicated progressive verbal paradigm exhibits both stem-controlled and prefix-controlled harmonic processes within the same domain. These two sources of harmony, the stem and the subject prefix, give rise to a vowel harmony system which is multidirectional, both linearly (left to right and right to left) and morphologically (stem-controlled and prefix-controlled).

Esimbi is spoken by 20,000 people in 11 villages of the Northwest Province of Cameroon, centered in the village of Benakuma. According to Ethnologue (Gordon 2005), the language is classified as Tivoid by virtue of lexical similarity (35%) with other Tivoid languages. Both the Esimbi and other inhabitants of the province, however, report that the Esimbi people are "different" from other people in the area. Both their language and their social customs set them apart from their neighbors. One of the most unique aspects of the language is its vowel harmony.

Previous work on vowel harmony in Esimbi has situated the language typologically within the stem-controlled systems of harmony. The vowel harmony of nouns has been described by Stallcup (1980) and Hyman (1988), and the majority of the verbal paradigms exhibit the same harmonic processes as nouns. This

paper's contribution to the description of vowel harmony in Esimbi is the prefix-controlled harmony present in the reduplicated progressive paradigm, which effectively reclassifies the language in regards to the typology of known vowel harmony systems. Section 1 summarizes the two stem-controlled processes already described. Section 2 introduces prefix-controlled vowel harmony and describes the interaction between the three harmonic processes at work in the progressive paradigm. Section 3 suggests theoretical implications for vowel harmony based on the Esimbi data. It is not the goal of this paper to provide a solution which accounts for the new data. Rather, the present work is a description of the vowel harmony present in Esimbi and a brief explanation of the challenges it presents to the theoretical frameworks employed up to this point.

1. Stem-Controlled Harmony

Esimbi has a noun class system typical of Bantoid languages. There are fifteen fully productive noun classes, and concord is overtly marked throughout the noun phrase. Nouns are marked with a class prefix, and the verbal subject prefix agrees in class with the subject of the phrase. It is these subject and class prefixes which are the targets of stem-controlled vowel harmony.

There are two stem-controlled harmonic processes in Esimbi. The first is a diachronic process which affects the height of class prefixes, and occurs in all nouns and verbs. The second is a synchronic backness harmony which also targets both nouns and verbs, but is more selective in its distribution.

1.1. Vowel Inventory and Height Harmony

There are eight vowels in Esimbi, given in (1). While all vowels appear in prefixes, only high vowels (i,ə,u) occur in noun and verb stems.

(1) Vowel Inventory

	front	central	back
high	i	ə	u
mid	e		o
	ɛ		ɔ
low		a	

The atypical unequal distribution of prefix and stem vowels can be accounted for historically. Reconstructed forms show a more typical vowel distribution; only four vowels (i,e,a,u) occurred in prefixes, while the entire range of vowels occurred in stems. Stallcup's explanation of the current distribution shows two stages, illustrated in (2). In the first stage, prefix vowels harmonized in height with stem vowels. Once stem height was expressed on the prefix vowels as a completely regular process, the stem vowels were systematically raised to high. The result is a system in which the underlying vowel height of the stem is syn-

chronically realized solely on the prefix. Table (2), adapted from Stallcup (1980), shows this process with three nouns from Class 3. The first column shows the Proto-Bantu reconstructions of the noun stems, which are cognates of the Esimbi forms. In Pre-Esimbi, we see the addition of the Class 3 prefix *u-* to noun stems of varying vowel height. In the height harmony stage, the prefix vowel is changed to agree in height with the vowel of the noun stem, while maintaining its own backness. In the last stage, the vowels of the stems are raised to [+high], leaving the prefix alone to realize the original height distinction.

(2) Historical Height Harmony

Class 3 Nouns	Proto-Bantu	Pre-Esimbi	Height Harmony	Stem Raising
'death'	*-ku	*ú-kú	*ú-kú	ú-kú
'tail'	*-keda	*ú-kye	*ó-kye	ó-kyi
'thigh'	*-nama	*ú-nàmà	*ɔ́-nàmà	ɔ́-nəmə̀

Synchronically, the loss of vowel height has given rise to a large number of homophonous noun and verb stems. Since it is the height of the prefix vowel which disambiguates, bare noun stems do not occur. In the verbal paradigm, however, the imperative forms are realized as bare verb stems. Thus, the majority of imperatives are homophonous, and rely on context for disambiguation.

There are still four prefix vowels in Esimbi, but each vowel must now be able to exhibit the three-way height distinction which the stems lost. Table (3) shows the allophonic variation of these four vowels. The variant is chosen which matches the underlying height of the stem. A stem with a vowel that was historically high will select the highest vowel of the appropriate vowel set. Likewise, a stem that was historically mid will select the middle vowel and a historically low stem will select the lowest vowel. Note that the surface form of a prefix vowel is often ambiguous in terms of height. A surface *ɛ*, for instance, could be either the lowest realization of the *I-* prefix or the middle realization of the *E-* prefix.

(3) Prefix Vowel Heights

I-	E-	A-	U-
i-			u-
e-	e-	o-	o-
ɛ-	ɛ-	ɔ-	ɔ-
	a-	a-	

An example of prefixes disambiguating homophonous stems is given in (4) with the infinitive form of three verbs. The infinitive prefix is *kA-*, with allophones *ko*, *kɔ*, and *ka*. The underlying height of stems are indicated in all examples with a subscript [H], [M], or [L]. The imperative forms of these verbs shows the near

homophony of these three. Only the last one, 'stay', is further disambiguated by tone.

(4)

ko-mu$_{[H]}$	'to drink'	Mu!	'Drink!'
kɔ-mu$_{[M]}$	'to go up'	Mu!	'Go up!'
ka-mù$_{[L]}$	'to stay'	Mù!	'Stay!'

1.2. *A*- Harmony

The second stem-controlled harmonic process targets prefixes with the *A*- vowel. When this vowel occurs with a stem that selects the middle vowel, the prefix vowel, *ɔ*, harmonizes in backness with the stem. If the stem vowel is back or central (u,ə), the prefix vowel is *ɔ*. If the stem vowel is front (*i*), the prefix vowel fronts to *ɛ*. This harmony, illustrated in (5), occurs in both nouns and verbs. The example uses the *kA*- infinitive prefix. Notice that the prefix vowel is the corresponding *A*- vowel (*o,ɔ,a*) except when the underlying stem vowel is mid-front. High and low allophones of this prefix vowel do not participate in this process.

(5) Infinitives

	front stem vowel	central stem vowel	back stem vowel
high	ko-ri$_{[H]}$ 'eat'		ko-mu$_{[H]}$ 'drink'
mid	**kɛ-bi$_{[M]}$ 'boil'**	kɔ-gbə$_{[M]}$ 'die'	kɔ-mu$_{[M]}$ 'go up'
low	ka-tili$_{[L]}$ 'be slippery'	ka-təbə$_{[L]}$ 'grow'	ka-mu$_{[L]}$ 'stay'

1.3. An Underspecification Approach

The first theoretical work on Esimbi approached the data from the point-of-view of underspecification. In Hyman (1988), a feature system was introduced which posited two underlying prefix vowels, *I*- and *U*-, and derived the other two prefix vowels from them by way of the [+/- ATR] feature. *A*- was described as a lowered variant of *U*-, and *E*- a lowered variant of *I*-. This allowed the possibility of a single surface form to be associated with two different sets of features, given in (6), adapted from Hyman (1988:265). This two-to-one mapping was considered necessary since there is significant overlap in the prefix allophones.

(6) Vowel Features

[+high, -low, +ATR]	i, ə, u
[+high, -low, -ATR] / [-high, -low, +ATR]	e,o
[-high, -low, -ATR] / [-high, +low, +ATR]	ɛ, ɔ
[-high, +low, -ATR]	a

Height was transferred from stem to prefix before vowels were fully specified, and any vowels which remained unspecified for height, namely stem vowels,

were assigned [+high] as a default. *A-* harmony was described as a secondary process.

1.4. An Optimality Theory Approach

Height transfer was discussed in an Optimality Theory framework in Walker (1999). In the analysis, root faith is ranked higher than affix faith, allowing the height of the root to be realized instead of the height of the prefix. A licensing constraint accounts for the transfer of height to the prefix by stipulating that non-high root heights can only be realized on the first syllable of the word. These constraints, presented in (7) below, operate in tandem with an epenthetic [+high] feature and a requirement that features not be double-linked.

(7) Constraint Ranking

Faith: MAX-ROOT[height] >> *[-high] >> MAX-AFFIX[height], DEP[+high]
Licensing: LICENSE([-high], σ_1) >> MAX-AFFIX[height], DEP[+high]
Tautosyllabicity: TAUT-SYLL[height] >> DEP[+high]

While these constraints accounted for all of the noun-class data available at the time, they are based on the assumption that stem height must be realized somewhere in order to prevent homophony. The prediction that follows is that the first syllable of a word exhibits the full range of vowel height even if it is a bare stem. The existence of homophonous imperatives from (4) above, however, is evidence against this prediction.

2. The Reduplicated Progressive Aspect

While the two stem-controlled harmonic processes discussed in Section 1 occur systematically throughout Esimbi, prefix-controlled harmony is much smaller in scope. It occurs in the reduplicated progressive paradigm, where two prefixes co-occur. The progressive aspect in Esimbi is given in (8) and illustrated with the verb *ko-ri*$_{[H]}$ 'eat' in (9). The leftmost morpheme is a subject prefix. It agrees with the subject either in person/number or in class. It is followed by a reduplication of the first syllable of the verb stem. Between the reduplicated syllable and the verb stem is what will be referred to as the "progressive vowel" (VPRG.), an epenthetic vowel which occurs only in this construction. The verb stem follows this progressive vowel. If the stem is monosyllabic, an extension in the form of *-nV* is added, the V being identical to the stem vowel.

(8) SUBJ PREFIX + REDUP + VPRG. + stem (+NV)

(9) mi.rié.ri.ni

mi-	ri-	é-	$ri_{[H]-}$	ni
1SG-	eat.REDUP-	V.PRG-	eat-	EXT

'I am eating.'

2.1. Subject Prefixes

The subject prefix vowels are of two different types. Some are invariant for height, while others exhibit the three-way height distinction typical of prefixes. Subject prefixes for each person and class are given in (10). Variable prefix vowels are listed with a capital letter and invariant ones in lowercase. Only back vowels are of variable height, but not all back vowels participate in height harmony. For example, 2sg/pl *wu-* and Class 12 *ku-* are invariant back vowel prefixes. It is possible for subject prefixes in this construction to be invariant for height because it is the progressive vowel, as we shall see below, which obligatorily exhibits the three-way height distinction.

(10) Subject Prefixes

1sg	*mi-*	Class 6a	*mU-*
1pl	*si-*	Class 8	*mi-*
2sg/pl	*wu-*	Class 9	*i-*
3sg	*U-*	Class 10	*i-*
3pl	*mɘ-*	Class 12	*ku-*
Class 1	*U-*	Class 13	*ti-*
Class 2	*mU-*	Class 14	*mU-*
Class 3	*U-*	Class 18	*mU-*
Class 5/7	*ki-*	Class 19	*si-*
Class 6	*U-*		

Examples (11) and (12) provide a contrast between variable and invariable prefixes. (11) uses the invariable second person prefix *wu-*, while (12) has the variable 3SG prefix *U-*, with allophones *u,o,* and *ɔ*. The vowels under consideration are underlined in the examples.

(11) wu̲.m(u)ó.$mu_{[H]}$.nu 'You are drinking.'
wu̲.m(u)ɔ́.$mu_{[M]}$.nu 'You are going up.'
wu̲.m(u)á.$mu_{[L]}$.nu 'You are staying.'

(12) u̲.m(u)ó.$mu_{[H]}$.nu 'He is drinking.'
o̲.m(u)ɔ́.$mu_{[M]}$.nu 'He is going up.'
ɔ̲.m(u)á.$mu_{[L]}$.nu 'He is staying.'

2.2. Reduplicated Vowels

The vowel of the reduplicated syllable, the second element of this construction, is often deleted or reduced by additional phonological processes. First, if this vowel is the central vowel, *ɔ*, it is deleted, as in (13).

(13) mi.gbɛ̲.gbə.nə

mi-	gbə̲-	ɛ-	gbə [M]-	nə
1SG-	die.REDUP-	V.PRG-	die-	EXT

'I am dying.'

If the reduplicated vowel is of the same backness as the progressive vowel, it is either deleted or forms a diphthong, as shown in (14). These two possibilities are in free variation, though individual speakers are more or less consistent.

(14) mi.biɛ̲.bi.ni. *or* mi.bɛ̲.bi.ni

mi-	bi̲-	ɛ-	bi[M]-	ni
1SG-	boil.REDUP-	V.PRG-	boil-	EXT

'I am boiling.'

Finally, when the reduplicated vowel is of the opposite backness as the progressive vowel, it forms a diphthong, as illustrated in (15).

(15) mi.zuɛ̲.zu.mu

mi-	zu̲-	ɛ-	zumu[M]
1SG-	dry.out.REDUP-	V.PRG-	dry.out

'I am drying out.'

2.3. The Progressive Vowel and Prefix-Controlled Harmony

The progressive vowel is the most susceptible to harmonic processes. It belongs to one of the 'lower' vowel series, *E*- or *A*-. That is, the highest vowel that appears is *e* or *o*. Example (11), repeated below as (16), shows the stem-controlled height harmony of the progressive vowel. Since the second person prefix is invariant (*wu*-), the progressive vowel is the only difference in this minimal triplet.

(16) wu.m(u)ó̲.mu[H].nu 'You are drinking.'
wu.m(u)ɔ̲́.mu[M].nu 'You are going up.'
wu.m(u)á̲.mu[L].nu 'You are staying.'

This vowel also participates in stem-controlled *A*- harmony. As (17) shows, when the stem vowel is front and the underlying height is mid, the progressive vowel is ɛ rather than *ɔ*.

(17)	mi.ch(i)ɛ̲.chi.shi$_{[M]}$	'I am teaching'
	wu.ch(i)ɛ̲.chi.shi$_{[M]}$	'You are teaching'
	u.ch(i)ɛ̲.chi.shi$_{[M]}$	'He is teaching'
	si.ch(i)ɛ̲.chi.shi$_{[M]}$	'We are teaching'
	mə.ch(i)ɛ̲.chi.shi$_{[M]}$	'They are teaching'

The progressive vowel is also the target of prefix-controlled backness harmony. If not overridden by *A*- harmony, this vowel agrees in backness with the subject prefix. This can be seen in the examples in (18). A front prefix vowel occurs with a front progressive vowel, while a non-front prefix vowel (*ə* or back) occurs with a back progressive vowel. It must be the subject prefix which triggers this harmony, rather than the progressive vowel, as subject prefixes are invariant for backness.

(18)	mi.r(i)e̲.ri.ni	'I am eating'
	wu.rio̲.ri.ni	'You are eating'
	u.rio̲.ri.ni	'He is eating'
	si.rie̲.ri.ni	'We are eating'
	mə.rio̲.ri.ni	'They are eating'

The value of the progressive vowel is different from any of the prefix vowels in Esimbi. It is a lowered vowel, which rules out *U*- or *I*-. It participates in *A*-harmony, however it is fronted regardless of height in the presence of a front subject prefix vowel. Since *A*- only has a fronted mid allophone, the presence of a fronted high allophone discounts *A*- as the underlying form. In fact, the only feature that this vowel has inherently is what Hyman (1988) would label [-ATR]. It has no underlying height, as the stem determines the height, and it has no underlying backness, as backness is determined either by the stem if it is mid-front (*A*- harmony) or by the subject prefix. It has been suggested that the progressive vowel is allophonic, either *E*- or *A*- depending on the backness of the subject prefix; however the selection of an underspecified allomorph based on the quality of the vowel of a different prefix is a rare, if even attested, phenomenon.

3. Conclusions and Implications

Vowel harmony in Esimbi involves three phonological processes. The first, transfer of underlying height from stem to prefix, is diachronically a vowel harmony process but synchronically best described in terms of feature transfer since the harmonizing height feature does not appear in the surface form of the stem. The second process, *A*- harmony, falls into the domain of stem-controlled vowel harmony: a front vowel in the stem causes the mid prefix vowel to be fronted. However this process only affects prefix vowels belonging to the *A*-series. The same surface vowel, if an allophone of *U*-, is unaffected by harmony. The third harmony moves in the opposite direction, from left to right. The source

is the subject prefix, and it targets the non-stem "progressive vowel". These three harmonic processes converge on the progressive vowel in such a way that its height is determined by the stem, to its right, and its backness is determined either by the stem (if it is mid-front) or more commonly by the subject prefix to its left.

The challenges that the Esimbi data provide to a theoretical description are numerous. First, the underlying stem height is not always expressed. The imperative is a bare verb stem in which the underlying stem height is not realized. Second, vowel height is transferred to either just the progressive vowel, in the case of invariant subject prefixes, or to both the progressive vowel and the subject prefix vowel, in the case of variable prefixes. Third, the stem vowel determines the backness of the progressive vowel only if the stem vowel is front and underlyingly mid. Finally, the subject prefix determines the backness of the progressive vowel if the stem doesn't. This creates a system with a second source of harmony which spreads in the opposite linear direction (left to right). The theoretical descriptions provided for the noun system in Hyman (1988) and Walker (1999) adequately describe height transfer for the data that were available at the time; however neither of them account for the progressive verb data without modification. Future fieldwork on Esimbi will help to situate these data both in the grammar of Esimbi and in a broader typological framework of vowel harmony.

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A Study on Perceptual Compensation for /u/-fronting in American English

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0. Introduction

There is an undeniable link between speech production and speech perception. In running speech, the phonetic form of consonants and vowels varies due to the overlapping of adjacent articulations (coarticulation). However, the listener hears them as if there were no coarticulatory distortions on the segments. The latter phenomenon—perceptual compensation for coarticulation, a type of context effect whereby a listener's perception of speech segments is influenced by surrounding sounds so as to 'undo' coarticulation—is the topic of the current study.

This is an important area of inquiry because of its contributions to the linguistic theories of sound change and theories of speech perception in general. Sound change refers to change in pronunciation norms over time in a speech community, and one major cause for common sound changes is listeners' misperception of contextually perturbed speech sounds (Ohala 1981, 1993). Since compensation prevents this particular type of misperception, it is an essential component of the theory of sound change. Although much work has been devoted to this topic (see, e.g., Repp 1982; Diehl, Lotto, & Holt 2004 for reviews), exactly how the human auditory system achieves compensation is yet to be fully understood, and more studies are needed to this end. This paper will report one such study, an experimental study on compensation for /u/-fronting in an alveolar context.

1. Background

1.1. Hypo-Correction

Ohala (1981, 1993) proposed a theory of sound change due to the listener's misperception. The theory acknowledges considerable variations in the phonetic form of functionally equivalent speech units, and states that when encountering coarticulatory speech variation, listeners either: 1) perceptually compensate for predictable variations and arrive at the pronunciation target intended by the speaker, or 2) fail to compensate for coarticulation and assume that the coarticulated form is the intended pronunciation. The former scenario describes what happens in normal speech perception; the latter, what happens in the type of

misperception termed 'hypo-correction'.[1] According to Ohala, hypo-correction is the underlying mechanism for many assimilatory sound changes.

The key concept of hypo-correction is that 'contextually induced' perturbation is interpreted by a listener as an 'intended' feature of the speech sound. In this way, hypo-correction has the potential to alter the listener's phonological grammar by what Hyman (1976:408) called 'phonologization,' a process whereby intrinsic/automatic variation becomes extrinsic/controlled. Today, many researchers analyze sound change as a result of phonologization (e.g., Barnes 2006, Blevins 2004, Blevins & Garrett 1998, Yu 2004), underscoring the theoretical importance of hypo-correction as a precondition for sound change via phonologization.

1.2. Compensation for Coarticulation

Listeners' ability to normalize coarticulation has been demonstrated in many studies. For example, Lindblom and Studdert-Kennedy (1967) examined listeners' recognition of a vowel in a series of [jVj] and [wVw] syllables varying perceptually from /CɪC/ to /CʊC/, and found that ambiguous vowel stimuli were more often heard as /ʊ/ in the [j_j] context as opposed to the [w_w] context. Their results indicate that a listener's categorization boundary on a vowel continuum shifts toward the /ɪ/-end in the [j_j] context. Similar results were obtained by Ohala and Feder (1994), where their American listeners judged a vowel stimulus ambiguous between /i/ and /u/ more frequently as /u/ in an alveolar context than in a bilabial context. The listener's response in these studies mirrors coarticulatory fronting of a high back vowel in palatal and alveolar contexts.

Listeners are also capable of taking non-segmental contexts into account in judging speech sounds. In the above mentioned study, Lindblom and Studdert-Kennedy found a greater boundary shift in shorter speech stimuli than in longer ones, indicating that their listeners employed greater compensation in response to faster speech (as the listener would measure speech rate from the duration of the vowel). Ladefoged and Broadbent (1957) tested, among other things, listeners' identification of a vowel stimulus from an /i/-to-/ɛ/ continuum after a precursor phrase, F1 of which was shifted up or down. They showed that ambiguous vowels were more often heard as /i/ (with lower F1) when the precursor phrase had high F1 than low F1, presumably because their listeners took the overall low- or high-frequency context into account when judging the height of the target vowel.

These findings suggest that compensation and other contrastive context effects are closely related phenomena, and that compensation is achieved by a dynamic process, involving not only a local-level adjustment (i.e. adjusting the interpretation of a target acoustic signal relative to the immediate context), but also a

[1] The theory acknowledges two systems of 'hearing' sounds—the peripheral system that detects change in acoustic energy (sensation) and the central system that interprets input from the peripheral system (perception). By explicitly stating that what listeners 'hear' may not be attributed to acoustic properties alone, it highlights the role of expectation at higher level of processing.

larger-level adjustment or some sort of transformation of perceptual scale that relates to time normalization as well as adjustment over larger time windows.

1.3. Cause of Hypo-Correction

Ohala points out that hypo-correction occurs when a listener fails to employ compensation, or more specifically, when the listener lacks experience with various contextual variations that enables him/her to do such correction, or fails to detect the conditioning environment due to various reasons such as noise and filtering associated with communication channels (1993:246-7).

However, later studies suggest that there could be yet another reason for hypo-correction to occur—namely, 'variation' in the compensation. For example, Beddor and Krakow (1999) tested American listeners' nasality judgments on the nasalized vowel [ɛ̃]/[õ] between nasal consonants ([mṼn]), on oral vowels [ɛ]/[o] between oral consonants ([bVd]), and on the same oral vowels in isolation ([#V#]), and found that 25% of [Ṽ] in nasal contexts were heard as more nasal than [V] in oral contexts, showing that compensation was not complete or uniform.

Later, Harrington et al. (2008) demonstrated systematic variation in compensation between young and old listeners. They compared the two groups' identification of a vowel from an /i/-to-/u/ continuum in palatal ([j_st]) and labial ([sw_p]) contexts. Both groups' category boundaries were at comparable points on the palatal continuum and were closer to the /i/-end than on the labial continuum, showing a compensation effect. However, the younger group's boundary on the labial continuum was much closer to the boundary on the palatal continuum, indicating less compensation than the older group. According to the authors, these results reflected a difference in the listeners' own speech production: Younger speakers' /u/ was generally more fronted than older speakers'.

These findings suggest that listeners compensate for only as much coarticulation as is expected in their own grammar, and that this 'compensation grammar' is, just as other components of grammar, shaped by the listener's previous linguistic experience. Following from this, one might then add to Ohala's list of causes of hypo-correction differences in the coarticulation/compensation norm (grammar) between a speaker and a listener, which could result in occasions where a listener employs compensation and still fails to extract from a heavily coarticulated speech segment 'the same pronunciation target intended by the speaker'.

1.4. Hypotheses and Research Questions

One aim of the current study is to replicate and elaborate three findings from previous work. Firstly, it aims to replicate Ohala and Feder's (1994) findings of perceptual compensation for /u/-fronting in an alveolar context.[2] Secondly, it

[2] The study also tried to replicate Ohala and Feder's (1994) findings that perceptual compensation can be caused not only by acoustic context but also by assumed, or 'restored,' context. The study did not find an effect of restored context and this part of the study is not reported in this paper. See Kataoka (2009) for the details.

aims to replicate Lindblom and Studdert-Kennedy's (1967) findings of speech rate effects on compensation. Thirdly, it aims to elaborate the findings of Harrington et al. (2008) by testing for systematic differences in category boundaries across listeners. Following Harrington et al., compensation is operationally defined as shift in category boundary on the stimulus continuum as a function of phonetic context. This effect is tested by using an /i/-/u/ continuum in [b_p] and [d_t] contexts. Thus, the following three hypotheses were formulated:

(1) a. H1: The /i/-/u/ category boundary will be shifted towards the /i/-end (more stimuli will be heard as /u/) when the vowel is heard in the alveolar context as compared to the bilabial context.
b. H2: Greater boundary shifts will be observed when the stimuli are spoken in fast speech as compared to slow speech.
c. H3: Category boundary will vary across listeners systematically.

In addition to testing these hypotheses, the study addresses an issue of exactly how context alters perception of a target sound. One particularly heated debate concerns whether compensation is achieved by gestural perception (e.g., Liberman & Mattingly 1985, Fowler 1986) or by spectral contrast (Lotto, Kluender & Holt 1997). The spectral contrast view has strong support such as the finding that both speech and non-speech contexts induce comparable compensation effects (Holt & Kluender 2000), dismissing the need to access the representations for speech production. However, there have been ample demonstrations that compensation can be mediated by non-acoustic cues such as visual information (Fowler et al. 2000) and lexical status of the context (Elman & McClelland 1988), suggesting that spectral contrast alone does not account for the full range of effects.

The current study aims to contribute to this debate by investigating the effect of a natural precursor phrase on compensation and by examining the reaction time (RT). Will an additional precursor affect compensation, by possibly encouraging the listeners to engage in a speech mode of processing? Does the precursor provide facilitative or impeding effects on phoneme identification that can be observed in RT data? These are the additional questions asked in the current study.

2. Methods

A series of experiments were conducted to test the three hypotheses: 1) compensation for [u]-fronting in an alveolar context, 2) an increasing degree of compensation with an increase in speech rate of the stimuli, and 3) systematic individual variation in compensation. Data on the effect of a precursor on compensation and RTs were also collected. The basic experimental design follows.

2.1. Participants

Thirty-two native speakers of American English (18 female, 14 male), aged between 19 and 45 years, participated as listeners. All but a few had no previous linguistic training. Of these 32 participants, 27 evaluated themselves as a 'speak-

er' of one or more foreign languages with varying proficiency. The participants were paid $10 upon completion of the experiments.

2.2. Stimuli

Two sets of ten-step CVC continua ranging between minimal pairs *beep-boop* (/bip/-/bup/) and *deet-doot* (/dit/-/dut/) were created in a fast, medium, and slow speech rate by concatenating a natural onset stop burst, a re-synthesized steady-state vowel without formant transitions, and a natural coda stop burst by using Praat (Boersma & Weenink 2007).[3] Rather than being fully synthesized, the vowels were re-synthesized by using the speaker's voice source so that the stimuli would sound natural when played after a precursor spoken by the same speaker.

The process of vowel re-synthesis was as follows. First, a male Californian's natural utterance of a sustained vowel /u/ was digitally recorded at 44.1 kHz and 16 bps. Then, a single period was selected from the middle and iterated to obtain a vowel of 80 ms. From this vowel, source and filter were separated by re-sampling the signal to 10 kHz; performing LPC analysis with 10 linear-prediction parameters, using an analysis window of 25 ms, time step of 5 ms, and a pre-emphasis frequency of 50 Hz; and applying inverse filtering of the LPC object on the original sound. Next, to the source signal a new filter that was specified by five frequency peaks and bandwidths was applied to create a steady-state vowel. For example, peak frequencies (and bandwidths, in Hz) for the /i/-end of the continuum are: F1=375 (50), F2=1200 (100), F3=2319 (150), F4=3500 (200), and F5=4500 (250). The nine other vowels were made by applying nine different filters that had identical specifications except the F2 and F3. These values are given in Table 1.

Table 1. F2 and F3 values on the ten-step vowel continuum ranging between /i/ (#1) and /u/ (#10). F2 and F3 values decrease by 0.5 and 0.18 Bark, respectively, for each subsequent step.

	/i/	.....								/u/
Stimulus#	1	2	3	4	5	6	7	8	9	10
F3 (Hz)	2969	2888	2808	2732	2658	2586	2516	2448	2382	2319
F2 (Hz)	2372	2201	2042	1895	1759	1632	1513	1402	1298	1200

To these vowels, a smooth amplitude contour was added by applying a Hamming window to the first and the last 15 ms. Then, F0 contour (130 Hz at onset and 90 Hz at offset) was added to obtain natural-sounding vowels. Finally, from this /i/-/u/ continuum, /bip/-/bup/ and /dit/-/dut/ continua were created by adding a natural /b/ (or /d/) onset burst immediately before the vowel and a /p/ (or /t/) coda burst 70 ms after the vowel offset. The duration of each CVC syllable was 170 ms between the two stop bursts (20 ms VOT + 80 ms vowel + 70 ms coda closure).

[3] The listener's judgment might be biased toward real words (i.e. towards 'beep'/'deet' vs. 'boop'/'doot'). However, this bias should be neutralized after the practice session, where equal numbers of the end stimuli were heard.

Two more sets of /bip/-/bup/ and /dit/-/dut/ continua, one with 100 ms of vowel duration (CVC duration = 190 ms) and the other with 120 ms of vowel duration (CVC duration = 210 ms), were created by using comparable methods. The CVC stimuli of 190 ms were used in 'no precursor' and 'medium' speech rate conditions. The other two—the short and long stimuli sets—were used in 'fast' and 'slow' speech rate conditions, respectively.

Three kinds of precursor phrase were created by altering the duration of the phrase "I guess the word is," spoken by the same speaker. The final durations of the 'fast,' 'medium,' and 'slow' precursors were 800 ms, 1000 ms, and 1200 ms.

2.3. Procedure

The experiment consisted of four blocks, testing four conditions separately. The first block tested the 'no precursor' condition.[4] In the remaining blocks, each of the 'fast,' 'medium,' and 'slow' rate conditions was tested in random order. Within a block, [dVt] and [bVp] stimuli were tested in separate sub-blocks in counterbalanced order. In each sub-block, each of the ten stimuli from the continuum was presented four times in random order for two-alternative forced-choice (/CiC/ or /CuC/) tasks. There were 80 trials in each block (10 stimuli x 4 trials x 2 contexts).[5] The procedure was the same for all blocks except that in the last three blocks, each stimulus was played after the precursor phrase of matching speech rate. Each block was preceded by a short practice block to familiarize the listeners with the task and stimuli.

The manner of stimuli presentation and response logging was identical across blocks. The listener was sitting in front of a computer monitor and a five-button response box. The computer monitor displayed instructions and answer options for each trial; for example, the display for the bilabial trials read "Press [1] for 'beep'—Press [5] for 'boop.'" The listener was asked to listen to each stimulus over headphones carefully and to enter a response as quickly as possible.

2.4. Data Analysis

A repeated-measures ANOVA was used to test for effects of context (alveolar vs. bilabial, separately for each block), precursor phrase (with precursor, medium rate vs. without precursor), and speech rate (fast vs. medium vs. slow). For the context effect, dependent variables were category boundary (see Fig. 1, panel C) obtained on the /dit/-/dut/ and /bip/-/bup/ continua separately for each listener, and for the precursor and speech rate effects, dependent variables were 'distance' between the boundaries on the two continua (see Fig. 1, panel D) obtained separately for each listener. Category boundary was defined as the stimulus number (1-10) for which responses with /i/ or /u/ were at 50%. Following Harrington et al. (2008) and Lotto et al. (1996), the 50% boundary was calculated using probit analysis.

[4] There were two types of [C_C] contexts tested in the first block—the 'acoustic' context and the 'restored' context. As stated earlier, the results of 'restored' context are not reported in this paper.

[5] The first block had additional 80 trials with 'restored' stimuli, mixed with 'acoustic' stimuli.

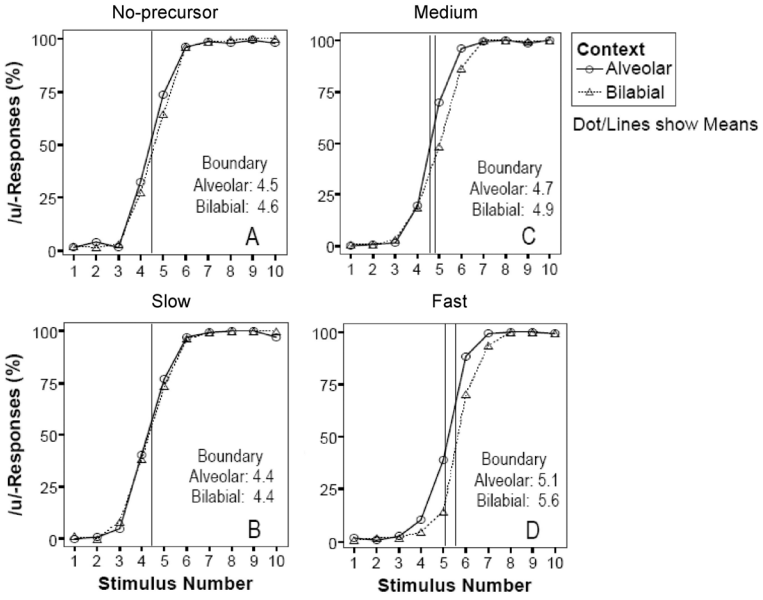
In order to test for systematic individual variation in category boundary, the listener was classified as a "Fronter" or a "Backer" based on the results in the first block, and then the difference in category boundary between the two groups was tested for the other three blocks. Those who had mean category boundaries (midway between the boundaries on alveolar and bilabial continua) below 4.5 were classified as Fronters, the others as Backers. Each group had 16 listeners.

Reaction time was measured as the time between stimulus onset and the moment when the button press was made. When there was no response, there was no RT data. Out of 10240 total observations (32 subjects x 4 blocks x 80 trials per block), there were 53 (0.5%) missing responses.

3. Results

Percentage of /u/-responses for the [dVt] and [bVp] stimuli and mean 50% boundary locations on each continuum in the four conditions are presented in Figure 1.

Figure 1. Percentage of /u/-responses as a function of stimulus number on a /dVt/ continuum (solid) and a /bVp/ continuum (dotted) in four conditions: A) no precursor; B) with precursor, slow rate; C) with precursor, medium rate; and D) with precursor, fast rate. Vertical lines indicate mean boundary on each continuum. (In panel A and B, mean boundaries are nearly identical.)



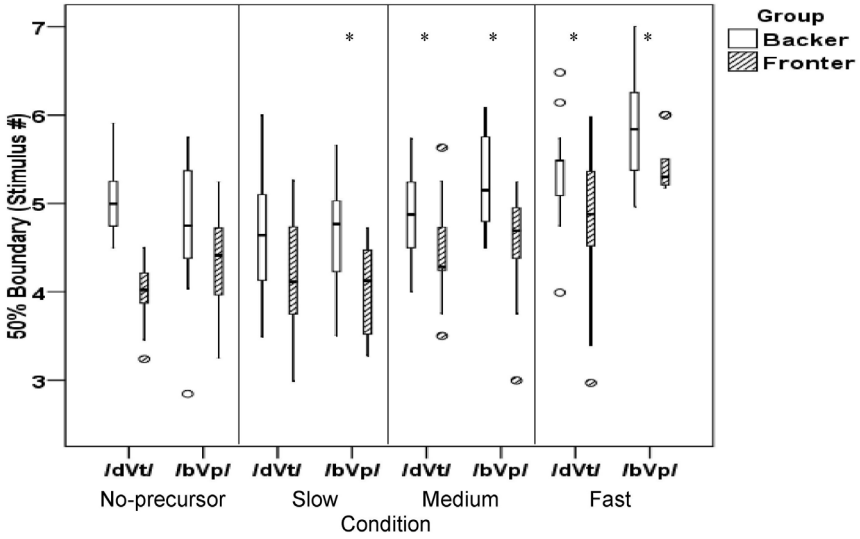
Significant context effects were observed in the 'medium' rate [$F(1, 31) = 4.98$; $p < 0.05$] and the 'fast' rate [$F(1, 31) = 18.27$; $p < 0.01$] conditions. Speech rate had a significant effect on boundary shifts [$F(2, 62) = 7.15$; $p < 0.01$].[6] Although

[6] Overall category boundary shifted toward the /u/-end as speech rate increased. This was an unexpected result, whose explanation will be sought in the future. Nevertheless, that relative /u/-bias became stronger as speech rate increased is taken as evidence for greater context effects (i.e. compensation) caused by speech rate manipulation.

there was a discernible increase of the boundary shift in the 'medium' rate condition when compared with the 'no precursor' condition (panel C vs. panel A), this difference was not significant [$F(1, 31) = 1.69$; $p = 0.20$].

Figure 2 shows the distribution of category boundary on /dVt/ and /bVp/ continua in four conditions by the Fronters and the Backers. There is a systematic pattern where the Fronters' boundaries lie closer to the /i/-end in all cases. A two-tailed t-test reveals a significant group difference in mean boundary on the /dVt/ continuum in the 'medium' rate and the 'fast' rate conditions: 'Slow' [$t(30) = -1.93$; $p = 0.06$], 'medium' [$t(30) = -2.37$; $p < 0.05$], 'fast' [$t(30) = -2.12$; $p < 0.05$]. On the /bVp/ continuum, the group difference was significant in all three conditions: 'slow' [$t(30) = -3.07$; $p < 0.01$], 'medium' [$t(30) = -3.61$; $p < 0.01$], 'fast' [$t(30) = -2.79$; $p < 0.01$].

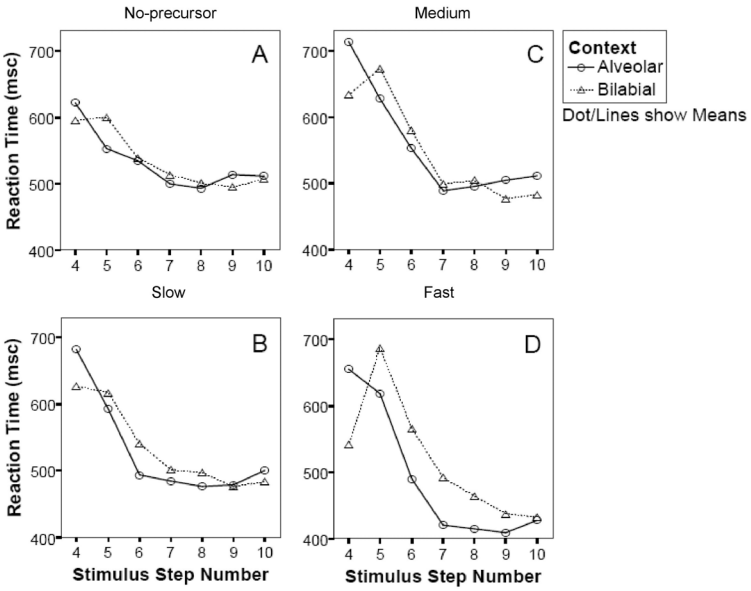
Figure 2. Distribution of category boundary by Backers (white) and Fronters (striped) on a /dVt/ continuum (left two plots in a given condition) and on a /bVp/ continuum (right two plots in a given condition), in four conditions (no precursor, medium rate, slow rate, and fast rate). The box plots show median (thick horizontal bar), interquartile range (box), and outliers (circles). Asterisks mark continua for which there was a significant group difference in boundary.



The mean RT from /u/-responses to the /dVt/ and /bVp/ stimuli (#4 and above) in the four conditions are presented in Figure 3. The RT data obtained from stimuli #1 to #3 are not considered because the percentages of /u/-responses were very low (6% for stimulus #3 in the 'slow' condition, less than 3% for all other stimuli), indicating that most of these responses were errors. Some patterns emerge from these results. For stimuli near the /u/-end, RT tends to be shorter for /dVt/ stimuli than for /bVp/ stimuli. The pattern is somewhat inconsistent for the stimuli near the /i/-end, but in 'medium' and 'fast' rate conditions, RT is generally shorter in [bVp] stimuli than in [dVt] stimuli. The RT data for stimuli #6 to #10, where within-condition RTs are relatively invariant across stimuli, show that mean RTs are markedly shorter in the 'fast' condition than in other conditions.

Finally, the RT data show much smaller across-stimuli variation in the 'no precursor' condition as compared to the 'medium' rate condition; another way to interpret these data is that for stimuli near the category boundary, RTs are much shorter in the 'no precursor' condition than in other conditions. These results are interesting since the target CVC stimuli were identical in duration in these conditions.

Figure 3. Mean RT as a function of stimulus number (increasing number corresponds to decreasing F2 and F3) on a /dVt/ continuum (solid) and a /bVp/ continuum (dotted) in four conditions: A) no precursor; B) slow rate; C) medium rate; and D) fast rate.



4. Discussion

The results generally supported the hypotheses. The hypothesis (H1) that listeners compensate for the fronting of a high back vowel in an alveolar context was supported in the 'fast' and 'medium' speech rate conditions. These results confirm the robustness of the compensation effect on phoneme identification. The hypothesis (H2) that the compensation, as defined by the boundary shift, and speech rate are positively correlated was supported by the results showing that the degree of boundary shift increased monotonically from the 'slow' to 'medium' and 'fast' rate conditions. The hypothesis (H3) that there is systematic individual variation in category boundary was supported in five out of six comparisons: The Fronters who had the category boundary closer to the /i/-end than the Backers in the 'no precursor' condition consistently had it this way in other conditions as well.

Now, how we can explain these results? As mentioned earlier, the mechanism of compensation is still a matter of debate. A general auditory approach explains the effect in terms of spectral contrast (Holt and Kluender 2000), while gestural approaches explain the effect in terms of the listener's ability to recover from the speech signal either 'intended gestures' through analysis-by-synthesis using an 'innate vocal-tract synthesizer' (Liberman & Mattingly 1985) or actual gestures

directly from the acoustic signal (Fowler 1986). Since the current study does not offer decisive evidence in support of one approach over the other, the rest of the discussion considers how the results can be explained in terms of either approach and considers implications for future research.

The speech rate effect can be explained in several ways. One is in terms of the listener's knowledge about speech production, which enables the listener, as discussed by Lindblom and Studdert-Kennedy (1967:839), to 'predict' the degree of coarticulation from the perceived speech rate. This explanation is compatible with the analysis-by-synthesis approach. Short RTs for /u/-responses in the alveolar context in the 'fast' condition might be taken as support for this analysis: In a context where a strong fronting effect is expected, low-frequency prominence might be mapped onto a back vowel more quickly than in other contexts.

Lindblom and Studdert-Kennedy (1967:840) also discussed another possibility, which is more compatible with the general auditory approach—the tendency to overshoot or extrapolate the formant values for short stimuli with rapidly changing spectra. Although the vowels had steady-state formants, the spectral peak in the preceding stop burst and the beginning of vowel formants might provide sufficient dynamism to cause perceptual extrapolation so that the vowels are perceived as having lower resonant frequencies than they actually have. This scenario predicts both a stronger compensation in shorter stimuli and a null effect in longer stimuli, where there is a sufficient steady-state region so that as the analysis proceeds the extrapolated resonant frequency would match the actual frequency.

Yet another possible explanation, which also accounts for the null effect in the 'no precursor' condition, is that a listener actively or passively varied the unit of analysis across conditions. Since the decision-making in the current task ultimately depended on vowel identification, the listener would pay more attention to the vowel rather than entire CVC stimuli if doing so was possible. A longer segment would be more isolatable than a shorter one, making it easier to pay attention selectively to that segment. The more the vowel was dissociated from the context, the less of an effect the context would have on phoneme identification.

In this scenario, the effect of the presence of a precursor would be to bias the listener to process the auditory information in larger chunks—syllables or words—since this is how listeners parse acoustic events in natural communication situations (speech mode of parsing). As RT indicates task difficulty, relatively constant RTs in the 'no precursor' condition might support the idea that the absence of a precursor indeed enables listeners to isolate the vowel from the context.

If this scenario is true, then it would be of interest to further investigate whether the same effect is obtained with a non-speech precursor that has speech-like prosody, such as periodic amplitude modulation repeating itself with a syllable-sized period. Positive results from such experiment would suggest the possibility for a general priming effect to account for variation in the unit of parsing, eliminating the necessity of a speech mode of parsing.

The results showing gradually increasing RT toward the category boundary strongly support the idea that the phonemic category is not simply an abstract

unit; it has well-defined internal structure, with category members varying in 'category goodness' (Miller 1994). Further, the fact that listeners are all native speakers of American English and yet systematically vary in phoneme categorization suggests that knowledge of phonemic entities is personal, being acquired through linguistic experience unique to each individual. This is a micro-level counterpart of what Harrington et al. (2008) found in their age-group comparison. A listener's compensation grammar varies across individuals, and it is shaped by previous linguistic experience.

These findings have significant implications for a model of sound change. Imagine a situation where a group of listeners hear a word *dude* with heavily fronted /u/. Some hear the vowel as an instance of ordinary /u/, while others hear it as a sound different from ordinary /u/ (say, /y/, for convenience); that is, some listeners pick up an 'accent' from such utterance. Even if these listeners compensate for fronting on another occasion and pick up /dud/ from that instance of the same word, these listeners would possess the mental representations /dyd/ and /dud/ as synonymous forms of *dude*. Such listeners, when they turn into speakers, would be in a position to utter this word either as /dud/ or /dyd/, whichever sounds better to the ears of the speaker. In this way, even when a listener employs perceptual compensation, speech variation may plant a seed of sound change in the auditory field of the listener.

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Two Types of Covert *Wh*-movement*

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0. Introduction

Noting some similarities in syntactic behavior between overtly moved *wh*-phrases and in-situ *wh*-phrases, Huang (1982) claimed that the latter also undergo *wh*-movement, though covertly, or in LF. Within the Minimalist Program, at least three different ways of implementing Huang's insight have been proposed.

The first approach is to assume that an in-situ *wh*-phrase undergoes phrasal movement to SpecCP and its lower copy is pronounced at PF, as shown in (1) (cf. Chomsky 2004, Pesetsky 2000).

(1) *Covert phrasal movement*
~~which bike~~ $C^0_{[+Q]}$ …… which bike
↑_____|
Move

The higher copy and the lower copy of the *wh*-phrase are interpreted at LF as an operator and a variable, respectively.

The second approach is to assume that an in-situ *wh*-phrase does not move as a whole, but only the formal features of the *wh*-word undergo movement, adjoining to C^0, as shown in (2) (cf. Chomsky 1995; "FF[which]" stands for formal features of *which*).

(2) *Feature movement*
FF(which)-$C^0_{[+Q]}$ …… which bike
↑_____|
Move

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The moved set of formal features is interpreted as an operator and its trace is interpreted as a variable at LF.

The third approach is to assume that an in-situ *wh*-phrase does not undergo any movement and is licensed through entering into an Agree relation with C^0, as shown in (3) (cf. Chomsky 2000, 2001).

(3) *Agree*

$C^0_{[+Q]}$ …… which bike

|_____|

Agree

The C^0 which is involved in the Agree relation and the in-situ *wh*-phrase are interpreted as an operator and a variable, respectively, at the LF interface.

The main aim of this paper is to claim that there are (at least) two different types of covert *wh*-movement which cannot be reduced to Agree. As far as we confine ourselves to the above-mentioned three approaches to *wh*-in-situ, this means that it is necessary to assume both phrasal and featural covert *wh*-movement (cf. Pesetsky 2000).

The rest of this paper is organized as follows. In the next section, it is shown that in-situ echo *wh*-phrases may undergo covert phrasal movement, but in-situ non-echo *wh*-phrases cannot. In section 2, it is argued that in-situ non-echo *wh*-phrases are not licensed through Agree and undergo some sort of movement. From these results, it is concluded in the final section that there are (at least) two different types of covert *wh*-movement which cannot be reduced to Agree.

1. Echo Questions vs. Non-Echo Questions

As is well-known, in examples like (4) below, an R-expression contained within a fronted adjunct can be co-indexed with a pronoun which c-commands its original position (Freidin 1986, van Riemsdijk and Williams 1981).

(4) [Which claim [that **John$_1$** made]] was **he$_1$** willing to discuss?

(Chomsky 1993)

An interesting observation which concerns us here is that analogous binding effects obtain in echo questions (Kato 2004a, b, Rochemont and Culicover 1990). Thus, in the following example, *the teacher*, which is contained within a relative clause modifying an in-situ echo *wh*-phrase, can be co-indexed with *her*:

(5) *Echo question*

Bill told **her$_1$** that Sam was dating [which student [that **the teacher$_1$** liked]]?

(Rochemont and Culicover 1990:168, note 18)

In order to account for why this example does not exhibit a Condition C effect, Rochemont and Culicover (1990) suggest that the relative clause in this ex-

ample is (string-vacuously) extraposed and appears in the matrix clause, in a position higher than the matrix dative pronoun. There are several reasons to believe that this analysis is not plausible. One of them concerns the ungrammaticality of the following example (see Kato 2004a: note 15 for other reasons):

(6) *Non-echo question*
*Who told **her$_1$** that Sam was dating [which student [that **the teacher$_1$** liked]]?

This example differs from (5) in that it is a regular, non-echo question. If the relative clause in (5) were extraposed to a position higher than the pronoun *her*, it would be mysterious why such extraposition is not available in (6).

For this and other reasons, Kato (2004a, b) claims that the contrast between (5) and (6) indicates that echo *wh*-phrases may undergo covert phrasal movement, but non-echo *wh*-phrases cannot. Suppose first that the in-situ *wh*-phrases in (5) and (6) undergo covert phrasal movement. Then, the LF representations of these examples should look like (7) below.

(7) *Covert phrasal movement*
[which student … **the teacher$_1$** …] $C^0_{[+Q]}$ …… **her$_1$** ……
[which student … **the teacher$_1$** …]

In this representation, if the higher copy of the *wh*-phrase is somehow chosen to be interpreted at LF (against Chomsky's (1993) Preference Principle), no Condition C violation will be incurred. In contrast, if the in-situ *wh*-phrases at issue undergo featural movement or are licensed through Agree, the LF representations of the examples should be like (8) or (9).

(8) *Featural movement*
FF(which)-$C^0_{[+Q]}$ …… **her$_1$** …… [which student … **the teacher$_1$** …]

(9) *Agree*
$C^0_{[+Q]}$ …… **her$_1$** …… [which student … **the teacher$_1$** …]

In these representations, there seems to be no way of *the teacher* obviating Condition C. Thus, the fact that example (5), but not example (6), satisfies Condition C indicates that echo *wh*-phrases, but not non-echo *wh*-phrases, can undergo covert phrasal movement.

Further evidence showing that echo *wh*-phrases may undergo the type of movement which is not available to non-echo *wh*-phrases comes from parasitic gap constructions. Consider the following examples:

(10) *Parasitic gap licensing*
a. *Overtly moved* wh-*phrase*
Which paper did you file without reading **e$_{pg}$**?

b. *In-situ non-echo* wh-*phrase*
*Who filed **which paper** without reading $\mathbf{e_{pg}}$?
c. *In-situ echo* wh-*phrase*
?You filed **which paper** without reading $\mathbf{e_{pg}}$?

These examples show that like overtly moved *wh*-phrases, in-situ echo *wh*-phrases can license a parasitic gap, but in-situ non-echo *wh*-phrases cannot (Kato 2004a, b).

To sum up, it has been shown in this section that echo *wh*-phrases may undergo covert phrasal movement but non-echo *wh*-phrases cannot.

2. *Wh*-in-situ and CSC Effects

What is given in (11) below is the well-known Coordinate Structure Constraint (CSC).

(11) *Coordinate Structure Constraint (CSC; Ross 1967)*
In a coordinate structure, no conjunct may be moved, nor may any element contained in a conjunct be moved out of that conjunct.

It is clear that this constraint consists of two parts: the part which bans extraction *of* conjuncts, which accounts for the ungrammaticality of examples like (12a), and the part which bans extraction *from* conjuncts, which accounts for the ungrammaticality of examples like (12b).

(12) a. *Extraction of a conjunct*
*What did Mary buy a bike and *t*?
b. *Extraction from a conjunct*
*What did Mary [send *t* on Monday] and [receive the parcel on Wednesday]?

In what follows, I refer to the first part (or the ban on extraction of conjuncts) as the CSC_{of} and the second part (or the ban on extraction from conjuncts) as the CSC_{from}.

It is argued by a number of researchers that the CSC_{from} is not a derivational constraint but a constraint on LF (or semantic) representations (cf., for example, Fox 2000, Kato 2006, Munn 1993; for arguments against the view that the CSC_{from} is a PF constraint, see Kato 2006: Chapter 5). In particular, Kato (2006) argues, following Fox (2000), that CSC_{from} effects of *wh*-questions should be attributed to an LF ban against vacuous quantification under the following assumptions:

(13) a. A sentence with a coordinate structure is well-formed only if each of its component structures independently satisfies grammatical constraints.

b. Component structures of a sentence with a coordinate structure $=_{def}$ structures each of which is composed of one of the conjuncts together with the material which is not included by the coordinate structure[1]

Let us consider how the unacceptability of (12b), in which a *wh*-phrase is moved out of one of the two conjuncts, is dealt with under this approach. According to (13b), this example has the following two component structures:

(14) *Component structures of (12b)*
a. what did Mary send *t* on Monday
b. what did Mary receive the parcel on Wednesday

In one of these structures, (14b), the *wh*-phrase fails to bind a variable, violating the ban on vacuous quantification. According to (13a), this is why the example is ill-formed.

Next, let us consider why example (15) below, where a *wh*-phrase is moved out of a coordinate structure in an across-the-board (ATB) manner, is acceptable:

(15) *ATB movement*
What did Mary [send *t* on Monday] and [receive *t* on Wednesday]?

The two component structures of this example are the following:

(16) *Component structures of (15)*
a. what did Mary send *t* on Monday
b. what did Mary receive *t* on Wednesday

Neither of these structures violates the ban on vacuous quantification (or any other grammatical constraints). Thus, the condition in (13a) correctly predicts that the example is acceptable.

A piece of evidence in favor of the LF representational approach to the CSC_{from} over the derivational approach comes from *wh*-in-situ (Fox 2000, Ruys 1993; see Kato 2006 and Lin 2001 for further evidence). Consider the following set of examples:

(17) a. *I wonder who [took **what** from Mary] and [gave a book to Fred].
b. I wonder who [took **what$_1$** from Mary] and [gave **it$_1$** to Fred].
(Ruys 1993:36)

In both of these examples, the first conjunct contains an in-situ *wh*-phrase. The difference is that in the acceptable example, (17b), a pronoun co-indexed with the in-situ *wh*-phrase appears in the second conjunct, while such a pronoun does not appear in the unacceptable example, (17a). If the CSC_{from} is a derivational con-

[1] See Kato (2008) for a slightly different definition of component structure.

straint on Move or Agree, the contrast between the above examples is unexpected: If movement of *what* out of the conjunct or its agreement with a head outside the conjunct is banned, (17b) should be ill-formed on a par with (17a).

In contrast, as argued by Fox (2000), the contrast in (17) is what the LF representational approach to the CSC_{from} predicts. First, consider the component structures of (17a). At LF, they should be represented as in (20), if the in-situ *wh*-phrase undergoes feature movement (cf. (18)), or as in (21), if it is licensed through Agree (cf. (19)).

(18) *LF representation of (17a) (feature movement)*
… **FF(what)$_1$**-$C^0_{[+Q]}$ [took **what$_1$** from Mary] and [gave a book to Fred]

(19) *LF representation of (17a) (Agree)*
… $\mathbf{C^0_{[+Q]1}}$ [took **what$_1$** from Mary] and [gave a book to Fred]

(20) *Component structures of (17a) (feature movement)*
a. … **FF(what)$_1$**-$C^0_{[+Q]}$ took **what$_1$** from Mary
b. … **FF(what)$_1$**-$C^0_{[+Q]}$ gave a book to Fred

(21) *Component structures of (17a) (Agree)*
a. … $\mathbf{C^0_{[+Q]1}}$ took **what$_1$** from Mary
b. … $\mathbf{C^0_{[+Q]1}}$ gave a book to Fred

In either case, one of the component structures ((20b) or (21b)) involves vacuous quantification, hence the unacceptability of the example.

Next, consider the component structures of (17b), which should be like (22a, b) or (23a, b) below.

(22) *Component structures of (17b) (feature movement)*
a. … **FF(what)$_1$**-$C^0_{[+Q]}$ took **what$_1$** from Mary
b. … **FF(what)$_1$**-$C^0_{[+Q]}$ gave **it$_1$** to Fred

(23) *Component structures of (17b) (Agree)*
a. … $\mathbf{C^0_{[+Q]1}}$ took **what$_1$** from Mary
b. … $\mathbf{C^0_{[+Q]1}}$ gave **it$_1$** to Fred

In each of these structures, no violation of the ban on vacuous quantification is incurred. In particular, this condition is satisfied in (22b) and (23b) because the operator binds the co-indexed pronoun as a variable there. Thus, the grammaticality of the example is correctly predicted.[2]

[2] For the unacceptability of examples like the following (Kasai 2004, Potts 2002), see Kato 2006: Appendix of Chapter 2.

(i) *I wonder who [took **it$_1$** from Mary] and [gave **what$_1$** to Fred].

Now, let us turn to the CSC_{of}, the ban on extraction of conjuncts. As shown in (24), *wh*-in-situ exhibits CSC_{of} effects, too ((24a) is adapted from Bošković and Franks 2000: footnote 4):[3]

(24) a. *Mary wonders who reported that [**who** and Max] disappeared.
b. *Mary wonders who reported that the dog bit [**who** and Max].

However, unlike (17a) above, these examples cannot be rescued by adding a pronoun co-indexed with the *wh*-phrase to the second conjunct:

(25) a. *Mary wonders who reported that [**who$_1$** and **his$_1$** brother] disappeared.
b. *Mary wonders who reported that the dog bit [**who$_1$** and **his$_1$** brother].

Given the above discussion, it follows from this fact that the ungrammaticality of the examples in (24) cannot be attributed (through (13)) to the LF ban against vacuous quantification, suggesting that the CSC_{of} is a derivational constraint (see Kato 2008: Appendix of Ch. 5 for more detailed discussion on the nature of the CSC_{of}).[4]

The fact that so-called "first conjunct agreement" is possible, as shown below, indicates that it is not Agree but Move that the CSC_{of} applies to (see Aoun et al. 1994, 1999, Munn 1999, among many others, for first conjunct agreement).[5]

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[3] Some speakers judge examples like (i), where an in-situ *wh*-phrase appears as the second conjunct, to be acceptable or only slightly deviant (see Bošković and Franks (B&F) 2000, Fiengo et al. 1988: 81, Reinhart 1997:339; for different judgments, see Bresnan 1975:37, Ginzburg 1992:171, Merchant 2001:200-201, footnote 16):

(i) Who reported that [Max and **who**] disappeared? (B&F 2000: 109)

Interestingly, B&F, who judge (i) acceptable, observe the following contrast:

(ii) a. ?*[**Who** and Max]$_1$ did you report t_1 disappeared? (ibid.: footnote 4)
b. [Max and **who**]$_1$ did you report t_1 disappeared? (ibid.: 110)

Thus, here I assume (following B&F) that some speakers can have recourse to covert pied-piping of the whole coordinate structure in examples like (i).

[4] It is reported by some researchers that violations of the CSC_{of} can be repaired under sluicing (though speakers' judgments do not seem to be clear; see Merchant 2001:193-4). This is not a problem for the view that the CSC_{of} is derivational in nature, if Boeckx (2008) and Wang (2007) are right in arguing that island-repair under ellipsis contexts is not directly related to the lack of pronunciation.

[5] Bošković (2007) also draws the same conclusion by contrasting "first conjunct movement" and "first conjunct agreement." However, his argument is less conclusive, because he does not take into consideration the possibility that the former may be ruled out by non-derivational constraints. His example intended to show the impossibility of movement of conjuncts is the following:

(i) *A woman$_1$ is [t_1 and five men] in the garden. (Bošković 2007: (20))

(26) *First conjunct agreement*
There **is** [**a man** and three children] at the front door.

Thus, the ungrammaticality of the examples in (24) indicates that in-situ (non-echo) *wh*-phrases undergo some sort of movement, not being licensed through Agree (otherwise, those examples should not exhibit the CSC_{of} effects).

3. Conclusion

In section 1, it was shown that in-situ echo *wh*-phrases may undergo covert phrasal movement, but in-situ non-echo *wh*-phrases cannot. In section 2, it was argued that in-situ non-echo *wh*-phrases are not licensed through Agree and undergo some sort of movement. It follows from these results that there are (at least) two different types of covert *wh*-movement which cannot be reduced to Agree. If we confine ourselves to the three approaches to *wh*-in-situ mentioned in the introduction (namely covert phrasal movement, feature movement, and Agree), this means that we need to assume both phrasal and featural covert *wh*-movement.

Note that Pesetsky (2000) argues that at least two kinds of covert movement-like relations can be identified and that one of them is covert phrasal movement and the other is either feature movement or Agree. Crucially, he does not choose between the last two (see his p. 58). Thus, the present work could be seen as an elaboration of his argument.

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In this example, as a result of the overt movement of *a woman*, the first conjunct of the coordinate structure is phonologically null. Thus, this example violates whatever PF constraint rules out examples like the following, where one of the conjuncts are deleted (cf. Grosu 1973, 1981, Merchant 2001):

(ii) a. *I couldn't lift this weight, but I know a boy who could [[__] and [lift a crowbar, too]]. (Grosu 1981: 53)
b. *I have five cats, but he has six [[dogs] and [__]]! (Merchant 2001:196)

Note that the examples I give, (24a, b), satisfy the PF constraint at issue.

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Stress Dependent Vowel Reduction

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0. Introduction

In this paper, I examine a vowel reduction pattern in Western Armenian. The stressed and unstressed vowels of related forms in a paradigm present an interesting derived environment effect (DEE), where only destressed vowels undergo any change. Working in the framework of Optimality Theory (Prince and Smolensky 1993), I extend the application of Comparative Markedness (McCarthy 2003) to the phenomena in Armenian where the interaction between the phonotactics, faithfulness to vowel height and markedness against newly stressless vowels governs the surface forms of the language. A subset of the data reveals an interesting phonotactic restriction against the …rə… sequence.

Section 1 presents the stress dependent vowel reduction data from Western Armenian and some relevant processes found in the language. Comparative Markedness and some relevant constraints are discussed in Section 2. In Section 3, I go through the analysis of all of the data. Reduction outside of Armenian is discussed in Section 4. Section 5 briefly presents stress shift off diphthongs and Section 6 concludes.

1. Western Armenian

Western Armenian is an Indo-European language spoken in major cities of the Middle East, Americas, Australia and Europe. I will be looking at how primary stress in Armenian affects the vowels in derived forms. Except for some adverbs and proper names lexical stress is assigned to the rightmost syllable of a prosodic word (Vaux 1998:132). When another morpheme is added to the right, stress shifts to the right as seen in (1).

(1) ar**á**k^{h} ⇒ ar**a**k^{h}-a-ʃárʒ ⇒ arak^{h}a**ʃa**rʒ-ut^{h}jún
‘fast’ ⇒ ‘fast moving’ ⇒ ‘capability of moving fast’

Secondary stress is said to surface on the initial syllable, but this will not be investigated or considered in this paper since it does not seem to play a role in vowel reduction (Vaux 1998:134).

1.1. The Phenomena

If the stressed vowel in the shorter word is a high vowel, *i* or *u*, it either deletes (2a), surfaces as a schwa in the same location (2b) or surfaces as a schwa in a different location (2c) in the derived form. Other vowels do not undergo any change as seen in (3).

(2) a. deletion: {[i], [u]} ⇒ Ø

mak^{h}**ú**r	'clean'	ma**k^{h}r**-él	'to clean'
jerg**í**r	'earth'	jer**gr**-aʃárʒ	'earthquake'
irig**ú**n	'night'	iri**gn**-at^{h}ém	'nighttime'

b. schwa, same location: C_1{i,u}$C_2 \Rightarrow C_1əC_2$

k^{h}**í**n	'price'	k^{h}**ə**n-él	'to buy'
har**ú**st^{h}	'rich'	har**ə**st^{h}-anál	'to become rich'

c. schwa, different location: C_1{i,u}$C_2 \Rightarrow əC_1C_2$

əst^{h}**rú**g	'slave'	əst^{h}**ər**g-at^{h}sadz	'enslaved'
dʒəʃk^{h}**rí**d	'exact'	dʒəʃk^{h}**ər**d-ut^{h}jún	'truthful'

(3) [-high] vowels does not change

d**ó**n	'holiday'	d**o**n-él	'to celebrate'
ark**á**[1]	'king'	ark**a**-jaχənt^{h}sór	'pineapple'

An important fact to point out is the derived environment effect, where stressless vowels in the base are not affected. Derived environment effects (DEE) is a cover term for a phonological process that applies only to environments that have undergone some other phonological change, therefore are said to be derived (Gnanadesikan 1997; Lubowicz 1999; McCarthy 2003 to name a few). This DEE is demonstrated in (4a-b) where only the high vowels that loose stress undergo any change. Therefore the word initial stressless [u] in (4a) or [i] in (4b) surfaces as is in the derived form. High vowels in positions that are never assigned stress like in bound morphemes (4c) or in the left nuclei of polysyllabic suffixes (4d) further demonstrate the restriction of reduction to only derived environments.

(4)

a. **u**ráχ	'happy'	**u**raχ-ut^{h}jún	'happiness'
b. **i**r**i**gún	'night'	**i**r**i**gn-at^{h}ém	'nighttime'
c. **u**d-él	'to eat'		
d. -**u**t^{h}jún	'-ation'		

[1] Armenian words can end in vowels, these vowels would be assigned the primary stress, but upon adding another morpheme this final vowel coalesces, deletes or remains depending on different factors, like vowel height, which will not be examined. I will be putting these cases aside.

Any analysis of Western Armenian should account for both the derived environment effect triggered by stress shift demonstrated above in (4) and all three repairs of high vowel reduction (2a-c), predicting all derived forms.

1.2. Schwa Epenthesis and Phonotactics

Since some of the schwas appear in a different location than the destressed high vowels as seen in (2c) and since Armenian exhibits an independent ə-epenthesis system it is relevant to ask what the phonotactic restrictions are on these schwas, since some of the schwas in the derived forms are possibly epenthetic instead of being reduced forms of the high vowels. Underlying consonant clusters are broken up by ə-epenthesis, as seen in (5) (Vaux 1998:66). The distribution of the schwa vowel is almost entirely predictable.

(5) /hrmʃdg-el/ hərməʃdəgél 'to jostle'

Here are a few relevant restrictions on the system. Every non-stop or non-affricate consonant needs to be adjacent to a vowel. Therefore forms like *[**h**rəmʃədgel] with respect to [h] or *[hər**m**ʃdəgel] with respect to [m] violate this photactic and do not exist in the language. However a surface form like [χən**t**^{h}rel] 'to request' where a stop is not adjacent to a vowel is phonotactically sound. Since certain consonant clusters are phonotactically acceptable epenthesis applies minimally, being restricted by a markedness constraint like *ə, and forms like *[hərəməʃədəgel] do not surface. Roots that have a string of identical consonants, abab..., surface with the two substrings, ab, as identical to each other, in the same vein as aggressive reduplication (Zuraw 2002) as seen in (6):

(6) t^{h}ərt^{h}ərél *t^{h}ərt^{h}rel 'to flutter'
nert^{h}rúm *nert^{h}ərum 'investment'

The phonotactics of non-reduplicative roots do not surface with a schwa for a …t^{h}r… string, indicating that some form of aggressive reduplication is at play, specifically Zuraw's MAX-**KK** constraint: "If a word contains two substrings S_1 and S_2 that are coupled, then every segment in S_1 must have a correspondent in S_2 and vice versa" (2002:404).

2. Comparative Markedness

As seen from the previous section, only the high vowels that bear stress in the base reduce. An example of this derived environment effect is reproduced in (7):

(7) **iri**gún 'night' **iri**gn-at^{h}ém 'during dusk'

A certain class of processes, of which Armenian DEE is a part of, are blocked unless their structural description is met either by morpheme concatenation or by prior rule application (Kiparsky 1973). A classic OT markedness constraint forces

reduction of all (high) vowels and is not able to account for the derived environment effect presented above. We need to turn to a different markedness approach, namely Comparative Markedness (CM) (McCarthy 2003). In CM, the set of markedness constraints are split into New and Old; "a constraint violation is new if the corresponding material in the fully-faithful candidate (FFC) does not violate that constraint" (McCarthy 2003:6). The FFC is identical to the base.

(8) For example taking $*V_{[-stress]}$ which is violated when a vowel is stressless:
a. [ur**á**χ] ⇒ [ur**a**χut^{h}jún] $*_{N}V_{[-stress]}$ is violated with respect to [a].
b. [**u**ráχ] ⇒ [**u**raχut^{h}jún] $*_{O}V_{[-stress]}$ is violated with respect to [u].

All the relevant faithfulness constraints evaluate surface forms and are therefore base-derivative (BD) constraints, unless otherwise stated. Since stress is assigned to the right most nuclei the ALIGN-STRESS-RIGHT constraint is ranked high in the system, which states that the primary stress of a prosodic word must appear on the final vowel. A newly stressless vowel is preferred over preventing a stress shift as seen from a simple example as in (9). Therefore the ranking AL-STR-RT >> $*_{N}V_{[-stress]}$ is revealed, where $*_{N}V_{[-stress]}$ assigns a violation for every new instance of a stressless vowel, demonstrated in (8a).

(9) bár ‘dance’ barél ‘to dance’

The vowels of Armenian are not all affected by the shift of stress as presented above. Namely only the high vowels {[i],[u]} are affected. To drive the syncope of high vowels and restrict the deletion of non-high vowels, MAX-F, with respect to vowel height, must be at play in Armenian. More relevantly, MAX[-high] and MAX[+high] discussed by Casali (1997) must be ranked with respect to the markedness constraint $*_{N}V_{[-stress]}$. MAX[-high] >> $*_{N}V_{[-stress]}$ will ensure (10) and $*_{N}V_{[-stress]}$ >> MAX[+high] will result in (11) drives syncope of high vowels. The ranking of MAX[-high] >> MAX[+high] which falls out from transitivity is consistent with Casali (1997).

(10) MAX[-high] >> $*_{N}V_{[-stress]}$: [bár]+/el/ ⇒ barél *bərél

(11) $*_{N}V_{[-stress]}$ >> MAX[+high]: [dzúr]+/il/ ⇒ dzəríl *dzuríl

3. Analysis

In this section I will go through the three cases outlined above that need to be accounted for with respect to stress shift of high vowels. The CM constraint $*_{N}V_{[-stress]}$ triggers three repairs summarized below in (12):

(12)	Deletion:	jergír	'earth'	jergr-aʃárʒ	'earthquake'
	Reduction 1:	p^həʒ-íʃk	'doctor'	p^həʒəʃk-ut^{h}jún	'medicine'
	Reduction 2:	dʒəʃk^{h}ríd	'exact'	dʒəʃk^{h}ərd-ut^{h}jún	'truthful'

3.1. Deletion Cases

The destressed high vowels delete in the derived forms. The resulting consonant clusters are phonotactically sound and therefore schwas are not needed as seen from tableau (13).

(13) […VCuCíC]+/…/ ⇒ […VCuCC…]

[VCuCíC]+/VC/	$*_N V_{[-stress]}$	*ə	MAX[+high]
a. VCuCiCV́C	*!		
b. ☞ VCuCCV́C			*
c. VCuCəCV́C	*!	*	*
d. VCəCCV́C		*	*!*

3.2. Reduction to Schwa: Schwa in situ

In some cases the schwa is indispensable phonotactically as seen in the tableau (14) where the strict restriction against word initial complex onsets forces a ə in the derived form:

(14) [dzúr]+/il/ ⇒ [dzəríl], *[dzríl]

[CúC]+/VC/	C//V	$*_N V_{[-stress]}$	*ə	MAX[+high]
☞ CəCV́C		*	*	*
CCV́C	*!			*

However, we run into some trouble when considering the candidate that does not undergo any reduction, namely the most faithful candidate seen in (15):

(15) [dzúr]+/il/ ⇒ [dzəríl], *[dz**u**ríl]

[CúC]+/VC/	C//V	$*_N V_{[-stress]}$	*ə	MAX[+high]
☞ CuCV́C		*		
☹ CəCV́C		*	*!	*

Tableau (15) reveals that $*_N V_{[-\text{stress}]}$ should not apply to all vowels, and should discriminate between ə and u. To trigger reduction of the high vowel the two vowels must be categorically separate in the current system. Therefore reformulating the new CM constraint we get: $*_N V_{[-\text{stress}]}$ which penalizes every instance of a newly stressless *sonorous* vowel. I assume a difference in sonority between the high vowels and schwa: i, u > ə, following de Lacy (2006). With this new formu-

lation we get the following tableau in (16), where the most optimal candidate that ends up surfacing is the one with the ə in place of the high vowel that was stressed in the base.

(16)

	[CúC]+/VC/	C//V	$*_N V_{[-stress]}$	*ə MAX[+high]
a.	CuCV́C		*!	
b. ☞	CəCV́C			* *
c.	CCV́C	*!		*

3.3. Reduction to Schwa: Schwa Off-Site

In a third class of reduced forms the schwa in the derived form is not found in the same environment as the deleted high vowel in the base, demonstrated in (17). More specifically if an [r] segment precedes the high vowel in the base then it will follow the schwa in the derived forms:

(17)

dʒəʃk^{h}**rí**d	'exact'	dʒəʃk^{h}**ər**d-ut^{h}jún	'truthful'
vədʒ**rú**m	'decision'	vədʒ**ər**m-ajín	'like a decision'
bad**rí**g	'patrician'	bad**ər**g-ajín	'like a patrician'
p^{h}əχ**rú**n	'brittle'	p^{h}əχ**ər**n-avór	'brittle-esque'

There are two paths to get from a base [...rí...] to a derived form [...ər...]. The first is a reduction path, where the high vowel reduces to schwa and a concurrent process of metathesis occurs, demonstrated in (18a). The second is one of deletion of the high vowel and a concurrent epenthesis of a schwa vowel before the [r] seen in (18b).

(18) a. [...Crú$_1$C]+/…/ ⇒ [...C**ə$_1$**rC…]
b. [...Crú$_1$C]+/…/ ⇒ [...Cə$_2$rC…]

Two possibly relevant constraints at play here are the faithfulness constraints, DEP-ə, controlling the epenthesis of schwa, and LINEARITY, controlling metathesis. If DEP-ə >> LINEARITY then the optimal candidate is the one that has undergone metathesis as seen in (18a) and demonstrated by the tableau in (19):

(19)

	[...Crú$_1$C]+/VC/	*rə	$*_N V_{[-stress]}$	DEP-ə	LINEARITY
a.	...Cru$_1$CV́C		*!		
b.	...Crə$_1$CV́C	*!			
c.	...Crə$_2$CV́C	*!		*	
d. ☞	...Cə$_1$rCV́C				*
e.	...Cə$_2$rCV́C			*!	

However, if LINEARITY >> DEP-ə then the optimal candidate is the one where the high vowel has deleted and a schwa has been epenthesized as in (18b) and seen below in (20):

(20)

	[...Crú$_1$C]+/VC/	*rə	*$_N$V$_{[-stress]}$	LINEARITY	DEP-ə
a.	...Cru$_1$CV́C		*!		
b.	...Crə$_1$CV́C	*!			
c.	...Crə$_2$CV́C	*!			*
d.	...Cə$_1$rCV́C			*!	
e.	☞ ...Cə$_2$rCV́C				*

A way to determine which of the two paths Western Armenian takes is with wug words. Taking base forms like VC$_1$úC$_2$C$_3$# and VC$_1$C$_2$úC$_3$#, we see where the schwas surface in the derived forms. If all the schwas surface in the same locations as the original high vowels then there would be strong evidence for the reduction analysis, therefore the metathesis path as in tableau (19). However if what is underlying the system is in fact deletion and epenthesis then the ə would not be driven by the location of the high vowel in the base and would always appear in the same position in the derived forms, pointing to the ranking in tableau (20). Preliminary testing with minimally contrasting wug words of the forms {…VC$_1${ú, í}C$_2$C$_3$#, …VC$_1$C$_2${ú, í}C$_3$#} indicates that when C$_2$ is [r], the derived forms of either wug word of a pair surface with a [ə] before the [r]. When C$_2$ is any other segment, the overwhelming majority of the derived forms surface with the [ə] in the position of the original high vowel environment. Therefore the system in WA at this juncture seems to be a mixture of deletion/epenthesis, when [r] is C$_2$, and reduction, for all other C$_2$ segments.

The results of the wug test and the available related forms in the lexicon reveal a high ranked phonotactic restriction in Western Armenian where instead of a ...rə... string, a ...ər... sequence surfaces regardless of the base position of the high vowel. I have represented this with the markedness constraint *rə seen in the above tableaux (19) and (20). To figure out the exact nature and motivation of this constraint investigation into the phonetics of the interacting segments might help. Also other constraints or approaches should be explored at this point to figure how to account for this restriction.

Another obstacle in the Western Armenian phonological system is the high front rounded vowel [y] which does not reduce when stress shifts off of it like the two other high vowels [i] and [u], as see in (21):

(21) k^{h}ýʁ ‘village’ k^{h}yʁ-abéd ‘chieftain’

This non-reduction is unexpected since [y] is [+high] like [i] and [u]. Relevant formants and length of [y] are similar to the other two high vowels and reduction

is expected. As we saw [i] and [u] change, so why would [y] not change? A likely explanation can be found in how this vowel is produced by different speakers. I am currently conducting some experiments examining the phonological nature of this nucleus in Western Armenian. The initial observation of the fluidity in production might be due to exposure of Western Armenian speakers to the other dialects, since most Eastern Armenian dialects realize these nuclei as [ju]. Western Armenian speakers can sometimes produce [y] as [ju] or [uj] depending on the word. I will put the non-reduction of [y] aside for the time being.

In this section I have presented a Comparative Markedness approach to the derived environment effect found in Western Armenian. The constraint against newly stressless sonorous vowels, $*_{N}V_{[-stress]}$ is at play. The derived forms that surface with schwas in the same location as the destressed high vowels correspond back to the base high vowels. While the forms where the schwa surfaces in a different position, forms involving the segment [r] point to a deletion/epenthesis analysis where the ə does not correspond back to the base vowel as seen with a wug test. Now I will briefly mention what happens in other languages that exhibit vowel reduction patterns and move onto the diphthongs.

4. Reduction Outside Armenian

Reduction alternations are common cross-linguistically. First, languages like Romanian (22), Palauan (23) and Yakan exhibit phenomena of derived environment effects of stressless vowel reduction, as was seen in Western Armenian where only a certain set of vowels are affected by stress shift.

(22) In Romanian, [á] ⇒ [ʌ] when stress shifts (Steriade 2008):

a. sʌr**á**k	'poor'	sʌr**ʌ**k-úts	'poor-dim'
b. p**a**púk	'slipper'	p**a**putʃ-él, *p**ʌ**putʃ-él	'slipper-dim'

(23) In Palauan all destressed short vowels delete or reduce to ə (Zuraw 2003:3):

a. os**í**b	osp-ú-k	'pick'
b. b**i**lás	b**i**ləs-ŋ-él, *b**ə**ləs-ŋ-él	'boat'

Armenian has a phonological process of ə-epenthesis as demonstrated above, which differentiates it from Romanian and Yakan. Therefore in Armenian, surface schwa could be either a reduced vowel or an epenthetic vowel. According to Flora (1984) Palauan also has a phonological process of ə-epenthesis, evidenced from surface glottal stops. Further investigation needs to be conducted to figure out the most accurate phonological description of Palauan and how the epenthesis would interact with the reduction/deletion. Putting Palauan aside, Armenian, just like Romanian and Yakan can be accounted for using CM (Steriade 2008).

Other languages exhibit vowel reduction across the board. For example in Catalan, Bulgarian and Russian vowel contrasts collapse in unstressed positions. In Catalan for example there are seven vowels that can surface in stressed positions, {i, e, ɛ, a, ɔ, o, u}, while only three are found in unstressed positions, {i, u,

ə} (Crosswhite 2000). The Comparative Markedness analysis can be extended to the languages where vowels in both destressed and never stressed positions reduce. Instead of just the $*_{N}V_{[-stress]}$ constraint being ranked above a specific faithfulness constraint, the $*_{O}V_{[-stress]}$ will also be ranked higher. This will result in a general reduction of stressless vowels.

5. Reduction of [uj]

A final case of reduction that is related to stress is that of the diphthongs. The diphthong [uj] reduces to [u] when stress shifts off of it as seen in (24a). The reduction of the diphthong is accomplished by the deletion of the glide. Whereas no other diphthong reduces as seen from (24b).

(24)	a.	húјs	'hope'	hus-ál	'to hope'
		məʃagújt^{h}	'culture'	məʃagut^{h}-ajín	'cultural'
		k^{h}újn	'color'	k^{h}un-avór	'colorful'
	b.	ʒájr	'boulder'	ʒajr-ód	'rocky'
		χój	'ram'	χoj-anál	'to attack'
		t^{h}éj	'tea'	t^{h}ej-níg	'tea pot'

Putting the reduction of the high vowels together with the paradigm presented in (24) the chain shift uj > u > ø is revealed. This chain shift cannot be accounted for with classical OT markedness. Any markedness constraint that would trigger the reduction of [uj] to [u] would be better satisfied with the complete deletion of [uj] instead of reduction to [u]. There is a large literature on chain shifts and I will not go into the details of each proposed addition to OT. These phenomena are found in a number of languages, such as Arabic (McCarthy 2003), Tonkawa (Gouskova 2003), Palauan (Zuraw 2003), Nzebi (Kirchner 1996), Polish (Lubowicz 2003)...

I will account for this chain shift using a distantial faithfulness constraint, DIST[mora] ≤ 1 (Zuraw 2003). This constraint restricts alterations of more than one mora between two corresponding nuclei. In other words two corresponding nuclei can differ by at most one mora. I assume that ə does not carry a mora, since it cannot bare stress. The rest of the monophthongs carry one mora and the diphthongs carry two. One other constraint active in this system is WSP (Weight-to-Stress-Principle (Prince & Smolensky 1993)), which triggers reduction of the diphthong. This constraint requires the heaviest nuclei of a word to be stressed, weight in terms of number of moras. Both DIST[mora] ≤ 1 and MAX[+high] must be ranked above WSP in this system as shown in (25):

(25)	DIST[mora] ≤1 >> WSP	[t^{h}sájn]+/avor/	⇒ t^{h}sajnavór, *t^{h}sənavór
	MAX[+high] >> WSP	[t^{h}sájn]+/avor/	⇒ t^{h}sajnavór, *t^{h}s**a**navór

The non-reduction of non-high diphthongs is seen with tableau (26).

(26)

	[Cá$_1$jC]+/VC/	DIST[MOR]≤1 AL-STR-RT	MAX[+hi]	WSP
a.	☞ CajCV́C			*
b.	CaCV́C		*!	
c.	CájCVC	*!		
d.	Cə$_1$CV́C	*!	*	

The mechanism that prevents the reduction of [aj] is MAX[+high]. The glide in the diphthongs is specified for height, namely [+high]. When the glide is deleted and the other segment in the nuclei is [-high], the [+high] feature deletes and incurs a MAX[+high] violation, demonstrated in (27b). This is not the case for [uj], where the [+high] feature is preserved on the reduced [u], (27a):

(27) (a) [+high] ⇒ [+high]
k^h[ú] [j]n k^h[u]n...

(b) [-high][+high]⇒ [-high][+high], *[-high]
t^{h}s[á] [j]n t^{h}s[a] [j]n... t^{h}s[a]n...

Now turning to the reduction of [új], the system reduces the diphthong to [u], as revealed by tableau (28) below.

(28)

	[Cú$_1$jC]+/VC/	DIST[MOR]≤1 *[+voc]//ə	MAX[+hi]	WSP
a.	CujCV́C			*!
b.	☞ CuCV́C			
c.	Cə$_1$jCV́C	*!		
d.	Cə$_1$CV́C	*!	*	
e.	Cə$_2$CV́C	*!	*	

As seen from the above tableau MAX[+high] is not violated by the surface form (28b) since a high segment from the base diphthong [uj], namely [u] is present in the derived form.

6. Conclusion

Examining the stressed and unstressed vowels of related forms of Western Armenian, it becomes clear that a process of destressed vowel reduction exists, where potentially deletion and epenthesis work together to get the desired forms of some of the paradigms. High vowels that once bore stress do not undergo an across the board reduction to ə, but delete whenever the resulting consonant cluster is phonotactically acceptable. In the framework of Optimality Theory, specifically Comparative Markedness, I have been able to account for the derived environment effect data of Western Armenian. Romanian and Yakan derived environment effects are also accounted for with CM. Therefore we have a unified account for these effects that now includes Western Armenian.

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Stress Dependent Vowel Reduction

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Do What You Know: "Semantic Scaffolding" in Biclausal Raising and Control

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0. Introduction

Verb learning requires action at the interface of 3 linguistic modules: syntax, semantics, and the lexicon. The child must associate a verb with its meaning, subcategorization requirements, and possible syntactic frames–a large task. But learning raising-to-object (RO) and object control (OC) verbs poses a special challenge, since a single string can be mapped onto two underlying structures.

(1) Suki gorped Neil_i…
  a. RO: t_i to drink espresso
  b. OC: PRO_i to drink espresso

In this paper, I examine the acquisition of RO/OC verbs, and propose that children learn them through "semantic scaffolding": a non-adultlike tactic of taking recourse to the semantics of an utterance to support interpretation. In situations where the processing system is overtaxed, children rely on the semantics of the smallest complete proposition–*the embedded clause*–in their assessment of the sentence as a whole. Furthermore, the phenomenon of semantic scaffolding lies behind several other patterns in child and adult language.

1. Background

While they may share a surface string in terms of the overt syntactic frames in which they may occur, RO (e.g., *want*, *need*) and OC (*ask*, *tell*) verbs differ on a number of issues. In short, RO verbs are "laxer" than OC verbs in both semantic and syntactic requirements. First, RO verbs may embed any clause which is internally semantically felicitous, while OC verbs demand felicity with the embedded subject (2). In addition, RO (but not OC) verbs may grammatically embed expletive subjects (3).

(2) Neil wanted/needed/#asked/#told the coffee to be strong

(3) Neil wanted/needed/*asked/*told there to be more coffee left

To date, the verb-learning literature has focused on single clauses, and little is known about the acquisition of verbs that take multiclausal frames. Within the realm of verb learning, the case of RO and OC is of special interest since these verbs' meanings are abstract, and because unlike verbs that appear in single clauses, the underlying structure of these utterances is ambiguous, given the surface string. Moreover, the relevant syntax is biclausal, and contains silent elements, thus rendering it fairly complex.

In short, the RO/OC distinction is opaque to a child hoping to bootstrap into syntax. How, then, do children assemble the lexical-semantic and syntactic information for these verbs? The acquisition of RO has not been examined at all, nor has OC been examined with this learning challenge in mind. Because RO/OC syntax is so complex, it is possible that children with limited processing resources may capitalize on the syntax-semantics interface, using a non-syntactic strategy for interpretation. I hypothesized that on the way to adultlike knowledge, children may rely on the semantics of the smallest *complete* proposition within a RO/OC utterance in their assessment of the sentence as a whole.

2. Experiment 1: Semantic Anomaly

I tested this hypothesis with 32 children (ages 4-5) using two judgment tasks: a semantic anomaly task (SA: *The teacher needed the books to weigh less/#The girl told the soup to have carrots in it*), which tested children's restrictions on the animacy of the embedded subject, and a grammaticality task (GJ: *The girl wanted there to be cookies in the bag/*The boy asked it to be time for bed*), which tested children's restrictions on embedded expletive subjects.

2.1. Method

In Experiment 1, children ages 4-5 were tested on their judgments of RO and OC utterances containing inanimate embedded subjects. 32 monolingual English speaking children (ages 4;1.15-5;11.15) were recruited from the Chapel Hill, NC, area to take part in the study.[1] Children received a small token gift for their participation.

Experiment 1 comprised a SA sentence judgment task (McDaniel and Cairns 1996) which was modeled on the reward/punishment variant of the truth-value judgment task (Gordon 1996). In this task, children saw pictures and heard short vignettes about them. After each vignette, the child listened to a puppet make a comment about the picture. The child was asked to reward the puppet for his semantically felicitous comments by "feeding" him a plastic orange, and to punish

[1] The 4s group contained 8 boys and 8 girls and had a mean age of 4;6 (range: 4;1.15--4;11.12); the 5s group contained 7 boys and 9 girls, and had a mean age of 5;5 (range: 5;0.18--5;11.15). Participants had no known linguistic (speech or hearing) impairment or other cognitive or developmental delays.

him (i.e. provide him with a less attractive reward) for his semantically anomalous comments by "feeding" him a plastic piece of lettuce. In the latter case, children were also asked to explain why what the puppet said was "silly." Test items were separated by filler items, included to check for answer biases or inattention.

After a training period, children were asked to provide SA judgments on a number of sentences. Each child received either "want/ask" items, or "need/tell" items. All test items in Experiment 1 involved matrix clauses containing animate subjects, and embedded clauses containing inanimate subjects. Example stories appear in (4), and test items appear in (5) and (6). Note that all RO test items had target "okay" answers, while all OC items had target "silly" answers.

(4) Example vignettes: Semantic anomaly

a. RO: The boy's mother was making a cake, but he didn't know what kind. He really wanted a chocolate cake, though.
Puppet: *The boy wanted the cake to be chocolate*

b. OC: Bert and Ernie were listening to music together, but Ernie didn't like the music. He said to Bert, "Can you turn that music off?"
Puppet: *#Ernie asked the music to stop playing*

(5) Semantic anomaly judgment test items: "want/ask" group

a. The boy wanted the cake to be chocolate
b. The girl wanted the coat to fit her
c. She wanted the key to open the door
d. #Ernie asked the music to stop playing
e. #The girl asked the trees to be tall
f. #The boy asked the ball to fall back down

(6) Semantic anomaly judgment test items: "need/tell" group

a. The teacher needed the books to weigh less
b. The cat needed the bed to be shorter
c. Big Bird needed the pen to write
d. #Elmo told the toys to be smaller
e. #The girl told the soup to have carrots in it
f. #Bert told the car to drive faster

Importantly, given the pre-stimuli vignettes, all of the test items for both RO and OC verbs contained embedded clauses that were semantically infelicitous (either false, or unverifiable). However, when considered as biclausal utterances as a whole, all RO items were semantically felicitous, while OC items were semantically infelicitous. Thus, if children parse only the embedded clause, they should reject *all* items. This will resemble adultlike behavior on OC items, but not RO items.

2.2. Results

The outcome of Experiment 1 was that both 4s and 5s performed above chance in their judgments on the semantic restrictions of OC verbs, but that neither group performed in an adultlike way on RO items. This means that both groups correctly rejected sentences like *#Elmo told the toys to be smaller*, but that both groups also incorrectly rejected sentences like *The boy wanted the cake to be chocolate*. The results are given in Table 1 (grey cells indicate $p < 0.01$).

Table 1: Percentages of OK/Silly Responses (Experiment 1)

Type	Item	adultlike		4s		5s	
		OK	silly	OK	silly	OK	silly
RO	…wanted [the coat to fit her]	100	0	56.3	43.7	58.3	41.7
OC	…asked [the trees to be tall]	0	100	22.9	77.1	20.8	79.2

The data was analyzed by age group and by verb type, and logistic regressions were performed to compare the number of correct responses per age group to a chance level of performance. A test of the hypothesis that children's performance was equal to chance levels on OC items was rejected; both 4s' and 5s' judgments on OC utterances were significantly above chance (4: $z = 2.81$, $p = 0.0050$; 5: $z = 2.85$, $p = 0.0044$). However, neither group performed above chance levels in their judgments of RO verbs (4: $z = 0.71$, $p = 0.4771$; 5: $z = 0.90$, $p = 0.3678$).

Thus, both 4s and 5s performed as predicted.

2.3. Discussion

In the SA task, children were asked to provide judgments on the felicity of RO and OC constructions containing embedded clauses with inanimate subjects. Both 4-year-olds (4s) and 5-year-olds (5s) performed in an adultlike way by correctly rejecting OC utterances. However, both age groups also *incorrectly* rejected RO sentences, performing at chance levels on these items. Thus, the response pattern evidenced by children in both age groups indicates that children may have been parsing only the embedded clause in each item, leading them to reject all items. This strategy would lead to what looks like adultlike behavior on OC, but not RO, items.

Children's justifications for their negative answers supported the analysis that they were judging the felicity of the embedded clause, as shown in (7).

(7) Children's justifications for negative answers

a. *Elmo told [the toys to be smaller]*
"Because they can't turn into small" (JS, 5;0.27)

b. *The girl told [the soup to have carrots in it]*
"Carrots don't be in soup" (GH, 4;7.4)

c. *Bert told [the car to drive faster]*
"Because the car can't go faster" (SA, 4;4.1)

d. *The boy told [the ball to fall back down]*
"Cause it couldn't come back down, but if they got a ladder they could get it" (KO, 5;11.15)

Such an interpretation strategy might be caused by a bottleneck on utterance size with regard to parsing, as a result of limited processing resources (memory, syntax parser). That is, the requirements of a metalinguistic sentence judgment task on biclausal utterances–a task which furthermore demands abilities at the interface of linguistic and non-linguistic cognition, especially given the abstract nature of the semantics of these verbs–may simply require an amount of extra processing power which is not available at this age. As a result, 4s' and 5s' processors must "pick and choose" what makes it through to the interpretive function of the grammar. However, it should be noticed that–if the results of Experiment 1 are indicative–what *does* make it through is not a random or haphazard collections of morphemes. Instead, it is a semantically and syntactically independent proposition: the embedded clause. Thus, even the allotment of limited processing resources may be constrained and guided by UG.

Experiment 1 still leaves open the question of how children fare when the judgment task is one of grammaticality, rather than semantic anomaly. Experiment 2 aimed to assess children's performance in this area.

3. Experiment 2: Grammaticality of Embedded Expletives

Experiment 2 tested children's competence on the grammaticality of expletive subjects embedded under RO and OC verbs. Recall that RO (but not OC) verbs allow embedded expletives. This experiment tested whether children ages 4-5 respect this grammatical restriction.

3.1. Method

The participants and method were identical to those in Experiment 1.

Children were trained to provide judgments on grammaticality and were then asked to provide such judgments on a number of sentences. Each item accompanied a picture and each prompt sentence was preceded by a short vignette describing the picture.

Children again received either "want/ask" items, or "need/tell" items. All test items in Experiment 2 involved matrix clauses which contained animate subjects, and embedded clauses which contained expletive subjects. Example stories appear in (8), and test items appear in (9) and (10). Again, all RO test items had target "okay" answers, while all OC items had target "silly" answers.

(8) Example vignettes: Grammaticality judgment

a. RO: The woman bought some ice cream at the grocery store. When she got in the car, she realized she needed to turn on the air conditioning so the ice cream wouldn't melt.
Puppet: *The woman needed it to be cooler in the car*

b. OC: The girl was walking around outside and got really cold. She said, "I sure wish it was warm outside today!"
Puppet: **The girl told it to be warm*

(9) Grammaticality judgment test items: "want/ask" group
a. The girl wanted there to be cookies in the bag
b. Big Bird wanted there to be crayons in the box
c. Dora wanted it to be her friend Boots on the phone
d. *The girl asked it to snow
e. *The boy asked it to be time for bed
f. *The policeman asked there to be people on the sidewalk

(10) Grammaticality judgment test items: "need/tell" group
a. The woman needed it to be cooler in the car
b. The chef needed there to be more sandwiches
c. The farmer needed it to rain
d. *The girl told it to be warm
e. *Sponge Bob told there to be a party at his house
f. *The woman told there to be flowers on the table

As in Experiment 1, given the pre-stimuli vignettes, all of the test items for both RO and OC verbs contained embedded clauses that were semantically infelicitous (false or unverifiable) and ungrammatical (since untensed). However, all biclausal RO items were felicitous and grammatical, while OC items were felicitous but ungrammatical. Thus, if children parse only the embedded clause, they should reject all items, which will again look like adultlike behavior on OC, but not RO, items.

3.2. Results

The outcome of Experiment 2 was that development of the restrictions on embedded expletives appears to be non-monotonic. That is, while 4s judged expletives embedded under OC verbs in an adultlike way (i.e., they correctly rejected sentences like **The girl asked it to snow*), they did not perform above chance on expletives embedded under RO verbs (i.e., they failed to correctly accept sentences like *The farmer needed it to rain*). In contrast, however, 5s performed in an adultlike way on expletives embedded under RO sentences, but were at chance for judging expletives embedded under OC sentences. Thus, performance by 4s and 5s was diametrically opposed.

The results are given in Table 2 (grey cells indicate $p < 0.01$).

Table 2: Percentages of OK/Silly Responses (Experiment 2)

Type	Item	adultlike		4s		5s	
		OK	silly	OK	silly	OK	silly
RO	…needed [it to rain]	100	0	62.5	37.5	77.1	22.9
OC	…asked [it to snow]	0	100	27.1	72.9	50	50

The data was analyzed as in Experiment 1. This analysis indicated that 4s performed significantly above chance on the OC items ($z = 2.91$, $p = 0.0037$), but not the RO items ($z = 1.23$, $p = 0.2197$), while 5s showed the opposite pattern: they performed above chance on RO items ($z = 2.62$, $p = 0.0089$) but not OC items ($z = 0.00$, $p = 1.0000$).

Thus, 4s performed as predicted, but not 5s.

3.3. Discussion

In the grammaticality judgment task, children were asked to provide judgments on the acceptability of RO and OC constructions containing expletive subjects in the embedded clause. While 4s correctly rejected OC utterances (e.g., **The girl told [it to be warm]*) at above-chance levels, they failed to correctly accept similar RO utterances (*The woman needed [it to be cooler in the car]*). In contrast, 5s correctly accepted RO utterances but failed to correctly reject OC utterances. If we assume that children are indeed performing the grammaticality judgment task in an adultlike way, we cannot make sense of their response patterns.

However, these patterns may be explainable given the hypothesis that children are actually performing a semantic, rather than a grammatical, assessment of the test items in Experiment 2. Recall that given the pre-stimulus vignettes, none of the embedded clauses were semantically felicitous, while all of the full utterances–both RO and OC–were felicitous, as seen below.

(11) a. *RO vignette:* The girl's mother gave her a bag with something tasty inside. The girl said, "I hope it's cookies!"
b. *RO test item:* The girl wanted [there to be cookies in the bag]

(12) a. *OC vignette:* The girl wanted to play it the snow, but it was a bright, sunny day. The girl said, "I wish it would snow! Why can't it snow?"
b. *OC test item:* *The girl asked [it to snow]

Syntactically, the entire RO, but not the OC utterances, are grammatical, while the bracketed embedded clauses in both RO and OC utterances are grammatical (if untensed). *Semantically*, however, the entire utterances are felicitous in both RO and OC, while the bracketed embedded clauses are infelicitous, given the pre-stimulus vignettes: that is, each embedded clause corresponds to a state of affairs that was *not* described in the vignette.

Given the response pattern we see here, then, it appears that just as in Experiment 1, 4s are assessing the embedded clauses (not the full biclausal utterances) in

isolation, and are doing so for semantics, rather than syntactic grammaticality. This strategy of using local semantics in their judgments, and not global syntax, led to what appeared to be adultlike rejection of OC items and nonadultlike rejection of RO items

However, the 5s' data *cannot* be explained with this analysis, as 5s responded in the opposite fashion. Instead, I propose that 5s, who must certainly have greater processing resources than 4s, have greater flexibility in what linguistic information they allow through the processing bottleneck to reach the parser; they appear to prefer to parse the embedded verb with the next c-commanding *lexical* (not expletive) NP, which in the test items in Experiment 2 can only be found in the matrix clause. By disregarding the embedded expletive, 5s are able to construct "grammatical" semantically-driven parses for both RO and OC utterances. Thus, test items like those in (13) may be interpreted by 5s as in (14), allowing these children to accept both RO and OC utterances.

(13) a. The girl wanted there to be cookies in the bag
b. *The boy asked it to be time for bed

(14) a. The girl wanted… cookies in the bag
b. The boy asked… for bed

Children's "choice" of matrix subject and lower predicate makes sense in the context of studies on serial position effects on memory, specifically the effects of primacy and recency (e.g., Deese and Kaufman 1957). Studies indicate that when a number of items (say, words) are presented in succession, the elements at the beginning (i.e., "primacy") and at the end (i.e., "recency") of the list will be disproportionately salient, and thus better recalled. In contrast, items in the middle of the list will be less easily recalled. This phenomenon makes exactly the prediction we see borne out in 5s' interpretations of items in the GJ task: namely, that they would parse the matrix subject and the embedded predicate together, but would appear to disregard the "middle" of the utterance (i.e., the semantic subject of the embedded clause, and perhaps the matrix verb as well).

Results in both tasks thus supported the prediction that children will focus on the embedded clause in their sentence judgments.

4. Conclusion

In the experiments presented here, I tested children's knowledge of the semantic and syntactic restrictions on clauses embedded under RO and OC verbs. In Experiment 1, both age groups correctly rejected OC sentences, but incorrectly rejected RO sentences, indicating that they parsed only the embedded clause, and not the entire utterance. In Experiment 2, children again appeared to parse only the embedded predicate in test items, and to do so with respect to semantics, rather than syntax. 4s again parsed the lower clause alone (they correctly rejected OC sentences, but incorrectly rejected RO sentences), but 5s' reversed pattern (they correctly accepted RO sentences, but incorrectly accepted OC sentences)

indicated that these older children, who likely have greater processing resources, were parsing the embedded VP with the next c-commanding lexical (not expletive) NP as a subject. By disregarding the expletive, 5s constructed semantically-driven parses which they judged as "grammatical." Results in both tasks thus supported the prediction that local semantics, and not global syntax, guided children's judgments. This process is one piece of a cluster of strategies I refer to as *semantic scaffolding* (for greater detail, see Kirby 2009).

In short, instead of distinguishing (and assessing) RO and OC verbs syntactically in these experiments, children appeared to "scaffold" their judgments of these biclausal utterances in both tasks by parsing the smallest *acceptable* semantically independent proposition in each utterance: either the embedded clause alone (for 4s), or the embedded predicate plus the first c-commanding lexical NP (5s). This analysis has the added appeal of explaining how UG may still constrain non-adultlike performance in the face of processing limitations.

In children's performance on these tasks, we can see how semantic scaffolding constrains and directs interpretation in the absence of adultlike syntactic knowledge or processing power. Faced with a taxing metalinguistic judgment task on a syntactically complex biclausal utterance, along with the demands of integrating linguistic and non-linguistic (real-world) knowledge, children may encounter a processing bottleneck in terms of the linguistic components that make it through to the interpretive function. Here we see semantic scaffolding, as an innate predisposition, guiding precisely *what* makes it through: not a haphazard collection of morphemes, but rather *a clausal proposition as an independently functioning semantic "whole."* The particular shape of the proposition that makes it through the bottleneck seems to change over time (in terms of whether it must include a lexical–not expletive–NP), but the thrust of the process is the same in either case.

Although children *do* distinguish the verb classes syntactically under other circumstances (Kirby 2009), they did not *appear* to do so in the experiments presented here. Rather, they "scaffolded" their judgments of biclausal RO/OC utterances by parsing the smallest *acceptable* semantically independent proposition in each utterance: either the embedded clause alone (4s), or the embedded predicate plus the first c-commanding lexical NP (5s). Indeed, it should be noted that what may appear to be a conflation of the two verb types (by parsing them both in the *same* preferential way) may instead simply be a result of the matrix verb not making it through the full interpretive process (that is, a reflection of the fact that the parsing is, in fact, constrained by a bottleneck).

This preferential attention to the embedded clause in multiclause constructions should not be too surprising, as it appears to be a natural and expected result of tendencies observed in MacWhinney's (1982) predisposition of "relatedness" or Behaghel's (1932) First Law; the strategy of parsing of the embedded clause as a unit, to the exclusion of lexical elements in the matrix clause, appears to arise from the desire to keep units together *syntactically* which function together *semantically*. For all speakers, the clausal proposition is the basic semantically

coherent unit which should ideally be processed together syntactically. Semantic scaffolding biases the child to expect and prefer a particular clausal shape: a well-formed clause contains a syntactically contiguous subject and predicate. Moreover, given 5s' performance in contrast with that of 4s', it appears that the grammar actually prefers that the subject appearing in the contiguous clause be referential, not expletive. This makes sense, considering crosslinguistic adult tendencies in what is lexicalized as a "subject" (Keenan 1976, Dowty 1991).

The "contiguity" effect in semantic scaffolding may lie behind other patterns in child language, including children's interpretation of the multiclause control structures. C. Chomsky (1969) found that children were slower to acquire the syntax for the subject control (SC) verb *promise* (*Neil promised Louise to make coffee*) than for object control (OC) *tell* (*Neil told Louise to make coffee*); young children interpret both sentences under the OC pattern, assuming that *Louise* is the coffee-maker in each utterance. I suggest that the staggered acquisition of the *tell* and *promise* patterns is in fact related to the alignment of thematic roles in the embedded clause and whether they allow for the contiguous appearance and processing of an embedded clausal proposition. In the *tell* utterances, the semantic subject, *Louise*, forms a contiguous unit with its predicate *cook dinner*. In contrast, in the *promise* utterance, the semantic subject of the cooking event, *Neil*, does not appear contiguously with its embedded predicate; instead, the child must look above the embedded predicate past one c-commanding NP to reach the semantic subject. As predicted by semantic scaffolding, the children in C. Chomsky's Stage 1 incorrectly interpret *promise* sentences as having object control, like *tell*.

Data from relative clause (RC) processing also support semantic scaffolding's assumption that children prefer to produce and/or parse entire semantic (clausal) units as a whole. MacWhinney (1982) cites data from Limber (1976) and Menyuk (1969; both cited therein) indicating that OO (object-modifying, object-extracted) and OS (object-modifying, subject-extracted) RCs emerge in spontaneous production before SO and SS types. I would argue that this acquisition pattern arises specifically from the desire to present clausal units as an uninterrupted whole: where subject-modifying relative clauses would disturb the contiguity of the matrix subject and its verb, object-modifying RCs do not.

The desire to match semantic with syntactic contiguity may also have left a mark in adult language. Children's interpretations of the contiguous embedded clauses here may be related to Specified Subject Condition (SSC; N. Chomsky 1973) effects seen in adult language; the SSC both limited NP movements (i.e., an NP may not raise over another NP that could have moved) and defined domains for anaphor binding, or more specifically "complete functional complexes." These CFCs are essentially clausal propositions of the type in which we are interested: "all grammatical functions compatible with its head are realized in it–the complements necessarily,… and the subject…" (N. Chomsky 1986:169). It seems that there is a preference, even in adult language, for producing and interpreting contiguous clausal propositions as independently functioning semantic units.

Semantic scaffolding may also lie behind "garden path" effects in sentence processing (e.g., Frazier 1978). Sentences like *The horse [raced past the barn] fell* are often initially misparsed as *The horse raced past the barn* (i.e., as not containing a reduced RC); it appears that in the absence of other information, the grammar defaults to an expectation of contiguous *subject + predicate* utterance shape.

Finally, we may see some effects of semantic scaffolding in second language relative clause processing. Research has indicated that L2 speakers of both Turkish, an SOV language (Özcelik 2006), and English, which is SVO (Izumi 2003), perform better in comprehension and production on RCs which do not disturb the continuity of the matrix clause. Thus, when the adult processing system is stressed, adults–like children–appear to get syntactic support from the basic semantic clause shape in its contiguous form.

In sum, the umbrella term "semantic scaffolding" encompasses several strategies which children turn to in the absence of adultlike syntactic knowledge and/or processing power, and which dictate what the canonical and expected overall shape of clauses and relationships among elements in clauses should be. These strategies can be seen not only in child language, but also in adult language as well. Given the literature on child cognition in both linguistic and extralinguistic realms, it appears that semantic scaffolding has a basis in domain-external structure (Kirby 2009). However, as we have seen, UG takes these extralinguistic notions and puts them through its own domain-specific filter, giving rise to the *linguistic* patterns we see here.

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Format Tying and the Acquisition of Syntax in Toddlers' Peer Interactions

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0. Format Tying

Goodwin (1990) defines format tying as participants' strategic use of the surface structures (such as phonological, syntactic, and semantic surface structures) of prior utterances through exact or elaborated repetitions. That is, format tying is a "publicly available apparatus for tying talk in one turn to another" (Goodwin 2006:12). There are other terms in the literature, capturing phenomena similar to format tying, such as "dialogic syntax," studied by Du Bois (2001), and "dialogic priming" studied by Bock and Loebell (1990). This study examines how young children make interactional use of format tying, and how extended sequences of turns involving format tying may serve young children as a context for learning the grammatical structures surrounding verbs.

Format tying in child language is important to study, firstly because at early ages repetitions constitute a large portion of children's conversational discourse (Goodwin 1990, Keenan 1977). Very young children who are acquiring language do not have many semantic and syntactic resources available to them to work with; thus, they rely heavily on repetitions in their conversations (Keenan 1977). Secondly, repetition is a linguistic phenomenon whose importance has been underestimated (Keenan 1977). Keenan (1977) argued that repetition was usually equated with imitation, which undervalued children's linguistic competence and what they try to accomplish with repetitions. Eventually, "strategic use" of repetitions should be highlighted and children's repetitions may be regarded as strategic moves in their conversations to achieve communicative goals, such as display of alignments, and accomplishment of one-upsmanship in their peer interactions (Corsaro and Maynard 1996, Goodwin 1990).

The most important feature of format tying is that it allows speakers to exploit syntactic and pragmatic resources within a conversation. As Goodwin (1990) highlights the communicative goals are not necessarily independent of the syntactic surface structures in the prior talk. That is, the linguistic forms and functions are highly intertwined (Slobin 1985). Below is an example of an episode of format tying among elementary school children studied by Goodwin.

(1) A: Why don't you get out of my yard.,
B: Why don't you *m*ake me get out the yard. (Goodwin 1990:180)

Adding the phrase "make me" turns an already confrontational command into confrontational causative construction. Thus, format tying can be an interactional resource, especially for young children to "construct and reconstruct their social organization on an ongoing basis" (Goodwin 1990:33).

1. Conversational Repetitions and Argument Structure

Studies have found that, in mother-child conversations, extended rounds of repetitions facilitate the acquisition of syntax (Clancy 1996, 2009, Du Bois 2001, Küntay and Slobin 1996). For instance, Küntay and Slobin (1996) found that in mother-child conversations, Turkish mothers repeated a particular verb frame over and over varying particular arguments of the verb to maintain the child's attention. They argued that through this practice, which they termed "variation sets." Children learn particular features of the grammar of their language (for instance, in this case, Turkish-speaking children learn that word order is flexible in Turkish).

Participation and involvement in conversations through format tying and repetitions provides a rich context that facilitates learning. Du Bois (2001) lists a number of reasons why dialogic syntax provides "an ideal site for the on-going learning of all levels of linguistic structure" (see also Clancy 2009). Similarly, Miller and Ervin (1964) found that repetitions in conversations assist syntactic learning. In the present study, we examine how participation in conversations through format tying supports children's development of the argument structure of verbs. In this study, "argument structure" is defined as all the arguments that a verb takes, such as the subject, object, and recipient, as well as oblique arguments, such as expressions of manner, locatives, and temporal adverbs (Parisi and Antonucci 1974 as cited in Slobin 1979). The approach taken here is consistent with other literature (e.g. Budwig 1995, Clancy 1996, Cook-Gumperz and Kyratzis 2001, Ervin-Tripp 1993, Hopper 2001, Langacker 2001, Thompson and Hopper 2001) which has documented ways in which grammar can be viewed as a discourse-embedded phenomenon.

2. Research Questions

The present paper is part of a larger study, a master's thesis (Köymen 2008) which investigated whether and how toddlers were able to engage in peer conversations strategically through use of format tying in their conversations and how conversational repetitions and format tying supported aspects of the development of syntax, such as the development of the argument structure of verbs.

One important gap in the literature is that peer talk has been rather ignored in the acquisition of grammar. This is probably due to the fact that the acquisition of grammar is mostly studied through the child-directed speech of caregivers, which takes place at an early stage, when children are not believed to be systematically

exposed to peer interactions. However, currently, more and more toddlers attend daycare centers and spend significant amounts of time in interaction with their peers in daycare.

Out of all the instances of format tying identified in the database utilized here (see below), we selected the ones that were sustained for at least four turns, and examined how extended sequences of turns involving format tying may serve young children as a context for learning the grammatical structures surrounding verbs.

3. A Study of Extended Sequences of Format Tying

3.1. The Database

The data come from an ethnographic archival database which consists of 500 hours of video recordings of children's naturalistic interaction in two toddler-infant daycare centers in Southern California. Videotaping took place twice weekly over a two-year period. The researchers focused on peer-to-peer interactions, as well as on peer-to-caregiver interactions in various contexts such as indoor or outdoor free play and snack time. The ages of the children attending these daycare centers ranged between 18-30 months. Seven target children who were in the same cohort and participated in steady friendship groups were singled out for Köymen's (2008) master's thesis study. All the videotapes in which at least two of the target children participated were watched by the researcher (S.B.K). All of the instances of format tying were pulled out. These excerpts were transcribed using the Du Bois, Cumming, Schuetze-Coburn, and Paolino (1992) transcription system (see the appendix for the transcription conventions).

3.2 Data Reduction: Episodes of Extended Sequences of Format Tying

Episodes of extended sequences of format tying were defined as meeting two criteria: (1) expanding an argument structure of another speaker's utterance through varying an element or adding one into the next turn. The cases of expanding previous speaker's utterances were often for the purpose of topping. (2) These expansions should persist for four or more turns so that the persistent nature of these extended sequences was clear. Four or more turns was the criterion for persisting on a theme because format tying requires at least 2 speakers, and each speaker contributes more than once before the topic is dropped. All such episodes involving at least two of the seven target children were identified and pulled out for further analysis. Structural and functional features of such episodes are discussed in greater detail elsewhere (Köymen and Kyratzis 2009).

3.3. The Analysis of Extended Sequences of Format Tying

Extended sequences of format tying that target children produced were analyzed line by line for: (1) what kinds of variations the children made on the format of the utterances of prior speakers; and (2) how these variations supported the use and learning of argument structure. This paper shows two examples addressing these research questions.

4. Examples

In the following example, Eathan and Kimmy are on top of a slide and they compete with each other in terms of how high and how fast they go up stairs of the slide.[1] In their extended sequence of format tying to one another, they practice the argument structure of "I go up," adding relevant arguments of speed, number, and manner.

(2) [Eathan (2;1;28), Kimmy (2;1;24)]

(KIMMY AND EATHAN ARE ON TOP OF A SLIDE)

1	KIMMY;	Yeah I--,
*** 2**	**EATHAN;**	**Did you -- up(Hx) to- to ..two now** (LEANS DOWN)
> 3	**KIMMY;**	**I go [up to two]**
> 4	**EATHAN;**	**[Did-- did you--] up two-- up five,**
5	#EATHAN;	I go- My turn (GOES NEXT TO KIMMY)
> 6	**KIMMY;**	**I go up to ^two now. Ne::o::w.**
> 7		**I go up to ^two now.**
> 8		**I go up.. boch::** (FLINGS RIGHT ARM)
> 9		**I go up.. five.** (FLINGS RIGHT ARM)
> 10	**EATHAN;**	**I'm go up five too.**
11	#;	(…) Wa:::.
> 12	**KIMMY;**	**I go ^faster and ^faster.**
> 13	**EATHAN;**	**#I'm goin' faster and faster.**
> 14	**KIMMY;**	**I going.. ^faster and ^faster.**
15	A GIRL;	Faster
16	CG1;	Faster and faster?
17	A GIRL;	Faster. Faster
> 18	**KIMMY;**	**^Faster and ^faster,**
> 19		**And ^faster.** (JUMPS UP)

In line 2, Eathan makes a challenge, "Did you -- up(Hx) to- to ..two now," possibly challenging Kimmy by asking her whether she has climbed up two steps of the slide. He elides the verb here. In line 3, Kimmy takes Eathan's question and turns it into a declarative form, ("I go [up to two]"), showing that she can meet his challenge, and adding the verb "go" to his original construction. In line 4, Eathan upgrades the challenge by increasing the number of steps Kimmy should be going up, from two to five "[Did-- did you--] up two-- up five." In lines 6-9, Kimmy ties to the statement embedded in Eathan's challenge, first claiming that she has gone up two steps ("I go up to ^two now," lines 6-7), then saying she has gone up to five steps, ("I go up.. five," line 9), thereby meeting his challenge. In line 10, Eathan recycles Kimmy's utterance, and indicates that he goes up five too, maintaining an equal footing with Kimmy. He also switches to a near-progressive

[1] All names are pseudonyms.

form, changing her "I go" to "I'm go." By adding the (contracted) copula verb here, he might be taking an alternative viewpoint on the event, viewing it more from the inside the event rather than taking a more distanced perspective on it, as argued by Langacker (2001). Up to now, he has been merely challenging Kimmy, now he is making his own statements. Then, in line 12, Kimmy ties to this utterance by deleting the arguments of direction and distance, and by adding the argument of the speed of going with the comparative ending "er," "I go ^faster and ^faster." By using the comparative adverb "faster and faster," Kimmy explicitly upgrades his utterance. Then, Eathan ties to this by saying, "#I'm goin' faster and faster" in line 13. He recycled the same utterance as Kimmy, but he completes the progressive aspect that he initiated in line 10 by adding "–ing" to "go," saying "#I'm goin' faster and faster." Then in line 14, Kimmy repeats his utterance, ("I going.. ^faster and ^faster."), using the progressive form ("I going") as he had done, although she elides the contracted copula. In lines 18-19, she intensifies the statement by repeating the comparative adverb an additional time, "and faster."

Thus, across lines 1-19, a quite complex argument structure is produced dialogically across turns with arguments of manner, speed, distance, and time. The children even vary question and declarative forms of the same utterance (repeating "Did you [go] up" and "I go up") across different turns. They also vary the viewpoint that is taken for the same event (simple present to progressive).

The example in (2) showed children adding adverbial arguments of manner, speed, distance, and time to the constructions of prior speakers, as well as varying viewpoint and aspect. The next example shows children adding complexity in terms of contracted copula verbs and causal clauses. The excerpt begins with a pretend play that is triggered by singing the birthday song, through which one boy, Devon, claims himself as the birthday boy and a girl, Sammy, goes along with it.

(3) [Devon (2;6;16), Sammy (2;9;8)]

(DEVON AND SAMMY ARE IN A PRETEND PLAY OF A BIRTHDAY PARTY)

*** 13**	**DEVON;**	**<SING Happy birthday ^for ~^DEVON SING/>**
14	SAMMY;	It's ready guys (WALKING TO TABLE)
15	DEVON;	#We're #here. <SING Happy birthday to you. Happy SING/>
> 16		**For me. My birthday-- for me.**
17	SAMMY;	Happy birthday. Birthday's ready.
18	DEVON;	Huh?
19	**SAMMY;**	**Birthday's**
> 20		**(…) for ~DEVON**
21	DEVON;	Happy birthday too. (MEANS "YOUR BIRTHDAY TOO")
22		<SING Happy birthday ~Sammy SING/>
> 23	**SAMMY;**	**It- no, it's for you.**
24		I'm the mom.

(Example continues.)

In line 13, Devon sings the happy birthday song. He claims the birthday for himself by saying "For me. My birthday-- for me" in line 16. In line's 19-20, Sammy agrees with this statement and recycles Devon's "for me" construction by embedding it into a complete contracted copula construction, ("Birthday's … for Devon"). In lines 21-22, there is conflict, in that Devon recycles the utterance that it's somebody's birthday by saying that it's for Sammy "Happy birthday ~ Sammy." In line 23, she disagrees and recycles the same argument structure, again using the copula form, but puts Devon in the role of birthday person "it's for you." Moreover, she embeds this restructured statement in a negative construction, ("It- no, it's for you"). By embedding his statement in a negative construction, she turns around and refutes the statement he made in the previous turn. Across the two turns, the children practice turning negative and declarative forms of the same statement into one another. In the next line, she elaborates on her statement that it's for him by saying "I'm the mom." Being the mom positions her as an authority figure who can organize birthdays for others.

In example (3), we see that a preliminary argument structure "happy birthday, for Devon" evolves into a new argument structure with a contracted copula verb "Birthday's for Devon," and further into a negative contracted copula construction with a causal clause, "No, it's for you. I'm the mom." Hence, as the children attempt to top one anothers' statements and negate them, they evolve quite complex argument structures dialogically in the interaction.

5. Discussion

The main finding of this paper is that children seem to elaborate complex argument structures over sequences of conversational turns dialogically. In conflicts and discussions with their peers, through the practice of repeating and modifying the argument structures of one another's statements, children were provided an occasion to learn, practice, and appreciate the discursive underpinnings of the grammatical forms that they were contrasting across speaker turns. For instance, by juxtaposing two closely related forms "I go faster" vs. "I'm goin' faster" in an attempt to position themselves interactionally, they might begin to appreciate the functional context in which each of these forms might be appropriate.

These episodes of extended sequences of format tying provided an example of how discourse and grammar might be related in children's language acquisition (e.g. Budwig 1995, Clancy 1996, Cook-Gumperz and Kyratzis 2001, Ervin-Tripp 1993, Hopper 2001, Langacker 2001, Thompson and Hopper 2001). Usually the development of adverbs or the emergence of predicates is associated with cognitive development, such as mastery of relations of time, space, causality, purpose, obligation (Parisi and Antonucci 1974 as cited in Slobin 1979, Slobin 1979). However, as these examples suggested, in addition to cognitive factors, social and discursive factors were found to play a role and contribute to syntax acquisition and use. As found and suggested in previous studies (e.g. Du Bois 2001, Miller and Ervin 1964, Keenan 1977), participation and involvement in conversations through format tying and repetition provided very young children with a context

that facilitated their use and learning of quite complex grammatical constructions and argument structures.

Finally, this study highlights the scaffolding role of the interactant, similar to other studies on mother-child conversations (see also Bowerman 1976, Clancy 2009, Küntay and Slobin 1996, Ochs and Schieffelin 1984). However, this analysis departs from these studies in terms of how toddlers scaffold *one another* for syntax acquisition, thereby creating their own context for language learning.

6. Appendix: Summary of Transcription Symbols

MEANING	SYMBOL	COMMENTS
speaker attribution	JILL;	semicolon follows name in CAPS
pause, timed	(1.2)	pause duration in seconds, tenths of seconds
hold/micropause	..	< 150 milliseconds; brief silence
pause, untimed	...	0.2 seconds or more
lag/prosodic lengthening	:	colon marks slowing of local tempo
overlap (first pair)	[ ]	align left square brackets vertically
overlap (2nd pair)	$[_2$]	align left brackets, with subscript numeral
terminative	.	intonation morpheme signaling finality
continuative	,	intonation morpheme signaling continuation
truncated intonation unit	—	aborting projected intonation unit
appeal	?	combines with final/continuing: ?. ?,
truncated/cut-off word	wor–	aborting projected word (en dash)
laugh	@	one per pulse or particle of laughter
laughing word	@I @am	laugh symbol marks laughter during word
unintelligible	###	one symbol per syllable
uncertain	#I #am	transcribed words are uncertain
comment	((WORDS))	analyst comment on any topic
pseudograph	~Jill	name change to preserve anonymity

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A Tautology is a Tautology: Specificity and Categorization in Nominal Tautological Constructions

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1. Observation

Okamoto (1993) sheds light on the construal of Japanese nominal tautological constructions with regard to its language specificity. She argues that meanings of tautologies in Japanese are determined by the case markers *-wa* (topic marker), and *-ga* (subject marker), which leads to construals of immutability of category and undesirability, respectively. It seems to be implied that the meaning distribution is complementary except for some cases (see Okamoto 1993). One of the examples can be shown as below:

(1) ***kimi wa kimi, ware wa ware*** *nari, saredo nakayosi*.
you Top you I Top I Cop yet, (we) are good friends
'You are you, I am I, yet we are good friends.'
(from the newspaper *Asahi Shinbun*) [Okamoto 1993:443]

As shown in (1), if the topic marker *-wa* is used in the construction, the author argues that it conveys immutability of the category for the referred nominal in question, but not undesirability of the nominal. However, there are some cases where desirable meaning can be derived even though the topic marker *-wa* is used:

(2) [When seeing a student, who has been known for his brilliance, solving a very tough question in a second without any hesitation,]
tensai wa tensai*-da*
genius Top genius-Decl
lit. 'Genius is a genius' (HE IS a genius).

If it is true that the construction with the topic marker can convey either (un)desirable or category immutability reading, Okamoto's argument that mean-

ings are determined only by grammatical markers would not be convincing enough (further to be discussed below).

Similar to the Japanese constructions, construal of Korean tautologies seems to be determined by case markers such as *-un/-nun* (topic marker), and *-i/-ka* (subject marker). However, their semantic ranges also overlap with each other so that the construal of one sentence such as (3) varies:

(3) ***os-un/i*** ***os-i-ci/-ya/-ney***[1]
clothes-Top/Nom clothes-Cop-Decl
lit. 'Clothes are clothes.'

It can be equivalent to saying, 'This outfit can be barely called as an outfit,' 'That IS an outfit,' or 'That's nothing but an outfit,' depending on various contexts. If the meaning distribution only relied on grammatical markers, the semantic overlap shown above would not be expected.

The aim of this paper is to argue that the interpretation depends on the speaker's knowledge about the entity with regard to its specific/generic distinction and on the speaker's categorization of the referred entity, rather than only on language specific conventionality. Furthermore, this paper will relate the construal of tautologies to cognitive categorization processes regarding shared knowledge, expectation, and inferences. This paper will account for the meaning distribution of tautologies in general by considering some relevant examples from Korean and Japanese within the framework of Mental Spaces Theory (Fauconnier and Turner 2002; MST, henceforth), which provides an outstanding theoretical window through which we can account for interrelation of the two nominals in the construction.

In section 2, the paper explores background on this topic—recapitulation of the 1980's debate and advent of non-radical approaches and revisits one of the non-radical approaches, Okamoto's (1993) accounts. Then, the paper raises some problems in her accounts. In section 3, by analyzing Korean tautological examples, it is argued that construal of tautological constructions should be based on two cues—specificity and categorization. In section 4, based on the analyses, detailed explication of the construction will be provided within Mental Spaces Theory. Finally, a residual issue—similar semantic effects of tautologies to proverbs—will be discussed briefly in section 5.

2. A Concise Overview of the Debate Over Tautologies

In general, tautologies are regarded as redundant expressions and true by virtue of their logical form alone, from the perspective of truth-conditional semantics (Okamoto 1993:434). However, frequent use of colloquial tautologies has been studied by more than a few linguists, and the topic has given rise to overheated

[1] One of the endings *-ney* is not to be used as freely as the other two endings. In fact, the ending is one of evidential markers in Korean and I will argue that this evidential marker makes us a crucial evidence for relevance between the subject noun and specificity (to be discussed in section 3).

debate between radical semanticists (Wierzbicka 1987 and 1988; *inter alia*) and pragmaticists (Brown and Levinson 1987, Levinson 1983, Ward and Hirschberg 1991) in the late 1980's (Radical Approaches). The pragmaticists argue that meanings of tautologies are regarded as conversational implicatures which are calculable from general, language-independent conversational principles, such as the Gricean Cooperative Principle combined with the flouting of the maxims of Quantity (Brown and Levinson 1987), whereas the semanticists argue that the communicative import is conventionally encoded in a given construction, and is not calculable from any language-independent pragmatic maxims (Wierzbicka 1987). This debate itself shows that it would not be simple to say that tautologies are semantically vacuous, and there must be some kind of mental process in construing tautologies.

Meanwhile, it is noteworthy that non-radical approaches toward the topic have been conducted by many linguists (Escandell-Vidal 1990, Farghal 1992, Gibbs and McCarrell 1990, Gibbs 1994, Okamoto 1993), who thought that construing tautologies is possible only when we take into account speakers' embodied knowledge of the entity which is talked about as well as linguistic forms. They thought that linguistic forms trigger language-specificity in construing tautologies to some extent, but that it is also true that people's inferencing plays a crucial role to have additional pragmatic meaning extensions.

This paper agrees with the non-radical approach, since the speaker's embodied experience of the referred nominal as well as grammatical conventionality is found to be crucial to the construal.

2.1. Problem Raised

Among non-radical approaches, Okamoto's (1993) accounts are intriguing in that she argues that the core meanings are fixed by conventionality before pragmatic inferences are used. There are major core meanings for the tautologies and they are determined by grammatical markers such as a topic marker *-wa* and a subject marker *-ga*. These markers yield specific readings such as category immutability and undesirability respectively.

The construal is, however, not totally fixed by conventionality as shown in (2) containing the topic marker *-wa*. In addition, when *X ga X* is employed, it indicates that the referent of X has some undesirable quality (Okamoto 1993:448). This account is, however, not impeccable, since there is a case where the very same construction can convey the desirable attitude toward the nominal X.

(4) [The speaker is talking about the very formal wedding to which she is invited.]

basyo ga	***basyo***	***da***	*kara,*	*tyan to site*	*ik-anakutya*
place Sub	place	Cop	because,	in a proper (dress)	(I) must go

'Because the place is (not an ordinary) place, I must go in a proper dress.'
[Okamoto 1993:450]

As shown above, the example does not necessarily presuppose that the place is undesirable. Rather, the place is likely to be merely a formal place.

In short, core meaning distribution only by grammatical markers does not seem to be convincing, since each construction can convey either the (un)desirability reading or the category immutability reading. In this regard, Okamoto's criteria of semantic distinctions needs to be reconsidered and strengthened with another criterion.

2.2. Implications of the Counterexamples Against Okamoto (1993)

Considering the counterexamples presented above, core meaning seems to be determined by other semantic cues: The construal seems to depend on whether or not the entity which is talked about evokes a specific entity in the interlocutor's mind. That is, if she refers to a specific entity, the reading is likely to be either reading of undesirable or desirable attitude toward the nominal; If not, the category immutability reading can be evoked.[2] In order to have a meaning of (un)desirability, it would be natural that people have the relevant experience of the entity, which is related to the specificity of the noun phrase. For instance, if we do not have any specific person in mind, we cannot say *tensai wa tensai da* 'the genius is a genius' as a compliment or an insult. Instead, it would mean something like 'there is nothing special about a genius.' The working hypothesis can be recapitulated as follows:

(5) a. If a nominal X refers to a specific entity, the utterance is likely to convey a reading of desirability or undesirability.
b. If a nominal X refers to a general notion of the concept, the utterance is likely to convey the reading of category immutability.
b′. If both nominals refer to the same type of entity (specific-specific or generic-generic; "token indifference" (Gibbs and McCarrell 1990)), it is likely to convey category immutability.

This suggestion is far from being new: Farghal (1992) argues that various interpretations can be derived from the specific/generic distinction via our inferences based on expectation. He argues that absolute generalizations, fatalism, obligation, and indifference fall into the category where a generic notion is referred to, whereas assessment falls into the other category where a specific entity is referred to. In addition, Gibbs (1994) argues that the construal of the construction is based on a stereotypical understandings of the nominal.

[2] As Elizabeth Traugott points out, 'category immutability' reading might accompany construal of negative nuance in general, which means that purely semantic interpretation of the construction will readily call for some pragmatic inferences. Nevertheless, the author would like to assume for now that we can have that reading equivalent to 'token indifference' reading, which is assessment-neutral. As a matter of fact, this point is directly related to this paper's main claim: construal of the construction is determined by interaction of the interlocutor's sophisticated specificity distinction and categorization and thus, it is often times not easy to label the readings.

3. Specificity in Cross-Linguistic Tautological Constructions: Korean

This section explores the possibility that specificity lies in the center of construal of the construction cross-linguistically, by investigating Korean nominal tautologies. If the hypotheses are right, it would not be impossible to say that what matters most in the construal is how specificity is fused into the utterance.

3.1. Multiple Readings from a Single Utterance

Korean has a similar case marking system to Japanese: A topic marker *-un/-nun* and a subject marker *-i/-ka* and thus, the construction might be analyzed in a similar fashion: The topic marker *-un/-nun* evokes category immutability reading, and the subject marker *-i/-ka* evokes undesirability reading. However, as shown in (3), it is not hard to find that a single expression can be interpreted in multiple ways. Let us take another example, which is shown in (6)-(8):

(6) [Someone asks the speaker if X is the speaker's friend and the speaker is not sure about that]

na-eykey *ku-uy* *cenhwapenho-ka* *iss-nun-kes-ul*
I-to he-Gen phone.number-Nom Cop-Pres-Nmlz-Acc

po-ni ***chinkwu-nun*** ***chinkwu-ney***
see-because friend-Top friend-Decl
lit. 'Because I have his number, the friend is a friend'
(Considering that I have his number (in my cell phone), he might be my friend (I might have met him before)

(7) *tow-a* *cwu-ese* *cengmal* *koma-we*
help-Conn give-Conn.because really thank (you)-Decl

yeksi ***chinkwu-nun*** ***chinkwu-ney***
doubtlessly friend-Top friend-Decl
lit. 'Thank you for giving me help. The friend is a friend, doubtlessly'
(Thank you for giving me help. YOU'RE a friend.)

(8) [When advising your friend, who is afraid that friendship will turn to be bad and hesitates to tell her friend to give her money back, not to hesitate to,]

ese *tal-lako* *ha-e*.
soon give.me-Comp do (say)-Decl

ton-un *ton-i-ko,* ***chinkwu-nun*** ***chinkwu-ya***
money-Top money-Cop-and friend-Top friend-Decl
lit. 'Tell him to give you the money back as soon as possible. Money is money and Friends are friends' (Tell him to give you the money back quickly. The thing is that money and friendship are separate matters.)

In (6)-(8), the same utterance is used with different meanings: The one used in example (6) conveys the meaning that even though I don't know him very well, I will call him a friend, since I have him in my phonebook (evaluative), especially

somewhat negative attitude. Next, in (7), the speaker would like to express gratitude toward the hearer, who is the speaker's friend by meaning that the hearer is a real friend. The construction conveys another evaluative reading, especially positive attitude toward the nominal. Last, in (8), the construction does not convey any evaluative reading. Rather, it focuses on the immutability of the category FRIEND, regardless of the money matter.

It is worth noting that we can obtain other kinds of reading such as indifference and fatalism (Farghal 1992; in Jordanian Arabic), when the speaker does not have a specific entity in her mind, which can be exemplified in Korean as follows:

(9) A: *chinkwu-ka* *mwue-lako* *sayngkak-ha-ni*?
friend-Nom what-Comp thought-do-Intr
B: ***chinkwu-nun*** ***chinkwu-ci***.
friend-Top friend-Decl
lit.'What do you think is a friend? Friends are friends'
(How do you define a friend? There is nothing special about a friend)

In (9), the construction conveys meaning of indifference. That is, the speaker B implies that he does not want to think about the matter seriously. In this case, if the speaker has a specific person who is referred to by the nominal, we cannot get the reading.

3.2. Evidence Showing Specificity

3.2.1. Evidentiality

One compelling source of evidence comes from the evidential marking system in Korean. According to H.-S. Lee (1991), Korean ending markers can express various types of aspects, epistemicity and evidentiality. As already used in our examples above, the ending markers such as *-ci/-ya/-ney* play the role of aspectual marker. The first two markers are related to describing the speaker's belief of the proposition in question: Specifically, the marker *-ci* is called a committal marker by H.-S. Lee (1991). The last marker, *-ney,* functions as an evidential marker (H.-S. Lee 1991), since the marker cannot be used unless the speaker has a visual access to an entity or a person that is talked about.

If this is the case, the nominal tautologies that are construed as category immutability will not be compatible with the evidential marker *-ney*, because the reading requires that the referred entity be non-referential, whereas the evidential marker presupposes that the referred entity is referential. This prediction turns out to be correct: The utterance *os-un os-i-ney* [clothes-Top clothes-Cop-Evid] 'clothes are clothes' cannot have the category immutability reading, since it contains the evidential marker. Other evidential markers such as *-tela* [retrospective evidential], *-kes kathta* 'it seems-…' are also not compatible with the reading in general.

3.2.2. Negation

The argument that specificity matters in the construal can be supported by negating a tautological construction with a category immutability construal. For instance, if the sentence is negated as (10) below, the sentence cannot make sense without any specific entity referred to in the speaker's mind:

(10) **os-un/ i* *os-i* *ani-ya*
clothes-Top/ Sub clothes-Sub Neg.Cop-Decl
'(Lit.) clothes are not clothes'

(10) does not make sense for an obvious reason: If there is no entity to deny, we simply cannot deny it. So to speak, if we could deny the category itself, i.e. clothes, it would be impossible to logically say that the category member does not belong to the category. Thus, if (10) makes sense, the only way is that the nominal should refer to a specific entity. Along this vein, with a generic reading of the nominal, we can obtain the category immutability reading, rather than the (un)desirability readings.

3.2.3. Grammatical Referentiality

Languages have grammatical or lexical devices which denote specificity: For instance, in Korean, the definite articles *ku* and proper nouns. If specificity matters in the construal of the construction, these two devices would affect the construal of the construction when they are used in it. This sub-section will explore their usages in the construction.

To begin with, let us explore the usage of the definite article in the construction. With our familiar example 'clothes are clothes,' can we explore the definite article usage.

(11) [A couple goes shopping. While shopping, the husband gets bored and tired of looking around, but his wife keeps looking at clothes. By and by, his wife picks an outfit and asks him what he thinks about it. The husband can mean 'I don't care about it, just pick anything and let's go home,' by saying the following utterance.]

ku-os-un/-i ***ku-os-i-ci/-ya/-ney***
the-clothes-**Top/Sub** the-clothes-be-Decl1/-Decl2/-Decl3
'The clothes are the clothes.'

This utterance does not carry an evaluative meaning: It conveys an indifference reading via the category immutability construal. The interesting thing is that despite that this utterance employs the demonstrative *ku*, the utterance can be used without the speaker's pointing out any specific outfit. This example might show that as discussed above in (5b′), if the same type of nominals are used within a single tautology, the speaker would take the expressions only at the surface—thus

yielding the category immutability reading (Token Indifference). Consequently, we can learn that only with specificity of the first nominal, we cannot grasp the construal perfectly.

3.3. Evidence Showing Prototypicality of the Predicative Nominal

The fact that what the second nominal refers to affects the semantics of the constructions is supported by Gibbs and McCarrell's (1990) experiments. They argue that how speakers/listeners understand stereotypes of people, activities, and concrete objects in the use of tautologies definitely affects how they understand different tautological expressions. For example, comparing utterances such as *A hat is a hat* vs. *Business is business*, the latter is more readily understood. This suggests that in the construal of tautologies, people's categorization with regard to their cognitive reference point must be involved and this paper argues that the categorization process occurs when we process the predicative nominal. The relevance of this second cue can be found in the usage of proper nouns.

Proper nouns in general, are an unmarked grammatical category that is referential. In a similar vein, we can expect that the same tendency can be accounted for in the usage of proper nouns in the construction. See the following example:

(12) ***pwusi-nun pwusi-ney***
Bush-Top Bush-Decl
lit.'Bush is Bush' (HE IS great!/ HE IS stupid!/ I don't care about him)

Since 'Bush' denotes a specific person, the construction is likely to convey an evaluative reading. However, if someone who does not know who Bush is heard this utterance, it could not convey any meaning to him/her. Rather, it makes sense only when the speaker has a personal attitude toward the person. In this vein, this example shows that the construal of the construction deals not only with specificity, but we need, in addition, to link the topic to what we believe about the nominal, which could be a prototype, stereotype, peripheral member of the category, and so forth.

In sum, this section argued that the construal of the Korean nominal tautologies seems to be determined by the specific/ generic information of the nominal.[3] However, this criterion alone is unable to account for all the phenomena. It seems that we need another parameter, which is what we believe or expect about the nominal, which thus could be a prototype, a stereotype, a member of the category,

[3] It is brought to my attention that double subject construction in Korean is possible only when the first nominal is specific:

(a) *os-i* *os-un* *os-i-ney*
clothes-Nom clothes-Top clothes-Cop-Decl
'This clothes is great.' / 'This clothes is horrible.'

(a) is not licensed when the nominal refers to a generic category. In this respect, specificity distinction plays a critical cue for the construal.

the category itself, etc. Based on these observations, this paper will argue eventually that the meaning distinction in terms of evaluative reading and category immutability reading is meaningless, as a matter of fact. Rather, it will argue that specificity and the speaker's categorization of the nominal are the critical cues for a construal and will account for patterns of the construal of the tautologies within Mental Spaces Theory with regard to specificity, information structure, and categorization.

4. Construal of Nominal Tautologies Within Mental Space Theory

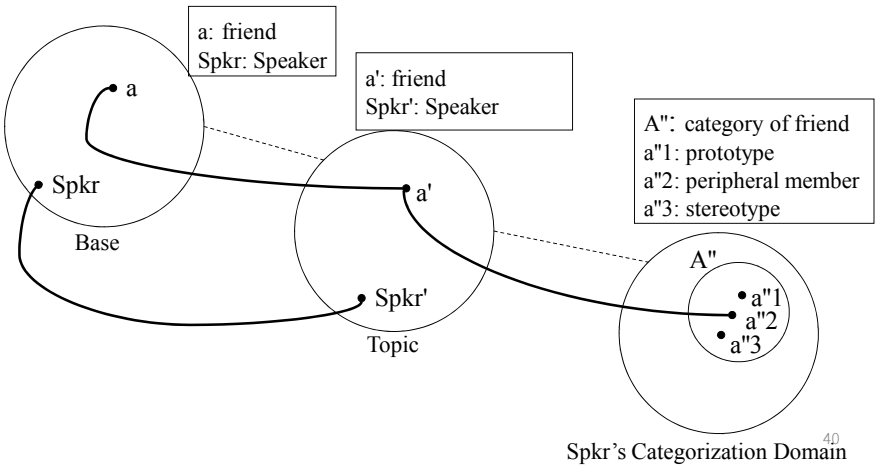
The construal of Korean nominal tautologies seems to be due to the interactive mappings between an entity in the real world (around the interlocutor), an introduced entity in the topic, and the speaker's belief about the entity. In short, we construe the construction with the first nominal's specificity and the second nominal's categorization process. In this section, the paper shows how linguistic cues and our inferences interact each other by means of Mental Spaces Theory (Fauconnier and Turner 2002).

4.1. Specificity and Categorization

When we refer to a specific entity, it is presumed that the speaker knows what it is and the hearer does not have to know what it is. It can be represented in a mental space where the referred entity is linked and grounded to the other entity in base space. Let us exemplify the previous example 'Friends are friends' or 'A friend is a friend,' which is attested to be able to be used in various contexts and is repeated in (13):

(13) ***chinkwu-nun chinkwu-ney***
friend-Top friend-Decl (lit. 'friend is friend')

(14)



Let us assume that (13) is used as conveying desirable and undesirable readings. These readings require that the speaker should have a specific entity in her mind. The specific entity in the speaker's mind is represented as *a* in the base space in (14). Since the entity is introduced as a topic in the utterance thanks to the topic

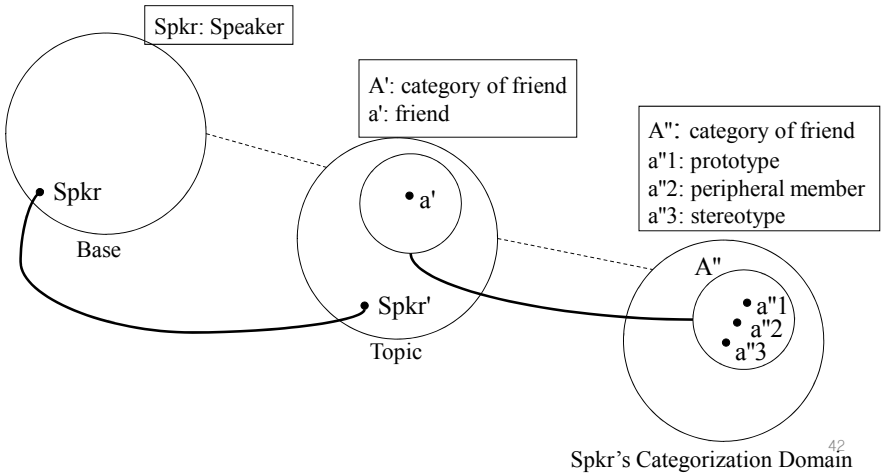
marker, the topic space is established, where the entity as a topic exists (a'). The entity could be anything that can be called a friend as shown in the Topic space above. The two roles *a* and *a′* are linked to each other, since the speaker has to have specific knowledge about the entity, which means the speaker has to have access to the entity in the base. Now, based on the information about the real entity in the speaker's mind, she can evaluate the entity and encode her attitude toward it into the utterance.

Notice that to evaluate something presupposes that there should be another hypothetical entity with which she can match it, and this hypothetical entity is represented in an Expansion space. This notion is equivalent to Rosch's (1975) cognitive reference points in that when uttering the sentence, people are likely to have a special reference point in reasoning, especially in making approximations and estimating size etc (Lakoff 1987:88). Thus, the construal could vary depending on which element in the Expansion space the entity in the topic space *a′* is linked to. That is, the category in the Expansion space can be specified into a prototype (ideal and typical; *a″1*), a peripheral member (*a″2*), and a stereotype (*a″3*).

4.2. Genericity and Categorization

As discussed above, if the speaker does not denote any specific entity in her mind, the construction would convey the so-called category immutability reading. In this case, the entity in the Topic space does not have to be linked to the one in the Base space. As for the same example discussed in section 4.1, we can account for the immutability reading with a different diagram, which is shown in (15).

(15)



As shown in (15), there is no such entity FRIEND that the speaker can have access to in the Base space. In the Topic space, the category of A' instead of individual member a', is linked to the category of A" in the speaker's categorization space. This linking yields the meaning of category immutability. This might be related

with Lakoff's (1987:87) observation that many categories are understood in terms of abstract ideal cases—which may be neither typical nor stereotypical.

5. General Discussion

If the construal of nominal tautologies is determined by the interaction between the two nominals, we might not need categories of the construals such as category immutability, evaluative, etc. That is because, first, it is not easy to label the construals due to their subtle meaning differences and second, the semantic mappings between them will take care of the construal process.

What is interesting about some nominal tautologies seems to be that they have similar illocutionary force as proverbs. When hearing an utterance, e.g. *boys will be boys*, interlocutors can infer that the generic expression in the utterance will apply to the specific target in the given context, e.g. a couple is talking about their son, while watching their son messing around in the room. In this context, even though the utterance does not contain any specific expression, the interlocutors infer that the generic expression *boys* will, somehow, apply to the specific child, their son, in the given context. The interpretation of the tautology involves some similar kind of specification/abstraction process to GENERIC IS SPECIFIC mapping, which is crucial for our understanding of proverbs. This similarity in the cognitive processes causes interlocutors to think that tautologies have the similar semantic effects as proverbs.

Another intriguing issue is the relationship between information structure and evidential ending. We have discussed that the evidential ending *-ney* cannot go with the category immutability reading. The interesting thing is that when the evidential marker is in use, the subject marker *-i*/*-ka* is not licensed in general. This suggests that the evidential marker is sensitive to information structure: If an entity is marked as old information and topicalized, it is more readily regarded as a specific entity based on the interlocutors' shared knowledge, and thus, the topic marker goes well with the evidential marker.

6. Concluding Remarks

This paper argued that in order to construe nominal tautologies, it is crucial to understand how specificity affects the construal and showed the interaction between two nominals in the construction within the framework of Mental Spaces Theory. It is also argued that the construal is affected by what the second nominal expression denotes: The second nominal expression evokes a whole category where a prototype, a peripheral member, a stereotype, the category itself, etc. and that what the second nominal expression denotes determine the meaning.

In closing, I confess that the other factors, such as tonal contour and ending markers that might affect the construal of Korean nominal constructions are not fully discussed. There might be some other semantic cue for the construal distribution: Tonal contour and various ending markers in Korean. Tonal contour seems to make contrast clearly depending on which meaning the construction conveys and ending markers are so subtly different in their semantics. These call for future research.

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So Close Yet So Far: External Possessors in German and Estonian*

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0. Introduction

This paper studies external possession in two typologically unrelated languages, German (Indo-European) and Estonian (Finno-Ugric). External possession is a configuration in which a possessor is realized outside the NP headed by the possessum noun and appears as a verbal argument or adjunct (cf. König and Haspelmath 1998, Payne and Barshi 1999). Examples (1) for German and (2) for Estonian show the contrast between NP-internal (a) and external (b) possession.

(1) a. *Maria hat Paul-s Hemd zerrissen.*
Maria has Paul-GEN shirt tear_apart.PTCPL
'Maria tore Paul's shirt.'

b. *Maria hat **dem** **Paul** das Hemd zerrissen.*
Maria has DEF.MASC.**DAT** Paul DEF.NEUT.ACC shirt tear_apart.PTCPL
'Maria tore Paul's shirt apart (on him).'
Lit.: 'Maria tore the shirt apart to Paul.'

(2) a. *Mari tõmba-s Erki särgi katki.*
Mari pull-PAST Erki.GEN shirt.SG.GEN broken
'Mari tore Erki's shirt apart.'

b. *Mari tõmba-s **Erki-l** särgi katki.*
Mari pull-PAST Erki.**ADESS** shirt.SG.GEN broken
'Mari tore Erki's shirt apart.'
Lit.: 'Mari tore the shirt apart on Erki.'

These data illustrate that the German marker for external possessors (EPs) is the dative case, whereas in Estonian it is the adessive, a spatial case otherwise encoding stative location on surfaces. Apart from the case difference, the two EP constructions exemplified by the b. sentences look very similar. This study shows

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that the similarity is a purely structural one, because in terms of meaning, the constructions are in fact remarkably different.

1. General Overview of the German Dative and Estonian Adessive

Before discussing the external possession data in section 2, this section will provide some background facts on the two case forms involved. The German dative has as its basic function the marking of indirect objects (or, from a semantic perspective, recipient participants in transfer events), as illustrated in (3). The Estonian adessive cannot encode this function, as shown in (4); rather, a different spatial case which encodes motion, the allative, is used.

(3) *Er* *hat* ***der*** ***Frau*** *Blumen* *gegeben.*
3SG.MASC.NOM has DEF.FEM.**DAT** woman flowers.ACC give.PTCPL
'He gave the woman flowers.'

(4) *Erki* *and-i-s* **mul / mulle* *lill-i.*
Erki.NOM give-EU-PAST 1SG.ADESS 1SG.ALL flower-PL.PART
'Erki gave me flowers.'

The Estonian adessive, on the other hand, can be used in basic locative constructions to express the ground (see (5)) without a mediating adpositional element. As (6) shows, this is impossible for the German dative, which cannot express spatial relations without a preposition.

(5) *Raamat-ud* *on* ***laua-l****.*
book-PL.NOM is table-**ADESS**
'The books are on the table.'

(6) *Das* *Buch* *ist* **(auf)* *dem* *Tisch.*
DEF.NEUT.NOM book is on DEF.MASC.DAT table
'The book is on the table.'

In addition to the basic functions of marking indirect objects (dative) and locative grounds (adessive), both cases can be used, quite similarly, to encode a participant who is indirectly or peripherally involved in an event, as in (7)/(8):

(7) *Das* *Publikum* *ist* ***mir*** *eingeschlafen.*
DEF.NEUT.NOM audience is 1SG.**DAT** fall_asleep.PTCPL
'The audience fell asleep on me [e.g., while I was lecturing].'

(8) ***Mul*** *jäi* *publik* *maga-ma.*
1SG.**ADESS** remain.PAST audience sleep-INF
'My audience fell asleep [e.g. when I was lecturing].'

Apparent translation equivalents like the pair in (7) and (8) suggest that the non-spatial adjunct uses of the adessive have the same functions as German adjunct datives. Accordingly, the label 'adessive-dative' was coined for these uses by Matsumura (1997 and prev.). No research to date has questioned this functional similarity; this is the aim of this paper.

EP marking is a subset of the 'indirectly involved participant' function that the Estonian adessive and the German dative share. Moreover, it seems that not only are the constructions structurally similar, but, also, there is considerable overlap in their use and interpretation. We can see this in (1b) and (2b) above, which both describe the event of someone's shirt being torn: both sentences have the stereotypical reading that the possessor was wearing the shirt while this happened. They sound less natural if the possessor was not physically present in the event. It thus seems that the use of both the German EP dative and the Estonian EP adessive is governed by similar conditions: both are most naturally understood as descriptions of events in which possessor and possessum are spatially close to each other. Further scrutiny, however, shows that the underlying semantic factors are not so similar. These factors are explored in the next section.

2. How Similar Are They Really?

With respect to the semantic properties of EP constructions, much work has been done on German-type EP datives, as similar constructions occur in a number of Central and Southern European languages (see Haspelmath 1999, König and Haspelmath 1998 for general overviews). Several semantic restrictions on these dative constructions have been identified. The three most important ones are:

1. Animacy of the possessor.
2. Inalienable possession/spatial proximity of possessor and possessum.
3. *Aktionsart*: telic event descriptions.

In the following, the Estonian and German EP constructions will be compared with respect to these three factors. The data are organized in groups of event types: in section 2.1, EP constructions in resultative – and thus telic – event descriptions will be discussed, with varying degrees of animacy and alienability; in section 2.2, EP constructions in descriptions of activities – without a change of state, but non-stative; and in section 2.3, states.

2.1. EP Constructions in Telic/Resultative Event Descriptions

We have already seen examples of EP constructions with telic event descriptions in (1b) and (2b) above (someone's shirt being torn). The examples to follow are similar in that they feature an event of breaking, another change of state with a clearly identifiable result. This event is kept constant throughout the examples, while the varied parameters are possessor animacy and alienability. First, we look at an animate possessor and an alienable possessive relation (a person and his cup; (9a)/(11a)), then, at an inanimate possessor of which the possessum is a part, rendering the relation inalienable (a cup and its handle; (9b)/(11b)).

Unsurprisingly, the acceptability judgments for German are in line with the generalizations on European EP constructions listed above: if the possessor is a person, it can be expressed as a dative EP even if the possessive relation is alienable (9a). If, however, the possessor is inanimate, then the EP construction is slightly odd, even for the inalienable relation between the cup and its handle (9b).

(9) a. *Maria* *mach-te* ***dem*** ***Paul*** *die* *Tasse* *kaputt.*
Maria make-PAST DEF.MASC.**DAT** Paul DEF.FEM.ACC cup broken
'Maria broke Paul's cup.'
b. *#Maria* *mach-te* ***der*** ***Tasse*** *den* *Henkel* *kaputt.*
Maria make-PAST DEF.FEM.**DAT** cup DEF.MASC.ACC handle broken
'Maria broke the cup's handle.'

Although (9b) is not ungrammatical, it is pragmatically inappropriate in most contexts, as indicated by the '#' symbol. The sentence is almost inevitably interpreted as assigning human traits to the cup, such as the ability to suffer from having its handle broken. This is contrary to fact, but the sentence could well be used in a humorous way if personification is intended. Thus, German EP datives can evoke an anthropomorphic interpretation for inanimate referents, which shows that an integral part of their meaning is personal affectedness.[1]

The same result emerges from closer scrutiny of (9a). Obviously, we cannot observe a personification effect here since the dative referent is already animate; but it must be noted that the sentence does in fact not entail actual possession. It could well be someone else's cup, not Paul's, which Maria broke, as long as the event has some sort of negative or positive consequence for Paul. In (10), an NP-internal possessor is added to illustrate this. The dative, then, no longer encodes an EP, but rather a beneficiary or maleficiary.

(10) *Maria* *mach-te* ***dem*** ***Paul*** *Peter-s* *Tasse* *kaputt.*
Maria make-PAST DEF.MASC.**DAT** Paul Peter-GEN cup broken
'Maria broke Peter's cup on/for Paul.'
(i) It was bad for Paul (e.g., because he was responsible for the cup).
(ii) It was good for Paul (Maria did him a favor).

The crucial point about (9a) is that the sentence does not exclude an interpretation analogous to (10), and is thus not necessarily understood as an EP construction. It is, however, necessarily understood as evaluating the event as either good or bad for Paul, regardless of whether or not he owns the cup.

If we now turn to Estonian and its EP adessives mirroring the German EP datives in (9), we find the acceptability contrast reversed. For a human possessor and an alienable, mobile possessum (11a), acceptability is limited and strongly context-dependent, whereas with an inanimate possessor in an inalienable possessive relation, the construction is inconspicuous (11b).

(11) a. *#Mari* *teg-i* ***Erki-l*** *tass-i* *katki.*
Mari.NOM make-PAST Erki-**ADESS** cup-SG.GEN broken
'Mari broke Erki's cup.'
b. *Mari* *murd-i-s* ***tass-i-l*** *sang-a.*
Mari.NOM break-EU-PAST cup-EU-**ADESS** handle-SG.GEN
'Mari broke the cup's handle.'

[1] This has been claimed for the German dative in general; cf., e.g., Wegener (1985).

Regarding (11a), the only context to which this sentence is applicable is one in which the possessor is present in the event. (11a) can thus only be interpreted as describing a scene in which Erki was holding on to the cup while Mari broke it. The German sentence lacks this restriction, even though we saw earlier that similar event descriptions (like someone's shirt being torn) do show a preference for spatial proximity of possessor and possessum. It now emerges that this preference is even stronger in Estonian. Affectedness, on the other hand, does not play a role: whether the event of the cup being broken is good, bad, or neutral for Erki has no bearing on the acceptability of (11a), nor does the sentence itself suggest any negative or positive evaluation of the event.

Similar observations can be made about (11b). In this case, spatial proximity is trivially given because the possessum is a part of the possessor; but, being inanimate, this possessor cannot be construed as affected. Unlike its German counterpart, (11b) does not evoke personification of the cup, but is a natural way to describe the event of the cup's handle being broken. Not just affectedness, but animacy in general is thus irrelevant to the Estonian EP adessive.

From the discussion of EP constructions with telic events, we can conclude that there are substantial differences between the German EP dative and the Estonian EP adessive constructions, similar as they look at first sight: animacy, as the prerequisite for experiencing an event as good or bad, is crucial for the use of the German EP dative, and is even evoked metaphorically for inanimate referents. For Estonian, on the other hand, spatial proximity is a much more important factor. The discussion of further event types will corroborate these preliminary findings.

2.2. EP Constructions in Atelic Event Descriptions (Activities)

Here we focus on animate possessors (since inanimate ones can be expected to generally disallow the EP dative in German, as we saw above) with varying degrees of alienability. The following considerations motivate this: for German, we saw above that for animate possessors in telic events that involve a drastic change of state in the possessum, alienability is irrelevant to acceptability (recall Paul and his broken cup); but if the event itself has less of a physical impact and the possessor is therefore not affected through a change of state in the possessum, it is reasonable to hypothesize, in light of the criteria listed at the beginning of this section, that alienability does influence acceptability. For Estonian, where it has become apparent that spatial proximity is relevant, we may wonder how this effect is enhanced or reduced if the possessum does not undergo a change of state.

The activity chosen for the comparison is an event of someone looking at the possessum; the possessa are body parts (legs), items of clothing (shoes), and, as the least inalienable item, a picture of the possessor. For these three degrees of alienability, we observe a decline in acceptability for the EP construction in German. An event of someone looking at someone else's legs permits an EP description without difficulty (12a); if someone looks at someone else's shoes, the EP description is strange and strongly context-dependent (12b); and for the picture scenario, it is hardly possible at all. In fact, (12c) can only be understood

as describing a scene in which Paul looks at a picture that Maria is painting, and Paul's looking at it disturbs her. It is inappropriate as the description of Paul looking at a picture showing Maria, when she isn't involved in the event herself.

(12) a. *Paul schau-te **der** **Maria** auf die Beine.*
Paul look-PAST DEF.FEM.**DAT** Maria on DEF.PL.ACC legs
'Paul looked at Maria's legs.'

b. *#Paul schau-te **der** **Maria** auf die Schuhe.*
Paul look-PAST DEF.FEM.**DAT** Maria on DEF.PL.ACC shoes
'Paul looked at Maria's shoes.'

c. ?/**Paul schau-te **der** **Maria** auf das Bild.*
Paul look-PAST DEF.FEM.**DAT** Maria on DEF.NEUT.ACC picture
intended: 'Paul looked at the picture of Maria.'
OK as 'Paul looked at the picture Maria was painting.'

Clearly, personal affectedness of the possessor is the crucial factor in the use of EP constructions here. This becomes even more obvious if one considers the pragmatic circumstances that favor an utterance like (12a) or, even more so, (12b). Both sentences evoke the interpretation that Paul's looking was blatant, inappropriate, undesired or rude: (12a) would be the perfect description of Paul unashamedly checking out Maria's physical appearance, whereas (12b), although less natural, might be said if Paul stared at Maria's shoes with impolite intensity and/or Maria did not want her shoes to be seen. In both cases, Paul's looking is an intrusion into Maria's personal sphere, in which the respective possessum is located. The importance of personal sphere in the use of the German dative has been recognized by various linguists (cf. König and Haspelmath 1998:531ff., Dąbrowska 1997:16ff.); suffice it to say here that, if the event itself does not involve any sort of change in the possessum, the possessor's affectedness can be determined through the personal sphere: if the possessum is located within it, then the possessor can be conceptualized as affected, which licenses the EP dative construction. If it is not – as in the case of the possessor's picture – then the EP construction is infeasible. Note that the possible interpretation of (12c) as 'Paul looked at the picture Maria was painting' can be accounted for along these lines as well, if the objects a person handles are considered part of the personal sphere.

For Estonian EP constructions, we have seen that spatial proximity is crucial; it is thus a viable hypothesis that acceptability ratings are similar to German, since the personal sphere can of course be interpreted in a purely spatial way as the region surrounding the possessor. It turns out, however, that all three degrees of alienability lead to perfectly acceptable sentences.

(13) a. *Erki vaata-s **Mari-l** jalgu.*
Erki.NOM look_at-PAST Mari-**ADESS** leg.PL.PART
'Erki looked at Mari's legs.'

b. *Erki vaata-s **Mari-l** jalanõus-id.*
Erki.NOM look_at-PAST Mari-**ADESS** shoe-PL.PART
'Erki looked at Mari's shoes.'

c. *Vaata-s-in* ***ta-l*** *Orkut-is* *pilt-e* *ka, ...*
look_at-PAST-1SG 3SG-**ADESS** Orkut-INESS picture-PART too
'I also looked at her picture on Orkut, [...]'[2]

For the body part (13a) and the item of clothing (13b), acceptability is expected, since these possessa are naturally close to the possessor. The picture showing the possessor, as in (13c), is not; it is just the possessor's image – an iconic sign representing her – that is spatially associated with the picture. Furthermore, the sentence, taken from an online discussion, refers to the picture on someone's profile on a networking website. Since the picture is a part of the profile, and the profile can be said to metonymically represent its owner, spatial proximity can also be said to be given metonymically. We can thus assume that this 'indirect,' either iconic or metonymical, presence of the possessor licenses the use of the EP adessive – in contrast to situations in which even this indirect proximity is lacking, like when someone's cup is broken (see (11a) above).

To conclude, the discussion of EPs with activity descriptions confirms and refines the initial findings on telic event descriptions: for German, where animacy has been found to be a crucial parameter licensing the EP dative, we have seen that the possessor's personal sphere plays a role as well. However, as the contrast with the Estonian data shows, this sphere is not merely the spatial region surrounding a person, but, rather, a region of minimal distance necessary for personal comfort; any intrusion into this region will cause discomfort. Such discomfort is a kind of negative affectedness and, therefore, licenses the use of an EP dative.

In Estonian, on the other hand, we see again that spatial proximity of possessor and possessum is the relevant factor, even if it is only indirect – iconic/metonymical. It thus seems that the Estonian EP adessive is acceptable for all kinds of possessors and all kinds of event descriptions, as long as there is some, however non-literal, way to interpret possessor and possessum as spatially close.

2.3. EP Constructions in State Descriptions

With states which have minimal capacity of inducing any sort of affectedness, we expect the German EP dative to be largely excluded. For Estonian, however, there is no reason for unacceptability under the condition of (indirect) spatial proximity.

The variation in the following examples is, again, in two variables: the nature of the possessive relationship (alienable/inalienable) and the way the state is experienced. The former parameter might be relevant to the Estonian EP construction, since inalienability is related to spatial proximity. The latter, the subjective evaluation of the state, may influence acceptability of the German EP construction: the three states predicated of the possessum in the examples, being dead, being sick and being dirty, are all likely to be perceived as negative by the posses-

[2] http://board.koffer.ee/viewtopic.php?p=1814139&sid=351f9962c7f84cf2b367f11d5053d177

sor and thus affect her; so if German allows any EP datives with state descriptions at all, it should be with states like these. As shown in (14), however, this prediction is only partially borne out.

(14) a. **Der Goldfisch war **ihm** tot.*
DEF.MASC.NOM goldfish was 3SG.MASC.**DAT** dead
intended: 'His goldfish was dead.'
b. *?Die Mutter war **ihm** krank.*
DEF.FEM.NOM mother was 3SG.MASC.**DAT** sick
'His mother was sick.'
c. ****Ihm** ist das Hemd dreckig.*
3SG.MASC.**DAT** is DEF.NEUT.NOM shirt dirty
intended: 'His shirt is dirty.'

The acceptability judgments for (14) show that the only context for which the EP dative is marginally acceptable with a state description is the case of kin as possessum (14b).[3] It is unacceptable with other possessa, even if the state predicated of the possessum is something as grave and irreversible as being dead (14a). Here, the affectedness necessary for the EP dative construction is brought about only by a combination of inalienability and negative evaluation of the state – the presence of just one of these two parameters is insufficient.

In Estonian, on the other hand, all three states are compatible with an EP:

(15) a. ***Erki-l** kuldkala ol-i surnud.*
Erki-**ADESS** goldfish be-PAST dead
'Erki's goldfish was dead.'
b. ***Ta-l** on ema haige.*
3sg.**ADESS** be.PRES mother sick
'His mother is sick.' (Matsumura 1997:33)
c. ***Erki-l** on särg must.*
Erki-**ADESS** is shirt.SG.NOM black
'Erki's shirt is dirty./Erki has his shirt dirty.'

The unconditional acceptability of these three EP constructions is a little surprising, since the situations they describe do not necessarily involve spatial closeness between possessor and possessum. Neither can we observe iconic or metonymical proximity, as discussed above for EP adessives with activity verbs. Note, however, that the specific construction shared by the examples in (15), a possessor-denoting adessive accompanying the copula *olema* 'be,' is in fact the Estonian strategy to express possessive predication ('A has B'). The next section will address this correspondence in more detail. Suffice it to say here that the data in (15) cannot be unambiguously categorized as EP constructions, since they have the same structure as possessive predication.

[3] This is not entirely true, since body-part possessa may allow EP datives with states as well (e.g., in the collocation *Ihm ist das Herz schwer* 'his heart is heavy', lit. 'to him the heart is heavy'). But as both kin and body parts are inalienably possessed, this fact does not affect the discussion.

To conclude this section, let us briefly review the comparison of the Estonian and German data. The translation equivalents of the EP constructions in the two languages do not show identical acceptability values when semantic parameters like event type, animacy, and alienability are varied; rather, we have seen that animacy and, moreover, personal affectedness are crucial for the EP dative in German, whereas Estonian seems to require spatial proximity (albeit in a possibly non-literal sense) of possessor and possessum to render the EP adessive feasible. In short, the data show clearly that, similar as the two constructions may look from a purely structural point of view, they have entirely different semantic properties. What semantic categories, then, are we dealing with here? The following section addresses this question and provides a semantic categorization for each of the EP constructions under discussion.

3. Affectedness Construction vs. Spatial Metaphor

To corroborate the diverging semantic analyses for the German and Estonian EP constructions that the comparison in the previous section suggests, it is desirable to find additional uses of the two cases (dative and adessive, respectively) that do not involve external possession, but do exhibit the same semantic properties that have been identified for their EP uses. The fact that such uses exist has already been hinted at in the above discussion: German has dative constructions that express affectedness without possession, which renders it plausible that the EP dative is really just a subtype of a general affectedness dative. Estonian, on the other hand, employs the adessive to express possession in predicative constructions, which suggests that, in this language, possession is treated as a spatial metaphor.

The following example illustrates a general affectedness configuration without possession. (16) shows a German dative encoding a maleficiary, a negatively affected participant, which the Estonian adessive cannot express (see (17)).

(16) [Context: Paul was telling Maria a story.]
Maria ist ***ihm*** *eingeschlafen!*
Maria is 3SG.MASC.**DAT** fall_asleep.PTCPL
'Maria fell asleep on him (it was rude to him).'

(17) [Context: as in (16)]
#Mari jäi Erki-l maga-ma.
Mari.NOM remain.PAST Erki-ADESS sleep-INF
intended: 'Mari fell asleep and it was rude to Erki.'

In Estonian, the only way to interpret the sentence is as a literal spatial description: Mari fell asleep on top of Erki. The German dative in (16), however, is naturally understood as marking its referent as a participant for whom the event is either good or bad – in the given context, the latter. Since no possession is involved (the dative referent does not possess anything mentioned or implied in the sentence) this example indicates that the German dative in general, not just as an EP marker, can portray an event participant as positively or negatively affected.

Affectedness constructions have been studied by Smith (2005), who shows that many languages single out particular formal or structural configurations to express benefit or adversity. This kind of positive or negative evaluation of events is thus a feature of grammatical relevance. The dative case in many Indo-European languages, including German, is a prominent example in her discussion, and the findings of the present study are in line with her analysis.

Turning to non-EP (and non-spatial) uses of the Estonian adessive, we have seen above that this case form is involved in possessive predication. This construction takes the form of a locative predication and features the copula verb *olema* 'be,' the possessum in the nominative and the possessor in the adessive case, conveying a literal meaning of 'POSSESSUM is on/at POSSESSOR.' This holds for inalienable possessive relationships (18a) as well as for alienable ones (18b). As (19) shows, Standard German cannot mirror this construction with the dative.[4]

(18) a. ***Ta-l*** *on* *ilus* *nägu.*
3SG-**ADESS** is beautiful.SG.NOM face.SG.NOM
'She has a beautiful face.'

b. ***Ta-l*** *on* *auto.*
3SG-**ADESS** is car.SG.NOM
'She has a car.'

(19) **Ihr* *ist* *ein* *hübsch-es* *Gesicht* / *ein* *Auto.*
3SG.FEM.DAT is INDEF.NEUT.NOM pretty-NEUT.NOM face / INDEF.NEUT.NOM car
intended: 'She has a pretty face/a car.'

The Estonian strategy of expressing possession by means of a form that, in its basic function, encodes a spatial relation is cross-linguistically frequent (Stassen 2008) and can be accounted for by general cognitive principles (cf. Lakoff and Johnson 1980). According to these principles, spatial concepts can be extended to non-spatial domains, including possession, and spatial vocabulary is then used metaphorically to refer to these domains. We can conclude from these facts that the EP use of the Estonian adessive is really just a constructional extension of the adessive use in possessive predication: in both cases, possession is encoded metaphorically as a spatial relation – in the latter case, as the only available strategy, in the former, as an alternative to NP-internal possession featuring the genitive case. The extension of spatial concepts to non-spatial domains, then, is the underlying motivation for the EP adessive in Estonian.

If the semantic and cognitive factors that govern the use of the EP dative in German and adessive in Estonian are so different, we may ask why the two constructions are so strikingly similar, not only in their structural features but also, to a large extent, in their distribution and meaning. Let us look back at an earlier example, repeated below as (20) [German]/(21) [Estonian]. The two sentences seem to convey exactly the same implications: the speaker, encoded by

[4] Several dialects do allow the construction illustrated in (19). For reasons of limited space, these variants will not be considered here.

dative/adessive respectively, is presented as an indirectly involved participant to whom the event is of some, presumably negative, relevance.

(20) *Das Publikum ist* ***mir*** *eingeschlafen.*
DEF.NEUT.NOM audience is 1SG.**DAT** fall_asleep.PTCPL
'The audience fell asleep on me [e.g. while I was lecturing].'

(21) ***Mul*** *jäi publik maga-ma.*
1SG.**ADESS** remain.PAST audience sleep-INF
'My audience fell asleep [e.g. while I was lecturing].'

The differences between these two translation equivalents are subtle and only emerge in light of the preceding discussion. To start with the Estonian example (21), the notion of negative relevance is purely a result of the sentence context plus world knowledge: it is common sense that it is bad for a speaker or lecturer if her audience sleeps while she is talking. Exactly the same idea would arise from the internal possessor (IP) version of the sentence, with the possessor realized as an adnominal genitive ('my audience'). In terms of affectedness and how this interpretation comes about, there is thus no difference between the EP and IP constructions in Estonian. In German, however, the negative evaluation is transported by the dative. The sentence in (20) is not equivalent, in this respect, to its IP counterpart; rather, the IP version has the same properties as the Estonian example, whereas in (20), the EP dative specifies the semantic property of affectedness for its referent – independent from, and in addition to, any context or world knowledge that may suggest it. The German EP dative construction, thus, makes an evaluative statement, which entails the affectedness of the dative referent by the event as part of its meaning. The Estonian construction, on the other hand, yields a neutral description, with any negative affectedness merely arising as an implicature.

4. Summary and Conclusion

This study has shown that the EP constructions in German and Estonian, similar as they look, have very different semantic properties. For German, the EP marker, the dative case, specifies positive or negative affectedness for its referent, a phenomenon that is also observed in non-possessive adjunct datives. This qualifies the German EP dative as an affectedness construction – or rather, as a subtype of a general affectedness dative construction, with possession a secondary component.

The Estonian EP adessive, on the other hand, lacks this semantic specification and yields neutral, non-evaluative descriptions. Although it portrays its referent, similarly to the German construction, as somehow indirectly involved, this effect arises merely from its spatial semantics – as well as possible implications from the sentence context and world knowledge. Since the adessive is a possessor marker in other contexts than external possession as well (in particular, possessive predication), we find that the EP adessive is simply a facet of the general strategy in Estonian to express possession as location.

The overall conclusion to be drawn from this comparison is that the label 'external possession' only applies to syntactic description. As this study illustrates,

two constructions in two different languages that can both be identified, structurally, as EP constructions may have very different semantic properties. Therefore, on the semantic level, the label 'external possession' is not applicable; other categories are necessary to describe the meanings of these constructions appropriately and account for the subtle differences that elude a purely structural approach. In the present study, the German EP dative has been classified as an affectedness construction, the Estonian EP adessive as a spatial metaphor. EP constructions in other languages might involve further semantic categories, which remain to be explored.

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Interpretative Effects of Multiple Determiners in Greek

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0. Introduction

The topic of this paper is the so-called polydefinite construction in Modern Greek (henceforth Greek), i.e. cases of adjectival modification in which the adjective is accompanied by its own determiner.

(1) a. i asimenia i pena
the silver the pen

b. i pena i asimenia
the pen the silver

A number of syntactic and semantic/pragmatic differences exist between polydefinites and 'regular' adjectival modification (or monadic definites, a term which, like the term polydefinite, is due to Kolliakou (2004)). First, the ordering freedom displayed by polydefinites is not attested in the case of monadic definites; the latter only allow the adjective in prenominal position:

(2) a. i asimenia pena
the silver pen

b. *i pena asimenia
the pen silver

When more than one adjective is present, all possible word orders are grammatical in the polydefinite:

(3) a. i pena i asimenia i kenurja
the pen the silver the new
b. i pena i kenurja i asimenia
c. i asimenia i pena i kenurja
d. i asimenia i kenurja i pena
e. i kenurja i asimenia i pena
f. i kenurja i pena i asimenia

Second, as Kolliakou (op. cit.) observed, adjectives in the polydefinite construction are obligatorily interpreted restrictively (which, as we discuss in detail in section 1.2, has repercussions for the set of admissible adjectives). Since as a

matter of world knowledge all cobras are poisonous (there are no non-poisonous cobras), the adjective 'poisonous' when applied to cobras cannot receive a restrictive interpretation and hence is not licit in the polydefinite construction:

(4) i dilitiriodis (#i) kobres
the poisonous the cobras

Finally, there is no equivalent of the polydefinite construction with the indefinite determiner (Alexiadou and Wilder 1998; but cf. Stavrou 2009):

(5) a. *mia pena mia asimenia
a pen a silver
b. *mia asimenia mia pena
a silver a pen

The purpose of this paper is twofold. One is to show that a common conception of polydefinites as involving predication is not warranted. In particular, the set of admissible adjectives and the restrictive interpretation thereof can be derived without further ado on the basis of an approach to polydefinites that posits noun ellipsis (Panagiotidis 2005, Lekakou and Szendrői 2007, 2009). The second aim is to derive the actual occurrence of multiple determiners. We point out that the very hallmark of the polydefinite construction (also known as determiner spreading) is dealt with in most existing analyses in a stipulative fashion, and that our own alternative (Lekakou and Szendrői, op.cit.) fares better. Moreover, we provide an explicit, albeit provisional answer to a question that has thus far been left unaddressed: What are the implications of determiner spreading for the semantics of definiteness in Greek?

In section 1 we summarize the key properties of our previous work on polydefinites: Section 1.1 discusses close apposition, and section 1.2 applies the proposal to polydefinites with particular reference to deriving the interpretation and distribution of adjectives in the construction. In section 2 we deal with the multiple occurrence and interpretation of the definite determiner.

1. Polydefinites As an Instance of Close Apposition

1.1. Close Apposition: The Syntax and Semantics of R-role Identification

In Lekakou and Szendrői (2007, 2009) we have provided an account of polydefinites as an instance of close apposition (henceforth CA), as in (6) and (7).[1] Specifically, we have argued that both CA and polydefinites are DPs whose subparts are DPs themselves (the only difference is that the latter but not the former involve noun ellipsis).

[1] Close apposition is distinguished from loose apposition on the basis of prosodic, syntactic and semantic properties. We discuss these differences in Lekakou and Szendrői (2007).

(6) a. o aetos to puli
the eagle the bird
b. to puli o aetos
the bird the eagle

(7) a. Burns the poet
b. the poet Burns

CA shares the core properties displayed by polydefinites that we identified above. First, as shown in (6) and (7), the order within the larger constituent is free. Second, CA is only possible with definite DPs (Stavrou 1995):

(8) a. *enas aetos (ena) puli
an eagle a bird
b. *ena puli (enas) aetos
a bird an eagle

Thirdly, one of the sub-parts of CA is obligatorily interpreted restrictively with respect to the other sub-part. This is illustrated in the following example from Potts (2005) (see also Kolliakou 2004):

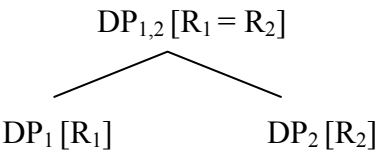
(9) Armstrong the Texan is a cyclist. Armstrong the Ohioan is an astronaut.

In (9), *the Texan* and *the Ohioan* restrict the denotation of *Armstrong.* Put differently, the use of *Armstrong* is not enough to establish who the referent of the DP is. It is through 'co-operation' between both subparts that reference assignment is made possible (even though both subparts would independently be able to refer).

Capitalizing on the fact just noted, namely that in CA, both subparts jointly contribute to reference, we have proposed that CA (and polydefinites, as a case thereof) involves a process of identification of R(eferential)-roles. Following Williams (1981, 1989), the R-role is the external theta role of nominal elements, and it is what enables nominal elements to act as referential arguments. In CA, we argue, two independent R-roles become identified (cf. the identification of thematic roles in adjectival modification, as discussed by Higginbotham (1985)). This identification takes place under sisterhood, i.e. within a multi-headed syntactic structure (see Baker and Stewart 1999 for the conceptual considerations pertaining to such structures, and for an application to serial verb constructions):[2]

[2] As is obvious, the ordering freedom of CA is consistent with the symmetric syntactic structure we propose. Additionally, since only nominal elements are endowed with R-roles, we capture the fact that CA is only possible with nominals (Huddleston and Pullum 2002).

(10)



Evidence in favour of the symmetric structure in CA comes from agreement facts given in (11), where the adjective in predicative position can agree for gender with either subpart of the CA in subject position. Since agreement privileges no particular subpart of CA, neither can be thought of as its head:

(11) a. o aetos to puli ine megaloprepos/megaloprepo.
the.M eagle.M the.N bird.N is majestic.M/majestic.N
b. to puli o aetos ine megaloprepos/megaloprepo.
the.N bird.N the.M eagle.M is majestic.M/majestic.N

In terms of the semantics, R-role identification is interpreted as set intersection (see Higginbotham (1985), and also the operation of predicate modification of Heim and Kratzer (1998)): The larger DP refers to an entity that belongs to both sets designated by the smaller DP-subparts. We assume that applicability of this operation is subject to a ban against vacuous application. Given this assumption, it follows that nominals whose R-roles are independently identical cannot form parts of CA. This belies the ungrammaticality of (12), noted by Stavrou (1995:225), and of (13) (*the Bard* conventionally refers to Shakespeare):

(12) *i sikaminja i murja
the blueberry-tree$_{\text{DIALECTAL}}$ the bluberry-tree$_{\text{STANDARD}}$

(13) *Shakespeare the Bard

The ban on vacuous application of R-role identification does not only rule out independently identical R-roles from becoming identified; it also forces a restrictive interpretation. Let us see why. 'Regular' set intersection allows for a situation where one set is completely contained in the other, i.e. a set-subset situation. For instance, the set of cobras is a subset of the set of poisonous entities: Being a member of the set of cobras entails being a member of the set of poisonous entities. To wit, membership in the smaller set automatically gives you membership in the bigger set. Under such circumstances, R-role identification is disallowed, since its application would yield a result already in effect.

The implication of our treatment of CA is that the two subparts, despite being formally DPs, denote predicates: They have to be of type <e,t> and not of type <e> (or <<e,t>,t>). We take this up in section 2 where we become more explicit about the semantics of definiteness in Greek.

1.2. Polydefinites: The Import of Noun Ellipsis

Going back to polydefinites, we propose that the latter are identical to CA and only differ in that one of the DP-subparts, namely the one containing the adjective, contains noun ellipsis. The structure we propose is given in (14):

(14) a. [$_{DP}$ [$_{DP}$ to spiti] [$_{DP}$ to megalo ∅]]
the house the big

b. [$_{DP}$ [$_{DP}$ to megalo ∅ [$_{DP}$ to spiti]]
the big the house

Positing noun ellipsis brings about a number of welcome results. Besides allowing us to maintain a one-to-one correspondence between number of overt D's and number of constituent DPs, it enables us to explain why in polydefinites it is necessarily the 'adjectival' DP that is interpreted restrictively with respect to the 'nominal' DP, even though it would in principle be possible for things to be the other way around. A well-known property of ellipsis is that non-elided material must be informative, or disanaphoric (cf. Williams 1997, and Giannakidou and Stavrou 1999 specifically for Greek). One way to satisfy this requirement on ellipsis is to receive a restrictive interpretation. In other words, it seems to be generally the case that noun ellipsis forces a restrictive interpretation on non-elided (adjectival) material. This is, we argue, also evident in the case in polydefinites (see Kolliakou 2004 for extensive discussion).[3]

Given this general fact about noun ellipsis, we expect the distribution of adjectives in polydefinites to pattern accordingly. To wit, we expect all and only the set of adjectives that can be interpreted restrictively/appear in noun ellipsis contexts to be licit in polydefinites. As we show below, this is indeed the case.

Alexiadou and Wilder (1998) and Alexiadou (2001) note that relational adjectives like *ekdotikos* 'publishing' (as in *ekdotikos ikos* 'publishing house'), and adjectives in proper names like *Vorios* 'North' in *o Vorios Polos* 'the North Pole' are unacceptable in polydefinites. They argue that this is because such adjectives form a compound with the noun (see also Ralli and Stavrou 1998). This suffices to rule them out in polydefinites: Compound-like A-N collocations are not amenable to taking part in constructions that would require their adjectival part (or the nominal one) to act as an independent syntactic head. As (15) and (16) show, such adjectives are also impossible in noun ellipsis contexts.[4]

[3] This property of polydefinites has been related by essentially every existing proposal in the literature to a DP-internal FocusPhrase. In our view, this is neither necessary (since ellipsis suffices to derive the alleged focus-effects), nor sufficient, as there are discrepancies between polydefinites and focally stressed adjectives (in polydefinites). See Lekakou and Szendrői (2007, 2009) for elaboration of this point, and for the empirical arguments against the view that a Focus Phrase is at play.

[4] On the other hand, we do expect these collocations to occur in a polydefinite as the (lexically realized) nominal subpart, and this is indeed true. Note that examples such as (ia) cannot be taken

(15) Kita tin idrojio. Aftos ine o Vorios Polos ke ekinos ine
look-2SG the globe this is the North Pole and that is
o Notios *(Polos).
the South Pole
'Look at the globe. This is the North Pole and that is the South Pole/*one.'

(16) o ekdotikos *(ikos)
the publishing house
'the publishing house'

Moreover, it has been observed (Alexiadou 2001, Campos and Stavrou 2004) that certain ambiguous adjectives only have one reading in polydefinites. Take for example the adjective *beautiful* in *Mary is a beautiful dancer*. On the intersective reading of the adjective, Mary is a dancer and she is beautiful, while on the non-intersective reading Mary is beautiful as a dancer. In a polydefinite, the non-intersective is lost, see (17a) (from Campos and Stavrou op.cit.). As expected on our analysis, only the intersective reading is available if the noun is elided, see (17b) (see Branco and Costa 2006 for the same observation in Romance).

(17) a. Gnorises tin orea tin tragudistria?
met-2SG the beautiful the singer
'Did you meet the beautiful singer?' (intersective only)
b. Gnorises tin orea?
met-2SG the beautiful
'Did you meet the beautiful one?' (intersective only)

In general, the adjectives that can receive a restrictive interpretation (and thus appear in polydefinites) are the ones that can partition the noun denotation. This rule out non-intersective adjectives (such as 'former'), since their denotation does not interact with the noun denotation: a former president is not a president. Therefore such adjectives are in principle illicit in polydefinites. However, there is (at least for some speakers) a way to contextually force an intersective interpretation of the adjective, such that an otherwise non-intersective adjective picks out a proper subset of the noun denotation and can thus appear in a polydefinite. For instance, Leu (2007) has pointed out that (18) is possible (for some speakers).

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to involve attributive modification inside this nominal DP, since re-ordering of the adjectives, which is otherwise possible in the polydefinite, is impossible, as shown in (ib):

(i) a. o diasimos o ekdotikos ikos
the famous the publishing house
b. *o ekdotikos o diasimos ikos
the publishing the famous house

(18) O PROIGUMENOS o prothipurgos pethane.
the previous the prime minister died
'It is the previous prime minister that died.'

(18) is licit in a context where the speaker corrects another interlocutor (hence the heavy stress on the adjective, notated by capitals), who thought she overheard that the current prime minister died. In this particular context, the noun denotation comprises two disjoint subsets, one containing the current prime minister and the other the previous one. What makes the polydefinite available is that the mention of the current prime minister in the previous discourse discourse-links the set of prime ministers in a salient way, and thus subsequent reference to the previous prime minister satisfies the restrictiveness constraint on polydefinites.

This kind of example is crucial, because it argues against an alternative way of deriving the set of adjectives in polydefinites to the one we have been pursuing here, namely one which invokes a correlation with predicative adjectives. The position held by predicative accounts of polydefinites (Alexiadou and Wilder 1998, Alexiadou 2001, Campos and Stavrou 2004, Panagiotidis 2005, Ioannidou and den Dikken 2006) is that only adjectives that can appear in predicative position are licit in polydefinites. This generalization can derive the facts about relational adjectives, adjectives in proper names and ambiguous adjectives, but Leu's example shows that the proposed correlation breaks down: *Proigumenos* 'previous' can appear in the polydefinite in the particular context discussed above, but even in this context the adjective is illicit in the post-copular position, as shown in (19). Finally, (20) gives the variant with noun ellipsis, which is, as expected under our analysis, good.[5]

(19) *Aftos o prothipurgos itan PROIGUMENOS.
This the prime minister was previous

(20) O PROIGUMENOS pethane.
The previous died
'The previous one died.'

2. The 'Extra' Determiner

In a certain sense, the essence of the polydefinite construction is that it involves multiple instances of the definite determiner. We explain this by assuming that polydefinites are instances of CA, albeit with N-ellipsis. As (6) showed, repeated below as (21), in Greek, multiple instances of the definite article actually appear in CA. So, assimilating the structure of polydefinites to that of CA provides an

[5] Among predicative analyses, only the one that assumes an underlying restrictive relative clause (Alexiadou and Wilder 1998) can relate to that the restrictive interpretation of the adjective in polydefinites; a restrictive interpretation is not obligatory in predicative position. For instance, *dilitiriodis* 'poisonous' can apply to cobras in a subject-predicate copular construction, but as we have seen the corresponding polydefinite is unacceptable.

analysis of the proliferation of determiners: The two (or more) subparts of the CA and the polydefinite are full DPs, headed by their own determiner.

(21) a. o aetos to puli
the eagle the bird

b. to puli o aetos
the bird the eagle

It seems to us that our approach fares better than alternative treatments of polydefinites in accounting for the occurrence of multiple determiners. Let us see why.

In the literature, there have essentially been three classes of approaches to polydefinites: Those where predication is involved (e.g. Alexiadou and Wilder 1998, Panagiotidis 2005); those that assume a split DP-structure (e.g. Androutsopoulou 1995, Kariaeva 2004); and those that combine predication and a split-DP structure (e.g. Campos and Stavrou 2004, Ioannidou and den Dikken 2006). These approaches differ in their treatment of the 'extra' definite article.

Alexiadou and Wilder (1998) argue that the underlying structure of Greek polydefinites is a Kayne-style relative clause, as in (22), with, crucially, the subject of the clause a DP, rather than an NP. But this is contrary to Kayne's original proposal and seems ad hoc to us. Presumably, the higher definite article is meant to be responsible for the unique interpretation of the whole DP. But the authors do not clarify what they think the semantic import of the lower definite article, the one on the subject of the relative clause, would be.

(22) $[_{DP}$ the$_D$ $[_{CP}$ $[_{IP}$ $[_{DP}$ the book] $[_{AP}$ red]]]]

In a different vein, Kariaeva (2004), following earlier work by Androutsopoulou (1995), proposes an analysis of polydefinites in a split-DP framework. She assumes that the Greek DP is split into a DeicticP and a DP with an additional Focus projection inbetween the two, as in (23). She takes AP modifiers to be base-generated at a high (FocP) or low (NumP) functional position within the DP.

(23) $[_{DeicticP}$ $[_{FocP}$ $[_{DP}$ $[_{NumP}$ $[_{NP}$]]]]]

Kariaeva assumes that if an AP modifier is base generated low, it enters into an agreement relationship with the N in terms of number and gender, but if it is merged high, i.e. in the FocP above DP, then it has to enter an agreement relation with the DP, and so it will also show definiteness agreement (alongside gender and number agreement). According to Kariaeva, this gives rise to a phonological copy of the definite article on the modifying adjective. However, no independent argumentation is offered to support the assumption that high merger of the adjectival modifier triggers definiteness agreement on the adjective.

Other approaches to polydefinites take one of the determiners to be a spell-out of D, and the other(s) to be the phonological instantiation of some functional head in the extended nominal projection (*Pred* in Campos and Stavrou 2004; *Deixis* and *Focus* in Ioannidou and den Dikken 2006). In our view, neither of these

approaches are forthcoming in their explanation as to why the relevant functional heads would be systematically homophonous to the definite article. In addition, as pointed out to us by Hedde Zeijlstra (p.c.), such approaches also face the potential problem of having to provide appropriate semantic meaning to the proposed functional heads. Otherwise, the labels become vacuous.

So, in our view, no existing alternative approach actually derives the presence of extra determiner(s) in a polydefinite, although this follows straightforwardly on our own approach.[6] However, even though we can capture the occurrence of multiple determiners in the morpho-syntax, we need to say something in addition regarding the semantics.

When faced with the multiple occurrence in the syntax of something which is only interpreted once in the semantics, in principle there are (at least) two options available: One is to take one of the occurrences as the semantically real one, and treat the rest as 'expletive' (or as realizations of different syntactic entities, as in some of the aforementioned proposals). The other option, a more radical one, is to say that all overt instances are actually 'expletive', and locate the source of the semantic effect in a phonologically non-realized element. The latter approach has an immediate advantage over the former one: It does not entail massive lexical ambiguity. What looks like the definite determiner is always the same element, but it is actually not the element responsible for the semantic effect.

This line of reasoning, which is the one we will follow in this paper, has been pursued for negative concord by Zeijlstra (2004). For strict negative concord languages, like Greek, Zeijlstra argues that (what looks like) the marker of sentential negation is actually not interpreted as negative. Rather, semantic negation is contributed by a covert negative operator, and the overtly realized 'negative' elements (sentential negation and negative polarity items) are semantically non-negative (they bear uninterpretable Neg features checked against the interpretable Neg feature of the covert negative operator).

That a similar situation obtains in the realm of definiteness in Greek is evident from polydefinites. A polydefinite, such as *to megalo to spiti* 'out of the houses the big one' refers to a unique big house. But the definite articles on 'house' and on 'big' are not interpreted: In a discourse context where *to megalo to spiti* is felicitously used, there cannot be a unique house (otherwise the restrictive interpretation of the adjective would be impossible) and there is no commitment carried by the definite on the adjective that there is a unique big entity. So, it seems that semantically, both definite articles are vacuous at the position where

[6] Panagiotidis (2005) also proposes that polydefinites involve two DPs, of which the adjectival one contains noun ellipsis. As a result, he too can account for the presence of the extra determiner. One important difference, however, is that on his proposal one DP is the subject and the other the predicate in a small clause structure. Thus, under his analysis, one of the DPs, and not necessarily the adjectival one, is a predicate. But this claim is not sufficiently motivated. Moreover, to the extent that the proposal aims to explain the restrictions on the set of admissible adjectives on the basis of the adjectival DP being predicative, it gives the incorrect prediction that these restrictions only apply in the DNDA order, as it is only in this order that the adjectival DP is the predicate.

they surface. Definiteness is interpreted on the large DP as a whole, i.e. it applies at the intersection of sets of big entities and sets of houses. This ties in with the issue, already mentioned in Section 1.2, that the DP subparts of a polydefinite have to be allowed to be of type <e,t>, so that their semantic composition can involve set intersection.

Adopting Zeiljstra's view of strict negative concord for the encoding of definiteness in Greek, we propose the following. The Greek definite article, D, is semantically empty. The semantics of definiteness (and referentiality) associated with it is encoded above D, usually in the form of an empty operator (though see below). Thus, overt definite Ds does not in themselves carry a uniqueness presupposition and do not saturate the nominal predicate; what does that is the empty operator projected above D. In the case of a monadic definite, one D-head and one operator are merged, giving rise to the expected syntax and semantics. In a polydefinite, two DP's are merged, but only one empty operator is projected above the composite DP, giving rise to a unique saturated nominal. We can exclude the possibility of merging multiple nominal projections that have a D and a covert operator each, because there would be no semantic composition rule to combine two saturated nominals (other than coordination, of course).

We would like to speculate that the proposed split nature of the definite article in Greek is evident in other cases in the language. For instance, demonstratives and proper names are often treated as definites. Contrary to English, the Greek definite article obligatorily co-occurs with both these, suggesting that it is not itself the locus of definiteness:

(24) afto to vivlio *this the book
o Jannis *the John

A comprehensive treatment of the encoding of definiteness in Greek awaits future research.

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Verb Serialization and Argument Unification? A Case Study of Three Serial Verb Constructions in Tsou

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0. Introduction

Serial verb constructions are a long-standing problem for most syntactic theories, which assume that verbs are unique within their clauses. Contrary to this assumption, a serial verb construction is often portrayed as a construction in which two or more verbs act together (as a single predicate) in a monoclausal structure, with only one specification for tense, aspect, modality, and negation (cf. Foley and Olson 1985, Bisang 1995, Durie 1997, Crowley 2002, Bril 2004, to name a few).

The present paper analyzes three serial verb constructions (henceforth SVCs) in Tsou. Using evidence from focus-marking and nominal morphology, I argue that arguments of individual verbs in the Tsou SVCs are not fused into a fully unified argument structure governed by the entire verb series, although the individual verbs are encompassed in a monoclausal structure sharing one specification of mood, person, and polarity values.

In what follows, I discuss the morphosyntactic properties of these Tsou SVCs focusing on their implications to the configuration of argument structure in this Austronesian language. I will contrast the features of Tsou SVCs with the two properties of SVCs that linguists most often talk about: (i) that serial verbs do not display any sort of syntactic dependency, and (ii) that verb serialization involves argument fusion.

1. Literature on Verb Serialization

A commonly cited SVC definition is that of Aikhenvald (2006:1), who claims that:

> A serial verb construction is a sequence of verbs which act together as a single predicate, without any overt marker of coordination, subordination, or syntactic dependency of any other sort. Serial verbs describe what can be conceptualized as a single event. They are monoclausal; their intonational properties are those of a monoverbal clause, and they have just one tense, aspect, and polarity value. Serial verbs may also share arguments and obliques. Each component of an SVC must be able to occur on its own.

In Aikhenvald's definition, the lack of syntactic dependency is the defining criterion that distinguishes SVCs from other types of complex predicates and from multi-verb constructions like coordination and subordination. Bril lists similar criteria, arguing that 'lexical autonomy is a prerequisite for serialization, excluding non-autonomous coverbs and nonfinite forms, as well as co-lexicalized compounds' (Bril 2004:3). Each of the serialized verbs is assumed to manifest the full-fledged finiteness and to be able to occur as the main predicate in an independent sentence. Bisang (1995) compares SVCs with converb constructions and points to lexical autonomy as the substantive difference that keep the two constructions distinct. According to Bisang, verb serialization is the unmarked juxtaposition of two or more verbs, each of which would also be able to form a sentence on its own (Bisang 1995:139). Converbs, on the contrary, are verb forms that cannot occur as main predicates of independent sentences.

The claim that SVCs involve the juxtaposition of fully autonomous verbs which together constitute a single predication presents a clear challenge to many syntactic theories, most of which assume that verbs are unique within their clauses and predicatehood is therefore equivalent to clausehood. Such an equation becomes problematic when SVCs are taken into consideration. The immediate problem is: how should predicatehood be gauged in SVCs? On the one hand, SVCs are said to act together as a single predicate. On the other, each of the serialized verbs is said to be able to occur on its own and make its own predication. Shibatani (2007:12) points to us that the common understanding of SVCs in fact involves a contradiction: if serial verbs together form a single predication, how could they each function as finite forms and make predication separately?

Regarding the contradiction, Shibatani argues that "if serial verbs constitute one single predication, as in Bril's characterization, the individual verbs shouldn't be able to function autonomously because they do not make predication separately" (2007:12). That is, although serial verbs are often depicted as the juxtaposition of two syntactically autonomous verbs, only one verb in the series is fully autonomous/finite; other verbs are restricted in functions and are not fully finite. The syntactic dependence between serial verbs, according to Shibatani, has been illustrated languages such as Paamese, based on Crowley's description. Crowley (2002) pointed out that the second verb in the Paamese SVC in (1) below is severly restricted; it is devoid of clitic and mood marking (although it may still display a number of finiteness features), unlike the independent verb in the second clause in (2). In Paamese SVCs, only the first verb has the potential of displaying the full range of formal finiteness features.[1] In a word, lack of overt dependency marking is no evidence that individual verbs in SVCs are necessarily fully autonomous and finite.

[1] Abbreviations used in the present paper include: SG: singular; PL: plural; R/REAL: realis; AUX: auxiliary; AF: ACTOR-FOCUS; PF: PATIENT-FOCUS; RF: REFERENCE-FOCUS; LF: LOCATION-FOCUS; NAF: NON-ACTOR-FOCUS; TOP: TOPIC; NTOP: NON-TOPIC.

Paamese SVCs (Crowley 1987:43)

(1) kail a-muas vuas emat
3PL 3PL.REAL-hit pig 3SG.REAL-die
'They killed the pig by hitting it.'

(2) kail a-muas vuas kai emat
3PL 3PL.REAL-hit pig 3SG 3SG.REAL-die
'They hit the pig and it died.'

If SVCs are not formed of equally autonomous verbs, we need to rethink their implications to the configuration of argument structure: Are finite verbs and dependent verbs equally important in determining the argument structure licensed by the newly-formed joint predicate? That is, does the serial complex together subcategorize all the arguments contributed by each of its component verbs? Aikhenvald's characterization states that serial verbs may share arguments and obliques; there is no mention whether or not arguments of individual verbs are fully unified, even though by claiming serial verb acting together as a single predicate, a single unified argument structure is implicated. Unlike Aikhenvald, Durie (1997:340-349) explicitly argues that arguments of individual verbs are integrated into a fused argument structure, but the fused structure may involve a new conceptual structure and assign different semantic attributes to the arguments involved.

2. A Sketch of Tsou Clause Structure

Tsou is an Austronesian language currently spoken in southwestern Taiwan. Most Tsou clauses begin with an auxiliary and a predicate, with nominals following immediately behind. Every nominal is preceded by a particle indicating the dependency relation of the nominal to its licensing predicate. The pre-nominal particle illustrates a two-way contrast, referred to as the TOPIC vs. NON-TOPIC distinction in the present study. A clause may contain multiple nominals coded as the NON-TOPIC, but only one nominal can be selected for the TOPIC, as shown in the examples (3)-(6) below.

(3) mo=ø mo-si to ca'hU to pooyoyo 'o amo
AUX.AF.R=3SG AF-put NTOP table NTOP pants TOP father
'**Father** put pants on a/the chair.' (agent=TOP, AF verb, AF aux)

(4) i=si si-a to ca'hU to amo 'o pooyoyo
AUX.NAF.R=3SG put-PF NTOP table NTOP father TOP pants
'Father put the **pants** on a/the chair.' (patient= TOP, PF verb, NAF aux)

(5) i=si si-eni to pooyoyo to amo 'o oko
AUX.NAF.R=3SG put-RF NTOP pants NTOP father TOP child
'Father put aside pants for the **child**.' (ben= TOP, RF verb, NAF aux)

(6) i=si si-i to pooyoyo to amo 'o ca'hU
AUX.NAF.R=3SG put-LF NTOP pants NTOP father TOP chair
'Father put pants on the **chair**.' (location= TOP, LF verb, NAF aux)

The verbal marking system in Tsou displays the Philippine-type voice/focus conrast. Depending on the nominal that bears the TOPIC marking, a verb may appear in at most four different focus forms: ACTOR FOCUS, PATIENT FOCUS, REFERENCE FOCUS, and LOCATION FOCUS. The examples in (3)-(6) illustrate the four focus forms of the lexical root *si* 'put': *mo-si* (AF), *si-a* (PF), *si-eni* (RF), and *si-i* (LF). The three NON-ACTOR-FOCUS forms are conventionally referred to as NAF forms collectively.

Verbs are not the only place where focus marking is indicated. A characteristic feature of Tsou is that focus marking is simultaneously registered on the co-occurring auxiliary in realis mood. An AF verb requires an AF auxiliary, but verbs marked in the other three focus forms take a NAF auxiliary instead, as shown in (7) and (8) below. Aside from focus and mood, the Tsou auxiliary also attracts prominal marking, which invariably coreferences the actor of the clause, as shown in the first person singular marking =*'o* in (7) and (8).

(7) mi='o c<m>uhu to moatU'nU
AUX.AF.R=1SG <AF>butcher TOP goat
'**I** butchered a goat.' (AF aux, agent=TOP)

(8) i='o chu-a 'o moatU'nU
AUX.AF.R=1SG butcher-PF TOP goat
'I butchered the **goat**.' (NAF aux, patient=TOP)

The four-way contrast as shown in (3)-(6) raises a question regarding the common understanding of argument-adjunct distinction. Semantically 'peripheral' elements such as location and beneficiary do not appear to be syntactically 'less core' than agent and patient. Both the 'peripheral' location and the 'core' patient, for instance, can be selected as the TOPIC, therefore triggering focus marking and being accessible to various syntactic processes.[2] That is, the 'peripheral' location, conventionally identified as adjunct in most syntactic theories, does not appear to undergo further derivational processes for being associated with core syntactic position. It is thus doubtful how the conventional argument-adjunct distinction—

[2] Any semantic role selected for the TOPIC status is accessible to raising, relativization, control, and certain types of conjunction reduction.

that agent and patient are arguments whereas all the other semantic roles are adjuncts—can be substantially obtained in Tsou.

While we claim that the conventional argument-adjunct distinction may not hold judging from the morphosyntax of Tsou, it would be an exaggeration to say that there is no argument-adjunct distinction in this language. Let us take locational nominals as example. While the common understanding assumes that all locational nominals are treated the same, Tsou in fact distinguishes two types of locational nominals: the one that can be selected for the TOPIC and trigger focus marking, as in (9), and the one that remains invariably NON-TOPIC and irrelevant to focus marking (in simplex predicates), as shown in (10)-(12).

(9) i=si si-i to pooyoyo to amo 'o ca'hU
AUX.NAF.R=3SG put-LF NTOP pants NTOP father TOP chair
'Father put pants on the **chair**.' (location=TOP, LF verb, NAF aux)

(10) *i=si chu-i to moatU'nU to amo 'o coca
AUX.NAF.R=3SG butcher-LF NTOP goat NTOP father TOP yard
intended: 'Father butchered a goat in the **yard**.'

(11) i=si chu-a ne coca to amo 'o moatU'nU
AUX.NAF.R=3SG butcher-PF NTOP yard NTOP father TOP goat
'Father butchered the **goat** in the yard.' (location=NON-TOP)

(12) mo=ø c<m>uhu ne coca to moatU'nU 'o amo
AUX.AF.R =3SG <AF>butcher NTOP yard NTOP goat TOP father
'**Father** butchered a goat in the yard.' (location= NON-TOP)

The above 'atypical' distinction should not be a big surprise if the argument-adjunct distinction is taken as a language-specific issue. To provide a descriptively appropriate characterization for the argument-adjunct dinstinction for the reset of the present study, I adopt the following Tsou-specific definition for argumenthood in this language: A nominal is taken to be of argument status when it can be selected for the TOPIC and therefore be accessible to various syntactic processes. This definition will be adopted as the criterion to examine whether or not a semantic element is included in the argument structure of the entire serial complex.

3. Morphosyntax of Tsou SVCs

3.1. Verb Types in Tsou SVCs

Three types of SVCs are considered in the present study. They come in the format of a restricted V1 slot followed by a comparatively unrestrictedly V2 slot. The three verbs that may occur in the V1 slot are the RF verb *tith-eni* 'use', the LF verb *yon-i* 'stay', and the PF verb *haf-a* 'take', as shown in the examples in

(13)-(15). Verb sequences such as 'go' plus 'see', while semantically felicitous in many languages, are not considered grammatical in Tsou, as shown in (16).

(13) i='o tith-eni m-apaso to fou 'o poyave
AUX.NAF.R=1SG use-RF AF-chop NTOP meat TOP knife
'I used the knife chopping meat.' (Instrumental SVC, RF+AF)

(14) i='o yon-i m-apaso to fou 'o oyonapei'i
AUX.NAF.R=1SG use-LF AF-chop NTOP meat TOP kitchen
'I stayed in the kitchen chopping meat.' (Locational SVC, LF+AF)

(15) i='o haf-a uh to taipahu 'o naau
AUX.NAF.R=1SG take-PF AF.go NTOP Taipei TOP Naau
'I took Naau to Taipei.' (Directional SVC, PF+AF)

(16) *i='o us-a b-aito to naau 'o taipahu
AUX.NAF.R=1SG go-PF AF-see NTOP Naau TOP Taipei
intended: 'I went to Taipei to see Naau.'

3.2. Tsou SVCs and Syntactic Autonomy

At first glance, the individual verbs in the above verb sequences appear to display features of syntactic autonomy, the most conspicous one being the different focus forms in which these verbs occur. Depending on verb types, the first verb may occur in one of the NAF forms; but the second verb is invariably in the AF form. These focus forms are all legitimate for making a grammatical sentence when used alone, as shown in Section 2. The fact that serialized verbs take different focus marking appears to suggest that individual verbs in the verb sequence still retain its syntactic independence and that the nature of Tsou SVCs is a combination of two syntactically autonomous verbs.

However, if we look carefully into the pattern of focus marking, the conflict in focus marking in fact demonstrates features of syntactic dependency. First, serialized verbs in Tsou come under strict syntactic constraints. Unlike simplex predicates which can alternate between AF and NAF forms under appropriate pragmatic context (depending on which semantic role is selected for the TOPIC), the first verb in SVCs is restricted to one of the NAF forms and the second verb is resricted to AF forms. Any change to focus forms is strictly prohibited. The examples (17) and (18) demonstrate that the verbs 'use' and 'chop' can alternate between AF and NAF forms when used alone in a monoclausal structure. When the two verbs occur in the serial verb context, however, they are bound by the focus constraint illustrated above, as shown in (19), (20), and (21).

(17) mi='o titho to poyave ho m-apaso to fou
AUX.NAF.R=1SG use.AF NTOP knife and AF-chop NTOP meat
'I used a knife and chopped meat.'

(18) i=’o tith-eni ’o poyave ho papas-a ’o fou
AUX.NAF.R=1SG use-RF TOP knife and chop-PF TOP meat
‘I use the knife and chopped the meat.’

(19) i=’o tith-eni m-apaso to fou ’o poyave
AUX.NAF.R=1SG use-RF AF-chop NTOP meat TOP knife
‘I used the knife chopping meat yesterday.’ (RF+AF)

(20) *mi=’o titho m-apaso to fou to poyave
AUX.NAF.R=1SG use.AF AF-chop NTOP meat NTOP knife
intended: ‘I used a knife chopping meat.’ (AF+AF)

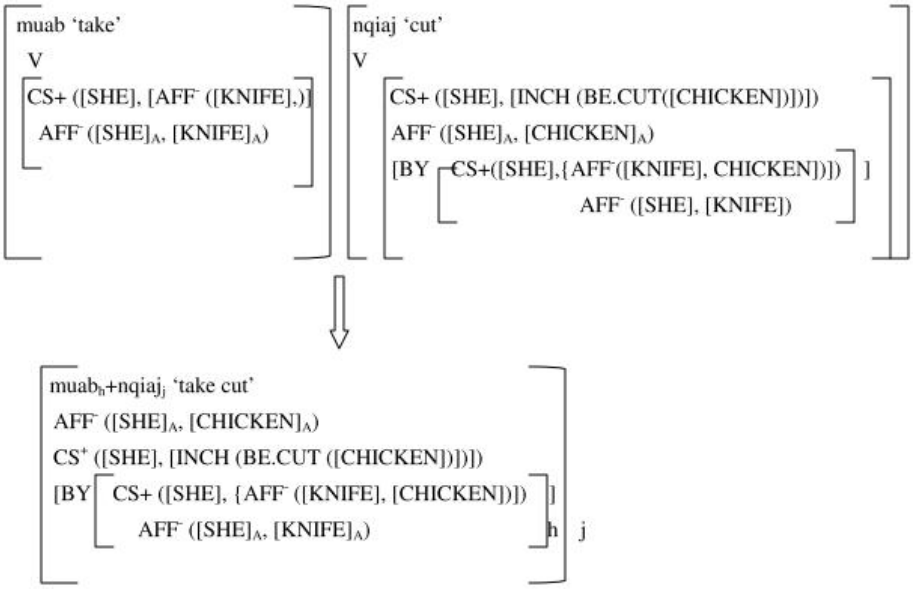
(21) *i=’o tith-eni papas-a to fou ’o poyave
AUX.NAF.R=1SG use-RF cut-PF NTOP meat TOP knife
intended ‘I used the knife chopping meat.’ (RF+PF)

The constraint on focus marking is accompanied with restricted finiteness. It was mentioned in Section 2 that a simplex finite verb controls the focus marking of the co-occurring auxiliary. An AF verb takes an AF auxiliary whereas a NAF verb requires a NAF auxiliary. In SVCs, the auxiliary is always marked in NAF, maintaining agreement with the first but not the second verb. This focus agreement indicates that serial verbs in Tsou are not equally autonomous; while the first verb displays finiteness features of an autonous verb, the second verb is restricted in finite marking and exhibits features of dependence. The syntactic dependence of the second verb also challenges Aikhenvald’s claim that serial verbs do not illustrate any syntactic dependency, instead confirming Shibatani’s and Crowley’s arguments that serial verbs are not composed wholly of autonomous verbs.

4. Tsou SVCs and Argument Unification

If serial verbs are not equally syntactic autonomous, a question then emerges as to whether the individual verbs are equally important in contributing arguments to the serial complex. In the literature, an SVC is often characerized as a sequence of verbs acting together as a single predicate, which is then implicative of a single unified argument structure. Each of the serialized verbs is assumed to contribute arguments to the entire verb complex. For instance, Durie (1997) gives us an example from White Hmong where arguments contributed by individual verbs are fully fused into an integrated structure. When used alone, the White Hmong verbs *muab* ‘take’ and *nqiaj* ‘cut’ both take an agent and a patient in their respective argument structure. In serial context, the two verbs share the same agent and their patients are both incorporated into the joint structure, despite some modification: the patient of ‘cut’ is still the patient whereas the patient of ‘take’ is assigned the instrument role in the argument structure of the entire verb complex (Durie 1997:345-348).

(22) Argument Unification in White Hmong (based on Durie 1997: 345-347)



Now, let us look at how individual verbs contribute arguments in the Tsou SVCs. In Section 2 we proposed to define a Tsou argument as a nominal that can be selected for the TOPIC and trigger focus marking on the verb. When used alone, the verb 'stay' involves two event participants: an actor and a location. Both participants can be selected as the TOPIC and trigger the appropriate focus marking on the verb, as shown in (23) and (24) below. By our definition, the verb takes a two-argument frame. A similar two-argument frame is observed in the verb 'chop', which involves an agent acting on a patient and both participants can be selected for the TOPIC, as shown in (25) and (26).

(23) mo=ø yon to oyonapei'i 'o oko=si
AUX.AF.R=3SG stay.AF NTOP kitchen TOP child=3SG
'**His child** stayed in a/the kitchen.' (simple predicate, agent=TOP)

(24) i=si yon-i to oko=si 'o oyonapei'i
AUX.NAF.R=3SG stay-LF NTOP child=3SG TOP kitchen
'His child stayed in the **kitchen**.' (simple predicate, location=TOP)

(25) mo=ø m-apaso to fou 'o oko=si
AUX.AF.R=3SG AF-chop NTOP meat TOP child=3SG
'**His child** chopped meat.' (simple predicate, agent=TOP)

(26) i=si papas-a to oko=si 'o fou
AUX.NAF.R=3SG chop-PF NTOP child=3SG TOP meat
'His child chopped the **meat**.' (simplex predicate, patient=TOP)

When the verb 'stay' occurs in the serial verb context together with 'chop', however, only the location nominal (contributed by 'stay') is allowed to be selected as the TOPIC and trigger the LF marking. The patient nominal (by 'chop') remains invariably as the NON-TOPIC and never gets to trigger focus marking in the verb sequence. Such restriction suggests that the patient nominal contributed by the second verb 'chop' does not acquire argument status in the serial complex. Instead, it displays features of an adjunct (see the examples (9)-(12)).

(27) i=si yon-i m-apaso to fou
AUX.NAF.R=3SG stay-LF AF-chop NTOP meat

to oko=si 'o oyonapei'i
NTOP child=3SG TOP kitchen
'His child stayed in the **kitchen** chopping meat.' (SVC, location=TOP)

(28) *i=si yon-i papas-a to oyonapei'i
AUX.AF.R=3SG stay-LF chop-PF NTOP kitchen

to oko=si 'o fou
NTOP child=3SG TOP meat
intended: 'His child stayed in a kitchen chopping the **meat**.'
(SVC, patient=TOP)

The above constraint illustrates that the serial complex does not subcategorize all the arguments contributed by each of its component verbs. The argument structures of individual verbs are not (fully) unified into an integrated set. Judging by the pattern of TOPIC marking, only the non-actor argument of the first verb can be convincingly shown to acquire the argument status in the serial complex. The arguments contributed by the second verb, given the restriction on nominal marking, are not incorporated into the argument structure of the entire verb complex.

5. Conclusion

The present study considers three Tsou SVCs and discusses their features of syntactic autonomy and pattern of argument unification. In the three constructions, although the individual verbs each show formal resemblance to independent finite verbs, only the first verb displays the full-fledged features of an independent, finite verb. The second verb is highly restricted in finite marking, illustrating features of syntactic dependency.

The difference in syntactic autonomy is correlated with the pattern of argument assignment between each of the component verbs in the serial verb context. Judging by the pattern of TOPIC marking, only the non-actor argument of the first verb is included in the argument structure of the entire serial complex; the arguments contributed by the second verb are never selected as the TOPIC in SVCs

and are arguably not an argument of the verb complex. Given the morphosyntactic features considered in the present study, arguments of individual verbs are not unified into an integrated set in the three SVCs of Tsou.

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Numeral Modifiers and Temporal Container Adverbials*

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0. Introduction

This paper is mainly concerned with restrictions on numeral modifiers (e.g *more than/less than, at least/at most*) inside *in*-adverbials, as in *Jane ran a mile in 5 minutes*. But before discussing these, the paper begins, in Section 1, by drawing attention to restrictions on these modifiers elsewhere, in contexts where a speaker assumes that the value of the numeral is low or high relative to a contextually shared norm. I shall term such assumptions 'evaluative'. The restrictions, it will be argued, are due to rhetorical considerations; the effect of inappropriate modifiers would go against the grain of the evaluative assumption. Section 2 will then proceed to *in* adverbials. These appear to measure the temporal length of extended telic eventualities, but their entailments and scalar implicatures go in the opposite direction from those of normal measure phrases. For reasons that will become clear in the discussion, such adverbials will be called 'container adverbials'. In Section 3 it will be shown that container adverbials are subject to a subset of the constraints discussed in Section 1. Section 4 will deal with some surprising data concerning the modifier *at least*, and Section 5 will extend the discussion to the use of *in*-adverbials in sentences like *The train will arrive in ten minutes*.

1. Restrictions and Numeral Modifiers

Unmodified numerals have an exhaustive ('exactly') scalar implicature (Grice 1975, Horn 1972). Modifiers on numerals yield fuzzy values. I shall deal mainly with the comparative modifiers *more than* and *less than*, and the superlative modifiers *at least* and *at most*. *At least n* can be paraphrased as *not less than n* / *n or more, at most n* as *not more than n / n or less*. Following Krifka (2006, 2007), I take superlative modifiers to have their locus in the speech act. *At least n* implies that n is the lowest value for which the speaker can take full responsibility, with the possibility of a higher value left open. *At most n* implies that n is the highest value for which the speaker can take full responsibility, with the possibility of a lower value (including 0) left open.

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In this section I note certain restrictions on these modifiers, connected to a speaker's assumptions about the quantity or amount of the entity that is measured by the numeral. A speaker who believes that the quantity is low would normally refrain from choosing an expression that points upward on the scale, i.e. that entails (in the case of *more than*) a higher value, or suggests the possibility of one (for *at least*); conversely, a speaker who believes that the quantity is high would refrain from choosing an expression that points downward.[1]

Let us assume a context in which you have been asked

(1) How many boys are there in the choir?

You do not know the exact number of boys in the choir but you know that it is relatively small, certainly compared with the number of girls in the choir. You might make this explicit by saying at the outset *Not many*; alternatively, this may already be part of the common background. You know that the number is roughly ten, plus or minus a few. If you think that ten is the upper bound, (2a) would be appropriate but (2b) would be doubtful:[2]

(2) a. fewer than 10, at most 10, not more than 10, not quite 10
b. almost 10

Suppose now that ten is the lower bound; suppose further that the person asking the question has no prior evaluative expectation about the number of boys in the choir. You begin by making it clear that the number is small. You couldn't just say

(3) Not many; more than ten / at least ten / not less than ten

The modified numerals in (3) cry out for an adversative conjunction:

(3′) Not many, but more than ten / at least ten / not less than ten

If the fact that there are relatively few boys in the choir is part of the background, you could say *a bit more than ten*, but *more than 10, at least ten no less than 10* would still be inappropriate.

[1] I suspect that the restrictions may turn out to be evaluative not only in the sense that relatively high/low values are assumed but in the sense of 'good' versus 'bad'. As I have not explored this matter more fully, I shall ignore it here.

[2] *Almost* has two meaning components, a negative or polar one (in our example 'not 10') and a proximal one ('close to 10'). Following Horn (2002) I take both to be entailments , but only the second to be asserted. Horn calls the polar entailment 'assertorially inert'; a*lmost* is "rhetorically oriented towards the positive component of its meaning".

If you thought that the number is exactly 10, the modifiers in (4) would also be appropriate inasmuch as they are evaluative; they draw attention to the lowness of 10 on the scale:[3]

(4) only 10, no more than 10

Now let us assume you have been asked

(5) How many girls are there in the choir?

Again, you do not know the exact number, but this time you know that there are relatively many, roughly fifty, and, if this is not part of the common ground, you start by saying *A lot*. If you think fifty is the lower bound you can use the modifiers that were problematic in (3):

(6) (a bit) more than 50, no less than 50, at least 50

If you think 50 is the upper bound you cannot say (7a) but you can say (7b):[4]

(7) a. fewer/less than 50, at most 50,
b. almost 50, not quite 50, a bit less than 50

In a context in which the speaker has no prior assumption that the value of the answer is relatively high or low, any of the modifiers could, of course, be chosen.

For the comparative and superlative modifiers the restrictions might be explained by the fact that the modified numerals would lack an upper bound; in theory, the values on the scale could be high/low enough to be on the wrong side of whatever line would be considered the border for low/high values according to the speaker's assumptions. I doubt, however, that this is a sufficient explanation for the restrictions. In practice these modifiers typically come with much more limited, though fuzzy, margins. Moreover, this explanation would not generalize to *almost,* since *almost 10* is less rather than more than 10. I suggest that the main motivation for the restrictions is rhetorical; the inappropriate choices would be felt to weaken the evaluative assumption of a high/low value on the scale.

In support of this suggestion, note that the restrictions are not absolute. Consider Beth's response to Anne in (8) and (9).

(8) Anne: There aren't many boys in the choir this year, at most 10
Beth: At least 10, I would say.

[3] Nouwen (2008) points out that the preferred reading of *no more than ten marbles* is *exactly ten marbles*, attributing this reading to an implicature. He also points out that the reading "has an evaluative side-effect of expressing that ten marbles does not count as a lot." The observation is traced back to Stoffel (1894) and discussed in Jespersen (1949).

[4] Notice that *not quite* is not restricted; it appears both here and in (2a) above.

(9) Anne: There are a lot of girls in the choir this year, at least 50.
Beth: At most 50 / less than 50 / not quite 50 / well, almost 50

Beth may well share Anne's belief that there are few boys and many girls in the choir, and differ from Anne only in her estimate of the numbers; her estimate is less extreme in terms of their shared assumptions than Anne's. This is sufficient to free up modifiers that we found to be inappropriate above.[5] If the absence of an upper bound were the sole, or even main, reason for the restrictions, we would not expect the restrictions to be overridden so easily.

2. Temporal Container Adverbials

When we measure the length of a homogeneous eventuality, the measurement proceeds straightforwardly as in ordinary counting:

(10) Mary typed for an hour.[6]

(10) entails that Mary typed for 10 minutes, half an hour, etc. (10) additionally implies that Mary typed for exactly an hour, no more than an hour. This is a scalar implicature, based on

the Maxim of Quantity: Say as much as you can and
the Maxim of Quality: Do not say anything for which you lack evidence.

But if Mary, in fact, typed for more than an hour, (10) is not false.

Unlike homogeneous eventualities, extended telic events cannot be measured in this way. We appear to measure them by *in*-adverbials, as in

(11) Mary typed 10 pages in an hour.

In fact we are not measuring the temporal length of Mary's typing directly in (11). What we are measuring is the interval which contains the event, or, conversely, into which the event fits (Krifka 1998, who calls such adverbials interval adverbials, Kearns 2003, Mittwoch 2010). The semantic and pragmatic relations are reversed. (11) does not entail that Mary typed 10 pages in half an hour. Instead it entails higher values:

(12) She did it in an hour and a half, in 2 hours, etc.

These larger intervals would simply not be completely filled by the event. The scale for this type of measurement is a descending one. Again, (11) implies that

[5] Only is not amenable to forgoing its implication of a low value in this kind of context. If Beth thinks there are exactly 50 girls in the choir, she cannot respond with *only 50*.
[6] Strictly speaking, we measure the temporal trace of the event, rather than the event itself.

she typed 10 pages in exactly an hour and, again, this is an implicature. If Mary did it in less than an hour (11) is not falsified. In other words, it is compatible with

(13) Mary typed ten pages in 55 minutes.[7]

In that case, the hour mentioned in (11) would contain slack – time not filled by part of the event. The Maxim of Quality would stop you from saying (13) if you had insufficient evidence for its truth; the Maxim of Quantity would stop you from saying (12) if you knew (11) to be true. In terms of strength, (13) > (11) > (12). The strongest statement is the one that specifies the lowest point on the scale, the statement according to which the event totally fills the specified interval and is thus completed in the shortest time.

So far the entailments and implicatures involved in measurement along a descending scale appear to be a perfect mirror image of what happens when we measure along the more familiar rising scale. But there is also a significant difference: The entailed values of the rising scale can play a part in subsequent discourse. (10), repeated as (14a), can be continued as in (14b) or (14c):

(14) a. Mary typed for an hour.
b. During the first twenty minutes she typed faster than for the rest of the hour.
c. Ten minutes before she finished she had to answer a phone call.

The entailed values of the descending scale cannot give rise to such continuations, since the larger intervals are empty of event content. The entailments seem to be backgrounded or 'inert', to borrow Horn's term (cf. Note 1) The effect of this difference is that the exhaustive ('exactly') implication is stronger for temporal container adverbials than it is for the durational adverbial in sentences like (10), or for values on rising scales in general.

As noted in Mittwoch (1980), these adverbials are inappropriate if the interval is considered to be relatively long, so that the speed of the event would be relatively slow:

(15) Mary typed 10 pages in a (very) short / #a (very) long time.

The construction is thus inherently evaluative. A speaker who reckons that an extended telic event was relatively slow would normally choose the alternative way of indirectly measuring the length of the event, the *take* construction, as in

[7] This is shown by the fact that a hearer cannot respond to (11) with (i) but only with (ii):
(i) #No/ That's not true she did it in 55 minutes.
(ii) Actually, she did it in 55 minutes.

(16) It took Mary an hour to type three pages.

This construction works on a rising scale, and carries no evaluative implications. Thus

(17) It took her a very short / a very long time to type the paper.

If the speaker has no preconceived notion about the matter, either construction can be used.

3. Numeral Modifiers in Container Adverbials

In the absence of speakers' assumptions about Mary's typing for a particularly long or short time, (10) is compatible with any of the modifiers discussed in Section 1.

(18) Mary typed for more than / at least / less than / at most / almost / only an hour.

But for (11) we find the same restrictions that we observed in (3) above. The examples in (19) are unproblematic, while those in (20) are problematic out-of-the-blue.

(19) a. Mary typed 10 pages in less than / under an hour, in at most an hour, in no more than an hour.
b. Mary typed 10 pages in only an hour.

(20) a. Mary typed 10 pages in more than / over an hour, at least an hour
b. Mary typed 10 pages in almost an hour.[8]

Note that modifiers which are weakeners for numerals on a rising scale serve to strengthen the speaker's claim in the good examples; conversely, modifiers that strengthen the claim for a rising scale would weaken it in the problematic ones. Instead of (20) one would normally use the *take* construction.

In view of what was said in the previous section about the evaluative implication of sentences with these adverbial, the above data are hardly surprising. They point in the same direction as (15) above. The adverbials are incompatible with any suggestion that the containing interval is relatively long so that the event would be slow.

We also saw in Section 1 that the implication of a low (or high) value can disappear in certain contexts. This applies here too:

[8] For *almost n* on a descending scale there is the added complication that it is not always clear whether the value is above or below n. Witness the ambiguity of *The temperature is almost zero*. Cf. Nouwen (2006).

(21) Mary: I have typed ten pages in an hour.
Jane: According to my watch, you did it in more than an hour / in at least an hour and ten minutes.

Again, Jane's response does not mean that she denies absolutely that Mary's typing was relatively fast. (22) illustrates a straightforward comparison between two similar events, and need not carry any implication, let alone value judgement, about the speed of the performances:

(22) Today's pianist played the sonata in 27 minutes. The one I heard last week did it in at least 30 minutes.

In the next example, not only is the restriction on the numeral modifier in the adverbial overruled; additionally, the evaluative implication is flipped from fast to slow. This happens when the scalar value of the numeral in the object NP is weakened by a numeral modifier:

(23) a. Mary typed at most / less than / only ten pages in more than an hour.
b. Mary typed at most / less than / only ten pages in at least an hour.
c. Mary typed at most / less than / only ten pages in almost an hour.

The modifier in the adverbial reinforces what is already implied by the one in the object: Mary was slow. If the modifiers are reversed, the implication is that Mary was super-quick:

(24) Mary typed more than/ at least / almost ten pages in less than / at most / only one hours.

Roger Schwarzschild (p.c.) has suggested that the problem with the examples in (20) is the fact, noted in the previous section, that they are entailed by (11), the same sentence without a numeral modifier, and that they are therefore not just less informative than (11), but, strictly speaking, vacuous. (Mittwoch 2010). This would also explain the data in (15), repeated below for convenience:

(15) Mary typed 10 pages in a (very) short / #long time.

Any sentence with a container adverbial would entail the same sentence with *a long time* replacing the temporal specification in the adverbial. The same is obviously not true *for a short time*.

Nevertheless it seems to me that this cannot be the whole explanation for the restrictions. For one thing, our reaction to a violation of the restriction is very different from our reaction to an inappropriate modifier on a rising scale. Compare (25a) below, one of the options from (20), with (25b), one of the options from (18):

(25) a. Mary typed 10 pages in more than an hour
b. Mary typed for less than an hour

with (25b) said in a context in which it is known that she typed for an hour– which entails that she typed for less than an hour. (25b) would be felt to be grossly misleading in this context; in asserting this entailment the speaker has subtracted part of the typing event. In (25a) the entailment from the interval specified in the container adverbial to a larger interval does not affect the quantity of the event. As suggested in the previous section, this kind of entailment is backgrounded, since the entailed higher value is, literally, 'uneventful'. (25a) is felt to be odd but neither misleading nor glaringly vacuous. Its oddness is of the kind that we encountered in Section 1. This would imply that the entailment to higher values is not computed; the implication of speed is not felt to follow from the entailment. Rather, this evaluative implication would be a built-in part of the meaning of container adverbials in neutral contexts, possibly a presupposition.

Furthermore, if we accept a semantic explanation for the problem with (20), we shall, again, be at a loss to account for examples like (21), (22), and (23), in which the restrictions on modifiers are inoperative. If the problem belongs to whatever branch of pragmatics will be able to tackle evaluative meaning, it should be easier to account for these counterexamples.

To conclude this section, I add examples showing that the restrictions discussed above apply to another descending scale. The first line of Beth's answers to Anne's questions in (26) is appropriate, the second is not.[9]

(26) Anne: How many bricks are sufficient to build the wall?
Beth: At most / less than / only 100
At least / more than / almost 100.

By contrast, all the answers would be appropriate if Anne's questions had been (27), which involves a rising scale:

(27) How many bricks are needed to build the wall?

4. More on *at least*

On a rising scale *at least* has the potential of strengthening an utterance by pointing to the possibility of a higher value, while *at most* weakens by pointing to a lower value. I have shown that on a descending scale, *at most* strengthens (Example (19a)), and *at least* is normally inappropriate; it cannot serve to weaken, since this would conflict with the normal (out-of-the-blue) implication of sentences with container adverbials. The exceptions noted in connection with (21), (22), and (23) involve particular contexts, the first two of which are of a type that we also encountered in Section 0.

[9] The example is adapted from Beck and Rullmann (1999), cited in Fox and Hackl (2006).

In this section I shall present further cases – and more surprising ones - where *at least* modifies a numeral situated on a descending scale. In most of the examples that follow both *at least* and *at most* could be used - with no difference in meaning. Consider

(28) My stuff will fit into at least the 80 cm. case, perhaps even into the smaller one.
(29) (Context: Cooling a liquid) By now the temperature must/will be at least / at most 15^0, perhaps even 12^0.
(30) By the year 2030 the world's top athletes will run a mile in at least / at most 4 minutes and 50 seconds, maybe even less.

These three examples differ from the ones discussed in the last section inasmuch as they involve ongoing movement along a scale. For (28) there is an implicit comparison between packing one's belongings into different cases, with the smallest one as the preferred option. In (30) the scale is not an athlete's actual performance now or in the past, but rather the expected process of constant improvement in athletic performance. Notice that all three examples include universal modals, denoting prediction.

The next example has a universal deontic modal:

(31) To qualify for the race you have to run a mile in at least / at most 5 minutes in the preliminaries.

Modality seems to facilitate this use of *at least* – for reasons that are not clear to me. But my final example, provided by an athlete, indicates that it is not a necessary condition;

(32) Yesterday John ran a mile in at least / at most 5 minutes.

What facilitates the use of *at least* here (and may also play a part in (30) and (32)) is the fact that in measuring the time taken in running a mile one also measures speed, and this is of prime importance in any racing context.

Recall that on a rising scale *at least* strengthens a claim, whereas *at most* weakens. At the beginning of this section I pointed out that on descending scales *at most* can strengthen but *at least* cannot, normally, weaken. The data discussed above indicate a fundamental asymmetry between these superlative modifiers. They are in competition for the same bit of meaning, with *at least* often the preferred option as a means of strengthening a claim.

5. *In* Adverbials for Future Events

Consider

(33) The train will arrive in ten minutes / in ten minutes' time.

Is this use of the *in*-adverbial related to its use as a container adverbial? A speaker who utters (33) at 9.50 is committed to (34):

(34) The train will arrive at 10.

Both sentences allow the modifiers in (35):

(35) a. The train will arrive in ten minutes at the earliest / at the latest.
b. The train will arrive at 10 at the earliest / at the latest.

It would seem that the adverbial here focuses on a specific time at the end of ten minutes, just as the (postpositional) PP in (36) focuses on a specific time at the beginning of a ten-minute interval.

(36) The train arrived ten minutes ago.

Both forms are deictic; the ten-minute interval is measured from speech time.[10] Haspelmath (1997) classifies both as temporal distance adverbials.

On the other hand, Kearns (2003:605) treats the construction in (33) as a special case of what she calls a 'delayed onset reading' of *in*- adverbials as in

(37) She noticed the marks in five minutes. (= Kearns (6a))

The inference from (33) to (34) in the context given would be an implicature. In support of the connection between this construction and what I have called container adverbials I might point out that for me and other speakers I have consulted the restrictions on adverbials are operative here in the same way as we saw in section 2, which suggests an implication of a low value on the scale. We feel comfortable with (38a) but not with (38b):

(38) a. The train will arrive in less than/ at most / only ten minutes.
b. The train will arrive in more than / at least ten minutes.

Kearns does not specify the type of implicature that she has in mind, but her discussion of *in*-adverbials in general suggests that she means a conversational implicature. In my view if it is an implicature, it would have to be a conventional one.

On balance, I am inclined to side with Haspelmath, and to regard the construction as a future 'distance' adverbial. Thus the inference from (33) to (34) in the context would be truth-conditional. However, pragmatically the future distance

[10] For some speakers *in ten minutes* in this sense can have a contextually given past reference point, with *would* instead of *will* – in contexts other than Free Indirect Discourse. In FID contexts *ago* can also have a past reference point.

adverbial would differ from its past counterpart inasmuch as it shares the evaluative implication of container adverbials, which means that the scale along which it measures would have to be a descending one.

I conclude this section with some examples from Google showing that by no means all speakers reject *at least* in the construction discussed here:

(39) a. I have finished the first and am about to start on the third…which will be out in at least two years' time.
b. Also – we are hoping to get married in at least two years' time.
c. I'm sure he'll be back in at least a year's time.
d. The only way out is to draft a temporary one now, and aim for the final one in at least two years' time.

(40) I think someone will achieve it, but in at least a year's time.

Judging by the content of the examples in (39), the speakers use *at least* in the sense of 'at most', i.e. the ≤ relation. This recalls the use of *at least* that we saw in the previous section; it strengthens the speaker's claim. Possibly, it is connected to the affinity between future and modality.

In (40) the use of *but* suggests that the speaker means the ≥ relation. I would guess that for such a speaker *in a year's time* is a true mirror image of *a year ago* with 'a year' being a value on a rising scale.

6. Conclusion

This paper has shown that the use of numeral modifiers is heavily dependent on speakers' evaluative assumptions about the numbers involved in what is being counted or measured. The ensuing restrictions, it was argued, are due to purely rhetorical reasons. It was then shown that the restrictions associated with a speaker's low estimate of a numerical value are systematically found in container adverbials, which indirectly measure the temporal length of an extended telic event by measuring the interval that exhaustively contains it. This finding is attributed to an evaluative meaning component of these adverbials, an inbuilt bias towards a low value and a fast event – or, at any rate, against a high value and a slow event. Additionally, the paper discusses a curious asymmetry between *at least* and *at most*, which shows up both in container adverbials and in future *in*-adverbials.

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Contextual Constraints on Geminates: The Case of Polish*

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0. Introduction

In this paper I argue from typological and perceptual evidence that the constraint against geminates (*Gem) should be split into constraints that incorporate contextual information (word position & adjacent segments). I show that splitting *Gem accurately captures the distribution and conspiratorial behavior of geminates in Polish.

1. Background

Geminates can be described as long consonant. Cross-linguistically, they are on average between one-and-a-half and three times as long as singletons (Ladefoged and Maddieson 1996). Geminates are often used contrastively in languages, as illustrated by the examples in (1).

(1) Italian: *be**ll**o* – *be**l**o* ('beautiful' – 'I bleat')
Finnish: *ta**kk**a* – *ta**k**a-* ('fireplace' – 'back')[1]

While geminates can vary greatly in the way they are represented phonologically, the discussion in this paper includes all geminates regardless of their exact structural representation (e.g., consonants with two timing slots, a single mora projection, two adjacent identical segments, etc.; see e.g. Hume, Muller, and Engelenhoven 1997, Davis 1999, Topintzi 2008).

In Optimality Theory (OT), the commonly used constraint against geminates is *GEM (Rose 2000). There have been proposals to split *GEM into a family of constraints targeting particular segmental types of geminates, as shown in (2) and (3), based on both typological and perceptual evidence. The main idea was to account for differences between, for example, geminate obstruents and geminate

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[1] The examples are from on-line dictionaries: http://www.wordreference.com/iten (for Italian) and http://www._ncd.com/ (for Finnish).

sonorants. The latter are typologically less common and perceptually less salient (at least in the intervocalic environment), and thus the constraints against geminate sonorants are assumed to outrank the constraints against geminate obstruents (see e.g. Kawahara 2007).

(2) *GEMGUTT >> *GEMSON, *GEMFRIC, *GEMVOICEDOBS
*GEMGLIDE >> *GEMLIQUID >> *GEMNASAL
(Podesva 2002)

(3) *GEMGLIDE >> *GEMLIQUID >> *GEMNASAL >> *GEMOBS
(Kawahara 2007)

In this paper I am concerned not with the segmental composition of geminates, but with the context in which they appear, where by context I mean their word position and adjacent segments. Previous work has shown that segmental context is an important property that often needs to be taken into account in the phonological analyses of geminates (see e.g. Muller 1999, McCrary 2004). Adjacency to vowels appears to be especially significant: typological evidence shows that geminates are most common intervocalically, and most rare when not adjacent to any vowel (Thurgood 1993, Muller 2001; plus an informal survey of 40 languages with geminates). This typological fact correlates with perceptual evidence (at least as tested for obstruents): intervocalic singleton-geminate contrasts are the most perceptible, and non-vowel-adjacent singleton-geminate contrasts are the least perceptible (Pajak 2009; see also McCrary 2004, Dmitrieva 2009).

2. Proposal

Vowel adjacency thus constitutes an important property that helps define common and uncommon geminate contexts. This property can be incorporated into phonological theory by re-defining *GEM as a family of constraints that target geminates in different contexts. This is analogous to the proposal of splitting *GEM into a family of segmental constraints, as discussed in §1. Informal definitions of the proposed contextual constraints on geminates are shown in (4).

(4) *Informal definitions of contextual constraints on geminates*

*GEM/V_V	Geminates flanked by vowels are not allowed ('no intervocalic geminates').
*GEM/1VA	Geminates adjacent to exactly one vowel are not allowed ('no single vowel-adjacent (1VA) geminates').
*GEM/NVA	Geminates not adjacent to any vowel are not allowed ('no non-vowel-adjacent (NVA) geminates').

These contextual constraints may need to be more specific than defined here, incorporating information about word position (e.g., *GEM/#GGV, *GEM/VGG#, etc.) or combining with segmental-type constraints (e.g., *GEMOBS/NVA). For present purposes, however, such considerations are left as open questions depending on further evidence.

A universal ranking of these contextual constraints can be established based on the typological and perceptual facts noted earlier, as shown in (5). The constraint against non-vowel-adjacent geminates is ranked the highest, while the constraint against intervocalic geminates is ranked the lowest. This hierarchy of constraints predicts certain implicational universals. Namely, the presence of non-vowel-adjacent geminates in a language implies the presence of one-sided vowel-adjacent geminates, which in turn implies the presence of intervocalic geminates. This is consistent with Thurgood's (1993) conclusion that if a given language allows geminates in any other environment than flanked by vowels, it also necessarily allows them intervocalically.

(5) *Universal ranking of contextual constraints on geminates*

*GEM/NVA	>>	*GEM/1VA	>>	*GEM/V_V
#GGC, CGG#, CGGC		#GGV, VGG#, CGGV, VGGC		VGGV

The only potential counterexamples to this universal ranking are languages which seem to allow word-initial geminates but not medial intervocalic ones, such as Pattani Malay, Iban, Sa'ban (Austronesian), or Nhaheun (Austro-Asiatic) (Blust 1995, 2007, Muller 2001). However, there are independent diachronic factors responsible for the apparent exceptionality of these cases. Initial geminates (or geminates in general) in many Austronesian languages (such as Pattani Malay or Iban) were created by a widespread diachronic process of vowel syncope between two identical consonants, which was motivated by a preference for disyllabic canonical shape (Blust 2007). In Sa'ban, initial geminates arose through a general process of unstressed vowel deletion in penultimate syllables (Blust 2001, 2007). In Nhaheun, on the other hand, most words are monosyllabic, which precludes any generalization concerning possible medial geminates (Muller 2001).

3. The Case of Polish

The proposed contextual constraints in (4) and their ranking in (5) are central to the account of the overall distribution of geminates in Polish, which is shown in the analysis developed in this section.

3.1. Geminates in Polish

Polish has a phonemic distinction between singleton and geminate consonants: e.g., [buda] 'kennel' and [budda] 'Buddha'. There are examples of both 'true' geminates, which are underlyingly long (mostly borrowings from other languages), and of 'fake' geminates, which are derived through certain morphologi-

cal processes (for discussion of geminates in Polish see e.g. Zajda 1977, Rubach 1986, Rubach and Booij 1990, Sawicka 1995, Thurgood 2002).

Geminates in Polish behave fairly typically when compared to other languages in that they are mainly found intervocalically, as shown in (6).

(6) *Intervocalic geminate consonants*

a. *Sonorants*

fɔntanna	'fountain'	ballada	'ballad'
gamma	'gamma'	muwwa	'mullah'
d͡ʑɛŋŋik	'gazette'	xɔrrɔr	'horror'

b. *Obstruents*

gɛttɔ	'ghetto'	pit͡st͡sa	'pizza'
lɛkkɔ	'lightly'	bɛzzasadnɨ	'unreasonable'
ɔddat͡ɕ	'to give back'	lasso	'lasso'

Whenever there is the potential to create a non-intervocalic geminate in Polish (e.g., via affixation), one of the consonants of the would-be geminate is deleted (Rubach and Booij 1990), as shown in (7)-(10). I refer to this deletion process here as *degemination*.

In (7a), single vowel-adjacent geminates could be created by adding the suffix *-nɨ* to stems ending with C*n*. However, degemination applies instead. The comparison examples in (7b) show that deletion does not occur when the stem ends with different consonants. Furthermore, it is even possible to create a geminate, as the example of 'sleep'/'sleepy' illustrates, as long as it is intervocalic.

(7) a. *Degemination postconsonantally*

pʲɛ̃kn-ɔ	'beauty'	pʲɛ̃k-nɨ	'beautiful'	*pʲɛ̃kn-nɨ
kupn-ɔ	'purchase'	pʂɛkup-nɨ	'corrupt'	*pʂɛkupn-nɨ

b. *No deletion*

vɔd-a	'water'	vɔd-nɨ	'aquatic'
vʲɛtʂ-ɛ	'wind' (Loc.)	vʲɛtʂ-nɨ	'windy'
sɛn	'sleep'	sɛn-nɨ	'sleepy'

The same process can be observed in (8a), where preconsonantal geminates are avoided. Note that degemination applies equally to a monomorphemic stem-final geminate [l] and to a potential 'fake' geminate [s] that would be created across an affix boundary. What these two cases have in common is the fact that a geminate is banned due to the presence of an adjacent following consonant. Again, there is no deletion in any other cases, as shown in the comparison examples in (8b).

(8) a. *Degemination preconsonantally*

sɛvill-a	'Seville'	sɛvil-ski	'Sevillian'	*sɛvill-ski
frant͡sus	'Frenchman'	frant͡su-ski	'French'	*frant͡sus-ski

b. *No deletion*

ɛkfadɔr	'Ecuador'	ɛkfadɔr-ski	'Ecuadorian'
sɛrp	'Serb'	sɛrp-ski	'Serbian'

Degemination also occurs word-finally, as shown in (9a). Stem-final geminates surface when followed by a vowel suffix, but degeminate when no (or zero) suffix is present on the stem. The comparison examples in (9b) show that the deletion is not enforced by a ban on word-final coda clusters.

(9) a. *Degemination word-finally*

fɔntann-ɨ	'fountains' (Nom.)	fɔntan	(Gen.)	*fɔntann
flɔtɨll-ɛ	'fleets' (Nom.)	flɔtɨl	(Gen.)	*flɔtɨll
lass-a	'lassoes' (Nom.)	las	(Gen.)	*lass

b. *No deletion of final cluster*

palm-ɨ	'palms' (Nom.)	palm	(Gen.)
ruzg-ɨ	'rods' (Nom.)	rusk	(Gen.)
vaxt-ɨ	'duty watches' (Nom.)	vaxt	(Gen.)

Degemination also optionally applies in the same segmental contexts at clitic and word boundaries (Sawicka 1995:153), as shown in (10a). Although consonant-adjacent geminates are tolerated in these cases, the optional repair available in this context (i.e., degemination) is the same as in all other potential single vowel-adjacent geminates.

(10) a. *Optional degemination*

bɛs+strɔnnɨ	~	bɛ+strɔnnɨ	'impartial'
rɔz+zwɔ͡ɕt͡ɕi͡tɕ	~	rɔ+zwɔ͡ɕt͡ɕi͡tɕ	'to enrage'
kask##kaz̨dɨ	~	kas##kaz̨dɨ	'every helmet'

b. *No deletion*

bɛs+pwt͡ɕɔvɨ	*bɛ+pwt͡ɕɔvɨ	'sexless'
rɔz+gz̨at͡ɕ	*rɔ+gz̨at͡ɕ	'to enrage'
rɔs+sad͡ʑi͡tɕ	*rɔ+sad͡ʑi͡tɕ	'to blow up'

There is, however, one case in which degemination is blocked: word-initial geminates can be formed with monoconsonantal proclitics /v/ and /z/, as illustrated in (11) (voicing assimilation in obstruent clusters is obligatory in Polish; e.g. Bethin 1992). Note that monoconsonantal proclitics differ from other clitics in that they cannot be syllabified separately from its host (Rubach and Booij 1990, Sawicka 1995, Rochoń 2000). This is in contrast to longer proclitics, as in (10), in which the final consonant is never resyllabified to form part of an onset but always remains in coda position.

(11) *Vowel-adjacent initial geminates: no degemination*

/v/+vɔʑit͡ɕ	→	v+vɔʑit͡ɕ	'to carry in'	*Ø+vɔʑit͡ɕ
/v/+fɔtɛlu	→	f+fɔtɛlu	'in an armchair'	*Ø+fɔtɛlu
/z/+zɛ̃bɛm	→	z+zɛ̃bɛm	'with a tooth'	*Ø+zɛ̃bɛm
/z/+sunɔ̃t͡ɕ	→	s+sunɔ̃t͡ɕ	'to slip down'	*Ø+sunɔ̃t͡ɕ

Polish also has four monomorphemic words with initial geminates – three of them affricates – plus a few more forms derived from these: [ssat͡ɕ] 'to suck', [t͡ʂt͡ʂɨ] 'empty', [d͡zʑd͡zʑvɲit͡sa] 'earthworm', and [d͡zʑd͡zʑɨstɨ] 'rainy'. Due to this limited number of examples, I conclude that they are simply exceptions to a ban on monomorphemic word-initial geminates in Polish. This conclusion receives some support from the fact that – in contrast to medial affricate geminates – initial affricate geminates are always pronounced as two separate consonants (Dunaj 1985), which casts some doubt on whether they are in fact geminates.

The final piece of data concerns the fact that word-initial geminates are only tolerated when adjacent to a vowel. Potential preconsonantal initial geminates formed with monoconsonantal proclitics are instead repaired by vowel epenthesis, as shown in (12a). The comparison examples in (12b) show that epenthesis does not apply to simply break a cluster because Polish allows very complex onset clusters.

(12) a. *Potential consonant-adjacent initial geminates: vowel epenthesis*

/v/+vzɛɕɲu	→	vɛ+vzɛɕɲu 'in September'	*v+vzɛɕɲu, *Ø+ vzɛɕɲu
/v/+frunɔ̃t͡ɕ	→	vɛ+frunɔ̃t͡ɕ 'to fly in'	*f+frunɔ̃t͡ɕ, *Ø+frunɔ̃t͡ɕ
/z/+znakʲɛm	→	zɛ+znakʲɛm 'with a sign'	*z+znakʲɛm, *Ø+znakʲɛm
/z/+stazʑɛt͡ɕ+ɕɛ̃	→	zɛ+stazʑɛt͡ɕ+ɕɛ̃ 'to get old'	*s+stazʑɛt͡ɕ+ɕɛ̃, *Ø+stazʑɛt͡ɕ+ɕɛ̃

b. *Potential consonant-adjacent non-geminate cluster: no epenthesis*

z+bzʑdɛ̃kʲɛm	'with a plunk'	*zɛ+bzʑdɛ̃kʲɛm
s+pʂt͡ʂɔwɔ̃	'with a bee'	*zɛ+pʂt͡ʂɔwɔ̃

There is only one exception to this generalization: epenthesis does not apply to the word [s+stɔ̃pit͡ɕ] 'to descend' (plus other paradigmatic variants), a word that has fallen out of use and is used almost exclusively in rote religious contexts (as in 'God descended on earth').

Finally, the reader might be familiar with the fact that Polish proclitics are often assumed to end in an underlying abstract vowel called a 'yer', which is vocalized when followed by an unvocalized underlying yer in the following syllable (e.g., Szpyra 1992). On the surface, yer vocalization appears identical to the process of vowel epenthesis described here. However, the discussed vowel epenthesis is completely independent from the process of yer vocalization since

there are no underlying yers in (the first syllable of) the stems like the ones shown in (12) (see e.g., Rubach 1977, 1985).

The table in (13) summarizes the distribution of geminates in Polish. Intervocalic geminates are allowed, and so are single vowel-adjacent initial geminates when formed with monoconsonantal proclitics. All other would-be single vowel-adjacent geminates undergo degemination, and non-vowel-adjacent geminates – in the one context where they could potentially be created – are repaired by vowel epenthesis.

(13) *Distribution of geminates in Polish*

intervocalic geminates	VGGV	allowed
single vowel-adjacent geminates	#G+GV	allowed
	VGGC CGGV VGG#	degemination
non-vowel-adjacent geminates	#G+GC	epenthesis

3.2. Analysis

I argue that the behavior of geminates in Polish constitutes a classic case of a conspiracy (Kisseberth 1970, Pater 1999). Two processes – deletion and epenthesis – conspire to avoid non-intervocalic geminates.

Only intervocalic geminates seem to be freely allowed in the language. Whenever a geminate would be expected to surface in a non-intervocalic context due to morphological concatenation, degemination takes place instead. However, degemination is blocked whenever – as I assume – it would lead to the loss of the entire proclitic. In these cases word-initial geminates are either tolerated (when prevocalic, or single vowel-adjacent) or repaired by vowel epenthesis (when preconsonantal, or non-vowel adjacent). (Casali (1997:506ff) discusses similar cases in which the result of an otherwise expected vowel deletion process is blocked just in case an entire morpheme would be sacrificed.)

This pattern can be straightforwardly accounted for with the proposed contextual constraints on geminates, defined in (4). Additional constraints necessary for the analysis are shown in (14).

(14) *Informal definitions of additional constrains*

DEP(V)	No vowel epenthesis.
MAX(C)	No consonant deletion (no degemination).
REAL(IZE)MOR(PHEME)	An input morpheme must have some phonological exponent in the output (e.g., Kurisu 2001).

The full OT analysis is provided below. In the tableau in (15), the candidate with an intervocalic geminate (a) surfaces as optimal because other candidates are eliminated by higher-ranked constraints. The degeminated candidate (b) violates

MAX(C), and the candidate with epenthesis (c) violates DEP(V). Therefore, the constraints DEP(V) and MAX(C) must dominate NOGEM/V_V.

(15) *Intervocalic geminates*

/lassɔ/	DEP(V)	MAX(C)	*GEM/V_V
a. → lassɔ			*
b. lasɔ		*!	
c. lasɛsɔ	*!		

The tableau in (16) shows how degemination is enforced in order to avoid a single vowel-adjacent geminate. The degeminated candidate (b) wins because the faithful candidate (a) is eliminated by the higher-ranked constraint NOGEM/1VA. Note that in this case the candidates with epenthesis (in any position) (c-d) are also not possible. This justifies ranking both NOGEM/1VA and DEP(V) above MAX(C).

(16) *Degemination*

/sɛvill-ski/	DEP(V)	*GEM/1VA	MAX(C)	*GEM/V_V
a. sɛvillski		*!		
b. → sɛvilski			*	
c. sɛvilɛlski	*!			
d. sɛvillɛski	*!			*

The tableau in (17) illustrates how degemination is blocked just in case it would lead to the complete loss of a proclitic. The candidate with an initial geminate (a) surfaces as optimal despite violating the constraint NOGEM/1VA because the degeminated candidate (b) is eliminated by REALMOR, while the candidates with epenthesis (c-d) are again eliminated by DEP(V). Thus, the correct result is obtained when both REALMOR and DEP(V) outrank NOGEM/1VA.

(17) *Initial geminates*

/v+vɔʑit͡ɕ/	REALMOR	DEP(V)	*GEM/1VA	MAX(C)	*GEM/V_V
a. → vvɔʑit͡ɕ			*		
b. vɔʑit͡ɕ	*!			*	
c. vɛvɔʑit͡ɕ		*!			
d. ɛvvɔʑit͡ɕ		*!			*

The last case of interest concerns the situation in which a non-vowel-adjacent geminate is avoided through vowel epenthesis. This is shown in the tableau in (18). The candidate with epenthesis (c) is optimal because the faithful candidate with a non-vowel-adjacent geminate (a) is eliminated by NOGEM/NVA, and the degeminated candidate (b) is eliminated by REALMOR. The second-best repair in this case is epenthesis. In order to obtain this result, both NOGEM/NVA and REALMOR have to be ranked above DEP(V). Note also that epenthesizing a vowel immediately after the clitic is optimal because any other epenthesis location (as in (d) and (e)) incurs a violation of NOGEM/1VA in addition to violating DEP(V).

(18) *Epenthesis*

/v+vzɛ̯ɕɲu /		*GEM/ NVA	REALMOR	DEP(V)	*GEM/ 1VA	MAX(C)	*GEM/ V_V
a.	vvzɛ̯ɕɲu	*!					
b.	vzɛ̯ɕɲu		*!			*	
c. →	vɛvzɛ̯ɕɲu			*			
d.	ɛvvzɛ̯ɕɲu			*	*!		
e.	vvɛzɛ̯ɕɲu			*	*!		

The summary of the constraint ranking that accounts for the distribution of geminates in Polish is provided in (19) (overleaf). The non-vowel-adjacent geminates are disallowed due to the high-ranked constraint *GEM/NVA. The repair of vowel epenthesis is enforced by REALMOR which crucially outranks DEP(V). The single-vowel-adjacent geminates undergo degemination, which is assured by ranking *GEM/1VA above MAX(C). The tolerance for single-vowel-adjacent geminates (created with proclitics) in the word-initial position is again enforced by high-ranked REALMOR. Finally, intervocalic geminates are freely allowed due to the low ranking of *GEM/V_V.

4. Conclusion

I have shown that context (defined here as word position & adjacent segments) is an important characteristic of geminates. Based on typological and perceptual evidence, I argued that the constraint against geminates, *GEM, should be split into at least three general contextual constraints: *GEM/NVA >> *GEM/1VA >> *GEM/V_V. Finally, I showed how these constraints correctly account for the distribution of geminates in Polish.

(19) *Constraint ranking responsible for the distribution of geminates in Polish*

<table>
<tr><td>non-vowel-adjacent geminates</td><td>#G+GC</td><td>epenthesis</td><td rowspan="3">*GEM/NVA REALMOR
DEP(V)
*GEM/1VA
MAX(C)
*GEM/V_V</td></tr>
<tr><td rowspan="2">single vowel-adjacent geminates</td><td>VGGC
CGGV
VGG#</td><td>degemination</td></tr>
<tr><td>#G+GV</td><td rowspan="2">allowed</td></tr>
<tr><td>intervocalic geminates</td><td>VGGV</td><td></td></tr>
</table>

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As-ing

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1. Niching

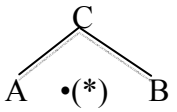
This paper concerns the syntax of tensed *as*-clauses of the type shown in (1):

(1) •(ok) No •(*) man •(??) can •(ok) pat •(?) a •(*) cat, *as I can a dog*.

Externally, this clause behaves like a type of sentence adverb (others are *possibly, perhaps, allegedly, I think, etc.;* and *you know*, *said Ed*, *not to put too fine a point on it*, *how can I explain it to you*, *worse luck*, etc.), and can be inserted (between commas) at those places in (1) marked by '•,' the resulting grammaticality being shown by the following parenthesized symbol. This characterization is criminally overgeneral; while the first four of these adverbs can be sandwiched between commas or not, the last five, which are underlined, require surrounding commas, as do *as*-clauses themselves.

And there are many further differences in distribution among what are all optimistically lumped together under the term "sentence adverbs." However, if we say that Niching, the rule that inserts these adverbs in various places in a clause, can only insert them in *niches,* then we might begin to broad-brushly characterize the distribution of these niches as in (2).

(2) Niches do not appear between any left branch of a constituent and a following branch of that constituent. Graphically,



This restriction blocks sentence adverbs from appearing in any of the environments in (3a-g).

(3) *Nichabilities*

a. Determiner •(*) N	(**They tore many, worse luck, hotels down.)*
b. Article •(*) N	(**The, worse luck, cats started to fight.)*
c. Adjective •(*) N	(**If red, worse luck, spots get on this, I quit.)*
d. P •(*) NP	(?**I talked to, worse luck, the kids about you.)*
e. Adverb •(*) Adjective	(**My pad got rather, worse luck, dingy.)*
f. Adverb •(*) V	(??*He often, worse luck, yodeled after dinner.)*
g. Adverb •(*) PP	(**It fell right, worse luck, near the bed.)*

Further, there are no niches in NPs, though there are niches between verbs and (some of) the types of objects of these verbs, as we see from the contrasts in (4).

(4)
a. He relied, not to put too fine a point on it, on astrology.
b. *His reliance, not to put too fine a point on it, on astrology cost him a promotion.
c. She shoved the fork (, allegedly,) into the socket.
d. Her shove of the fork (?, allegedly,) into the socket was poorly planned.
e. ?*The piece(,) perhaps(,) of pork was delicious.
f. ??A piece(,) perhaps(,) of pork would make the stew tastier.
g. ?*Somebody(,) possibly(,) drunk may sing.
[NB: ≠ Somebody drunk may possibly sing.]
h. They tore the contract (?, allegedly,) up.
i. Irv wants to keep Giselle (*, allegedly,) company.
j. They sat (*, allegedly,) in on the seance.
k. They sat in (, allegedly,) on the seance.

This characterization of the distribution of *as*-clauses *in their own clauses*, in terms of niches, rough though it be, will have to do for the moment.

2. External Syntax

2.1. The Originating Clauses of *as*-clauses

I postulate the existence of an optional deletion rule, called <u>*As*-ing</u>, which operates to delete the main verb of a finite *as*-clause, under identity with the main verb of the clause immediately to the left of the clause (which I will refer to as "the originating clause of the *as*-clause," for reasons which will become clear below). Thus (5a) becomes (5b), and (5c) becomes (5d).

(5)
a. I have played **chess**, as Al has played **checkers**.
b. I have played **chess**, as Al has, —— **checkers**.
c. I am playing **chess**, as Al is playing **checkers**.
d. I am playing **chess**, as Al is, —— **checkers**.

Note the contrastive direct objects, which must receive emphatic stress (indicated by boldfacing). The contrasting subjects must also receive contrastive stress, but I will leave them unmarked, for I am here more interested in what happens after the verb. Note also the comma after the tensed verbs in (5b) and (5d): For me, there must be a rising intonation just before the pause which, signified by the "——," marks the site of the deleted main verb.

In the case of a simple present, (6a), we might assume a remote structure containing the classic empty verb *do*. I do not wish to enter the lists about how the appearance and disappearance of this little verb is to be orchestrated; (6a) obligatorily becomes (6b).

(6) a. I do play **chess**, as Al does play **checkers**.
b. I do play [> play] **chess**, as Al does(,) —— **checkers**.

In the case of sequences of auxiliary verbs, the following types can show up.

(7) a. I have been playing **chess**, as Al has been playing **checkers**.
b. ?I have been playing **chess**, as Al has been, —— **checkers**. ≤
c. I have been playing **chess**, as Al has, —— **checkers**.

(8) a. I may have been playing **chess**, as Al may have been playing **checkers**.
b. ?I may have been playing **chess**, as Al may have been, —— **checkers**. ≤
c. I may have been playing **chess**, as Al may have, —— **checkers**. ≤
d. I may have been playing **chess**, as Al may, —— **checkers**.

(9) a. Al may have been being followed **by the NSA**, as Jo may have been being followed **by the FBI**.
b. *Al may have been being followed **by the NSA**, as Jo may have been being, —— **by the FBI.**
c. Al may have been being followed **by the NSA**, as Jo may have been, —— **by the FBI**.
d. Al may have been being followed **by the NSA**, as Jo may have, —— **by the FBI**.
e. Al may have been being followed **by the NSA**, as Jo may, —— **by the FBI**.

The generalization here seems fairly clear: The rule that optionally deletes the main verb under identity can also optionally delete preceding auxiliary verbs under identity, by a process which takes first the rightmost shared auxiliary, and then moves successively to the left. There is one wrinkle that requires comment: If the passive past participle is preceded by *being*, when that past participle is deleted, the deletion of *being* is not optional but instead obligatory, as we see from *(9b). The sequence *being* + *passive past participle* is special in a number of ways, some of which are mentioned in Ross (1991).

But now let us examine what would happen in the case of an *as*-clause whose object was not in contrast with the object of the originating clause. Such a sentence is in (10a). If *As*-ing applies, the ungrammatical *(10b) results, and if the rightmost identical auxiliary is also deleted, *(10c) results.

(10) a. I have been eating pizza, as he has been eating [pizza/it].
b. *I have been eating pizza, as he has been, —— [pizza/it].
c. *I have been eating pizza, as he has, —— [pizza/it].

I propose that here, a mopping-up rule applies, which deletes (usually obligatorily), any non-contrastive post-verbal element in the *as*-clause. There are conditions on this mopping up which I will not go into here; some of the relevant facts are displayed in (11).

(11) a. I have sent money to **Jan**, as he has sent money to **Hella**.
b. I have sent money to **Jan**, as he has, —— ([??money/*it]) to **Hella**.
c. I have sent **money** to Jan, as he has sent **books** to [her/>?Jan].
d. I have sent **money** to Jan, as he has, —— **books** ([?to her/??Jan]).
e. I have sent **Jan** money, as he has sent **Hella** *(money).
f. ??I have sent **Jan** money, as he has, —— **Hella** ([*money/***it]).
g. I have sent Jan **money**, as he has sent ([her/≥?Jan]) **books**.
h. ?I have sent Jan **money**, as he has, —— ([**her/** Jan]) **books**.

2.2. Parallels With and Differences From Gapping

One fact to take note of in (11) is the general unacceptability (except for ?/??(11d)) of *As*-ed sentences in which more than one constituent follows the deletion site. I would like to call attention here to a striking similarity between the above facts and the behavior of the rule of Gapping (cf. Ross 1971, Hankamer 1979). This rule, which only operates in coordinate structures, elides the verb(s) of the second clause under identity with the verb(s) of the first clause. In (12), I have presented sentences highly similar to the *As*-ing examples of (11) to highlight the similarities of *As*-ed and gapped clauses.

(12) a. I have taken money to **Jan**, and he has taken money to **Hella**.
b. I have taken money to **Jan**, and he —— ([??money/*it]) to **Hella**.
b′. I have taken money to **Jan**, and he —— (%taken) ([money/it]) to **Hella**.
c. I have taken **money** to Jan, and he has taken **books** to Jan.
d. I have taken **money** to Jan, and he —— **books** (to her).
d′. ?*I have taken **money** to Jan, and he —— (%taken) **books** (to her).
e. I have taken **Jan** money, and he has taken **Hella** money.
f. ??I have taken **Jan** money, and he —— **Hella** ([*money/***it]).
f′. ?*I have taken **Jan** money, and he —— (%taken) **Hella** ([money/***it]).
g. I have taken Jan **money**, and he has taken Jan **books**.

h. ?I have taken Jan **money**, and he —— ([** Jan/**her]) **books**.
h′. ?*I have taken Jan **money**, and he —— (%taken) ([Jan/her]) **books**.

The examples in (12 b′, d′, f′ and h′) are less than wildly popular, but there are people who can use gapping to delete only partially a string of identical verbs (deleting only the tense-bearing first auxiliary). Leaving undeleted a past participle is the least popular of all such undeletions. In (13), I have cited examples with undeleted present participles and even bare verbs, which seem easier to stomach than the examples in (12) with undeleted past participles..

(13) a. I am taking money to **Jan**, and he is taking money to **Hella**.
b. I am taking money to **Jan**, and he —— ([??money/*it]) to **Hella**.
b′. I am taking money to **Jan**, and he —— (?taking) ([money/it]) to **Hella**.
c. I am taking **money** to Jan, and he is taking **books** to Jan.
d. I am taking **money** to Jan, and he —— **books** (to her).
d′. I am taking **money** to Jan, and he —— (??taking) **books** (to her).
e. I am taking **Jan** money, and he is taking **Hella** money.
f. ?*I am taking **Jan** money, and he —— **Hella** ([*money/***it]).
f′. ??I am taking **Jan** money, and he —— (??taking) **Hella** *([money]).
g. I am taking Jan **money**, and he is taking her **books**.
h. ?I am taking Jan **money**, and he —— ([** Jan/**her]) **books**.
h′. ?I am taking Jan **money**, and he —— (??taking) (*her) **books**.
i. He will play some Beethoven, and she —— (?play) some Vivaldi.
j. He may have seen her, and she —— ((?have) seen) him.

I have not done a detailed study of the circumstances under which such undeletings are acceptable, and I will leave the matter for future researchers to investigate.

It is sometimes claimed that in a gapped clause, no more than one contrasted constituent can follow the deletion site. But while it is clear that there are robust inequalities between the sentences in (14) (the notation "X ≥ Y," makes the claim that no speaker will find Y to be more grammatical than is X. (Cf. Ross 1987, 2000 for discussion):

(14) a. ??He sent **Jan money**, and she —— **Tom books.** << (14b)
b. ?He sent **me money,** and I —— **him books**
c. He sent Jan **money**, and she —— —— **books**. >> (14a)

With respect to the inequality linking (14a) and (14b), while very few speakers can swallow anything like (14a), when there is morphological/case information that indicates clearly the role of the first post-gap NP (as there is in ?(14b), a few more speakers can tolerate the structure. And while a claim that there can be no sentences with two post-gap constituents would be overly restrictive, it is equally clear that the inequality (14b) >> (14c) is easily confirmed.

Finally, it is also the case that sentences in which two NPs without preceding prepositions follow the gap are by far the most heavily dispreferred by speakers, as we see from the inequality in (15).

(15) a. ??He sent **me money** and I —— **him books.** <<
b. He sent **money** to **me** and I —— **books** to **him.**

But finally, when it is the case that one or both of the post-gap constituents are adjuncts, and are not in the argument structure of the verb, as is the case in (16),

(16) a. He orders **lasagna** when it rains, and she —— **gnocchi** when it snows.
b. He works **in LA in the summers**, and she —— **in NY in the winters**.

many speakers find such sentences acceptable.

The reason that this discussion is relevant for present purposes is that inspection of the sentences in (11) reveals that also *as*–clauses in which there are more than one argument following the deletion site left by *As*-ing are not acceptable to many speakers. The worst case would be a sentence such as ?*(17b), which is the result of *As*-ing a structure like that underlying (17a). As ??(17c) shows, even replacing the first two NPs in (17b) with case-marked pronouns can only improve this structure slightly.

(17) a. Todd sent Alice flowers, as Alice sent Todd love poems.
b. ?*Todd sent Alice flowers, as Alice did, ___ Todd love poems. <
c. ??We sent him flowers as he did, ___ us love poems.

The point of this discussion is that the restrictions on sequences of constituents that follow the verb-deletion site left by the application of *As*-ing closely resemble the restrictions on the types of post-deletion constituents in gapped structures.

Another strong parallel between *As*-ing and Gapping concerns the behavior of Gapping as it applies to sentences whose verbs are followed by a direct object (whose thematic role is that of a Gruberian Theme) and a directional particle (which, following an insightful proposal of Fraser (1976), should derive from a reduced directional phrase). Thus a structure like that underlying (18a) would be converted into (18b) under Fraser's analysis. Following the ellipsis of the two PPs whose object is *place*, the remaining particles, *in* and *out*, can be moved leftwards to follow the verb *bring*. As we see from *(18e), gapping is only possible when the post-gap constituents appear in their underlying order – direct object + reduced directional phrase.

(18) a. I will bring **the wine in (to some place$_i$)**, and he will bring **the beer out (from that place$_i$)**.
b. I will bring **the wine in**, and he will bring **the beer out**.

c. I will bring **the wine in**, and he —— **the beer out**.
d. I will bring **in the wine**, and he will bring **out the beer**.
e. *I will bring **in the wine**, and he —— **out the beer**.

As far as I know, no explanation is currently available for the difference between (18c) and *(18e). What is of great relevance for the analysis of *as*-clauses is that the same asymmetry appears in parallel *As*-ing clauses, as we see in (19).

(19) a. I will bring **the wine in**, as he will bring **the beer out**.
b. I will bring **the wine in**, as he will, —— **the beer out**.
c. I will bring **in the wine**, as he will bring **out the beer**.
d. *I will bring **in the wine**, as he will, —— **out the beer**.

In trying to find a more general constraint which might cover the parallels between (18) and (19), I have noticed that in some cases, inverting the order of post-verbal arguments of some verbs blocks both Gapping and *As*-ing, as we see in (20) and (21),

(20) a. I painted an old pickup truck red.
b. I painted red an old pickup truck.
c. *I painted red an old pickup truck, and he —— blue an old trailer.
d. I painted red an old pickup truck, as he painted blue an old trailer.
e. ?*I painted red an old pickup truck, as he did, —— blue an old trailer.

(21) a. I kicked the left door shut and he kicked the right door open.
b. I kicked shut the left door and he kicked open the right door.
c. *I kicked shut the left door and he —— open the right door.
d. I kicked shut the left door, as he kicked open the right door.
e. *I kicked shut the left door, as he did, —— open the right door.

It might look as if it were only when the argument that comes to immediately follow the deletion site is only "a single word" that the Gapping and *As*-ing must be blocked. This would account for why the sentences in (22) are somewhat better than are *(18d) and *(19d),

(22) a. ??I will bring **into the hall the wine**, as he will, —— **out of the hall the beer**.
b. ?*I will bring **into the hall the wine**, and he —— **out of the hall the beer**.

but it is a hollow "victory," for adding *wide* as a left modifier of *open* in *(21c,e) does nothing to improve it, and nor would modifying *out* with *right* produce a fully acceptable sentence in *(18d) and *(19d), as we see in (23):

(23) a. *I kicked shut the left door and he —— wide open the right door. (cf. *(21c))
b. *I kicked shut the left door, as he did, —— wide open the right door. (cf. *(21e))
c. *I will bring **in the wine**, and he —— **right out the beer**. (cf. *(19d))
d. *I will bring **in the wine**, as he will, —— **right out the beer**. (cf. *(20d))

I conclude that whatever constraint it is that makes *(18d) and *(19d) ungrammatical has yet to be discovered. However, the fact that they do exhibit such a striking parallel provides strong evidence for the correctness of analyzing *As*-ing as a transformation which parallels Gapping, in that both rules delete a verb (or verbs) under identity with another verb in a separate clause. I surmise too, that when the confused facts presented in (11)-(17) are understood better than I have been able to thus far, they too will point to a verb-deletion analysis for both Gapping and *As*-ing.

A word is in order about how the two verb deletion transformations differ with respect to the treatment of auxiliaries. In a way, they are complementaries: As we see in (11), Gapping requires that the auxiliary bearing the tense be deleted – this has happened in (11b′, d′, f′ and h′). I have not conducted a survey to establish what percentage of speakers accept this kind of gapping, but my impression is that it is a tiny minority at best. Thus for these speakers, only the gappings in (11b, d, ??f, and ?h) are acceptable, and all of these are worsened if repeated elements remain in the gapped sentences, as I have tried to indicate by the asterisks inside the parentheses in these examples. The default rule for gapping for the largest dialect of English, as far as I know, is that the gap must contain the main verb and all preceding identical auxiliary verbs, and that the post-gap part of a gapped clause should contain just one contrastively stressed element. Furthermore, it is definitely preferred for any repeated (and therefore non-contrastive) elements in the gapped clause to be deleted.

Thus (24a) is preferred to (24b),

(24) a. I will be **writing** and he —— **reading**. >>
b. *I will be **writing** and he —— be **reading**.

and (25a) to (25b) and (25c),

(25) a. I will be writing **novels** and he —— **letters**. ≥
b. ?I will be writing **novels** and he —— writing **letters**. >>
c. *I will be writing **novels** and he —— be writing **letters**.

and (26a) to (26b),

(26) a. I wrote **letters** to them and she —— **cards**. ≥
b. I wrote **letters** to them and she —— **cards** (?to them).

and (26b) to (27),

(27) I wrote **letters to him** and she —— **cards to them**.

and (27), with its post-gap sequence of a NP and a PP, is far preferable to (28), with its post-gap sequence of two NPs.

(28) I wrote him **letters** and she —— (?*him) **cards**.

It would take me too far from our main topic to go into further details about Gapping, or in fact to point out all of the parallels between these gapping facts and the *As*-ing facts that we see in comparing (11) and (12).

Summing up, however, what we notice in the gappings of two clauses with multiple auxiliaries, while the zeroing of all repeated auxiliaries and the main verb is what would make most speakers the happiest, there are speakers who allow progressively greater subsequences of the repeated auxiliaries to remain, starting from the those closest to the main verb – cf. (29).

(29) a. Jo could have been being followed by the CIA, and
Al could have been being followed by the NSA.
b. Jo could have been being followed by the CIA, and
Al —— by the NSA.
c. Jo could have been being followed by the CIA, and
Al —— followed by the NSA.
d. Jo could have been being followed by the CIA, and
Al —— being followed by the NSA.
e. Jo could have been being followed by the CIA, and
Al —— been being followed by the NSA.
f. Jo could have been being followed by the CIA, and
Al —— have been being followed by the NSA.

By contrast, if we look at a parallel initial *as*-clause-containing sentence, and pay attention to the variants it offers, we see a reverse pattern emerging:

(30) a. Jo could have been being followed by the CIA, as
Al could have been being followed by the NSA.
b. *Jo could have been being followed by the CIA, as
Al could have been being —— by the NSA.
(Cf. the comment on the ungrammaticality of *(9b) above)
c. Jo could have been being followed by the CIA, as
Al could have been —— by the NSA.
d. Jo could have been being followed by the CIA, as
Al could have —— by the NSA.
e. Jo could have been being followed by the CIA, as
Al could —— by the NSA.

The strange complementarity of these two processes is brought into focus in the following brief statement:

(31) In Gapping, at least the auxiliary bearing the tense morpheme must be deleted; in *As*-ing, at least this morpheme must be retained.

There is another mysterious difference between these two deletion processes: Gapping operates only between two or more adjacent coordinate clauses; *As*-ing requires only that the clause whose main verb (and optionally, some number of preceding identical auxiliaries) are optionally deleted (I will refer to this clause as *the target clause*) be in the same island as the originating clause, as I will demonstrate in Section 3.

3. The Islandmate Condition

In the examples considered thus far, the *as*-clause has contained only one subordinate clause (the target clause), which, if it bore the requisite structural parallels to the originating clause (whose dominating sentence node immediately dominated the *as*-clause), could have its verb deleted by the rule of *As*-ing. This is the case for (32a); in (32b), *As*-ing has deleted the shared main verb *wash*, and the mopping up rule has deleted *the cats*.

(32) a. [I will wash the cats, [as Jo will wash the cats]$_{S2}$]$_{S1}$ →
b. [I will wash the cats, [as Jo will ——]].

But in (33), we see that another sentence intervenes between originating clause and target clause:

(33) a. I will wash the cats, [as Al knows [that Jo will wash the cats]$_{S2}$]$_{Sa}$]$_{S1}$ →
b. [I will wash the cats, [as Al knows [that Jo will ——]].

And in (34), a second sentence has been interposed:

(34) a. [I will wash the cats [as everybody says [that Al knows [that Jo will wash the cats]$_{S2}$]$_{Sb}$]$_{Sa}$]$_{S1}$ →
b. [I will wash the cats, [as everybody says [that Al knows [that Jo will ——]].

Clearly, there is no limit to the number of such interpositions. And yet originating clause and target clause must be in the same island (for a definition of this term, cf. Ross (1986, Chapter 6)). The sentences in (35) violate this *island-mate condition*, for various types of island-forming nodes; all are ungrammatical.

(35) a. *[I will wash the cats, [as Al knows a man [who will ——]].
(a violation of the Complex NP Constraint)

b. *[I will wash the cats [as Al likes me and knows [that Jo will ——]].
(a violation of the Coordinate Structure Constraint)
c. *[I will wash the cats, [as [that Jo will ——] might upset Tim].
(a violation of the Sentential Subject Constraint)

Technically, of course, the sentences S_2, S_a and S_b are not in the same island as the elements dominated by the *as*-clause, because adverbial subordinate clauses are themselves islands. But for ease of exposition, I will disregard this point.

In summary, let me make one point of theoretical interest. In order for the rule of *As*-ing, as I have formulated it, to apply, it must inspect some originating clause (this is easy to find: An originating clause will have an *as*-clause adjoined to it), and then must be able to proceed indefinitely far down into this *as*-clause to find a possible target clause. If the target clause matches it in structure sufficiently, which is not the case in (36) – (if *As*-ing were to apply to (36a), the ungrammatical (36b) would result),

(36) a. [I will wash the cats [as the cats will be washed by Jo]$_{S2}$]$_{S1}$ →
b. *[I will wash the cats [as the cats will (be) —— by Jo]].

then the deletion of the identical verb in the *as*-clause may proceed.

This seems to me to be an unusual way for the notion of constraints on extraction to enter into a syntactic process. The *search for a comparable clause* is what is here subject to extraction constraints – though nothing is being extracted. And the search is catalyzed by the presence of *as*, a conjunction, a word to which nothing happens. It just sits there and sops up the milk.

However, it is putting it way too mildly to merely say that this is an unusual way for an extraction constraint to apply: The constraints suggested in Ross (1986) do not constrain optional deletion transformations such as VP Deletion – nor will they constrain the similar rule of *As*-ing. The grammaticality of the sentences in (37), which are grammatical with or without the struck-through phrases,

(37) a. The bowler who won last week met a bum who didn't (~~*win last week*~~).
(To delete the italicized phrase, VP Deletion will have to "violate" the Complex NP Constraint)
b. If you enter, I will swallow my pride and try to (~~*enter*~~) also.
(To delete the italicized phrase, VP Deletion will have to "violate" the Coordinate Structure Constraint.)

given the ungrammaticality of the sentences in (35), thus leaves us in a quandary. Some recasting of the conditions specifying what types of syntactic operations are subject to island constraints will have to be formulated. However, at present, it is completely unclear to me how this should be attempted.

I will end with one more parallel between Gapping and *As*-ing: As is well known, *as*-clauses exclude negatives (cf. (38a)), as does Gapping – cf. (38b).

(38) a. I am rich, as my neighbors (*don't) know.
b. I (*don't) like pizza, and Bill ___ lasagna.

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Arab American Ethnicity and the Northern Cities Shift*

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0. Introduction

Sociolinguists have a tradition of studying the social patterning of phonetic variation to understand how sound changes spread through different kinds of speakers and communities. While the bulk of these studies has been on language use and variation among speakers of white ethnicity, a significant amount of work has also focused on minority speakers (particularly African Americans), and sociolinguists continue to expand the breadth of their research on the linguistic practices of ethnic minorities in the United States. Yet, large gaps in the study of widespread, regional linguistic phenomena remain; we still know little about how and to what extent ethnic minorities use linguistic variables of regional sound changes that are often (implicitly and explicitly) associated with white speakers (Fought 2002:457). Labov's (1994:508) assertion that ethnic minority speakers do not participate in mainstream sound changes has also shaped research in this area to some extent. Though early studies of ethnic minority speakers gave evidence that they were not using the variables of mainstream sound changes, Fought (2002:457) observes that these early findings have been over-generalized and have at times led to an assumption that no ethnic minorities use variables of mainstream sound changes. Several studies, however, show complex relationships between the ethnic identity of speakers' language variation (e.g. Fought 1999, Mendoza-Denton 1997), suggesting that the intersection of regional sound change and ethnicity is in fact a fruitful site of research.

This paper presents findings from a study of Arab American high school students in Southeastern Michigan. I examine their use of two vocalic variables associated with the Northern Cities Shift, a widespread, regional set of vowel changes. My findings show that the variation of these two variables is linked to local distinctions within the ethnic category of Arab American.

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1. Background

Research for this study took place during the 2006-2007 school year at Mercer High School in Dearborn, MI, a suburb of Detroit.[1] Dearborn, where Arab Americans make up about 30% of the city's 130,000 residents (U.S. Census Bureau 2003), serves as a social, political, and cultural hub for the large and diverse Arab American community in Southeastern Michigan. Mercer High School's school district does not keep official demographic records of the Arab American population, as Arab American students are classified racially as white. But administrators, teachers, and students all suggest that at least 85-90% of Mercer's 2,400 students are Arab American (less than 2% of students are African American; the rest are white/European American).

There are many signs of Arab (and Muslim) culture at Mercer, which are closely intermingled with the day-to-day practices of any typical American high school. Girls in headscarves (about half the female students) wear Detroit Pistons basketball jerseys and letterman's jackets. During Ramadan, the month of fasting in Islam, classrooms are made available for fasting students who do not want to go the cafeteria; yet, fasting football players still show up to team practice and to games. Chicken shawarma is served alongside pizza in the cafeteria.

In addition to these non-linguistic signs, Arabic language is also used regularly. Signage at the school (e.g. for visitor parking) is often in both English and Arabic. Many teachers, administrators, and students all regularly use Arabic, and several Arabic words have entered into the vocabulary of all students (e.g. *wallah* 'I swear'), not just those who speak Arabic fluently. Noor, a 17-year-old Iraqi senior, explains that someone who is "such an Arab" would "probably say...'wallah' or 'bro' or 'cuz' after every word", suggesting that the stereotype of an Arab at Mercer uses both Arabic and English slang.[2] The word *cuz* also highlights a running joke that all Arabs at Mercer and in Dearborn are related. As Reem, a Lebanese student, says about Dearborn:

> You can walk into a place and know people. You feel like everybody is your family. (.) Most of the time everybody in Dearborn is your family but otherwise (.5) because a lot of us Lebanese people have a lot of cousins.

Reem's quote also equates "everybody in Dearborn" with "Lebanese people". This temporary erasure of non-Lebanese Arabs (and non-Arabs) in Dearborn is not uncommon among Lebanese students. The demographics of the Arab American students at Mercer reflect those of the city. Most of Dearborn's Arab American population is an established, economically successful Lebanese Muslim

[1] Mercer High School and all participant names are pseudonyms.

[2] Students, whether born in the U.S. or abroad, regularly used *Arab* and *Arabic* to refer to their ethnicity. I use *Arab American* in part to follow other labels for ethnic minorities (e.g. *African American*, *Asian American*), but this does not align with local labels used by students. Future work will further address this issue.

community, but recent waves of migration from the Middle East have brought Iraqi refugees of the two Gulf Wars and families from Yemen, Palestine, Jordan, and Syria. Alex, a U.S.-born Syrian student, observed:

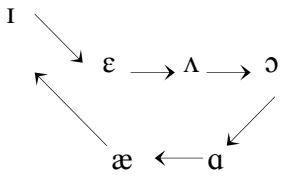
> Most of the school, their nationality is Lebanese. So they place theirself as higher class than like Iraqis and Yemenis…They think they're like the cool ones. Cause it's like the most populated here. You don't see much attraction. The Iraqis and the Yemenis they're always looked down on. Who are you? You're garbage.

Alex's description highlights divisions between the Lebanese students and the Iraqi and Yemeni students, and suggests a hierarchy in which Lebanese students are in a dominant position within the school. Alex's observations are similar to those of other students and to my own observations during my visits to the school. On more than one occasion I saw Lebanese students vehemently object to being categorized as anything other than Lebanese. These hierarchical divisions based on local, within-ethnic category distinctions may play an important role in the social landscape of the school and thus the social variation of linguistic variables.

2. The Linguistic Variables

I examine two vocalic variables: the raising of /æ/ and the backing of /ɛ/. Both of these variables are part of the set of sound changes known as the Northern Cities Shift (NCS). The NCS, shown in figure (1), is associated with speakers in urban and suburban areas stretching from the Mississippi River to New England (Labov 1994). The shift is well-studied, particularly among white speakers, in the urban centers of Detroit, Buffalo, and Chicago (e.g. Labov, Yaeger, and Steiner 1972, Gordon 2001).

(1) Diagram of the Northern Cities Shift vowel shifts (Labov 1994:191)



Studies of the NCS have linked it to a variety of social dimensions, including community size and location, social class, gender, and ethnicity. Here, I focus on findings related to gender and ethnicity, though it is important to note that these findings often intersect with other social factors (and with each other).

Research in sociolinguistics suggest that women tend to lead men in the use of new or innovative variants of sound change variables (Labov 2001), and studies on the NCS variables among white speakers tend to confirm this finding. Gordon's (2000) study of the NCS in two small towns in Michigan finds that women lead men in four out of six NCS variables (/ɪ, æ, ɑ, and ɔ/). Herndobler's

(1993) study of working-class speakers in Chicago shows that women lead men in /æ/-raising, which she argues is linked to the community's working-class norms and expectations, women's jobs in nearby more affluent towns, and gender-differentiated interests in preserving cultural norms. Eckert's (2000) study of high school students in suburban Detroit shows that use of NCS variables is linked to both gender and a local identity distinction between Jocks and Burnouts, where Burnout girls use the most extreme NCS variants to index an urban and working-class identity, but Jock girls lead in use of variables associated with the suburban and institutional identities supported by the school.

Other studies have examined speakers' ethnic identity in relation to the NCS variables. Knack (1991) investigates /ɔ/-backing among Jewish and non-Jewish speakers in Grand Rapids, MI, and finds a strong correlation between the Jewish participants' network ties to a geographically-distant and ethnically-like community in New York City and their use of backed (non-NCS) variants of /ɔ/. Non-Jewish participants, who don't have ties to New York City, have overall more /ɔ/-fronting, characteristic of the NCS. In Gordon's (2000) study of three NCS variables (/æ, ɑ, and ɛ/) in white, Mexican American, African American, and mixed-ethnicity speakers in Indiana, he finds that the NCS is not very well-established in this region, and that, to the extent the NCS is present, it is still generally restricted to the white speakers in his study. Fought (2006:145-146), however, argues that Gordon's generalization about the speakers obscures variation among individual speakers. She notes that several of the mixed-ethnicity speakers and one of the Mexican American speakers use NCS variants at rates comparable to the white speakers. Roeder's (2006) study of Mexican Americans in Lansing, MI, show age and gender differentiation within the community. She finds that younger women produce more fronted variants of /æ/ than other participants in the study, while patterns for three other NCS vowels (/ɛ, ɔ, and ɑ/) do not show significant use of NCS variants.

These studies suggest that both gender and ethnicity are likely to be relevant to understanding the social variation of NCS variables. Based on past findings, we might expect the female students to lead male students in use of the NCS variants, and we might also expect an overall picture of Arab American students to show little use of NCS variables. I consider the effects of gender on the variation of two linguistic variables, which I discuss below. I also examine briefly the effects of Arab American ethnicity, but my analysis focuses on intra-ethnic distinctions between Lebanese and non-Lebanese students, based on the findings from interviews and ethnographic observations that this distinction is socially salient for students.

3. Data and Methods

The data for this study come from sociolinguistic interviews of 15 students at Mercer High. Interviews took place in a small carpeted room at the high school and were recorded on a steady-state digital recorder. A baseline speaker, a native of a nearby Detroit suburb whose data also come from a sociolinguistic interview,

is included to provide a reference point for the NCS. The table in (2) provides basic demographic information about the 16 speakers.

(2) Information about speakers

Speaker	Gender	Nationality	Age at time of Immigration
Aisha	F	Jordan	1
Alex	M	Syria	US-born
Asad	M	Lebanon	US-born
Bilal	M	Lebanon	US-born
Dee	F	Iraq	2
Hamze	M	Lebanon	US-born
Jamil	M	Lebanon	US-born
Lina	F	Sierra Leone	6 months
Noor	F	Iraq	1
Rasim	M	Lebanon	US-born
Reem	F	Lebanon	US-born
Shadya	F	Lebanon	US-born
Zahrah	F	Lebanon	US-born
Zeinab	F	Lebanon	US-born
Baseline	F	n/a	US-born

As close to 30 tokens as possible of each vowel were extracted using the Praat acoustic analysis application (http://www.fon.hum.uva.nl/praat/). Measurements of the first and second formants were taken at the midpoint of each token's vowel nucleus, and these measures were normalized using Lobanov's formula, which minimizes differences between speakers due to vocal tract size while preserving differences based on social factors (see Adank, Smits, and van Hout (2004) for further discussion).[3] All statistical tests are performed on normalized data. For /æ/-raising, I look at measures of F1, the acoustic correlate of vowel height; for /ɛ/-backing, I look at F2 measures, the acoustic measure which corresponds to the front-back vowel dimension.

4. Results

4.1. Overview

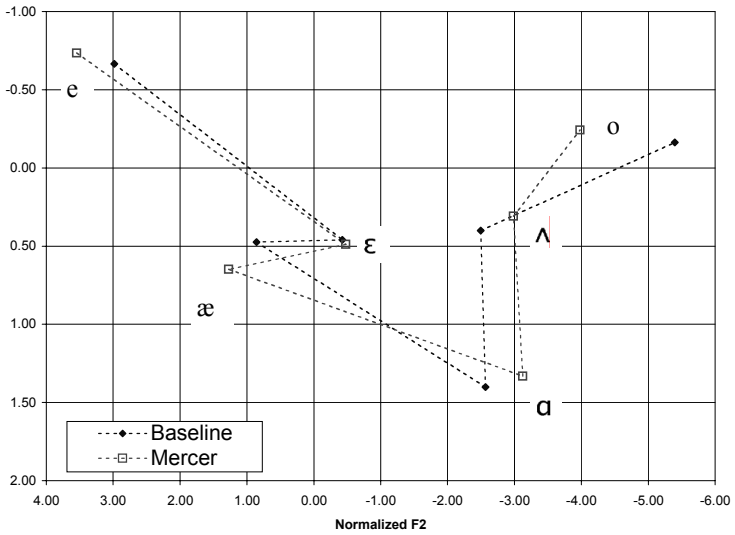
An initial comparison between the students at Mercer and the baseline speaker provides information about the presence of the NCS in the Mercer students' data. Figure (3) provides an overview of part of the vowel space (including four other vowels to provide context and relative positioning). As the figure shows, the overall pattern for the average Mercer speaker is quite similar to the baseline

[3] Lobanov's formula: normalized $F_n = (F_{ni} - \mu_i)/\delta$, where *n* is the formant number (F1 or F2), μ is the mean value of the relevant formant frequency for all vowels in speaker *i*'s vowel system, and δ is the standard deviation of that same mean formant (μ_i). Normalization included measures from up to 30 tokens of /i, e, æ, ɛ, u, o, ʌ, ɑ/ to balance out the vowel space.

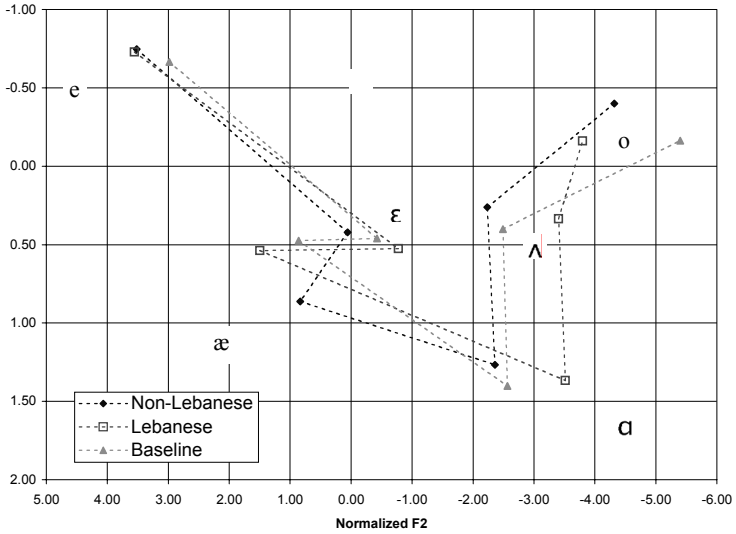
speaker; /æ/ is raised (relative to /ɛ/ and to /ɑ/) and /ɛ/ is backed (relative to /e/ and to /æ/).

Differences emerge, however, when Lebanese and non-Lebanese speakers are separated, as shown in Figure (4). While the Lebanese speakers' /æ/-raising and /ɛ/-backing still look quite similar to the baseline speaker, the non-Lebanese speakers' /æ/ and /ɛ/ averages pattern quite differently. For the non-Lebanese speakers, their average /æ/ does not appear to be nearly as raised as either the Lebanese speakers' average or the baseline speaker's average, and /ɛ/ is not as far back as either the Lebanese speakers' average or the baseline speaker's average. Results of statistical tests on these differences are discussed below.

(3) Average formant values for all speakers and baseline speaker



(4) Average formant values for Lebanese and non-Lebanese speakers



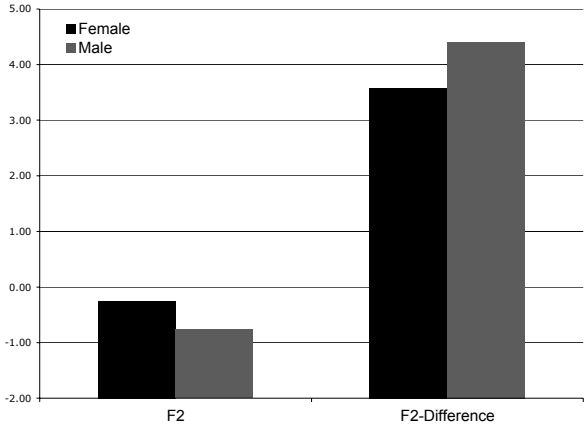
4.2. /ɛ/-backing

Two measures are used to assess the backing of /ɛ/: the F2 of /ɛ/ and the difference measure between the F2 of /ɛ/ and the F2 of /e/, since /e/ is relatively stable within the vowel systems of speakers in the NCS region.

Figure (5) shows the two measures (F2 and F2-difference) for males and females. U-test results (see figure (6) for details) showed significant differences between males females for both the F2 of /ɛ/ (p=.001) and the F2-difference measure (p=.000). As figure (5) indicates, males had a greater F2-difference and smaller F2 values, both of which suggest that the males in this study have an /ɛ/ that is, on average, farther back than that of the females.

Results of a u-test (see Figure (8) for details) comparing Lebanese and non-Lebanese students were significant for both the F2 (p=.000) and the F2-difference measure (p=.000). Lebanese speakers, as shown in Figure (7), have an overall smaller F2 and a greater F2 difference, both suggesting that their /ɛ/ variants are on average farther back than the non-Lebanese students.

(5) F2 and F2-difference measures for /ɛ/-backing by speaker gender

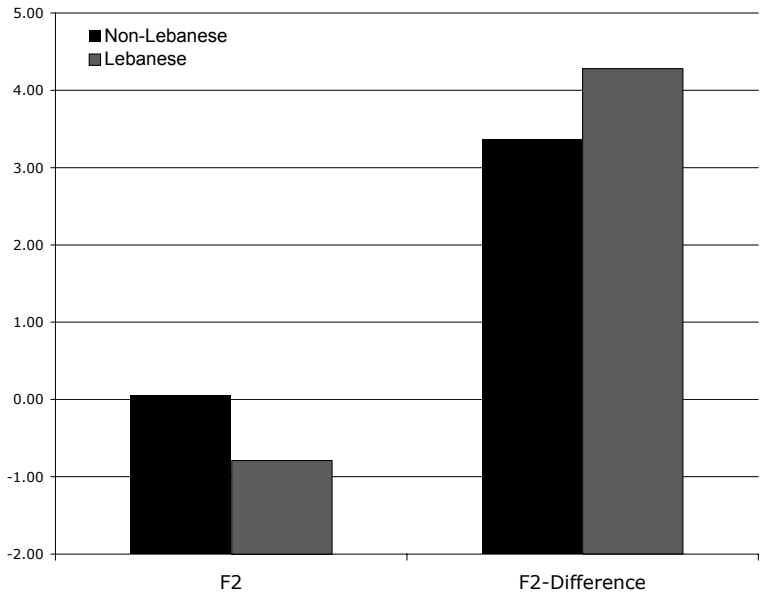


(6) U-test results for /ɛ/-backing in male and female speakers

	Gender	N	Mean Rank	Sum of Ranks
F2	Female	261	256.48	66941.00
	Male	214	215.46	46109.00
	Total	475		
F2-Difference	Female	261	206.11	53796.00
	Male	214	276.89	59254.00
	Total	475		

	F2	F2-Difference
Mann-Whitney U	23104.000	19605.000
Significance (2-tailed)	.001	.000

(7) F2 and F2-difference measures for /ɛ/-backing for Lebanese and non-Lebanese speakers.



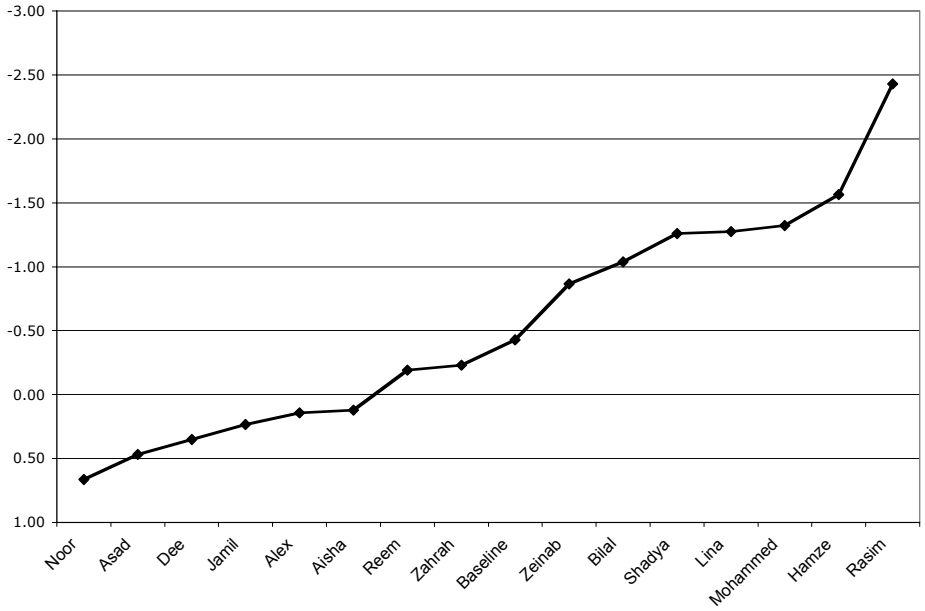
(8) U-test results for /ɛ/-backing in Lebanese and non-Lebanese speakers

		N	Mean Rank	Sum of Ranks
F2	Lebanese	305	209.95	64034.00
	Non-Lebanese	170	288.33	49016.00
	Total	475		
F2-Difference	Lebanese	305	265.55	80994.00
	Non-Lebanese	170	188.56	32056.00
	Total	475		

	F2	F2-Difference
Mann-Whitney U	17369.000	17521.000
Significance (2-tailed)	.000	.000

Figure (9) gives the average F2 of /ɛ/, arranged from the speaker with least backed /ɛ/ to the most backed speaker. The non-Lebanese speakers tend to be at the left, or least backed, end of the graph, while the speakers at the right, or most backed, end of the graph are Lebanese. The baseline speaker is roughly in the middle of the speakers, suggesting that some of the Lebanese speakers have /ɛ/ variants that are more backed than even the baseline speaker. Though the gender differences are statistically significant, a similar kind of clustering is not apparent (e.g., the female students are not clustered at the left end of the graph).

(9) Average F2 of /ɛ/ by speaker, including baseline speaker.



4.3. /æ/-raising

To investigate /æ/-raising, I also used two measures: the Fl of /æ/ and an F1-difference measure (between the F1 of /e/ and of /æ/), to again get a measure of relative raising. U-tests (see figure (10) for details) on the two /æ/ measures between female and male students showed no significant differences (for F1, p= .533; for F1-difference, p=.456) between the two groups (to save space, figures of these non-significant differences are not included). Between Lebanese and non-Lebanese students, a u-test showed significant differences between the two groups for both the F1 of /æ/ (p=.000) and the F1-difference (p=.000). Lebanese students' /æ/ is, on average, more raised than the non-Lebanese students' /æ/, as shown in Figure (11).

(10) U-test results for /æ/-raising in Lebanese and non-Lebanese speakers.

		N	Mean Rank	Sum of Ranks
F2	Lebanese	366	305.08	111660.00
	Non-Lebanese	188	223.80	42075.00
	Total	554		
F2-Difference	Lebanese	366	252.99	92593.00
	Non-Lebanese	188	325.22	61142.00
	Total	554		

	F2	F2-Difference
Mann-Whitney U	24309.000	25432.000
Significance (2-tailed)	.000	.000

(11) F1 and F1-difference of /æ/ for Lebanese and non-Lebanese students.

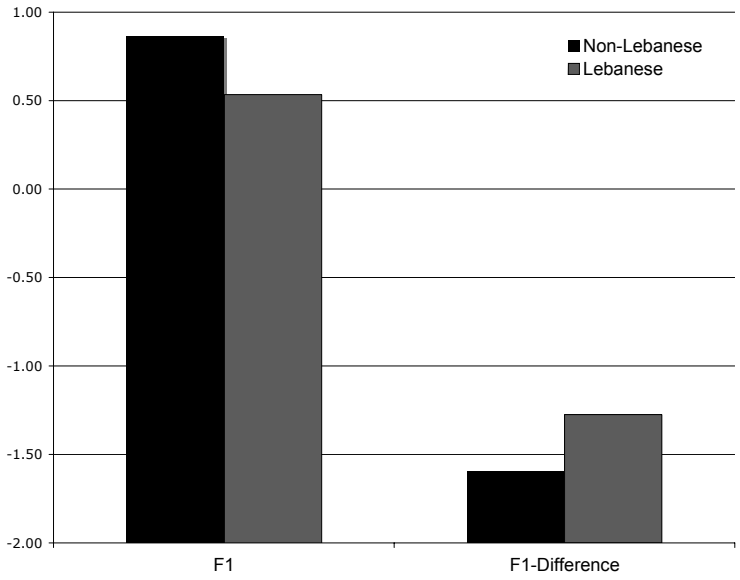
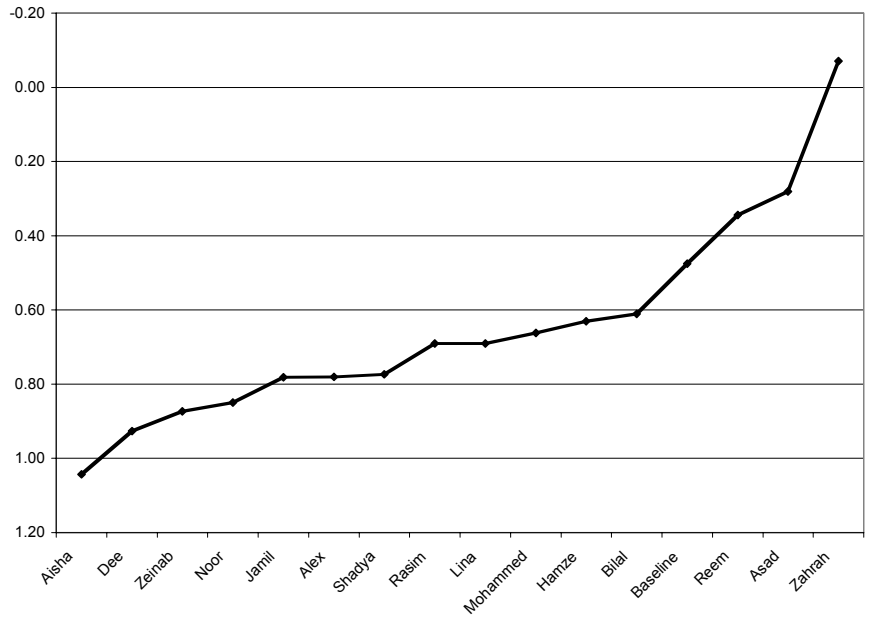


Figure (12) shows the F1 of /æ/ from most raised (the lowest F1) speaker to least raised (the highest F1). Non-Lebanese speakers are clustered at the right end (least raised) end of the graph, as they were with /ɛ/-backing.

(12) Average F1 of /æ/ by speaker, inlcuding baseline speaker.



5. Discussion and Conclusion

The results of this study show significant differences between men and women for /ɛ/-backing, in which men appear to be leading women in /ɛ/-backing. There are no significant differences between men and women in /æ/-raising. Average F2 values of /ɛ/ for individual speakers do not indicate a clear division between men and women. I plan to further investigate these differences by considering the effects of individual speakers on the overall variation, and the interaction of gender with other social factors such as use of Arabic, religious practice, and community orientation.

The results also show that a local distinction within Arab ethnicity, between Lebanese and non-Lebanese students, is related to differences in both /æ/-raising and /ɛ/-backing. Minority speakers' use of NCS-variants is often framed as "participation" in or accommodation to mainstream (or white) linguistic patterns (Labov 2001, Gordon 2000, Roeder 2006), which implies that these variants are somehow inherently or essentially linked to white speakers. But, as Fought (2006:149) argues, based on her research on Southern California Latino speakers' use of features associated with California vowel shifts, ethnic minorities can and do use these so-called mainstream features to convey social meaning that is locally understood, and which, crucially, is not tied to affiliation with white ethnicity.

This study demonstrates the importance of accounting for intra-ethnic distinctions that do not usually get addressed in studies on language and ethnicity (Fought 2006: 148). A study that simply compares Arab American speakers to white speakers would not reveal variation tied to intra-ethnic distinctions. The findings of this study suggest that Arab American speakers use linguistic resources of the NCS to index differences among themselves. This use by Arab American speakers of NCS variables to mark an intra-ethnic distinction, supported by testimony about these distinctions by speakers themselves, challenges the prevalent view of the NCS as a mainstream sound change associated with white norms and practices. I do not suggest that Arab Americans are "participating" in the norms of the white mainstream. The students at Mercer High School see their world as primarily Arab, referring to their school as "all Arab", or referring to Dearborn as "Arabtown". In this context, an analysis that takes for granted the presence of a dominant white culture that minority speakers can "accommodate" to is misguided. Rather, the symbolic resources of NCS variation are available to all speakers in the NCS region, not just white speakers, and as such, can be used to index a variety of social dimensions.

The findings of this study are the first step in my analysis and future analysis will take into account linguistic factors (e.g. vowel duration and following phonological context) known to have an effect on vocalic variation. I will also consider additional social dimensions (e.g. age at time of immigration, level of religious practice, Arabic language use) and the interaction between them.

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Investigating an Asymmetry in the Semantics of Japanese Measure Phrases*

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0. Introduction

It is often claimed that in Japanese when a measure phrase combines directly with an adjective, it has only a differential interpretation, with a contextually determined standard (Snyder et al. 1995; Schwarzschild 2005; Kikuchi 2006; Nakanishi 2007; Hayashishita 2009), as in the following examples:

(1) a. Kono tana-wa 2-meetoru takai.
This shelf-TOP 2-meter tall
'This shelf is 2 meters taller.'
NOT: 'This shelf is 2 meters tall.'

b. Kono roopu-wa 5-inchi nagai.
This rope-TOP 5-inch long
'This rope is 5 inches longer.'
NOT: 'This rope is 5 inches long.'

c. Kinoo-wa 5-do atataka-katta.
Yesterday-TOP 5-degree warm-PAST
'It was 5 degrees warmer yesterday.'
NOT: 'It was 5 degrees warm yesterday.'

Note that in the above examples, there is no comparative morpheme like English *-er/more*.

Although this observation about Japanese is correct, we find that Japanese does give rise to a 'direct measurement' reading in certain environments, e.g.:

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(2) a. Kono sao-wa 5-do magat-teiru.
This rod-TOP 5-degree bend-PERF
'This rod is 5 degrees bent.'
NOT: 'This rod is 5 degrees more bent.'

b. Kono fusuma-wa 3-senti ai-teiru.
This sliding door-TOP 3-centimeter open-PERF
'This door is 3 centimeters open.'
NOT: 'This door is 3 centimeters more open.'

c. Pisa-no syatoo-wa 3.97-do katamui-teiru.
Pisa-GEN leaning tower-TOP 3.97-degree incline-PERF
'The Leaning Tower of Pisa is 3.97 degrees inclined.'
NOT: 'The Leaning Tower of Pisa is 3.97 degrees more inclined.'

Whereas in (1), the combination of a measure phrase with a gradable predicate results in an obligatory differential interpretation, (2) shows the opposite patterning: only the direct interpretation is available. The purpose of this paper is to propose a formal semantics that captures the asymmetry between (1) and (2) in a principled way, and to compare the phenomenon to similar data in other languages.

Svenonius and Kennedy (2006) argue that measure phrases are introduced by a special degree morpheme *Meas*. We propose that unlike English, Japanese has two morphemes, $MeasJP_{dir}$ and $MeasJP_{diff}$: one for direct measurement and one for differential measurement. We then claim that $MeasJP_{dir}$ has a stronger selectional restriction than English *Meas*. $MeasJP_{dir}$ selects only for absolute gradable adjectives that have a well-defined zero point (in the sense of Kennedy 2007). $MeasJP_{diff}$, on the other hand, measures the interval between the target and a contextually determined standard. We further argue that $MeasJP_{dir}$ and $Meas_{JPdiff}$ are in complementary distribution and the choice between them is governed by Kennedy's (2007) principle of Interpretive Economy. We also consider cases where measure phrases occur in comparative constructions with an overt standard of comparison and show that our analysis trivially derives the right semantics for such constructions: $MeasJP_{dir}$ is automatically selected in such cases because a standard of comparison always introduces a well-defined absolute point.

The main theoretical implication of our proposal is that the interpretation of measure phrases in Japanese is sensitive to the scale structure of gradable adjectives, and that the difference between Japanese and English can be captured as a matter of variation in the inventory of *Meas* heads. At the end of the paper we also show that the proposed inventory of *Meas* heads predicts a third kind of system which is borne out in Spanish, Korean, and Russian.

1. Previous Analyses of Japanese Measure Phrases

As stated above, in previous literature it is claimed that when a measure phrase combines directly with an adjective in Japanese, it has only a differential interpretation, with a contextually determined standard (Snyder et al. 1995;

Schwarzschild 2005; Kikuchi 2006; Nakanishi 2007; Hayashishita 2009), as in the examples in (1) above.

To explain the obligatory differential reading for sentences like (1), Hayashishita (2009), following similar proposals in Fukui (1986) and Snyder et al. (1995), claim that AdjP in Japanese lacks the specifier position that hosts a degree variable:

(3) a. English
$[_{AdjP}$ _ $[_{Adj'}$ A]]

b. Japanese
$[_{AdjP}$ A]

In Hayashishita's system, measure phrases in Japanese can combine with gradable adjectives only through the mediation of covert morphology that gives rise to a differential interpretation.

In a different vein, Kikuchi (2006) attempts to derive the facts from the proposal that degree constructions give rise to a default comparative meaning in languages that do not have an overt morphological contrast between positive- and comparative-form adjectives. Since Japanese lacks an overt comparative morpheme like English *-er*/*more*, the default comparative value is chosen when a measure phrase is present.

An empirical shortcoming of both approaches is that neither considers examples like those in (2) above which show that Japanese does allow direct measurement in certain environments.[1] The goal of the rest of this paper is to develop an account of Japanese measure phrases that overcomes this difficulty.

2. Theoretical Background

In this section we introduce some theoretical tools that will give us a starting point for analyzing the Japanese data. Following Bartsch and Vennemann (1973), Kennedy (1999, 2007), and other work, we take gradable adjectives to denote functions of type <ed>; i.e., they are measure functions which take an individual and return a degree:

(4) [[tall]] = λx.**TALL**(x)

[1] There is a tendency for the predicates that give rise to a direct measurement reading to be deverbal, as signaled by their use of the perfective morpheme *-teiru* (see also footnote 2), and in this sense might be considered not true 'adjectives' and hence outside the empirical scope of these previous treatments. However, as the following example shows, the (non-deverbal) adjective *hayai* 'fast' gives rise to direct measurement as well:

(i) Kono tokai-wa 2-fun hayai.
This clock-TOP 2-minute fast
'This clock is 2 minutes fast.' NOT: 'This clock is 2 minutes faster.'

Thus the asymmetry between (1) and (2) is not entirely traceable to the categorial status of the gradable predicate. See also Schwarzschild (2005) on the semantics of *late/early*.

One consequence of this analysis is that bare predicative adjectives must co-occur with a null morpheme *pos* which is what gives them their positive interpretation relative to some context. A semantics for *pos* is given in (5), with a sample derivation in (6). As we see here, *pos* takes a gradable adjective measure function and an individual as its two arguments, and it orders the individual on the scale associated with the adjective relative to some contextually determined standard.

(5) $[[_{\text{Deg}}\ pos]]^c = \lambda g_{<e,d>}\lambda x.g(x) > d_{s(g)(c)}$

(6) [[John is tall]] = [[*pos*]]([[tall]])([[John]])
= $\lambda g_{<e,d>}\lambda x.g(x) > d_{s(g)(c)}$ (tall)(John)
= $\text{TALL(John)} > d_{s(\text{tall})(c)}$
'John's height is greater than a contextually determined standard.'

See Kennedy (2007) for a fuller exploration of the semantics of *pos*.

In some cases, a gradable adjective can combine directly with a degree-denoting measure phrase:

(7) John is four feet tall.

Note that (7) does not entail *John is tall*, indicating that *pos* is not involved in such cases.

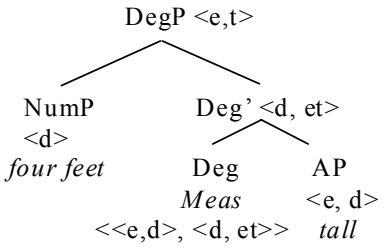
An important fact about measure phrases is that there is lexical idiosyncrasy in their distribution. In English, for example, they are compatible with *tall* but not with *heavy* even though both adjectives are associated with scales amenable to numerical measurement:

(8) *This book is [two pounds heavy].

This is a matter of crosslinguistic variation: German *schwer* 'heavy', e.g., is compatible with a measure phrase, as is Italian *pesante* 'heavy' (Schwarzschild 2005).

In part to account for this lexical idiosyncrasy, Svenonius and Kennedy (2006) propose that measure phrases are introduced by a special Deg head *Meas*, with the syntax as in (9) and semantics as in (10):

(9)



(10) $[[Meas_{Eng}]] = \lambda g_{<e,d>}$: g is a function from objects to measurable degrees $\lambda d \lambda x.g(x) \geq d$

$Meas_{Eng}$ can combine only with (a subset of) gradable adjectives that are associated with a measurable scale. Thus, it is compatible with the adjectives like *tall* but not with adjectives like *tired* for which no system of measurement is defined. (7) is thus computed as follows:

(11) [[John is four feet tall]] = [[*Meas*]]([[tall]])([[four feet]])([[John]])
$= \lambda g \lambda d \lambda x.g(x) \geq d$ ([[tall]])([[four feet]])([[John]])
$=$ TALL(John) $\geq$ 4 ft.
'John's height is greater than or equal to four feet.'

The lexical idiosyncrasy is captured as a matter of selectional restriction: In English, for example, *Meas* does not select for *heavy* whereas in German and Italian, it does. See Svenonius and Kennedy (2006) for details of this proposal.

3. Analysis of Japanese Measurement System

3.1. Direct Measurement in Japanese

We propose that as in English, Japanese also has a morpheme *Meas*, but it has a stronger selectional restriction: $Meas_{JPdir}$ can combine only with measurable adjectives having a well-defined absolute point (zero point) such as *bent* and *open*:

(12) a. $[[Meas_{Eng}]] = \lambda g_{<e,d>}$: g is a function from objects to measurable degrees $\lambda d \lambda x.g(x) \geq d$

b. $[[Meas_{JPdir}]] = \lambda g_{<e,d>}$: g is a function from objects to measurable degrees and **g has a well-defined absolute point** $\lambda d \lambda x.g(x) \geq d$

Here we can interpret having a "well-defined absolute point" as being a lower-closed scale. According to Kennedy (2007), lower-closed scale (or minimum standard) adjectives "simply require their arguments to possess some minimal degree of the property they describe" (p. 21). One empirical test for this property is that lower-closed scale adjectives are generally felicitous with *partially* whereas lower-open scale adjectives are not (Rotstein and Winter 2004):

(13) a. ??John is partially tall.
b. ??The rope is partially long.
c. ??The weather is partially warm.

(14) a. The rod is partially bent.
b. The door is partially open.
c. The tower is partially inclined.

In Japanese (and English), lower closed scale adjectives are also discernible based on entailment patterns: In (15), the negation of a lower-closed scale adjective entails its antonym, whereas in (16) the negation of a relative gradable adjective does not:

(15) (Entailment patterns of a lower-closed scale adjective)
a. Kono sao-wa magat-tei-**nai**. => b. Kono sao-wa masugu-da.
This rod-TOP bend-PERF-NEG This rod-TOP straight-PRED
'This rod is not bent' 'This rod is straight.'

(16) (Entailment patterns of a relative gradable adjective)
a. Taro-wa se-ga takaku-**nai**. ≠> b. Taro-wa se-ga hikui.
Taro-TOP height-NOM tall-NEG Taro-TOP height-NOM short
'Taro is not tall.' 'Taro is short.'

Because Japanese *magat-teiru* 'bent' is a lower-closed scale adjective, it has a well-defined zero point and hence is compatible with $Meas_{JPdir}$, thus correctly predicting the meaning in (17).[2]

(17) Kono sao-wa 5-do magat-teiru.
This rod-TOP 5-degree bend-PERF
'This rod is 5 degrees bent.'
NOT: 'This rod is 5 degrees more bent.'

Japanese *takai* 'tall', on the other hand, has no well-defined absolute point and thus does not express direct measurement when combined with a measure phrase, unlike its English counterpart:

(18) a. This shelf is 2 meters tall. (English)
b. Kono tana-wa 2-meetoru takai. (Japanese)
This shelf-TOP 2-meter tall
'This shelf is 2 meters taller.'

A key point is that when an **upper**-closed scale adjective like *simat-teiru* 'closed' combines with a measure phrase, the resulting sentence is odd (cf. Kubota 2009):[3]

[2] One might object here that because *magat-teiru* 'bent' consists of a verbal root *maga* 'bend' and perfective morpheme *-teiru*, (17) and the other examples in (2) are actually resultative constructions that do not involve adjectival predication at all. While we agree that *5 do magat-teiru* 'five degrees bent' could be analyzed in such a way, something would still need to be said about how the degree semantics associated with *5 do* '5 degrees' combines with the resultative predicate, and so $Meas_{JPdir}$ would still be applicable. See, among others, Oda (2005) for a semantics for *-teiru*. A direction for further research is to investigate the important relation between *-teiru* and scale structure.

[3] Note that if we add an additive particle *moo* 'additionally/more' (e.g. *moo 2-meetoru*), the sentence can be interpreted as having a differential interpretation.

(19) ??Kono fusuma-wa 3-senti simat-teiru. (cf. 2b)
This sliding door-TOP 3-centimeter close-PERF
NOT: 'This door is 3 centimeters closed.'
NOT: 'This door is 3 centimeters more closed than a contextually determined standard.'

Upper-closed scale adjectives have a well-defined absolute point, namely, a maximum point. Therefore, in principle, they combine with $Meas_{JPdir}$. However, since a maximum point cannot be a starting point in an upward directed scale, the resulting interpretation is infelicitous.

3.2. Differential Measurement in Japanese

In order to derive the correct interpretation of sentences like (20), we propose that unlike English, Japanese has another degree morpheme $Meas_{JPdiff}$ that is used for differential measurement:

(20) Kono tana-wa 2-meetoru takai.
This shelf-TOP 2-meter tall
'This shelf is 2 meters taller.'

(21) $[[Meas_{JPdiff}]] = \lambda g_{<e,d>}\lambda d\lambda x.\ g(x) - g(s) = d$ (where s is a contextually determined object)

$Meas_{JPdiff}$ introduces a contextually determined standard from which a new zero point is defined so that the measurement is computable.

We further propose that $Meas_{JPdir}$ and $MeasJP_{JPdiff}$ are in complementary distribution and the choice between them is governed by the following economy principle:

(22) *Interpretive Economy*: Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions. (Kennedy 2007:36)

This economy principle requires that if a given adjective has a well-defined absolute point, $Meas_{JPdir}$ should be used, since this morpheme relies on the zero point (absolute point) associated with the adjective (conventional meaning) to compute the measurement rather than introducing a contextual standard.

An advantage of positing $Meas_{JPdiff}$ is that we do not need to posit a null comparative morpheme MORE in the semantics of (20). This would be problematic given that the equivalent of (20) without a measure phrase cannot mean 'this shelf is taller': Only in the presence of an overt measure phrase is there a differential interpretation.

3.3. Semantics of Comparatives with Measure Phrases

In a regular Japanese comparative construction, the standard of comparison is introduced by *yori*, and an optional measure phrase measures the gap between the subject and the standard of comparison:

(23) a. Kono tana-wa ano tana-yori (2-meetoru) takai.
This shelf-TOP that shelf-than 2-meter tall
'This shelf is 2 meters taller than that shelf.'

b. Kono sao-wa ano sao-yori (5-do) magat-teiru.
This rod-TOP that rod-than 5-degree bend-PERF
'This rod is 5 degrees more bent than that rod.'

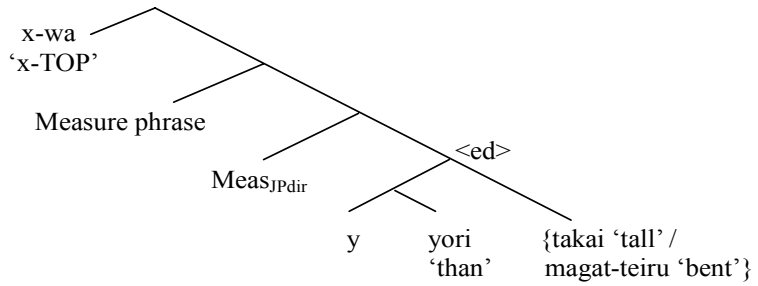
Following Kennedy and Levin (2008) and Kennedy and McNally (2005), we adopt the idea that the function of comparative morphology is to turn a basic measure function into a difference function with a scale whose minimal element – the "derived zero"- corresponds to the degree introduced by the comparative standard. Thus we posit the following denotation for *yori*:

(24) $[[\text{yori}]] = \lambda x \lambda g_{<e,d>} \lambda y . g_{g(x)}{}^{\uparrow}(y)$

Here, *yori* takes an entity *x* and a gradable adjective *g* as arguments and returns a function $\lambda y . g_{g(x)}{}^{\uparrow}(y)$ which maps entities to a derived scale $g_{g(x)}{}^{\uparrow}$. The starting point of the derived scale corresponds to the degree introduced by the comparative standard *x*.

A consequence of this analysis is that like morphologically bare adjectives, comparative adjectives are type <e,d>. Since a standard of comparison provides a well-defined zero point, comparative constructions with a measure phrase **always** use $Meas_{JPdir}$ regardless of the scale structure of the adjective itself, as in (25):[4]

(25)

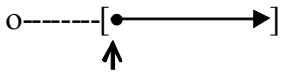


[4] We acknowledge Kubota (2009) for suggesting the application of Kennedy and Levin's (2008) semantics of comparatives to Japanese comparatives with measure phrases. Kubota (2009) does not posit $Meas_{JPdir}$ but his analysis uses the semantics of *yori* in (24).

Note: We assume here that at LF, the measure phrase precedes the standard of comparison (Kubota 2009). In syntax, it can also appear following the *yori* phrase.

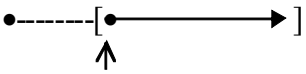
(26) shows the scale structure of *takai* 'tall' and *magat-teiru* 'bent' graphically. Although 'tall' has an undefined zero point and 'bent' has a well-defined zero point as indicated by o and • respectively, the crucial insight is that both take on a well-defined derived zero point when a standard of comparison is introduced:

(26) a. *takai* 'tall':



derived zero point is well-defined

b. *magat-teiru* 'bent':



derived zero point is well-defined

4. Theoretical Implications and Typological Investigation

In our analysis, the difference between Japanese and English is captured via cross-linguistic variation in the inventory of *Meas* heads:

(27) $[[Meas_{Eng}]] = \lambda g_{<e,d>}$: g is a function from objects to measurable degrees $\lambda d \lambda x.g(x) \geq d$

(28) a. $[[Meas_{JPdir}]] = \lambda g_{<e,d>}$: g is a function from objects to measurable degrees and **g has a well-defined absolute point** $\lambda d \lambda x.g(x) \geq d$

b. $[[Meas_{JPdiff}]] = \lambda g_{<e,d>} \lambda d \lambda x.$ max g(x) – max g(s) = d (where s is a contextually determined object)

Whereas English $Meas_{Eng}$ allows measurement from an undefined zero point for certain adjectives such as *tall*, in Japanese, $Meas_{JPdir}$ and $Meas_{JPdiff}$ conspire to disallow measurement from an undefined zero point. A prediction of this $Meas_{JPdir}$ / $Meas_{JPdiff}$ "lexical split" approach to Japanese measure phrase semantics is that we might find other languages that have only one of these two lexical items. Indeed, this prediction bears out: We find languages that are just like Japanese except that they only have $Meas_{JPdir}$ and not $Meas_{JPdiff}$.

Spanish disallows measure phrases with open-scale adjectives (29), but allows them in comparative constructions and with adjectives that have a well-defined absolute point (30):

(29) *Pedro es un metro alto. (open-scale)
Pedro is one meter tall

(30) a. Pedro es un metro **más alto** (que Jorge). (lower-closed scale)
Pedro is one meter more tall than Jorge
'Pedro is one meter taller (than Jorge).'

b. Esta varilla está **doblada** noventa grados. (lower-closed scale)
This rod is bent ninety degrees
'This rod is ninety degrees bent.'

c. El reloj está **adelantado** cinco minutos. (lower-closed scale)
the clock is early five minutes
'The clock is five minutes fast.'

Korean behaves the same way:

(31) *i kenmwul-un sip mite **khu**-ta. (open-scale)
this building-TOP ten meter tall-DECL
Intended: 'This building is 10 meters tall.'

(32) a. i kenmwul-un sip mit **te** **khu**-ta. (lower-closed scale)
this building-TOP ten meter more tall-DECL
'This building is ten meters taller.'

b. i hwoychori-nun i-to (cengto) **hwies**-ta. (lower-closed scale)
this rod-TOP two-degree about bent-DECL
'This rod is (about) two degrees bent.'

c. i sikyey-nun o pwun **pparu**-ta. (lower-closed scale)
this clock-TOP five minute fast-DECL
'This clock is five minutes fast.'

Russian also exhibits this patterning:

(33) *On dva metra **vysokij**. (open-scale)
he two meters tall
(Matushansky 2002:241)

(34) a. On na metr **vyshe** (Billa) (lower-closed scale)
he by meter high.MORE Bill.GEN
'He is one meter taller (than Bill).'

b. Etot prut **pognut** na p'at' gradusov. (lower-closed scale)
this rod bent by five degrees
'This rod is five degrees bent.'

c. Eti chasy **speshat** na p'at' minut. (lower-closed scale)
This clock hurries by five minute
'This clock is five minutes fast.'

The generalization is that in Spanish, Korean and Russian, a measure phrase can combine with a gradable predicate just in case there is a well-defined zero point; otherwise, the result is ungrammatical. This fact follows from the proposal that these languages have one *Meas* morpheme corresponding to Japanese $Meas_{JPdir}$, and it suggests the following implicational universal in the inventory of *Meas* heads:

(35) $Meas_{JPdiff} > Meas_{JPdir}$

In addition to accounting for the above patterning, (35) derives Schwarzschild's (2005) generalization that every language that allows measure phrases with positive-form adjectives allows them with comparatives but not vice versa.

5. Conclusions

This paper proposed a semantics that captures an asymmetry in the semantics of Japanese measure phrases. We proposed that unlike English, Japanese has two *Meas* morphemes, $Meas_{JPdir}$ for direct measurement and $Meas_{JPdiff}$ for differential measurement. $Meas_{JPdir}$ has a stronger selectional restriction than English *Meas* in that it selects only for absolute gradable adjectives with a lower closed scale. $Meas_{JPdir}$ and $Meas_{JPdiff}$ are in complementary distribution and the choice between the two morphemes is governed by the principle of Interpretive Economy.

The theoretical implication of this proposal is that the interpretation of measure phrases in Japanese is sensitive to the scale structure of gradable adjectives and the difference between Japanese and English can be captured as a matter of variation in the inventory of *Meas* heads. Spanish, Korean and Russian represent a third cross-linguistically available option. They are just like Japanese except that they only have $Meas_{JPdir}$.

One direction for future study is to investigate the relationship between *Meas* head inventory and overt comparative morphology. English, Spanish, Korean and Russian all have overt comparative morphology, and all were analyzed as having only one *Meas* head. Japanese, on the other hand, does not have overt comparative morphology,[5] and was analyzed as having two *Meas* heads. Thus there may be a correlation between the presence/absence of overt comparative morphology and the richness of the inventory of *Meas* heads in a given language.

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A Modal Approach to Open Questions

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0. Introduction

Received wisdom holds that questions, themselves lacking truth conditions, should be analyzed in terms of the propositions that count as answering the question. The literature on interrogatives often focuses on *informative* and *polar* questions which ask for a specific piece of information or a *yes-no* answer respectively (see for example Hamblin 1958, 1973; Karttunen 1977; Groenendijk and Stokhof 1982, 1984). These accounts more or less agree that a question denotes its true and complete answer, either as a partition of logical space (Groenendijk and Stokhof 1984), or as a set of propositions (Karttunen 1977).

In this paper I am concerned with a different kind of question, the class of *open questions*, like the ones in (1a) – (d).

(1) a. How do you feel?
b. What is Chicago like?
c. What do you make of Paris Hilton?
d. What is the effect of the stimulus plan on the economy?

Open questions display a number of properties that are different from other question types that make a formal analysis along the lines of the traditional accounts difficult. As Groenendijk and Stokhof (1997) have also noted, open questions do not seem to fit the picture drawn by various accounts of interrogatives, as answering an open question appears to be a creative process, where the answers are not pre-set, or exhaustive. They further note that it often does not make sense to qualify them as 'true' or 'false' but rather 'good,' 'helpful,' and so on (p. 55-56). To illustrate the difference between open and informative questions consider the two questions in (2). While (1a) is an informative question seeking a particular piece of information, (2b) very intuitively asks for an opinion, or a comment of some sort. Crucially, the answer is relative to the speaker, and there is no obvious sense in which an answer to such a question can be exhaustive.

(2) a. Who lives in Chicago?
b. What is living in Chicago like?

My goals in this paper are three-fold. First, I will show that the semantic analyses of interrogatives available do not account for data from open questions. In particular, I will be concerned with the observation that unlike informative questions, answers to open questions are agent-relative and non-exhaustive, and that the propositions in the answer space are non-mutually exclusive. Second, I propose an account of open questions using insights from modal semantics (Kratzer 1977, 1981), which builds directly on Karttunen's (1977) analysis and maintains the intuition that questions denote their true and complete answer. Finally, I show that this account is easily extendable to other problematic and unproblematic question types, moving toward a unified theory of questions. The proposed analysis has at its core the intuition that open questions merit a semantic analysis in their own right, one that incorporates concepts from pragmatics and discourse, rather than marginalizing the semantics for problematic cases by appealing to various extra-semantic components.

I will proceed as follows: Section 1 presents some background on the semantics of interrogatives. In section 2 I review the crucial data from open questions that seem to defy the conclusions of previous analyses. A formal framework and its extensions are laid out in section 3. Section 4 concludes.

1. Background on the Semantics of Interrogatives

Semantic accounts of interrogatives fall into two main camps: those that view questions as denoting sets of propositions and those that hold that questions denote a singe proposition corresponding to a partition of logical space.

1.1. Questions as Sets of Propositions

The foundational work for the semantics of questions was laid by Hamblin (1958, 1973), who was the first to postulate that a question denotes its answer. Hamblin viewed a question as denoting the set of alternatives that could count as answering the question. Karttunen (1977) builds on Hamblin's proposal by considering embedded questions. Based on the properties of some embedding verbs, such as *know*, *tell*, *find out*, he concludes that the meaning of an interrogative expression is not those propositions that count as possible answers, but only those which count as true answers. Thus the question *Who likes Bill?* denotes all the propositions containing individuals such that the property LIKES*(x, b)* is true of those individuals.

It is notable that the answer set consists of only those propositions, which include individuals of whom it is true in a world that they like Bill. The intuition is that when someone asks *Who likes Bill?* one is asking for only those answers, which include the individuals of whom the property of liking Bill is actually true in order to resolve the question. This contrasts with Hamblin's view in that there it does not matter whether individuals actually liked Bill.

One crucial feature of Karttunen's proposal is that a question denotes a set of propositions and is of type <s, <<s,t>, t >> as its sense is a function from worlds to sets of propositions. Thus the exhaustive answer to a question like *Who likes Bill?* is the conjunction of all the true instantiations of LIKES*(x, b)*. What is crucial here with regard to mutually exclusive alternatives is that the propositions in the answer space are not mutually exclusive with respect to other propositions that are true in that world of evaluation, but only with respect to other worlds of evaluation.

1.2. Questions as Partitions of Logical Space

Groenendijk and Stokhof (1982) appeal to the intuition that questions split up the logical space into different ways the world could be. In this respect, their analysis is more closely related to that of Hamblin (1958) who shared this intuition. More specifically Groenendijk and Stokhof explore in more detail Karttunen's notion of the exhaustive answer. They notice for example that knowing the answer to the question *Who likes Bill?* is not only knowing which individuals like Bill, but also which individuals do not. Thus they term Karttunen's view of answerhood as *weakly exhaustive*, and their own as *strongly exhaustive*.

Since strong exhaustivity does not follow from Karttunen's proposal, their analysis makes use of the intuition already familiar from Hamblin, that questions divide the logical space into partitions of possible worlds. For example, the question *Who likes Bill?* might partition the possible worlds into five compartments, in each of which one of these possible answers is true: 'Only Annie likes Bill,' 'Annie and Susan like Bill,' 'nobody likes Bill,' 'everybody likes Bill,' and 'Bill is the only one who likes Bill.' Knowing that one of these propositions is the true one thus entails knowing that the other four are false. In this view, a question is thus a function from worlds to propositions, of type <s, <s,t>> and a question denotes a single proposition that counts as its true and complete answer. Since a question denotes only one single proposition, this proposition is mutually exclusive with any other proposition since it is the only one that answers the question in a given world of evaluation.

Though both types of theories agree that a question denotes its true and complete answer, they do make different predictions concerning what precisely makes an answer complete. These differing predictions hinge on the two conceptions of the answer space with a set of non-mutually exclusive propositions on the one hand, and a single proposition which is mutually exclusive with respect to all other alternatives on the other hand. As we shall see in the next section, open questions present a challenge to both of these views.

2. Properties of Open Questions

Open questions appear at first glance to pose a problem to the semantic theories outlined above, as answers to these questions are agent-relative (to borrow a term from Ginzburg 1997), not exhaustive, and the propositions in the answer space are not mutually exclusive with respect to other propositions.

2.1. Agent-Relativity

One important property of open questions is that their answers are relative to the beliefs, or epistemic state of the speaker. Consider the following exchange taking place on a news show between the anchor Tom, and his guests Dick and Harry.

(3) Tom: What effects will the stimulus have on the economy?
Dick: It'll avert disaster, putting people to work doing jobs that needed to be done anyway.
Harry: Oh forget it. All it will do is drive the economy into the ground for good.

In this exchange Dick and Harry express opposite points of view on an issue, but neither one of them could be said to be right or wrong, at least not at speech time. It may turn out at some later point that Dick or Harry will be proven wrong, but at the time of speech the speakers do not have access to this knowledge and answer based on what they know about the issue and their beliefs. In short, the answer to this question, and other open questions like it, is relative to each individual's epistemic state, and not objective knowledge about the world.

This kind of relativity is reminiscent of what Lasersohn (2005, 2007) calls *faultless disagreement*, since despite the fact that the two propositions openly contradict each other, neither one can be said to be true or false. Though the kind of relativism found here is not exactly like faultless disagreement since disagreements about mistaken beliefs give rise to *at fault disagreement* according to this account, it is clear that speakers answering open questions are relativizing responses to their beliefs or knowledge state, rather than speaking objectively about the world.

2.2. The Answer Space

The two views on the semantics of questions paint different pictures concerning the organization of the answer space. On Karttunen's view, the answer space is made up of a set of propositions that jointly provide the exhaustive answer to a question. Thus, propositions within the answer space are mutually compatible. On the Groenendijk and Stokhof view, a singe proposition makes up one partition of the logical space, and that proposition is mutually exclusive with respect to all other possibilities.

Answers to open questions support the Karttunen view of the answer space, since answers are mutually compatible with a host of other propositions. Consider (4):

(4) Sally: What is Chicago like?
Mary: It's great. There's so much to do here, and the people are really nice.

If Mary's response were a partition of logical space corresponding to the true and complete answer to Sally's question, we would expect it to rule out all other possibilities. This prediction, however, does not appear to be borne out as her response is compatible with many other propositions, such as 'it's really cold in

the winter,' or 'Chicago is the third largest city in the world,' assuming these are both true statements about what Chicago is like.

The question of how the answer space is organized ties in directly with the question of what "exhaustive" means for the two theories of interrogatives in question.

2.3. Exhaustivity

Both the partitions of logical space view (Groenendijk and Stokhof 1982, 1984) and the sets of propositions view (Karttunen 1977) face a challenge with open questions since answers to these kinds of questions do not appear to be exhaustive in any relevant sense. Consider for example an answer to (1a) repeated here in (5) in a context where Ralph just got dumped and Susie is his best friend.

(5) Susie: How do you feel?
Ralph: # I feel rejected and lonely because my girlfriend left me, I have an ingrown toe-nail which is hurting my big toe, I feel a migraine coming on because I ate too much chocolate, I am nervous about my presentation, I have an itch on my arm...
Ralph′: I feel rejected and alone.

It is clear that Ralph's second answer is the more felicitous one, even if all the statements he makes about how he feels in the first scenario are true. Indeed one may argue that an embedded question like (6) should always be false under traditional analyses of questions.

(6) I know how you feel.

Very intuitively, this sentence means, "I know how you feel regarding such and such." What it does not mean is "I know the exhaustive set of propositions that correspond to how you feel." Answers to open questions are thus not exhaustive in the traditional sense of listing all the propositions that truthfully answer the question, but rather they are exhaustive only with respect to some relevant context or scenario.

2.4. To-do List

To sum up this section, we have seen that open questions present a challenge to existing theories of interrogatives, as answers to this type of question are agent relative rather than objectively true or false, as well as not exhaustive in the traditional sense, but rather exhaustive with respect to the relevant issue. Further we have seen that data from open questions support Karttunen's view of the answer space, i.e. that it is a set of propositions as opposed to a single proposition.

An analysis of open questions should capture their particular properties, and in addition maintain the basic intuition behind the semantics of questions, which is that questions denote their true and complete answer.

3. Towards a Meaning for Open Questions

In this section I present such an analysis that draws on insights from modal semantics (Kratzer 1977, 1981), making it possible to account for the facts with only a slight modification of Karttunen's original proposal. The proposed analysis also extends to other question types, yielding a unified account of interrogatives. I lay out the formal framework in section 3.1. and illustrate how the proposal works concretely on an example in section 3.2. Section 3.3. extends the analysis to other question types.

3.1. Formalizing Open Questions

This section lays out the formal framework that accounts for the various properties of open questions discussed above. The main departure from previous treatments of interrogatives (Hamblin 1958, Karttunen 1977, Groenendijk and Stokhof 1982) is that the propositions in the answer-space will be determined by a certain world of evaluation, rather than representing mutually exclusive alternatives. In order to get an ordering on the propositions that are possible answers, we can follow the semantics for modals presented by Kratzer (1977, 1981) for epistemic modals, and the semantics for imperatives and root modals presented by Portner (2007). The propositions that are true in the worlds that are BEST-ranked with respect to an epistemic modal base, and contextually determined ordering source are propositions that are resolving for a given question.

3.1.1. The Modal Base

I take an open question to denote a set of propositions and follow Karttunen (1977) in postulating that the answer space is defined by all the true propositions that can count as answering the question, rather than all the possible ones (Hamblin 1958). Karttunen's denotation for what he called a proto-question is given below - it is our point of departure:

(7) $[[?\varphi]]^{w1} = \lambda p(p = \lambda w[\varphi(w)]) \wedge p(w_1)$

That is, at a world, a question asks for a set of propositions that answers φ and is true in that world. In this section I show that by fixing the worlds of evaluation, we can leave Karttunen's analysis of interrogatives intact, while accounting for the full range of open questions data. Thus, in modal terms, the answer space is comprised of the set of propositions compatible with an epistemic modal base that contains all the propositions compatible with what the speaker knows. This is intuitively clear since it is reasonable to assume that a speaker asks an interlocutor a question because he thinks the interlocutor knows the answer. Thus, in a context *c*, an epistemic conversational background *cb* limits the worlds of evaluation to the ones accessible from what a speaker knows in *w*, such that *f(w)* represents a set of facts known by the speaker in *w*, and the set of worlds accessible from *w* is $\cap f(w)$.

(8) a. A conversational background *cb* is a function form worlds to sets of propositions (Kratzer 1977, 1981)

b. Epistemic *cb* function *f*: For any world w in the domain of *f*, *f(w)* = {*p*: the speaker of *c* knows *p* in *w*.}

As I pointed out in section 2.1., the answers to open questions are true only relative to an individual, so we can relativize the truth of these propositions to each individual using an individual anchor (Farkas 1992). Applying an individual anchor to an epistemic modal base thus relativizes the accessible worlds to an individual:

(9) $epistemic_x(w)$ = {*p*: *x* takes *p* to be true in *w*}

The intersection of all the propositions compatible with the speaker's knowledge $\cap f(w)$, is a set of worlds, the epistemic modal base. By anchoring an epistemic conversational background to any individual *x*, we can account for the truth-relativity of speakers (Farkas 1992). Truth is thus defined as follows:

(10) For any proposition *p*, context *c* and conversational background function *f* : *p* is true in *w* iff $w \in [[p]]^{c,f}$.

In other words, a proposition is true in any given world, if that world is a member of the modal base, the intersection of all the propositions compatible with an individual's epistemic state ($\cap f(w)$). Now we are in a position to consolidate the fact that to interlocutors may have conflicting opinions about any given question with Karttunen's intuition that a question denotes a set of true propositions. However, the modal base may still be compatible with some propositions that are not acceptable answers to a question. In order to narrow down the propositions that can count as "good" answers, we can further restrict which worlds are accessible for the evaluation of the question. This is done by applying a second *cb* function, an ordering source on the modal base.

3.1.2. Setting the Worlds of Evaluation

Ordering sources are also functions from worlds to sets of propositions, and can in principle be any of the following:

(11) a. $teleological_x(w)$ = {*p*: *p* expresses a belief of *x* in *w*}
b. $deontic_x(w)$ = {*p*: *p* expresses a an obligation of *x* in *w*}
c. $epistemic_x(w)$ = {*p*: *p* expresses knowledge of *x* in *w*}
d. $bouletic_x(w)$ = {*p*: *p* expresses a desire of *x* in *w*}
e. $circumstantial_x(w)$ = {*p*: *p* expresses a set of circumstances holding for *x* in *w*}
f. $stereotypical_x(w)$ = {*p*: *p* expresses an expectation on the part of *x* concerning what *w* is like}

g(w) is a set of propositions used an ordering source on the modal base. Thus the BEST-ranked worlds are those worlds from the modal base in which all of *g(w)* are true. $\leq_{g(w)}$ does the ordering:

(12) For any set of propositions *g(w)* and any worlds *w*, *v* in the modal base:
$w \leq_{g(w)} v$ iff for all $p \in g(w)$, if $v \in p$, then $w \in p$.

This definition says that ranking *w* higher or equal with respect to *v* means that any proposition in *g(w)* that is true in *v* is also true in *w*. The worlds that come out BEST according to this ranking are the accessible ones. Using a ranking of worlds in a modal base according to a contextually determined ordering source thus fixes the worlds of evaluation for open questions. Now we can express the meaning of an open question as in (14), where BEST is defined as in (13).

(13) $\text{BEST}^w = \{v \mid v \in \cap f(w)$ and there is no $v' \in \cap f(w)$ such that $v' \leq_{g(w)} v\}$.
(14) $[[?\varphi]]^{w,c,f,g} = \lambda p.p = \lambda w'.\ \varphi(w') \wedge \forall w'' \in \text{BEST}^{f(w)}.p(w'')$

This denotation says that an interrogative expression is evaluated with respect to a world, *w,* context *c* and two conversational background functions, *f*, and *g*. A question "*?φ*" thus asks for a set of propositions, such that the propositions are of the form *φ* and those propositions must true in all of the BEST-ranked worlds. As a result only those propositions that are true in all the BEST-ranked worlds are the actual answers, i.e. the propositions in the answer space. Another way of thinking about this is that all the BEST-ranked worlds have to be part of the denotation of any proposition that counts as the answer. This definition departs from that of Karttunen (1977) only in that the set of propositions that are true are restricted to the ones that are true in the BEST worlds according to the relevant conversational backgrounds.

3.2. How it Works

In this section I show how the proposed analysis achieves the desired result of relativizing truth to individual epistemic states, and exhaustivity to a specific context, while maintaining a standard denotation for questions. Consider once again our first question, given below, in two different contexts.

(15) $[[\text{How do you feel?}]]^{w,c,f,g} = \lambda p.p = \lambda w'[\exists f$ .you feel *f* in $w'] \wedge$
$\forall w'' \in \text{BEST}^{f(w)}.p(w'')$

3.2.1. Context 1

In this context Susie and Ralph are best friends, and Ralph's girlfriend just left him. The two relevant *cb* functions are the following:

(16) *f* = Epistemic
g = Circumstantial

Thus the modal base is a set of worlds comprised of the intersection of all the propositions compatible with Ralph's beliefs, and the ordering source is a set of propositions.

(17) Modal base:
$\cap f_{Ralph}(w)$ = Set of worlds compatible with Ralph's beliefs.
Ordering source:
$g(w)$ = {'My girlfriend just broke up with me,' 'She left me for another guy.'}

Recall the set of propositions that are true answers with respect to Ralph's beliefs from (5). We want to be able to get to the actual answer, which is *I feel rejected and alone* while at the same time eliminating such true but irrelevant statements as *My foot hurts because I have an in-grown toenail.*

To accomplish this end, the worlds in the modal base are ordered according to how may of the propositions in the ordering source are true in them and the (exhaustive) answer is made up all of propositions that answer the question and are true in the BEST-ranked worlds. Applying the ordering source to the epistemic modal base rules out statements about in-grown toenails and the like for the following reasons. The first concerns the ordering source; there are some worlds where Ralph has an in-grown toenail, and others where he does not, but the only thing all the BEST-ranked worlds have in common is that the set of circumstances in $g(w)$ hold. The second reason concerns universal quantification over BEST-ranked worlds; since the propositions that count as answers have to be true in all of the BEST-ranked worlds, propositions about toenails will be ruled out, as these are true in only some of the BEST-ranked worlds, but not all.

3.2.2. Context 2

In this context Ralph was still just broken up with but now Susie and Ralph are at the LSA where Ralph is about to give his first conference presentation. The *cb* functions are the same as before, with an epistemic modal base and circumstantial ordering source, but now Ralph considers different propositions to include in his ordering source.

(18) Modal base:
$\cap f_{Ralph}(w)$ = Set of worlds compatible with Ralph's beliefs.
Ordering source:
$g(w)$ = {'I am about to give my first conference presentation,' 'Famous people are here,' 'My advisor is watching to see how I'll do.'}

In this scenario, though he is still feeling lonely and rejected, answering so would not be felicitous given the circumstances. We might say that Susie is really asking *How do you feel in view of your impending presentation*? as opposed to *How do you feel in view of having been dumped?* as before. In this case the actual answer would be, *I feel a little nervous*. Furthermore, other true but irrelevant propositions would be ruled out as before since they may be true in all the worlds in the

epistemic modal base, but not all the BEST-ranked worlds according to this particular ordering source.

3.3. Extensions

The analysis presented above is straightforwardly extendable to other question types. In this section I show how the analysis can account for simple informative questions as well as mention-some questions, which have posed a problem to previous accounts of questions.

3.3.1. Informative Questions

Concerning informative like (19) are the basic case in the semantic literature on interrogatives.

(19) Who went to BLS this year?

There is a strong intuition here that the exhaustive answer to such a question would have to include all the individuals of whom it is true that they went to BLS last year. We can achieve just that using a modal approach by simply saying that the ordering source is simply empty in the case of informative questions, demanding the addressee to name all those individuals who came to BLS, as compatible with her epistemic state.

3.3.2. Mention-Some Questions

Mention-some questions, as the one below, have been problematic for theories subscribing to view that questions denote their true and exhaustive answer.

(20) Where can I buy a newspaper?

Questions such as this one are viewed as problematic, because they very intuitively do not ask for a complete list of places where you could buy a newspaper, but ones that are close by, or easily reachable. However, it is not necessary to resort to principles of pragmatic reasoning to capture this specific interpretation. A modal analysis allows a fully semantic explanation through the application of a circumstantial ordering source on the worlds compatible with the addressee's epistemic state to give us the correct outcome. The question will limit the accessible worlds to ones that are specified for a particular geographic location, requiring an exhaustive answer with respect to those worlds only.

In this respect open questions and mention-some questions are different from informative questions as these require a contextually determined ordering source to get the right denotation.

4. Conclusions and Direction for Future Research

In this paper I have argued that the semantic accounts of interrogatives account for only a small sample of the natural language data from interrogative expres-

sions. The main goal of the paper has been to present an analysis of questions that takes the seemingly most deviant data as basic and accounts for the standard interrogative types by extension. After reviewing the shortcomings of previous analyses in light of data from open questions, I presented an analysis in the framework of modal semantics that draws on insights from the literature on truth-relativity.

Specifically, I have shown that interrogatives, like modal expressions, rely on the context as part of their semantic meaning. Like a modal, a question is thus evaluated with respect to a context, a modal base, and an ordering source, which determine for each individual, and each context the denotation of the question.

In sum, I have argued for a meaning of interrogatives that is not very different from what Karttunen (1977) proposed. A question still denotes its true answer, only the truth of the answer hinges on the epistemic state of the individual questioned rather than the state of the world; and a question still denotes its exhaustive answer, only the answer is exhaustive with respect to the BEST-ranked worlds according to a contextually determined ordering source.

The analysis presented here raises a number of important questions for future research. The first concerns the structure of the discourse and the pragmatics involved in evaluating different question types. In the account I presented here, the pragmatics are directly 'built-in' to the semantics, as the pragmatics is responsible for selecting the relevant ordering source in a given context. In addition to integrating the pragmatics into the truth-conditional meaning of a question, the discourse plays an important role. It might be, for example, that the modal base is not an individual's belief worlds, but rather the intersection of all the propositions that make up the common ground (CG) (Stalnaker 1974, 1978). Outlining a model of questions that takes principles of pragmatics and the discourse into account in order to arrive at a meaning is thus one avenue for further inquiry.

Another question raised by the analysis concerns the difference between open questions and other kinds of questions with respect to truth-relativity. I have presented a view in which expressions are evaluated with respect to individual epistemic states rather than the tangible world. The obvious question is thus why the truth conditions of open questions should hinge on individual epistemic states while it appears that we use our knowledge about the world to evaluate expressions otherwise. This particular question is an extremely rich area of inquiry that I hope to be able to address in future work.

The study of open questions has thus led to a semantic account of interrogatives that is able to handle a range of data that was not possible under existing semantic proposals. In addition, this rich topic lies at the intersection of a number of other avenues of research well worth exploring.

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Mandarin Vowels Revisited: Evidence from Electromagnetic Articulography

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0. Introduction

The distributional properties of Mandarin vowels provide an excellent opportunity to examine issues related to the categorization of speech sounds. Structural analysis of Mandarin vowels has been done in a number of phonological theories (Cheng 1973, Lin 1989, Wang 1993, Duanmu 2000). Acoustic properties and articulatory movements are both reported in phonetic studies (Howie 1970, Shih 1995, Torng 2000). Previous studies bring us to deeper questions about the reality of Mandarin vowels. How do native speakers produce vowels in context? How are vowels in Mandarin categorized? In this study, the goal is to demonstrate phonological variations of Mandarin vowels in terms of articulatory and acoustic properties with Electromagnetic Articulography AG500 (hereafter EMA). By studying Mandarin vowels, we stand to gain a better understanding of how they are categorized in terms of articulatory and acoustic properties.

In the following, the Mandarin phonetic system will be introduced in Section 1. The previous studies of Mandarin vowels related to the transcription systems, phonological categories, phonetic measurements, as well as the articulatory investigations will be reviewed in Section 2. The methodology will be described in Section 3. The data analysis and conclusion will be presented in Section 4 and Section 5, respectively.

1. The Phonetic System of Mandarin

The Mandarin vowel inventory is a controversial topic. Many vowels occur in complementary distribution. Without minimal pairs, it is not a straightforward task to provide proofs of vowel categories in either the phonological input or the phonological output. As a starter, Table 1 lists 12 monophthongs in Mandarin, including a retroflex vowel. These vowels are classified in three dimensions, namely: [high/low], [front/back], [rounded/unrounded]. However, Table 1 is far from being a consensus view. There is little agreement in the literature. We do not know the maximum number of Mandarin vowels, though the number of possible

rhymes is generally agreed on; we do not know whether native Mandarin speakers and listeners treat some of these vowels as the same, and if so, which ones should be combined, and how similarity is measured.

Table 1. Vowels in Mandarin

	FRONT	CENTRAL	BACK
HIGH	i y	ɨ	ɯ u
MID	e	ə ɚ	(ɤ) o
LOW	a		ɑ

In Mandarin, the possible syllable structures are CGVN, CGVG, CGV, CVN, CVG, GVN, GVG, CV, GV, VC, VG, V.[1] Only alveolar or velar nasals [n, ŋ] and glides [j, w] can occur in the coda position.

Linguists have debated for decades on how many vowels there are in the Mandarin phonemic inventory (Cheng 1973, Lin 1989, Wang 1993, Duanmu 2000). Table 2 presents the co-occurrence constraints on consonants and high vowels in the syllable structure CV. The vowels [ɨ] and [ɯ] only occur in CV syllables. For the high vowels, the distribution of [y] is much more restricted than other vowels. The vowels [i], [ɨ], and [ɯ] are in complementary distribution. [ɨ] only occurs after [s, ts, ts^h]; [ɯ] only appears after [ʂ, tʂ, tʂ^h,ʐ] and [i] elsewhere. The minimal set [i, y, u] can be found after [n] or [l]. The question is, do Mandarin speakers consider [i], [ɨ], and [ɯ] as the same vowel or distinct vowels?

Table 2. Occurrence of consonants and high vowels

	High vowels				
	i	ɨ	ɯ	y	u
p, p^h, m	✓				✓
f					✓
t, t^h	✓				✓
n, l	✓			✓	✓
s, ts, ts^h		✓			✓
ʂ, tʂ, tʂ^h,ʐ			✓		✓
ɕ, tɕ, tɕ^h	✓			✓	
k, k^h, x					✓

Table 3 shows the distribution of mid vowels in different syllable structures in the surface forms. The vowel [e] may only be preceded by one of the glides [j, ɥ]

[1] In this paper, C is the abbreviation for consonant; G is for glide; V is for the nucleus vowel and N is for nasals. Also, the phonological input of sounds will be annotated with //; the phonological output of sounds will be presented with [ ]; the pinyin transcription will be shown with ‘ ’.

in CGV(N) syllables; the vowel [ə] exists in CV(N) or CGV(N) syllables when G is the glide [w]. The vowel [e] is in complementary distribution with the vowels [ə] and [o].

Table 3. Occurrence of syllable structures and mid vowels

	Mid vowels		
	e	ə	o
CG _ G = j	✓		
CG _(n) G = ɥ	✓		
CG_ G = w			✓
CG _ n G = j	✓		
CG _ ŋ G = j			✓
C_(n)		✓	
C(G)_n G = w		✓	
C_ŋ		✓	✓

With regard to low vowels, the back low vowel [ɑ] occurs in an open syllable or before the coda [ŋ]. The front low vowel [a] only occurs before the velar nasal [n], as shown in Table 4.

Table 4. Occurrence of syllable structures and low vowels

	Low vowels	
	a	ɑ
C_		✓
C(G)_n	✓	
C(G)_ŋ		✓

Complementary distribution is only one way to group sounds as allophones of a phoneme. In English, [h] does not occur in word-final position, while [ŋ] does not appear in the word-initial position. Hence, they are in complementary distribution. However, [h] is not considered an allophone of [ŋ] because they do not

sound similar. In this paper, vowel categories will be examined in terms of acoustics and articulation.

2. How Many Vowels in Mandarin?

In this section, we will review how the vowels in Mandarin have been categorized from different perspectives, including the transcription systems, phonological categories, phonetic measurements and articulatory investigations in the previous literature. The transcription systems reflect how native speakers have been taught to acquire their sound system explicitly. The phonological categories present the abstract representation of vowels. Phonetic measurements provide the acoustic values of vowels and the articulatiory investigation describes the physiological and kinematic movements of vowels. Different approaches sketch different dimensions of Mandarin vowels and help us to understand them.

2.1. Transcription Systems

The Chinese writing system uses symbols known as Chinese characters. There are thousands of characters in common usage, and tens of thousands if rare characters and archaic forms are included. Many transcription systems were developed to annotate pronunciations as a study aid in school systems. Two such systems are used widely today. Zhuyin is used in Taiwan, and Pinyin in used in China. Zhuyin uses distinct symbols to represent 21 onset consonants, 3 glides and 13 rhymes. Two of the rhymes ([ɨ, ɯ]) are not assigned distinct symbols, and the 3 glides are also used to represent vowels. In sum, this system recognizes 18 rhymes, including the two signs that are not written. Pinyin is a Romanization system that uses Roman letters to represent onset consonants, glides, vowels and nasal codas. In the Pinyin system, the vowels in Mandarin are presented by six symbols 'a, e, i, o, u, ü'. These two transcription systems give us the range of the possible number of surface vowels in Mandarin: anywhere between 6 and 18.

2.2. Phonological Categories of Mandarin Vowels

By "surface vowels", we mean the phonological output. It is not the same as the phonological input, or the underlying system. In Mandarin tonal phonology, there are four tones in the phonological input and still four tones in the output after tone sandhi rules (Shih 2008). Unlike Mandarin tones, it is not clear how many Mandarin vowels exist in the underlying representation and the surface forms. Phonologically, many vowels are predictable from context. For example, the rewrite rule in (1) expresses that the back low vowel /ɑ/ will become the front low vowel /a/. /ɑ/ in the rewrite rule is the phonological input or the phonological underlying representation, while /a/ is the phonological output or the surface form.

(1) ɑ → a / __ n

According to various theoretical approaches, the number of Mandarin vowels ranges from two to six in the underlying representation and nine to fifteen in the

surface forms (Cheng 1973, Lin 1989, Wang 1993, Duanmu 2000). Cheng (1973) proposes six underlying vowels in Mandarin based on whether a vowel can occur in CV syllables, as opposed to surface representations of twelve vowels. Based on underspecification theory, Lin (1989) presents a five-vowel system and surface manifestations of eleven vowels. The eleven vowels are created as the result of assimilation processes. One of the most extreme analyses is Wang (1993), who suggests there are only two vowels in Mandarin. This is done by treating high vowels as glides underlyingly. Duanmu (2000) suggests that Chinese has five vowels phonemically and nine forms in the surface representation. His analysis is based on evidence of rhyming and the distribution of vowels in the syllable structure GVX.

2.3. Phonetic Categories of Mandarin Vowels

A central issue within speech technologies such as text-to-speech synthesis (hereafter TTS) is the naturalness of the system, which requires an optimal collection of acoustic inventory and an understanding of how the pronunciations vary in context. Howie (1970) was the first study to obtain a systematic acoustic description of Mandarin vowels, including phonemes and allophones in the occurrence of the four tones.

Shih (1995) investigates the acoustic properties of Mandarin vowels for the purpose of achieving naturalness in TTS. In Shih (1995), the findings show the following: (1) For diphthongs, the vowel nucleus is typically different from the corresponding monophthongs, with the exception of the diphthong [ow]. That is, [a] in [aj], [aw] and [e] in [ej] are different from monophthongs [a] and [e], respectively. Diphthongs are only similar to the corresponding monophthongs at the beginning 20% portion. (2) Coarticulation effects on schwa [ə] and the low vowel [a] are observed. The effects of the following nasals [n, ŋ] in [ən] and [əŋ] and the preceding glides [j, w] in [ja] and [wa] are expected and consistent with the anticipated tongue position of the sounds in context.

2.4. Articulatory Studies of Mandarin Vowels

One major articulatory study of Mandarin vowels is reviewed here. In an Electromagnetic Midsagittal Articulography study (Torng 2000), 24 words consisting of five Mandarin vowels [i, y, u, a, o] with four tones were measured. The results are summarized as follows: (a) For the tongue body position, the high vowel [i] has the highest absolute tongue height followed by [y], [u], [o], [a], as expected. (b) For jaw position, vowels [u, y] have high jaw positions and the vowel [a] has a low jaw position. Unexpectedly, the mid vowel [o] has a jaw position as high as the high vowel [u] and the high vowel [i] has a lower jaw position than [u, y, o]. (c) Vowels [y, u, o] have stronger lower lip protrusion and vowels [i, a] have weaker lip protrusion. As expected, vowels [y, u] have a smaller lip aperture and vowels [i, o, a] have a larger lip aperture. (d) The tongue body position is determined by the jaw position since the tongue rests on the jaw. One exception is the

vowel [o]. The derived tongue position shows that the vowel /o/ has a lower tongue position than the vowel /a/.

Consideration of transcription systems, phonological categories, and phonetic properties have not answered the question concerning how many vowels there are in Mandarin. Basically, there is no agreement in the previous research. The goal of this study is to investigate the phonological output of vowels in Mandarin in terms of the articulatory demonstration of the positions of the tongue and lips, as well as the corresponding acoustic results of the articulatory data. Further, we examine all vowels in context, but we are not limited to the five vowels [i, y, u, a, o] as in the previous articulatory study (Torng 2000).

3. Methodology

3.1. Materials

The data were collected from one native Mandarin speaker from Taiwan, who produced all possible Mandarin syllables including vowels with tone 1. Each word was read in a frame sentence, /tʂɤ kə ___ tsi/ 'This ____ word', to avoid the lengthening effect of producing the test words in the final position of a sentence. Stimuli were presented in traditional Chinese characters. A few syllables do not occur with tone 1. Therefore, no Chinese characters can represent these sounds. In those cases, Zhu-yin symbols were used to annotate the sounds.

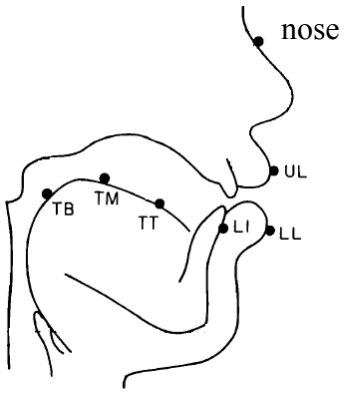
3.2. Procedure

The data were obtained from a Carstens 3D-Articulograph AG500. This apparatus consists of the EMA cube with six transmitter coils generating magnetic fields at different frequencies at defined orientations, 12 sensors and channels, a computer with an automatic calibration unit, real time display, head movement correction systems, and a receiver. Six transmitter coils generate alternating magnetic fields at different frequencies. Sensors, which consist of small coils, are fixed onto the articulators of the subject. The alternating currents induced by the alternating magnetic fields have different strengths as a function of the distance and the angle of the sensor to the respective transmitter coil (Carstens Medixinelektronik 2006). A microphone mounted on a microphone stand and extended on a boom stick is connected to the audio box, transferring the speech signal to the synchronizer. All articulatory and acoustic data are acquired and synchronized simultaneously.

The participant was seated in a wooden chair and their head was positioned in the center of the EMA cube. The filled circles in Figure 1 schematize the approximate locations of the sensors used in this experiment. Sensors were mounted on the tongue tip (TT, 1cm behind apex), the tongue body (TM, 1cm behind the tongue tip sensor) and the tongue back (TB, 1cm behind the tongue center sensor), as well as on the lower incisor (LI), the upper lip (UL), the lower lip (LL), and the right and left corners of the lip. Other sensors were attached to the bridge of the nose and the left and right tragi as reference points to normalize head movement. During the experiment, the sensor on TB fell out in the recording process and the data from TB were excluded from the analysis.

After obtaining the data, digitalizing of the reference point signal and head movement correction were carried out. The acoustic data were analyzed with WAVES+/ESPS software. Auditory judgments of vowel quality were made to verify correct production for acoustic analyses. With 406 possible syllables in Mandarin, 387 out of 406 were correctly produced. The target words were elicited from the speech strings and were segmented manually by the author. Possible measurement error with the EMA system and formant tracking with WAVES+ were examined and eliminated from the data analysis. The formant frequency and articulatory data at the mid point of the vowel duration were used to do the analysis with R statistical software.

Figure 1. Schematic view with seven sensors on the tongue and lips as well as a reference point on the bridge of the nose.



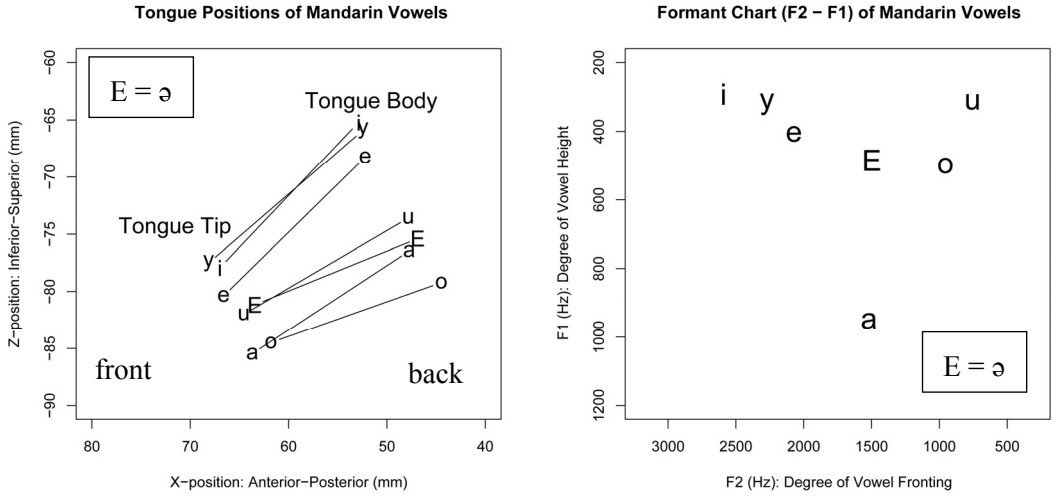
TB: Tongue Back
TM: Tongue body
TT: Tongue Tip
LI: Lower Incisor
UL: Upper Lip
LL: Lower Lip

4. Analysis of the Data and Discussion

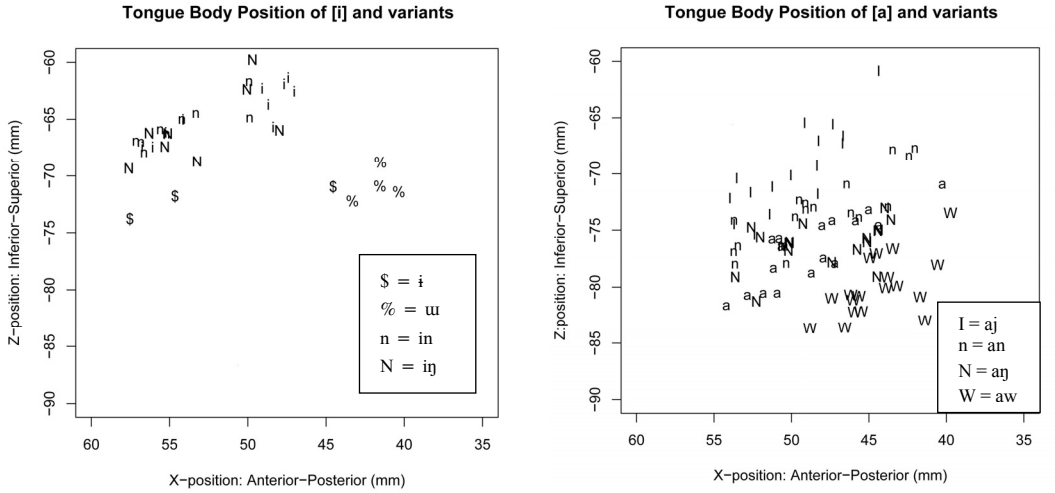
Figure 2 shows the mean values at the points of the tongue body and the tongue tip in the X (anterior and posterior) and Z (superior and inferior) dimensions for vowels [i, y, u, e, ə, o, a]. For the tongue body height, [i] has the highest tongue body position, followed by vowels [y], [e], [u], [ə], [a] and [o]. As for the tongue tip height, [y] has the highest tongue tip position, followed by vowels [i], [e], [ə], [u], [o], [a]. This result is similar with previous studies (Torng 2000) with the unexpected exception that the vowel [a] has a higher tongue body position than the vowel [o]. This observation is also found in Torng (2000). As for the anterior and posterior dimension, the vowels [i, y, e] have the greatest anterior tongue body position, followed by the vowels [u]/[ə]/[a] and then [o]. The vowel [y] has the greatest anterior tongue tip position, followed by the vowels [i]/[e], [u]/[a], and then [ə]/[o].

The formant analysis of the articulatory data in Figure 2 is illustrated in Figure 3, which shows the formant space of the vowels plotted by the mean values of the first formant (F1) and the second formant (F2) at the midpoint. As expected, the vowel [i] has the lowest F1, followed by [y], [u], [e], [ə]/[o] and [a]. Also, the vowel [i] has the highest F2, followed by vowels [y], [e], [ə]/[a], [o] and [u].

Figures 2 and 3. Tongue positions (left) and formant chart (right) of Mandarin vowels



Figures 4 and 5. Tongue body position of [i] (left) and [a] (right), with variants



Figures 4 and 5 demonstrate the mean values at the points of the tongue body in the X (anterior and posterior) and Z (superior and inferior) dimensions of the vowels [i] and [a] and their variants. The physical distance of the tongue positions in the vowel [a] is greater than the case of the vowel [i] in [in] and [iŋ]. The [a] in [an], [aŋ], [aj] and [aw] are fairly distinguishable articulatorily and acoustically. This finding is similar to Perkell and Nelson (1985), which shows the variations in production vowels [i] and [a] on the tongue, suggesting the vowel [i] has a relatively small size of distribution compared with the vowel [a].

The discrepancies between the articulatory and the acoustic data can be explained. Traditionally, the formant values of vowels are usually related to articulatory descriptions of vowels. That is, F1 represents the vowel height as the tongue body height and F2 represents the backness of vowels as the anterior and

posterior positions of the tongue. However, the formant values of vowels are determined by the position of the maximum constriction of the vocal tract, which affects the length and the cross-sectional area of the front and back cavities (tubes) in the multi-tube models of vowel production (Stevens and House 1955, Fant 1960). Ladefoged (1975) has pointed out that the position of the highest point of the tongue is not a valid indicator of vowel quality. The term 'vowel height' refers to auditory quality that is specified in acoustic properties rather than in articulatory positions.

In the current data, the analysis of the articulatory positions of the tongue and formant frequencies reveals discrepancies between traditional phonetic descriptions of vowels and the actual tongue positions. In terms of the acoustic vowel height, the vowel [e] is a mid vowel and the vowel [u] is a high vowel (low F1). However, the vowel [e] has a higher tongue position than the vowel [u]. Similarly, the vowel [a] is a low vowel (high F1) and the vowel [o] is a mid vowel, while the vowel [a] has a higher tongue position than the vowel [o]. In other words, the vowels [e] and [a] have higher tongue body positions than the vowels [u] and [o], respectively. In terms of the backness, the vowels [u] and [o] have a more posterior tongue body position than the vowel [e]. The tongue body position in Figure 3 does not indicate the place of maximum constriction of the vocal tract. Since we know that vowels [u] and [o] have constrictions both at the lips and at the soft palatal area, the retracted tongue body position and the lip rounding of the vowels [u] and [o] maintain lower F1 than the vowels [e] and [a], respectively.

In phonological or phonetic representation, distinctive features are used to classify speech sounds in terms of acoustic cues (Jakobson et al. 1952). Later reformulation of distinctive features by Chomsky and Halle (1968) reflects more articulatory properties than acoustic and perceptual correlates. Others may have suggested that some features might have better-defined auditory correlates than articulatory correlates and vice versa.

Daniel Jones (1956) was the first to draw the vowel space, the cardinal vowels, to visualize tongue positions in articulation of vowels. Jones envisioned cardinal vowels to be of equal distance to one another. The articulatory data in the current study show that the tongue positions are much more complicated than this view. However, it has been discussed whether the distinctive features describing vowels should be defined in terms of tongue height, in terms of acoustic properties, or in terms of perceptual distance. Regarding examining the articulatory correlates of vowel categories, Stevens (1975) has suggested that different patterns of contact between the tongue and maxilla may define vowel height categories. Lindau (1975) has pointed out that there is evidence against the traditional concepts of vowel height as the height of the highest point on the tongue, particularly for back vowels. Similarly, Ladefoged (1975) demonstrates that the tongue height of back vowels bears very little relation to vowel height. A different approach proposes that vowels can be categorized by the place of articulation (Wood 1979, Hasegawa-Johnson et al. 2003). Based on the constriction of the vocal tract, /i, e, ɪ, ɛ/ are classified as palatal vowels, /u, ʊ/ are velar vowels, /o, ɔ/

are uvular vowels, and /ɑ, a, ʌ, æ/ are pharyngeal vowels. The place of articulation more or less corresponds to the backness of the vowels.

In the current study, the data show that the vowel height in terms of the acoustic measurements is not equivalent to the tongue height in terms of articulatory positions. Vowel height better reflects the acoustic properties than articulatory movements. In quantal theory (Stevens 1972, 1989), the relation between the articulatory parameter and acoustic output is not linear. Linguistically, contrastive sounds involve differences between quantal regions. In the analysis of Mandarin vowels, the tongue positions of the monophthong [i] and [i] in [in] are similar, but slightly different from [i] in [iŋ]. Tongue positions and formant values of the vowels [ɨ] and [ɯ] distinguish them from [i] more than the [i] influenced by coda nasals. The question is whether they belong to the same or different categories due to the contrast quantal regions.

The problem of phonological categories of the vowels in different contexts is if native speakers perceive them as having the same quality and belonging to the same groups. It may not be controversial to classify the monophthong [i] and variants of [i] in [in] and [iŋ] in the same categories due to the small physical distance of the tongue positions and similar formant values. Due to the complementary distribution of the vowels [i], [ɨ] and [ɯ], [ɨ] and [ɯ] are treated, in the previous literature, as variants of the vowel [i] in the phonological input. However, it is possible that vowels [i], [ɨ] and [ɯ] may be treated as different vowel/phonetic/perceptual categories based on the greater differences of acoustic properties and articulatory positions from the vowel [i]. Furthermore, the articulatory and acoustic properties of the monophthong [a] and variants as [a] in [an], [aŋ], [aj], and [aw] are fairly different. It is not clear whether the discrepancies in [a] lead to different categories.

Vowel perception may be affected by both articulatory and perceptual factors. One way to test this issue is to examine native listeners' perceptual judgments of the vowels in different contexts. A perceptual experiment of vowel classification will be conducted to answer this question in future studies.

5. Conclusion

In this paper, we reexamine the categories of Mandarin vowels in terms of articulatory positions and acoustic properties. We review this issue from the perspectives of the influences from the transcription systems, phonological representation, acoustic-phonetic measurements, as well as articulatory properties. We investigate the production of Mandarin vowels with the EMA system in terms of acoustics and articulation.

The analysis of the articulatory positions of the tongue and formant frequency reveals some discrepancies between traditional phonetic descriptions of vowels and the actual tongue positions. The data in the present study shows that the changes in articulation do not necessarily change the acoustic output. For instance, the tongue height does not completely correspond to the vowel height in formant values. In addition, the vowel [a] is influenced by a wider range in

different contexts than the vowel [i]. This topic is important not only to understand the reality of vowels in Mandarin, but also to help the second language acquisition of the sound system, and speech recognition. A perception study of vowel categorization will be carried out and the relationships among articulation, acoustics and perception will be explored in future studies.

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Tonal Mapping in Cantonese Vocative Reduplication

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0. Introduction: Tonal (Non-)Transfer in Reduplication

Research on reduplication has traditionally focused on the segmental mapping between the reduplicant and the base. Until recently, little attention is paid to the mapping of prosodic features, such as tone, stress, or pitch accent. Downing (2003) is a noted exception. She examined the behavior of tone in the reduplicative morphology of several Bantu languages and observed that there are three common patterns of tonal correspondence in verbal reduplication in these languages. The first type involves a match in the tone of the RED(duplicant) and its Base (tonal transfer; e.g., Chichewa (1a)). The second pattern is understood to be the result of markedness motivated mismatch (the emergence of the unmarked; TETU). Whether the first or second half of a RED+Base complex retains the underlying tone pattern depends on which half is the reduplicant. For example, in KiHehe, the marked H tone is realized on the second half (1b), while it is realized on the first half in Shona (1c). The third pattern reflects the Base stem (BStem) tone being realized on the entire RED+Base complex form. Thus in Kikerewe, if an H tone is realized on the first two syllables in the unreduplicated form, then an H tone is also realized on the first two syllable of the reduplicative complex. If H is on the final two syllables in the unreduplicated verb, then the H tone is realized on the final two syllables of the reduplicative complex (Odden 1996).

(1) Verbal reduplication (Downing 2003)

		Unreduplicated	'X repeatedly'
a.	Chichewa	phikits-á 'really cook!'	phikits-á-phikits-á
b.	KiHehe	si-tu=[déeña 'we won't cut'	si-tu=[deña-déeña
c.	Shona	-tóresá 'I didn't make take'	-tóresá-toresa
d.	Kikerewe	ku-[káláanga 'to fry'	ku-[káláanga-kalaanga
		m-[baz-ílé 'I counted (yesterday)'	m-[bazile-bazílé

The case of Kikerewe is particularly interesting since, despite the claim that tonal mapping is at the level of the reduplicative complex, the tonal pattern of the unreduplicated verb nonetheless appears faithfully on at least one part of the

reduplicative complex. That is, there is segmental and tonal matching between the unreduplicated form and one part of the reduplicative complex. A summary of the range of tonal matching in reduplication found in Downing's study is given in (2). For the sake of clarity, I shall use R_A and R_B to refer to the left and right members of the reduplicative complex respectively.

(2) Typology of tonal (mis)match in reduplication[1]

R_AR_B	Total matching	Chichewa
$\underline{R_A}R_B$	Left-bound mismatch	KiHehe
$R_A\underline{R_B}$	Right-bound mismatch	Shona
$\underline{R_A}R_B/R_A\underline{R_B}$	Mismatch obviation	Kikerewe
$\underline{R_A}\underline{R_B}$	Total mismatch	?

This paper investigates a case of tonal mismatch in Cantonese, arguing that tonal mapping in Cantonese also occurs at the level of the reduplicative complex, similar to Kikerewe. However, unlike Kikerewe, the tonal pattern of the reduplicative complex may bear no relationship to the tone of its unreduplicated counterpart. The paper is organized as follows: I begin with an introduction of the basic pattern of tonal mismatch in Cantonese reduplicative vocatives (Section 1). Section 2 explores potential motivations for the tonal mismatch, arguing ultimately that tonal mismatch is not phonologically-driven. Section 3 sketches a morphological-doubling analysis of vocative reduplication in this language.

1. Cantonese Vocative Reduplication

Cantonese is within the Yue subfamily of Chinese. It has a six tone systems, although traditional Cantonese linguistic literature treats tones occurring on obstruent-final syllable (CVO) as distinct tones. Since no segmental alternation is involved in any of the examples below, for the sake of convenience, Cantonese examples are transliterated in the Jyutping romanicization system designed by the Linguistics Society of Hong Kong for Cantonese. Tones are indicated using the Jyutping tone numbers (3).

(3) Cantonese tone system

Jyutping[2]	Chao tone number	
1	53 ~ 55	CVV, CVN, CVO
2	25	CVV, CVN
3	33	CVV, CVN, CVO
4	21	CVV, CVN
5	23	CVV, CVN
6	22	CVV, CVN, CVO

[1] Underline indicates unfaithful tonal realization between the input and the output.
[2] All tone numbers will be prefixed with "T" in text (e.g., T2, T4, etc.) for ease of reference.

Cantonese has multiple methods for forming vocatives. The method of interests here is vocative formation via total segmental reduplication. Such reduplicative vocatives often exhibit tone changes that result in tonal mismatch. Two notions of tonal mismatch are relevant here. Vocative reduplicative complexes always exhibit tonal mismatches between the base and the reduplicant (BR-mismatch), although, non-tone-changing alternatives are often possible.[3] There are also mismatches between the input and the output reduplicative complex. Three patterns of IO-mismatch at the tonal level are observed. As shown in (4), when the tone of the source syllable is T3 or T4, R_A retains the source tone, but R_B has T1 or T2. Let us refer to this Pattern 1.

(4) Pattern 1: Reduplication with $R_A\underline{R_B}$ mismatch

Base	with tone change	without tone change	Gloss
po4	po4<u>po2</u>	po4po4	'old woman'
fei4	fei4<u>fei2</u>	*fei4fei4	'fatty'
ye4	ye4<u>ye2</u>	?ye4ye4	'paternal grandfather'
mou4	mou4<u>mou1</u>	?mou4mou4	'little hairy thing'
taai3	taai3<u>taai2</u>	*taai3taai3	'wife'

In Pattern 2, R_B retains the source tones (i.e. T1 or T2), but R_A carries T4.

(5) Pattern 2: Reduplication with $\underline{R_A}R_B$ mismatch

bong1	<u>bong4</u>bong1	bong1bong1	'little Bong'
gung1	<u>gung4</u>gung1	gung1gung1	'old man'
maa1	<u>maa4</u>maa1	maa1maa1	'mother'
go1	<u>go4</u>go1	go1go1	'elder brother'
zai2	<u>zai4</u>zai2	*zai2zai2	'son'
bi1	<u>bi4</u>bi1	*bi1bi1	'baby'
ze1	<u>ze4</u>ze1	ze1ze1/zi2zi2	'elder sister'

Pattern 3 characterizes instances of total tonal mismatch; when the source tone is T5 or T6, neither R_A nor R_B retains the source tone. R_A has T4, while R_B has T2.

(6) Pattern 3: Reduplication with total tonal faithfulness

mui6	<u>mui4mui2</u>	mui6mui6	'younger sister'
dai6	<u>dai4dai2</u>	dai6dai6	'younger brother'
nai5	<u>nai4nai2</u>	*nai5nai5	'husband's mother'
noei5	<u>noei4noei2</u>	*noei5noei5	'daughter'

There also exist several intrinsically reduplicated vocatives (i.e. the reduplicative complex has no non-reduplicated counterpart; (7)). Of relevance here is the fact

[3] Total reduplication with faithful tonal mapping is primarily a feature of the literary and more formal register. It is commonly used in read speech and broadcast speech.

that the tone patterns of such intrinsically reduplicated vocatives follow the T4{T1/T2} tonal templates observed in (4)-(6).

(7) Baseless reduplication

di4di2	'little boy'
zoe4zoe1	'child's penis'
gu4gu1	'child's penis'

The tonal transfer properties of reduplicative vocatives present a curious puzzle: Why does tone change take place sometimes on the second syllable (4), on the first syllable (5), or on both syllables (6), all resulting in tonal mismatches between the reduplicant and the base? More puzzling is the fact that, except for source syllables with T3, the outcomes of the different tone changes converge in a sequence of T4 followed by either T1 or T2. Why should this be? The next section considers two possible explanations.

2. Why T4T1/T2?

In this section, I review two potential explanations for non-tonal transfer in reduplicative vocatives in Cantonese: Changed Tone (Section 2.1) and the emergence of the unmarked (Section 2.2).

2.1. Changed Tone in Cantonese

Many morphological constructions in Cantonese are signified either solely or partly by a change to T1/T2 from non-T1/T2 syllables. Traditional descriptive linguistic literature of Cantonese refers to this process as *Pinjam* 變音, 'changed tone.' For example, (8) shows an instance of deverbal nominalization signaled solely by a tone change to T2.[4]

(8)

a. Verb	Gloss	b. Noun	Gloss
sou3	'to sweep'	sou2	'a broom'
pong6	'to weigh'	pong2	'a scale'
mo4	'to grind'	mo2	'a grind'
daan6	'to pluck'	daan2	'a missile'
waa6	'to tell'	waa2	'an utterance'
yau4	'to grease'	yau2	'oil'

Another word formation strategy that requires tone change to T2 is diminutive formation.

[4] Historically Cantonese has a high-falling tone (53) that changes to high-level (i.e. T1) as a result of *pinjam*. A recent merger of 53 and 55 (T1) renders this tone change opaque today.

(9)	a.	toi4	'stage, terrace'	→	toi2	'table'
		kwan4	'skirt'	→	wai4kwan2	'apron'
		geng3	'mirror'	→	ngaan5geng2	'eyeglasses'
		neoi5	'girl, woman'	→	mou5neoi2	'call girl'
		neoi5	'girl, woman'	→	sau1neoi2	'nun'
	b.	gaat6zaat6	'cockroach'	~	gaat6zaat2	
		wu4dip6	'butterfly'	~	wu4dip2	
		aap3	'duck'	~	aap2	
		gaap3	'pigeon, squab'	~	gaap2	

Of particular relevance here is the fact that certain vocative/familiar name formation strategies are accompanied by tone change as well. For example, when the vocative prefix *a3-* or *lou3-* is attached to a name, the tone of that name may become T2 (10).

(10) Cantonese familiar name formation (Yip 1992; Bauer and Benedict 1997)

a.	yip6	a3yip2
	can4	a3can2
	zoeng1	a3zoeng1
b.	yueng4	lou3yueng2
	lei3	lou3lei2
	wong4	lou3wong2
	daai6	lou3dai2

In part because of examples such as (8)-(10), traditional descriptive linguistic literature of Cantonese often attributes tonal mismatches in reduplicative vocatives to the general tendency of tone change to T2. While it seems plausible to attribute tone change to T2 on R_B to Cantonese's preference for tone change to T1 or T2, this only accounts for half the problem. Tone change to T4 on R_A remains a puzzle. Further complicating the picture is the fact that, as illustrated by (11), the type of tonal mismatch in reduplicative vocatives is not a general property of tonal mapping in Cantonese reduplication. Attentuative reduplication in Cantonese adjectives also requires tonal change to T2 on R_B (underlined). However, no concomitant tone change on R_A is needed even when the source syllable carries T5 or T6.

(11) Attentuative reduplication

geng1	'afraid'	geng1<u>geng1</u>dei2	'a bit fearful'
coen2	'stupid'	coen2<u>coen2</u>dei2	'a little stupid'
man3	'edgy'	man3<u>man2</u>dei2	'a bit close to the edgy'
so4	'silly'	'so4s<u>o2</u>dei2'	'a bit silly'
nuen5	'warm'	nuen5<u>nuen2</u>dei2	'a bit warm'
mun6	'boring'	mun6<u>mun2</u>dei2	'a bit boring'
lok6	'green'	lok6<u>lok2</u>dei2	'greenish'

In light of the examples in (11), the grammar of Cantonese must provide some construction-specific means to derive the tonal patterns of the reduplicative vocatives apart from other forms of reduplication in the language.

Recent literature on reduplication suggests that mismatches in reduplicative faithfulness may be the results of the emergence of the unmarked (McCarthy and Prince 1994, 1995; TETU). The next section explores the possibility of analyzing changes to T4 on R_A and T1/T2 on R_B as the effects of TETU in tone-prominence interaction.

2.2. The Emergence of the Unmarked?

This section considers an explanation of the T4T1/T2 templatic effect from the perspective of prominence-driven tonal assignment. The argument for prominence and metrical structures being relevant in Cantonese comes from the need for a disyllabic iambic output template in Cantonese vocative formation.

Yip (1992) argues for the need of a disyllabic iambic output template in Cantonese based on examples such as those in (10). She points out that "[t]hese Cantonese data…can be analyzed as the result of matching a monosyllabic input to a bisyllabic iambic output template, forcing the provision of an extra syllable, and a H-tone prominence marker at the boundary of the foot. The iambic template here is a prosodic target" (p. 29). That the extra syllable /a/ appears as the left rather than the right syllable of the iamb foot is argued to be the result of the head position (i.e. the second syllable) being filled by the source syllable. The fact that the head position carries a high tone is interpreted as a means to increase the prominence of the second syllable.

For the sake of argument, let us assume that the iambic template is what drives vocative reduplication, it is conceivable then that tone change to T4 on the first syllable and to T1/T2 on the second may be analyzed as a consequence of prominence-driven tone assignment (de Lacy 2002). For the sake of argument, let us also posit the structurally-determined tonal prominence scales in (12). The first scale (12a) captures the idea that high-toned syllables (T1 or T2) are preferred in the head position over non-high-toned syllables. The second scale (12b) suggests that T4 is the preferred tone in non-head positions.

(12) a. Structurally-determined tonal prominence scale 1 in Cantonese
HD/{T1, T2} >> HD/¬T{1, 2}
b. Structurally-determined tonal prominence scale 2 in Cantonese
NON-HD/T4 >> NON-HD/¬T4

Given the constraints in (13), the fact that T4 emerges as the tone on R_A when the input syllable carries T2 can be explained as an instance of the emergence of the unmarked. That is, as long as the input T2 has a correspondent in the output word (cf. Struijke 2000; see the failure of (14d)), the remainder of the reduplicative complex may differ in its tonal specification from the input tone provided that tonal mismatch leads to satisfaction of tonal markedness constraints that dominate

BR-faithfulness (i.e. (14a) is chosen the winner over (14b) and (14c) because (14b) and (14c) fatally violate UseT12 and UseT4 respectively).

(13)

IDENT-ASSOC$_{WD}$ (ID-T$_{WD}$)	If there is an association between *x* and tone T in the input, then there is an association between *x*' and T' in the output word, where x' and T' are the correspondents of *x* and T respectively (cf. Myers 1997:863; de Lacy 2002:16, Struijke 2000)
IDENT-ASSOC$_{BR}$ (ID-T$_{BR}$)	If there is an association between *x* and tone T in the base, then there is an association between *x*' and T' in the reduplicant, where x' and T' are the correspondents of *x* and T respectively
*HD/¬T{1, 2} (UseT12)	Assign a violation for each occurrence of a head syllable with a non-T1/T2 tone.
*NON-HD/¬T4 (UseT4)	Assign a violation for each occurrence of a non-head syllable with a non-T4 tone.

(14)

input	RED, /T2/	ID-T$_{WD}$	UseT12	UseT4	ID-T$_{BR}$
☞a.	(T4-T2)[5]				*
b.	(T2-T2)		*!		
c.	(T2-T4)			*!	*
d.	(T4-T4)	*!	*		

Similarly, when the input syllable carries T4, the fully faithful candidate (15b) is rejected because the head syllable carries T4. Gratuitous non-tonal transfers are ruled out because of the effects of dominating tone-prominence constraints (15b) & (15c) or input-word faithfulness (15d).

(15)

input	RED, /T4/	ID-T$_{WD}$	UseT12	UseT4	ID-T$_{BR}$
☞a.	(T4-T2)				*
b.	(T4-T4)		*!		
c.	(T2-T4)		*!	*	
d.	(T2-T2)	*!		*	

While this TETU analysis is appealing from the perspective of being able to tie mismatches in tonal mapping to the interaction between metrical prominence and tonal assignment, such an account runs into several theoretical and empirical problems. To begin with, the TETU analysis developed thus far fails to generate

[5] The head position of a foot is underlined. It is assumed here that the output form must be an iamb; candidates not conforming to this output foot structure will not be considered further. The segmental content of the input and the output candidates are left out for the sake of ease of reference since segmental information does not interact with tonal assignment.

the right output when the input syllable carries a tone that is neither T2 nor T4. As shown in (16), for example, when the input syllable carries T6, the dominance of ID-T_{WD} over UseT12 and UseT12 dictates that the input tone must be faithfully realized somewhere in the output. Total tonal mismatch, the attested option, is ruled out prematurely (see failure of (16a)). Note that demoting ID-T_{WD} is not an option as it would erroneously predict that all disyllabic words in Cantonese have T1 or T2 in the second syllable and T4 in the first.

(16)

input	RED, /T6/	ID-T_{WD}	UseT12	UseT4	ID-T_{BR}
☜a.	(T4-T2)	*!			*
☞b.	(T6-T6)		*!		
c.	(T6-T2)			*!	*
c.	(T4-T6)		*!		*

Furthermore, the unmarkedness of T4 is dubious. (17) shows the type and token frequencies of Cantonese tones reported in Leung et al.'s (2004) recent corpus study of Cantonese.[6] T4 is not the most frequent tone in Cantonese either in terms of token or type frequency. The most common tone in both token and type frequencies is T1. The second most frequent tone is T3.

(17) Type and token frequencies of Cantonese tones (Leung et al. 2004)

Tone			Token	Type
55	T1: 25,193	T7:4,952	30,145	442
25	T2: 23,346		23,346	310
33	T3: 23,279	T8: 3,309	27,002	399
21	T4: 15,898		15,898	271
23	T5: 15,098		15,098	140
22	T6: 25,218	T9: 4,442	29,660	361
Total			141,149	1923

The unmarked nature of T4 is further cast in doubt in light of the type of default tonal assignment evidenced in loanword adaptation in Cantonese. Silverman (1992) reports that disyllabic forms which receive final stress in English enter Cantonese with a H tone (T1 or T2) on the final syllable and a M tone (T3) on the initial syllable (18a). All final syllables that are not perceived as possessing a tone in English surface with a pitch rise (18b) and (18d).

[6] The HKCAC corpus contains eight hours of recordings of phone-in programs and forums on the radio of HK, including 69 native speakers in addition to the program hosts. The corpus contains approximately 140,000 syllable-character units.

(18) Stress-to-tone in English loanwords (Silverman 1992:304)

	English	Cantonese
a.	buffet	pou3fei1
	cigar	syut3gaa1
b.	motor	mou1taa2
	soda	sou1daa2
c.	break	pik6lik1
	fluke	fu6luk1
d.	lace	lei1si2
	film	fei1lam2

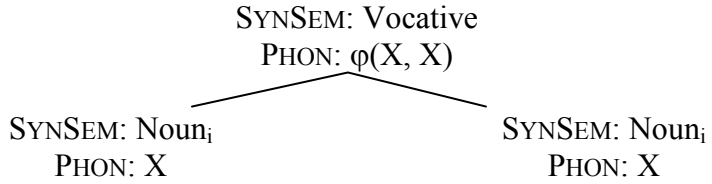
Of particular interest here is the adaptation of English initial consonant clusters into Cantonese. English monosyllables with an initial cluster enter Cantonese as disyllables with an L tone (T6) on the first syllable and an H tone (T1 or T2) on the second (18c). The fact that the epenthetic first syllable in such forms carries T6 instead of T4 thus argues against treating T4 as the default unmarked tone.

In this section, it is shown that the tonal templatic effect observed in reduplicative vocative in Cantonese is largely specific to this morphological construction alone. The next section develops an analysis of tonal transfer (or the lack thereof) in Cantonese vocative reduplication.

3. Vocative as Morphological Doubling

Vocative reduplication is analyzed here in terms of double-stem formation (i.e. a form of stem-compounding), where identity holds at the morphosyntactic rather than the phonological level (Inkelas and Zoll 2005), as illustrated in (19). Tone change is governed by a set of tonal alignment constraints (20) associated with the co-phonology (φ) of reduplicative vocative stem formation.

(19) Reduplicative vocative construction



(20)

ALIGNR-T{1, 2} (ALIGNR)	The right edge of a PrWd must be aligned with the right edge of a syllable with T1 or T2.
ALIGNL-T4 (ALIGNL)	The left edge of a PrWd must be aligned with the left edge of a T4 syllable.
IDENT-ASSOC$_{IO}$ (MAXTONE)	If there is an association between *x* and tone T in the input, then there is an association between *x*' and T' in the output, where x' and T' are the correspondents of *x* and T respectively (cf. Myers 1997:863; de Lacy 2002:16)

Thus, when the input contains T4 syllables, the tone of R_B must change to T2 (21a) because the dominating tonal template constraint, ALIGNR-T{1,2}, which requires the right edge of a PrWd be aligned with the right edge of a syllable with T1 or T2. This constraint must be satisfied even if tonal faithfulness (MAXTONE) is sacrificed. Note that gratuitous tone changes, such as (21c), are not allowed since they do not improve the wellformedness of the reduplicative complex against the tonal template requirements of the vocative reduplication construction.

(21)

input	po4, po4	ALIGNR-T{1,2}	ALIGNL-T4	MAXTONE
☞a.	$[po4po2]_{PrWd}$			*
b.	$[po4po4]_{PrWd}$	*!		
c.	$[po2po4]_{PrWd}$	*!	*	*

When the input contains T1 or T2, the tone of R_A must be T4 (22a) because of another dominating tonal template constraint, ALIGNL-T4, which requires the left edge of a PrWd be aligned with the left edge of a T4 syllable.

(22)

input	go1, go1	ALIGNR-T{1,2}	ALIGNL-T4	MAXTONE
☞a.	$[go4go1]_{PrWd}$			*
b.	$[go1go1]_{PrWd}$		*!	**
c.	$[go1go4]_{PrWd}$	*!	*	*

The analysis thus far shows that tone change is required only when the reduplicative complex would otherwise emerge with tonal specifications that conflict with the templatic requirements of the vocative co-phonology. Total tonal mismatch between the source syllable and the reduplicative complex is observed when the source syllable is associated with tonal specification that does not coincide with tones required by the tonal template constraints. For example, when the tone of the input syllable is T6, candidates that preserve the source tone, either fully (23b) or partially (23c) and (23d), are all rejected as optimal candidates because they violate at least one of the two tonal template constraints.

(23)

input	mui6, mui6	ALIGNR-T{1,2}	ALIGNL-T4	MAXTONE
☞a.	$[mui4mui2]_{PrWd}$			**
b.	$[mui6mui6]_{PrWd}$	*!	*	
c.	$[mui6mui2]_{PrWd}$		*!	*
d.	$[mui4mui6]_{PrWd}$	*!		*

Total tonal mismatch is not an absolute requirement when the source syllable carries a tone other than T1, T2, or T4, however. Recall that when the source syllable has T3, only R_B undergoes tone change. R_A retains the T3 specification. Here, I propose that this is due to the presence of a high ranking tonal faithfulness constraint, MAXT3, which requires the preservation of input T3 association.

(24) MAXT3 If there is an association between *x* and tone T3 in the input, then there is an association between *x*' and T3' in the output, where x' and T3' are the correspondents of *x* and T3 respectively

Given that R_B undergoes tone change while R_A does not, it suggests that MAXT3 is only active when T3 preservation does not conflict with the templatic requirement of ALIGNR-T{1,2} (see the losing candidates in (25b) and (25c). The tonal template requirement of ALIGNL-T4 can be sacrificed if tone change on R_A incurs more violations of MAXT3 than necessary (25a).

(25)

input	taai3, taai3	ALIGNR	MAXT3	ALIGNL-T4	MAXTONE
☞a.	$[taai3taai2]_{PrWd}$		*	*	*
b.	$[taai3taai3]_{PrWd}$	*!		*	
c.	$[taai4taai3]_{PrWd}$	*!	*		*
d.	$[taai4taai2]_{PrWd}$		**!		**

(26) summarizes the final ranking of the reduplicative vocative co-phonology.

(26) ALIGNR-T{1,2} >> MAXT3 >> ALIGNL-T4 >> MAXTONE

The analysis advocated here views the tonal convergence of reduplicative vocative outputs as the results of the idiosyncratic requirements of the co-phonology of vocative reduplication. These tonal template requirements interact with constraints on tonal faithfulness to give rise to the range of observed tonal mapping variation.

4. Conclusions

This paper presents a case of non-tonal transfer in reduplication from Cantonese vocative formation. An analysis appealing to the emergence of the unmarked in metrical prominence-driven tonal assignment is rejected for both empirical and theoretical reasons. It is argued that the lack of tonal transfer in vocative reduplication in Cantonese is governed instead by a set of construction-specific tonal templatic requirements. The interaction between these tonal templatic constraints and constraints on tonal faithfulness give rise to the tonal mapping variation observed in this construction. Thus, unlike the case of Bantu reduplication (Downing 2003), the present case study shows that the lack of tonal transfer does not always result from the emergence of the unmarked or variation in the domain of tonal mapping. Morphological construction-specific tonal mapping should be admitted as a possible mechanism for the lack of tonal transfer in certain cases. It is noteworthy that reduplicative faithfulness plays no role in the present analysis because the individual parts of a reduplicative complex are understood to be independent stems that come together as a result of double-stem formation. The individual parts of the reduplicative complex thus do not stand in correspondence relationship with each other.

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The Effects of Coda Voicing on the Onsets of L2 Learners

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0. Introduction

It has been well-established that syllables define a domain for phonetic as well as phonological processes. In particular, this paper focuses on the interaction of segments at a sub-phonemic level within a unit of syllable. Classifying sub-phonemic and phonemic assimilation, Jones (1932) called the former "similitude" rather than assimilation or coarticulation. For instance, when it comes to production, the consonants and vowels within the same syllable have been found to show greater degrees of active coarticulation than across the syllables (Browman and Goldstein 1989). In addition, as for perception, Mehler et al.'s (1981) experiment with French data indicated that "…the syllable constitutes a unit of speech processing and could serve as accessing units to the lexicon…"

Given that syllables consist of onset, nucleus, and coda, within-syllable interaction at the allophonic level is observed in the following types: within-onset, within-coda, onset-nucleus, nucleus-coda, and onset-coda. First, a well-known example of similitude within onsets is partial devoicing of approximants as an influence of preceding voiceless stops (e.g. [p̥liz] '*please*', [t̥waɪs] '*twice*'; Ladefoged 2006). Next, within coda positions, the closure of the first stop is not released until the second stop is closed in a sequence of a stop and a stop consonant as is illustrated in *abrupt, exempt, inept*… (Hardcastle and Roach 1979). Furthermore, many cases of coarticulation between onsets and nucleus have been found primarily in production. Stetson (1951) found a type of nucleus-to-onset anticipatory coarticulation where tongue body was higher preceding /i/ than preceding /a/ (e.g. /ba/ vs. /bi/, /za/ vs. /zi/). As for the effect of coda on nucleus, vowels were found to be longer before voiced than before voiceless obstruents (Raphael 1972). Last, as is well-known, F0 of nucleus vowels is lower next to voiced than next to voiceless codas (Kingston and Diehl 1994). Such findings allow us to suggest that such a coda-dependent effect might extend to F0 of onsets.

The last type involves long-distance "co-acoustical" effects between onsets and codas. Nguyen and Hawkins (1998, 1999) and Hawkins and Nguyen (2003, 2004) suggested that phonetic correlates of codas can be predicted by onsets. What they found was that duration of onset /l/ and F2 frequency caused listeners

to predict voicing of codas. Their perception experiments showed that the longer duration and the lower F2 of /l/ was perceived as real words with voiced codas faster than the shorter and the higher F2 of /l/, leading to an implication that acoustic cues distributed across the syllable play an essential role in word recognition. Hawkins and Nguyen's acoustic studies with 4 speakers of British English also revealed that "../l/ in onset was 4ms longer and showed lower F2 before voiced (e.g. *blob*) than voiceless codas (e.g. *blop*)…" (Nguyen and Hawkins 1999:647; see also Nguyen and Hawkins 1998, Hawkins and Nguyen 2003). In addition to /l/ in onset, fricatives as well as other sonorants in onset position were longer before voiced than before voiceless codas.

Following Hawkins and Nguyen's recent studies for native speakers of British English, the present study aims to see whether similar coda-dependent acoustic effects can be found with English-learning Korean speakers. The examination of possible coda-dependent effects on onset /l/ with L2 learners could provide a better understanding of how L2 learners are sensitive to allophonic cues stretching from coda over nucleus to onsets.

As is commented by Nguyen and Hawkins (1999), some might wonder if longer duration of onset /l/ is an anticipatory effect from the nucleus rather than from a voiced coda. However, note that F2 of nucleus /ɛ/ was not affected by voicing of codas at least with British English, but F2 of onset /l/ showed coda-dependent effects, indicating that the voicing effect stretches far from the coda crossing over the nucleus. Assuming such long-distance dependencies between codas and onsets for L1 speakers, the present study examines whether English-learning Korean speakers also show long-distance interaction between onsets and codas at phonetic-fine details primarily in L2 production. If significant effects are obtained with speakers of Korean, it might offer a possibility that voicing can be seen as a syllabic feature across different language users.

1. Goals

This study focuses on the L2 production at phonetic-fine details and addresses two questions. The first is whether Korean L2 adult learners' production reflects coda-voicing cues in the onsets in English. If they show the signs of being sensitive to "long-distance" coda dependent effects on onset, it might support the idea that even non-native speakers gradually acquire phonetic fine details such as coarticulation just as L1 speakers do (Oh 2008). Of course, degrees of coda-dependent effects as compared to effects found in native speakers' production would be utilized to evaluate the proficiency of L2 learners. Second, this study investigates whether voicing is a segment-internal feature or a syllable feature across different language users. Even though voicing is not a contrastive feature for the Korean consonant system, if Korean learners reveal sensitivity to voicing contrasts of codas realized in the acoustic properties of onsets, it might suggest that voicing could be a syllable feature even with L2 learners, depending on L2 learners' exposure to target languages.

In order to answer these two questions, this present study first aims to see whether voicing effects over the entire syllable can be observed with L2 learners, i.e. speakers of Korean, which does not have a contrast in the voicing of consonants. The second purpose is to see whether L2 learners' syllabic representation includes phonetic-fine details through production if we assume that the production module is linked with the perception module in the mental lexicon.

2. Acoustic Experiment

Eight female and two male English-learning native speakers of Korean from Daegu University participated in the current production experiment. All subjects had no known speech disorders in pronunciation. Their major or minor was English. They were all junior or senior college students. All were intermediate or advanced English learners collected on the basis of achieving English-related course records of 80% out of 100%. One weakness with our experiment is that the subjects learned American English primarily, while the results in this study will be compared with the results with speakers of British English (Hawkins and Nguyen 2004). Participants' ages ranged between 22 and 28 with an average age of 23.1. They had all learned English in school, starting between ages 8 and 14. The average age of starting English learning was 13.3 years. Their mean period of learning English was 11 years.

Most of the materials were created similarly to the data in Hawkins and Nguyen (2004) in order to easily compare the results with native speakers of British English. All the stimuli were monosyllabic /(C)lVC/ nonce words. Onsets were a single /l/ or six consonant clusters, including /l/ (/l, bl, pl, gl, kl, fl, sl/), and nuclei varied among eleven vowels /i, ɪ, e, ɛ, ə, æ, aɪ, a, ʌ, aʊ, u/. Codas consisted of voiced/voiceless stops according to three places of articulation (/b, p, d, t, g, k/). Since this study examines the acoustic characteristics of onset /l/ possibly affected by coda-voicing, /l/ was included in each onset type. Further, onsets were divided into subcategories such as a single /l/, a stop followed by /l/, and a fricative followed by /l/. All these types were legitimate in English onset clusters. A subset of stimuli materials are illustrated in (1).

(1) Stimuli

/l+V+C/

lead	*leat*	*leab*	*leap*	*leak*	*leag*
lid	*lit*	*lib*	*lip*	*lick*	*lig*

/bl+V+C/

bleed	*bleet*	*bleeb*	*bleep*	*bleak*	*bleeg*
blid	*blit*	*blib*	*blip*	*blik*	*blig*

/pl+V+C/

plead	*pleet*	*pleeb*	*pleep*	*pleek*	*pleeg*
plid	*plit*	*plib*	*plip*	*plick*	*plig*

/gl+V+C/					
gleed	*gleet*	*gleeb*	*gleep*	*gleek*	*gleeg*
glid	*glit*	*glib*	*glip*	*glick*	*glig*
/kl+V+C/					
kleed	*kleet*	*kleeb*	*kleep*	*kleek*	*kleeg*
klid	*klit*	*klib*	*clip*	*click*	*klig*
/fl+V+C/					
fleed	*fleet*	*fleeb*	*fleep*	*fleek*	*fleeg*
flid	*flit*	*flib*	*flip*	*flick*	*flig*
/sl+V+C/					
sleed	*sleet*	*sleeb*	*sleep*	*sleek*	*sleeg*
slid	*slit*	*slib*	*slip*	*slik*	*slig*

In total, 4620 stimuli (7 onset types x 11 nucleus vowels x 6 codas) were collected and analyzed, including 1240 filler words. As is shown above, the words in a minimal pair consisted of the same onset and nucleus vowel except for the voicing contrast. Since this study focused on the coda voicing factor, the acoustic properties of onset /l/ were compared in both conditions.

All the subjects were instructed to read the stimuli list in (2) in random order at a normal speaking rate. Each word was embedded in the carrier sentence *Please say _____ to me*. to minimize the effects of other factors. Their sounds were recorded with PRAAT in the computer in a sound-attenuated phonetics lab. This recording was done digitally. The digitization was done at 44100 Hz sampling rate. Probably because of the advanced level of English, most speakers had little trouble pronouncing the onset sequences such as 'Cl' without inserting vowels between clusters. F2 frequency and F0 of /l/ in both the conditions (voiced/voiceless codas) were measured at the midpoint of /l/; the duration of /l/ was also measured.

3. Results

3.1. Coda-Voicing Effect on F2 of Onset /l/

Table 1 shows the mean and standard deviation of F2 in onset /l/ in voiced and voiceless coda conditions.

Table 1. The mean and standard deviation of F2 in onset /l/ in voiced/voiceless conditions

		Mean	N	SD	SE
F2 (Hz)	voiceless	1488	70	209	24
	voiced	1479	70	216	25

A paired-sample t-test revealed that there was no significant difference in F2 frequency of onset /l/ between the voiced and voiceless coda conditions (1488 Hz vs. 1479 Hz; t (69) = 1.0, $p>0.05$). It indicates that overall, the coda voicing factor did not exert influence on the F2 of onset /l/ with Korean speakers. This finding

differs from that with native speakers of English, i.e., F2 of onset /l/ was lower before voiced than voiceless codas (Nguyen and Hawkins 1998).

Then we looked into coda-dependent effects on the F2 patterns in onset /l/ for individual speakers. A paired-sample t-test revealed that there was a highly significant difference in F2 for two speakers i.e. a female speaker K6 and a male speaker K8 (t (223) = 3.11, $p<0.001$ for K6; t (225) = 3.08, $p<0.01$). That is, interestingly, F2s of onset /l/ were lower before voiced than before voiceless codas for at most two speakers. This result indicates that for F2 values of onset /l/, coda-dependent effects on the onset varied from speaker to speaker. The upshot is that some L2 learners produced onset /l/ differently, depending on the voicing of codas, like native speakers of English, revealing long-distance anticipatory effect from coda to onset. As Nguyen and Hawkins (1999) comment, the fact that onset /l/ showed lower F2s indicates that /l/ was pronounced slightly darker before voiced codas than before voiced ones.

Table 2 shows the mean and standard deviation of F2 in onset /l/ according to three subcategories of onset type. A post-hoc paired sample t-test revealed that there was a significant difference in the F2 of the onset when the onset was a single /l/, but no difference when /l/ was included in consonant clusters CC. Like native speakers of English, F2 of onset /l/ was lower before voiced codas than before voiceless ones (1567 Hz vs. 1608 Hz, t (9) = 2.47, $p<0.05$). This indicates that overall, Korean speakers produced onset /l/ a littler darker before voiced codas than before voiceless codas particularly only when onset was a single /l/, confirming sensitivity to long-distance coda effects on onsets in production.

Table 2. The mean and standard deviation of F2 in onset /l/ in voiced/voiceless conditions by onset types

Onset Type		Mean of F2	N	SD	SE
lVC	vls	1608	10	243	76
	vd	1567	10	237	75
{bl,pl,gl,kl}VC	vls	1449	10	179	56
	vd	1441	10	188	59
{fl, sl}VC	vls	1508	10	218	69
	vd	1511	10	221	70

In summary, although the overall results with all speakers did not exhibit significant coda-dependent effects on F2s in onset /l/, some individual speakers showed signs of sensitivity to different voicing of codas. This result is interesting in that L2 learners are partly predicting coda-voicing contrasts, even in the pronunciation of onsets, or that they capture the voicing effects across the whole syllable like native speakers of English.

3.2. Coda-Voicing Effect on Duration of Onset /l/

Table 3 displays the mean and standard deviation of duration in onset /l/ between voiced and voiceless coda conditions. A paired-sample t-test with all subjects

revealed that there was a significant coda-dependent effect on duration of onset /l/, confirming "long-distance coarticulation" effect (t (69) = –3.778, p=0.001). Duration of onset /l/ was 5 ms longer before voiced than before voiceless codas (86 ms vs. 81 ms). This finding totally agrees with the result with native speakers of English (Nguyen and Hawkins 1999), indicating that, interestingly, Korean L2 learners are acquiring native-like sub-phonemic assimilation.

Table 3. The mean and standard deviation of duration of onset /l/ in voiced/voiceless conditions

		Mean of length (ms)	N	SD	SE
Duration of /l/	voiceless	81	70	29	3.4
	voiced	86	70	32	3.9

Table 4 exhibits the mean and standard deviation of duration in onset /l/ in voiced and voiceless coda conditions, depending on three onset types. A paired-sample t-test within each onset type revealed that there was a significant coda-voicing dependent effect on the duration of onset /l/ when the onset cluster CC was 'a stop + /l/' (e.g. *blid* vs. *blit*) or 'a fricative + /l/' (e.g. *flid* vs. *flit*) (t (9) = –2.194, p=0.05 for 'a stop + /l/'; t (9) = –2.91, p<0.05 for 'a fricative + /l/'). As is seen in Table 4, onset /l/ was 6 ms longer before voiced than before voiceless codas when onset clusters consisted of a stop followed by /l/ (80 ms vs. 74 ms). Similarly, the duration of onset /l/ was 6 ms longer before voiced than before voiceless codas when the onset clusters were a fricative followed by /l/ (84 ms vs. 78 ms). As was mentioned in previous section, though most of the CC onset clusters were pronounced without an inserted vowel by advanced learners, the length difference squarely reflects the coda-dependent effects on the onset /l/ rather than the duration of complex onsets. However, there was no significant coda-voicing effect on the duration of onset /l/ when the onset was a single /l/ (t (9) = 0.02, p>0.05).

Table 4. The mean and standard deviation of duration of onset /l/ according to onset type

Onset Type		Mean of length (ms)	N	SD	SE
lVC	vls	114	10	20	6.5
	vd	114	10	23	7.3
{bl,pl,gl,kl}VC	vls	74	10	24	7.7
	vd	80	10	29	9.3
{fl, sl}VC	vls	78	10	25	8.1
	vd	84	10	28	8.9

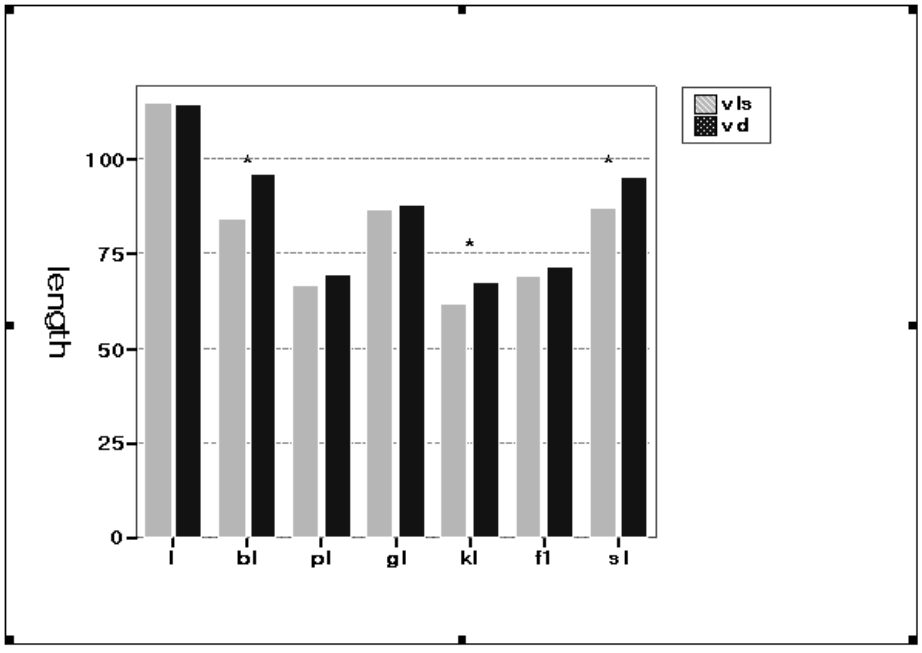
In brief, this result suggests that Korean L2 learners are sensitive to coda-voicing contrasts in the pronunciation of onset /l/, specifically when /l/ is part of complex onsets. Further, this finding provides the interesting implication that even for

English-learning Korean speakers, syllables can be specified as having voiced or voiceless codas even from the beginning of onsets, like native speakers of English (Nguyen and Hawkins 1998, 1999).

A one-way ANOVA with a factor of three types of onsets showed that there was a significant effect of onset-type on duration of onset /l/ ($F(2, 57) = 13.46$, $p<0.001$). When coda-voicing collapsed, a single onset /l/ was the longest (114 ms), the duration of onset /l/ following a fricative (/fl, sl/) was next longest (81 ms), and onset /l/ following a stop (/bl, pl, gl, kl/) was the shortest (77 ms).

Next, Figure 1 displays the mean duration of onset /l/ in both voiced and voiceless coda conditions according to seven onset types (/l, bl, pl, gl, kl, fl, sl/). A post-hoc paired-sample t-test was conducted to see coda-dependent voicing effects on the duration of onset /l/ according to each of seven onset types. The analysis revealed that there was a significant coda-voicing effect on the duration of onset /l/ for /kl/ and /sl/ onset clusters (for /kl/, t (9) = –2.436, $p<0.05$; for /sl/, t (9) = – 2.9, $p<0.05$). Specifically, onset /l/ was longer before voiced than before voiceless codas when onset clusters were /bl, kl, sl/ (for /bl/, 96 ms vs. 84 ms; for /kl/, 67 ms vs. 61 ms; for /sl/, 95 ms vs. 87 ms).

Figure 1. The mean of duration of onset /l/ for seven onset types in voiced/voiceless coda condition[1]



Let us turn to coda-voicing effect on duration of onset /l/ according to nucleus vowel types. A post-hoc paired-sample t-test was conducted. The analysis revealed that there were significant effects of coda-voicing on duration of onset /l/ primarily

[1] * represents significant differences

when the nucleus vowels were front mid vowels /i, ɪ/, but as for /e, ɛ/, coda-voicing showed insignificant tendency. Duration of onset /l/ was longer before voiced than before voiceless codas when V in a sequence of (C)lVC was /i, ɪ, e, ɛ/ (for /i/, 91 ms vs. 81 ms, t (9) = –4.248, p<0.01; for /ɪ/, 85 ms vs. 79 ms, t (9) = – 2.34, p<0.05; for /e/, 90 ms vs. 76 ms, t (9) = –2.076, p=0.06; for /ɛ/, 84 ms vs. 77 ms, t (9) = – 1.926, p=0.08). This result indicates that Korean L2 learners might have predicted coda voicing before the start of codas by producing onset /l/ longer before voiced than before voiceless codas, showing native-like patterns of phonetic fine details such as "long-distance" interaction within syllables.

In summary, we found that, overall, onset /l/ was significantly and slightly longer before voiced than before voiceless codas with Korean L2 learners, confirming long-distance anticipatory effects of coda-voicing on the onsets. These robust anticipatory effects are consistent with the results with native speakers of English, suggesting L2 learners' native-like sensitivity to voicing effects across whole syllables.

3.3. Coda-Voicing Effect on F0 of Onset /l/

Previous studies found that F0 of onset /l/ did not exhibit coda-voicing dependent effects on onsets with native speakers of English (Nguyen and Hawkins 1998, Hawkins and Nguyen 2004). Native speakers of English did not turn on the signal of F0 in onsets to indicate anticipatory coda-voicing. In order to directly compare such findings with Korean L2 learners' production, F0 at the midpoint of onset /l/ was measured. Table 5 displays the mean and standard deviation of F0 in onset /l/ in both conditions. Interestingly, a paired-sample t-test revealed that there was a highly significant effect of coda-voicing on F0 in onset /l/ (t (55) = 3.906, p<0.001). Unlike the case of native speakers of English, F0 of onset /l/ was lower before voiced than before voiceless codas (204 Hz vs. 207 Hz). What is of interest here is that Korean L2 learners employed more than one supra-segmental acoustic cue such as F0 as well as duration in onset /l/ to indicate voicing contrast in coda.

Table 5. The mean and standard deviation of F0 of onset /l/ in voiceless/voiced conditions

	Mean F0 (Hz)	N	SD	SE
Vls	207	56	45.2	6.0
Vd	204	56	44.5	5.9

This result implies that even L2 speakers of Korean might have lexical representation with voicing feature stretching over the whole syllable.

A post-hoc one-way within-subject ANOVA with one factor (onset-type: /l/ vs. /bl, pl, kl/ vs. /fl, sl/) was conducted to see if there is a coda-voicing effect on F0 in onset /l/. Analysis revealed that overall, there was no significant effect (F(2, 45) = 1.354, p>0.05). However, a paired-sample t-test within each onset type displayed that there was a significant effect of coda-voicing on F0 in onset /l/ when onset /l/ was followed by stops /b, p, g, k/ (t (7) =2.392, p<0.05). It was found that

F0 of onset /l/ was slightly but significantly lower before voiced than before voiceless codas in the onset type /bl, pl, gl, kl/ as is illustrated in Figure 7 (205 Hz vs. 207 Hz).

In summary, overall this investigation of F0 in onset /l/ revealed that Korean L2 learner's production of onsets were sensitive to predicting voicing contrast in codas, unlike native speakers of English, i) when onset clusters consisted of a stop followed by /l/ and ii) when coda consonants were coronals and labials. Thus this finding confirms "long-distance" influences of codas on onsets with L2 learners' production. More detailed implications on the acquisition of phonetic fine details by Korean L2 learners and the phonological status of voicing will be discussed in the following section.

4. Discussion

This study examined acoustic characteristics of onset /l/ to see if they are affected across nucleus vowels by the voicing feature of codas, especially with English-learning Korean speakers. We address two issues: (i) the availability of phonetic fine details such as duration, F0, and F2 that L2 learners might adopt to predict coda-voicing, and (ii) the possibility of specifying a voicing feature as spreading over the whole syllable in their mental representations.

First, as for the availability of phonetic fine details to predict long-distance influence by codas, results based on production of onset /l/ by ten English-learning speakers of Korean showed coda-voicing dependent effects on the onset. However, they were more sensitive to duration and F0 of /l/ than F2 of /l/ in onset. Such results slightly differ from a series of Hawkins and Nguyen's consistent studies in that native speakers of English exhibited significant effects with respect to F2 and duration of onset /l/, while F0 of onset /l/ was not affected. When it comes to Korean L2 learners, F2 of onset /l/ was lower before voiced than voiceless codas only i) for two speakers out of ten and ii) when codas were coronals. But overall duration of onset /l/ was longer before voiced than before voiceless codas. In addition, F0 of onset /l/ was lower before voiced than before voiceless codas. Put together, interestingly, Korean L2 learners mobilized more acoustic cues in the production of onset /l/ to predict coda-voicing than native speakers of English.

Thus, it is worthwhile to tackle the question of why Korean L2 learners resort to duration and F0 more than F2 in onsets. Put differently, supra-segmental elements like duration and F0 are more available than a lingual element like F2 involving tongue back position. One possible explanation involves phonological or phonetic transfer from Korean. As is reported in the present study, Korean L2 learners showed slightly "darker" /l/ by producing onset /l/ with lower F2 before voiced than before voiceless codas only with two speakers out of ten. This finding in a relatively small number of subjects implies that they might not yet have acquired subtle sub-phonemic details in the production of /l/. Such difficulty in production of phonetic fine details or acquisition of F2 might be due to the fact that there is no contrast between clear [l] and dark [l] at sub-phonemic level in Korean. However, supra-segmental elements like duration and pitch are relatively more available for the

Korean vowel or consonant system in a limited way. Kim's (2002) acoustic study of Korean stops found that closure duration of intervocalic tense and aspirated consonants is more than two times as long as lax consonants, and closure duration is the longest for the tense consonants. Further, it is well-known that a vowel length contrast still exists in a small range of lexical items with two or three syllables in most dialects except for the Seoul standard dialect (Jun 1995). In addition, Kim et al.'s (1993) acoustic and perception study exhibited that F0 in the first five glottal pulses were higher in aspirated and tense stops than in lax stops. Furthermore, F0 played a crucial role as a perceptual cue in the distinction of three-way stops.

These differences in the role of production and perception between F2 and duration and F0 in the Korean phonological/phonetic system might have transferred to the acquisition of phonetic fine details in English. Another line of explanation might involve markedness between duration and F2 across languages. Specifically, supra-segmental cues like length and pitch in vowels and consonants might be less marked than segmental lingual properties like F2, making it easier for L2 learners to acquire and manipulate than formant frequencies of /l/. The rationale behind this reasoning is that length and pitch are features commonly used cross-linguistically and thus are more likely to adapt for L2 production. As an anonymous reviewer points out, our results interestingly contrast with Dupoux et al.'s (2008) finding that L2 learners have more trouble learning stress than segments. Despite such differences, the overall results in the present study provide many interesting implications. First, the results show that Korean L2 learners are acquiring coda-voicing effects on the sub-phonemic properties of onset /l/ in English even though their availability is not identical. Such findings support Kuhl and Iverson's (1995) position that L2 learners' perceptual flexibility to phonetic properties in target languages (English) influenced their production, depending on their L2 experience or exposure to target languages, given that the production mechanism is closely linked to the perception system in their mental lexicon. Second, this study shows that voicing features of codas spread across syllables even in the production of Korean, with no phonological voicing contrast in its consonant system. Thus it leads us to offer the interesting implication that a voicing feature might be phonetically universal and can be specified as a syllable feature beyond segments.

Second, it was found that a contrast in the voicing of codas was manifested in the phonetic realization of onset /l/ for L2 learners with respect to F0, F2 and duration of /l/. As is discussed in the previous section, extension of phonetic correlates of a voicing feature over the entire syllable induces us to speculate that voicing might be a syllable feature rather than a segment-internal feature (Shastri et al. 1999, Greenberg 2004). Such an idea holds in terms of perception or word recognition (Nguyen and Hawkins 1999). That is, longer duration, lower F0, and lower F2 of onset /l/ followed by longer duration of nucleus vowels followed by shorter duration of voiced codas might contribute to enhancing the perception of voicing in the whole syllable or word according to "Auditory Enhancement Theory" (Kingston and Diehl 1994).

5. Conclusion

In this acoustic study, we explored "long-distance" co-acoustical patterns between onset and coda in (C)lVC sequences in English-learning Korean speakers. Results showed that they were sensitive to coda voicing effects on onset /l/ through phonetic fine details like F0, F2, and duration of /l/. Onset /l/ was slightly longer, darker (lower F2), and lower-pitched before voiced than before voiceless codas. This finding supports the position that even L2 learners are able to acquire sub-phonemic details like native speakers. Furthermore, it provides several interesting implications. First, the voicing property can be a syllable feature, influencing all the segments in the same syllable. Second, more robust phonetic manifestations of durational and F0 effects over F2 might be due to the possibility that the Korean L2 learners are more sensitive to temporal cues than to spectral cues.

Further studies are still worth pursuing to confirm the acoustic results of this investigation. First, it might be interesting to see if the delicate differences in F0, F2 and duration of onset /l/ affect word recognition for English-learning Korean listeners. Prospective significant results will definitely validate the status of voicing as a syllable feature even for L2 learners. Second, we might attempt to find out if other parameters, like the L2 learners' proficiency level, differently affect production and perception of phonetic fine details.

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PARASESSION:
NEGATION

Discourse and Scalar Structure in Non-Canonical Negation

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0. Introduction

This paper combines two strands of research: (i) the study of the discourse-contextual requirements on the use of non-canonical negative forms, and (ii) research on what has recently been termed the "permeable polar membrane" (Horn 2008) of approximative adverbs like English *almost* and *barely*. As regards the first, cross-linguistic studies have shown that non-canonical sentential negatives are licensed under particular discourse conditions that relate to information structure (Fretheim 1984, Espinal 1993, Zanuttini 1997, Kaiser 2006, Schwenter 2005, 2006). Regarding the second, it has been observed that the polar component of approximative adverbs is more open to contextual flexibility than their proximal component (see Li 1976, Horn 2002, Schwenter 2002, Amaral 2007 a.o.). In this paper, we focus on the negative readings of two approximative adverbs, Engl. *hardly* and European Portuguese (henceforth EP) *mal* 'barely, hardly,' and argue that their "strengthened" negative interpretations can be fleshed out in terms of constraints on the discourse structure. In our proposal, we build both on the licensing conditions of non-canonical negatives and on the scalar meaning of approximative adverbs.

The structure of the paper is as follows. In section 1, we present the Conjunctive Analysis of approximative adverbs and introduce the canonical and inverted readings of these forms. In section 2, we briefly review the literature on the licensing conditions of non-canonical negatives. Section 3 details the distribution of the inverted readings of Engl. *hardly* and EP *mal* and section 4 proposes the constraints on discourse structure effected by these inverted readings. Section 5 provides concluding remarks.

1. The Meaning of Approximatives: Canonical and Inverted Readings

The meaning of approximative adverbs like English *almost* and *barely/hardly* has been analyzed as the conjunction of two propositional components (Sevi 1998; Horn 2002), called "proximal" and "polar," fleshed out below in the paraphrases of examples (1) and (2), from Horn (2002):

(1) Gore **almost** won.
(1′) Gore came close to winning (proximal component) & Gore didn't win (polar component)

(2) Bush **barely/hardly** won.
(2′) Bush came close to not winning (proximal component) & Bush won (polar component)

Cross-linguistically, these adverbs can license interpretations where the polar component has opposite polarity (Li 1976; Schwenter 2002; Pons and Schwenter 2005; Amaral 2006), i.e. adverbs like *almost* may display a positive polar component and adverbs like *barely/hardly* may display a negative polar component. In this paper, we will refer to these interpretations as "inverted readings" of approximative adverbs to distinguish them from the "canonical interpretations" paraphrased in (1) and (2). The canonical and the inverted interpretations of *hardly* are exemplified below: Whereas in (3) the sentence containing *hardly* expresses a proposition that entails the truth of the predicate *pass the exam* (as in (3′)), in (4), the sentence containing *hardly* expresses a proposition that entails the negation of the predicate *be in short supply*, as in (4′):

(3) The final result, John **hardly** passed the exam, and received a low grade, and Sarah passed with a high grade and with less effort and stress.
(http://alittlebitabout.com/Articles/Education/Pareto-principle.html)

(3′) John passed the exam.

(4) Title: Ten Green Announcements From the Detroit Auto Show Kick-off.
Automakers kicked off this year's North American International Auto Show yesterday with less glitz and more conspicuous frugality than in years past. But new plans for hybrid and electric models were **hardly** in short supply. (Following paragraphs: description of ten new announcements of hybrid and electric cars)
(http://earth2tech.com/2009/01/12/10-green-announcements-from-the-detroit-auto show-kick-off)

(4′) The plans for green vehicles were not in short supply.

In this paper, we focus on the inverted interpretation of *hardly*, as exemplified in (4). We will show how the contribution of *hardly*, which entails the negation of the modified predicate, differs from the meaning of the canonical sentential negator *not* (e.g., *But new plans for hybrid and electric models were not in short supply*), by proposing a set of conditions on the discourse structure that are associated with the inverted readings of approximative adverbs.

1.1. Differences Between *barely* and *hardly*

Before we focus on the negative reading of *hardly*, it is important to distinguish this adverb from its near-synonym *barely*, as well as from its use as a stand-alone response particle. Consider the contrasts between the two adverbs in the following sentences:[1]

(5) Mary **barely** passed her exam.
(6) Mary **hardly** passed her exam.

(7) Mary BARELY passed her exam.
(8) Mary HARDLY passed her exam.

Without additional contextual modification, (5) and (6) have the same interpretation: Mary passed her exam but approximated not passing it. By contrast, (7) and (8), where the approximatives each receive a focal pitch accent, are most readily interpreted by native speakers in distinct fashion. In the case of (7), the pitch accent reinforces the proximal meaning of the adverb, i.e. the proximal component is understood as even closer to the negation of the predicate. In (8) however the interpretation of *hardly* is understood as that of the inverted approximative: Mary did not pass her exam, and in fact did not even come close to doing so. The focal pitch accent in (8) does not guarantee the inverted approximative interpretation (i.e. it is not criterial for this meaning "inversion"), but it does make that interpretation much easier to access in the absence of additional contextual material.

Another interesting restriction on *hardly* that distinguishes it clearly from *barely* can be appreciated in responses to yes/no-questions. In this context, *hardly* is actually restricted to its inverted reading; the approximative meaning is by contrast inaccessible, as shown by the possible continuations of B's response in (9) and (10):

(9) A: Did you finish writing your paper?
B: **Barely**/Just **barely**/Only **barely**: I finished it five minutes ago!

(10) A: Did you finish writing your paper?
B: **Hardly**/#Just **hardly**/#Only **hardly**: # I finished it five minutes ago!

(11) A: Did you finish writing your paper?
B: Yes, but (just) **barely**/#**hardly**.

(12) A: Did you finish writing your paper?
B: No, **hardly**/#**barely**.

As the difference between (9) and (10) shows, modification by *just* or *only* of *barely* is felicitous but similar modification is not acceptable with *hardly*, since *barely* in (9) entails that B finished writing her paper while *hardly* in (10) entails

[1] Small caps are intended to signal a pitch accent on the adverb.

the negated proposition, i.e. that B did **not** finish writing her paper. In a similar vein, the initial affirmative response particle in (11) is compatible with the positive polar component of *barely*, but the negative response particle in (12) only makes sense with *hardly*, because of the restriction of *hardly* to the inverted interpretation in the yes/no-question context.

2. Licensing Conditions of Non-Canonical Negatives

Research on the form and meaning of non-canonical negation has focused on sentential negatives that are formally distinct from the canonical or "unmarked" way of expressing sentential negation in a given language (Hansen 2008; Schwenter 2005, 2006). Contrasts between canonical and non-canonical sentential negatives, respectively, can be seen in pairs like *non* V vs. *non* V *mica* in Italian (Zanuttini 1997) or *no* V vs. *no* V *pas* in Catalan (Espinal 1993), where a post-verbal nominal minimizer (*mica* '(a) crumb'; *pas* '(a) step') have been reanalyzed as part of a bipartite sentential negative. The goal of much of this work has been to determine the specific licensing conditions for non-canonical negatives vis-à-vis their canonical counterparts.

On an intuitive level, non-canonical negatives (NCNs) are typically treated as "emphatic." NCNs have also been called presuppositional negatives, which contrast with their non-presuppositional canonical negative counterparts (Zanuttini 1997): NCNs like *non* V *mica* in Italian deny a proposition that is already entered into the discourse record, and is thereby "presupposed," while CNs do not display the same requirement on the status of the propositions they modify. More recent work has focused on information structural explanations (Schwenter 2005, Hansen 2008, Kaiser 2006, Fretheim 1984): NCNs differ from canonical negatives in that they pose pragmatic constraints on the discourse status of the propositions that they can modify. In most instances of NCNs studied to date, the negated proposition must be discourse-old (cf. Prince 1992; Birner 2006), i.e. it must be either evoked in or inferentially linked to prior discourse.[2] But crucially, different NCNs, both across languages and in the same language (see Schwenter 2005, 2006), have different information structure constraints.

A standard example of a NCN is the EP construction NEG-*NADA*, formed by the adverb of negation *não* 'not' in preverbal position and the negative indefinite pronoun *nada* 'nothing' in post-verbal position (after a finite verb). In EP, the felicitous use of this construction is only licensed in the context of a discourse-old proposition that has been asserted in the immediately prior context by an interlocutor (Schwenter 2008). So, in (13), while the use of the canonical sentential negator (as negative response particle) *não* 'no, not' is felicitous in B1's response, the occurrence of NEG-*NADA* in B2's response is infelicitous, since the denied

[2] Under this definition, which corresponds closely to Birner's (2006) revision of Prince's (1992) original model of given/new information, discourse-old propositions could be either familiar or unfamiliar to the hearer.

proposition, the proposition that Pedro buys a house in the near future, is not *asserted* in A's utterance:

(13) A: O Pedro vai comprar uma casa?
'Is Pedro going to buy a house?'
B1: Não.
B2: #Não vai nada.

On the other hand, in (14) both the canonical and the non-canonical negations are acceptable since the denied proposition enters the discourse record as an assertion. In other words, the non-canonical form contributes a propositional denial (like the canonical form) but is *pragmatically stronger* in that its use is more restricted than that of sentential *não*.[3] The claim that the EP construction is a strengthened negator can be tested by applying the *or at least* test for pragmatic scales (Horn 1972, Israel 1996), as in B1 and B2's elaborations on the initial response:

(14) A: O Pedro vai comprar uma casa.
'Pedro is going to buy a house.'
B1: Não, não vai. B2: Não vai nada!
B1: (CN) Ou pelo menos ainda não, porque não tem dinheiro.
B2: (NCN) #Ou pelo menos ainda não, porque não tem dinheiro.
'No, or at least not yet, because he doesn't have the money.'

As these continuations illustrate, any weakening of the negation with the *or at least* test is infelicitous with the NCN but perfectly fine with the CN construction.

In the following, we show that the distribution of the inverted readings of *hardly* and *mal* is more constrained than the distribution of canonical negatives (Engl. *not*, EP *não*). The negative interpretation of *mal* is restricted to a specific construction: The adverb modifies an epistemic stative verb (e.g. *saber* 'to know,' *imaginar* 'to imagine,' *acreditar* 'to believe') occurring in a form with imperfective aspectual value, e.g. the imperfective past (*Imperfeito do Indicativo*), and the verb selects for a sentential complement (in (15), introduced by the complementizer *que*). The subject, if overtly expressed, occurs typically in post-verbal position, although this is not obligatory. This construction is schematically represented in (15):

[3] The NEG-*NADA* construction applies only to propositions which have a certain pragmatic force: an asserted proposition is a proposal to update and change the discourse record, possibly in a controversial way (cf. Stalnaker 1978). The pragmatic restriction to denials of propositions with such a status explains the intuitively "emphatic" meaning of this construction. Given the privileged status of assertions, it may be the case that the NEG-*NADA* construction is associated with an implication of certainty on the part of the speaker (hence contributing to the strength of the speaker's commitment to the denial), but this is beyond the scope of this paper.

(15) *Mal* $V_{[\text{epistemic state}]}$ *que* S
[imperfective aspect]

In this construction, there is an implication as to the speaker's commitment to the truth of the proposition expressed by S.

Although the negative reading of *hardly* is more lexicalized than the negative reading of *mal*, in both cases the inverted readings of the adverbs are constrained by discourse structure. In section 4, we will show how the licensing conditions of the inverted readings make it possible to elucidate the notion of "strengthened negation."

3. Distribution of the Inverted Readings of English *hardly* and EP *mal*

Several diagnostics can be used to test the restricted distribution of the inverted readings of *hardly* and *mal*. Starting with *hardly*, whereas both *hardly* and *no* are felicitous in proposition denials, as in B1 in (16), only *no* is acceptable in expressing metalinguistic negation (Horn 1985, 1989), as shown by the contrast between B2 and B3:

(16) A: John is pretty tall.
B1: He is not/**hardly** tall, he is actually very short. (proposition denial)
B2: He is not TALL, he is GARGANTUAN.
B3: #He is **hardly** TALL, he is GARGANTUAN.

This test shows that *hardly* invariably indicates a proposition denial, hence the infelicity of B3.

The test of "redundant affirmation" (Horn 1991) also shows a difference between the behavior of the canonical and the non-canonical negatives. According to Horn, an "informationally redundant affirmation" is discourse-acceptable even after its content has been entailed or presupposed in the context as long as it is rhetorically opposed to the preceding utterance. Redundant affirmation is acceptable with *no*, as in (17), but not with *hardly*, as shown by the infelicity of (18):

(17) A: Did you finish writing your paper?
B: No, but I'll be done in a few minutes.

(18) A: Did you finish writing your paper?
B: #**Hardly**, but I'll be done in a few minutes.

Whereas the canonical negative form *no* in (17) is compatible with the rhetorically opposed proposition introduced by the *but*-clause, *hardly* is not acceptable in the same context.

As for *mal*, the *or at least* test shows that the inverted reading is infelicitous in a context inducing the weakening of the negation, whereas in such a context the canonical form *não* is acceptable:

(19) O João não imaginava que a água ia gelar nas torneiras, ou pelo menos que ia ficar tanto frio.
'João did not (CN) imagine that the tap water would freeze, or at least that the weather would become so cold.'

(20) #O João **mal** imaginava que a água ia gelar nas torneiras, ou pelo menos que ia ficar tanto frio.
'João did not (*mal*: NCN) imagine that the tap water would freeze, or at least that the weather would become so cold.'

Finally, both *hardly* and *mal* are not licensed as denials of a merely shared prior belief, as shown by (21) and (22) below, in which the counterpart canonical negatives are perfectly felicitous:

(21) (Context: The interlocutors believed that John was going to move to Michigan)
A: Guess what? #John is **hardly** moving to Michigan!
vs. Guess what? John isn't moving to Michigan!

(22) (Context: The interlocutors believed that João thought that Ana was going to move from Portugal to the USA)
A: Sabes uma coisa? #O João **mal** sabe que a Ana não vai mudar de país.
vs. Sabes uma coisa? O João não sabe que a Ana não vai mudar de país.
'You know what? João does not (*mal*/*não)* know that Ana is not going to move to a different country.'

The infelicitous use of *hardly* and *mal* in (21) and (22) shows that the approximative adverbs contribute the denial of a proposition whose salience must be established in the previous *linguistic* context. The existence of a shared belief which has not been linguistically expressed or cannot be inferred from a previous utterance is not enough for the felicity of the inverted reading.

Example (4), partially repeated here, shows how the discourse-old proposition denied by *hardly* may be unfamiliar to the hearer and inferentially linked to the previous discourse (Birner 2006):

(4) Automakers kicked off this year's North American International Auto Show yesterday with less glitz and more conspicuous frugality than in years past. But new plans for hybrid and electric models were **hardly** in short supply.

From the assertion that this year there is "less glitz and more conspicuous frugality than in years past" one may infer that there are fewer plans for new auto technology at this year's show, e.g. fewer hybrid and electric models. Thus,

hardly is denying a contextually-accessible proposition that can be inferred from prior linguistically explicit material.

4. Discourse Conditions on the Inverted Readings of *hardly* and *mal*

We propose that the negative readings of *hardly* and *mal* are licensed in a set of contexts that meet the following conditions:

(i) The linguistic context entails a set of propositions that are structured, namely, that are ordered by pragmatic entailment (in the sense of Fauconnier 1975) in a contextually determined scale;
(ii) There is a proposition accessible in the context (either explicitly expressed or that can be inferred from a proposition expressed in the previous linguistic context), the context proposition or cp (cf. Kay 1990), which is part of the common ground of speaker and hearer at the time of utterance;
(iii) The proposition expressed by the sentence containing the approximative adverb,[4] the text proposition or tp, pragmatically entails the negation of cp.

To make this more concrete, we will consider the application of these conditions to the dialogic example in (23), where the set of structured propositions that are entailed by the context is given in (23′).

(23) FBI agent: Was Luke unfriendly to you?
Luke's ex-classmate: **Hardly**, he was actually very nice. He even apologized for his behavior when we were in high school.
[from the CBS TV show "Without a Trace"]

(23′) cp: Luke was unfriendly to his classmate.
~cp: Luke was not unfriendly to his classmate.
tp: Luke was at least friendly.

In this case, the cp is accessible and part of the common ground of the interlocutors when the sentence containing *hardly* is uttered since it is one of the possible answers to the question asked by the FBI agent in (23). The negation of the context proposition (~cp) is obtained by applying negation to the predicate *be unfriendly*, as in (23′). The response particle *hardly* contributes a proposition (tp) that entails the negation of the context proposition, according to the Horn scale <friendly, not unfriendly>, and the following assertion by Luke's ex-classmate introduces a stronger term on the same scale: <very nice, friendly>. The intuitive notion of "strengthened" negation can be fleshed out by looking at (23′): While the canonical negative operator applied to cp would yield the negation of the property *unfriendly* (i.e. *not unfriendly*, cf. ~cp), the contribution of *hardly* is to

[4] For *mal*, the tp is the proposition expressed by the complement clause of the epistemic verb over which the adverb has scope.

introduce a property that is a stronger scalar alternative than *not unfriendly* (see Horn 1989). Note also the co-occurrence of the marker of counterexpectation *actually* and the scalar adverb *even*.

A similar analysis can be extended to (24), which exemplifies how the ordered set of propositions to which the cp and the tp belong may arise in a particular context:

(24) Q: Why are the roads littered with dead possums? – Are they really *that* stupid?
A: Opossums have small brains but they're **hardly** stupid. Their brains have evolved sufficiently to insure the survival of their species. Cars and other dangers of the modern world are relatively new – there hasn't been enough time to develop a defense.
(http://www.clcookphoto.com/possum.htm)

(24′) cp: opossums are stupid
~cp: opossums are not stupid
tp: opossums are capable animals

In (24), the second question in Q introduces the cp, situating opossums at a low point on a scale ordering animals by their intelligence and/or capability (from low values to high values of intelligence/capability). The *hardly*-marked response in A denies this proposition and implicates that opossums are actually far from stupid, a position that is further supported by the explanation that follows.

In (25), we observe the same contextual restrictions on the inverted interpretation of *mal*, as shown in (25′):

(25) O EF Language, o Merit Cup e o Innovation Kvaerner foram apanhados pela calmaria. "Lutámos durante quatro horas para percorrer cem metros em dez minutos. E parece que isto não vai melhorar nas próximas vinte horas," exclamou Paul Cayard, do EF Language, **mal** sabendo ainda que a sua táctica de navegação renderia óptimos dividendos dias depois. (*Cetempúblico*, ext 54806)

'The EF Language, the Merit Cup and the Innovation Kvaerner [names of yachts] were caught in the calm waters. "We've fought for four hours to advance 100 m in ten minutes. And it seems that this is not going to improve in the next twenty hours," said Paul Cayard from EF Language. Little (*mal*) did he know at that point that his navigation technique would yield great results some days later.'

(25′) cp: The EF Language's place in the race does not improve.
~cp: It is not true that the EF Language's place in the race does not improve, i.e. by double negation, the EF Language's place in the race improves.
tp: The captain's navigation technique yields great results.

In (25), the cp is explicitly provided in the discourse ("(And it seems that) [the EF Language's place in the race] is not going to improve"). The negation of this proposition is given as ~cp in (25′). The complement clause of the epistemic verb *saber* 'to know' denotes the proposition that the captain's technique yields great results (the tp), from which it can be inferred that the place of the sailing boat in the race improves a lot. This proposition constitutes a stronger propositional alternative than ~cp on the contextually-relevant scale. In other words, the tp entails the lower-ranked proposition ~cp "The place of the EF Language in the race improves," assuming the scale <yields great results, improves>. Hence, what underlies the pragmatic effect of the "strengthened negation" is the ordering of the tp on the relevant scale: The tp is a propositional scalar alternative which is more informative (in the sense of Fauconnier 1975) than the denial of the cp.

To sum up, we have argued that the inverted readings of Engl. *hardly* and EP *mal* differ from sentential negation in that they are constrained by discourse structure. Specifically, we have argued that the inverted readings contribute a denial of a proposition, the context proposition (cp), whose salience has to be contextually established (discourse-old, in the sense of Prince 1992 and Birner 2006). Our proposal makes an explicit claim about the way in which *hardly* and *mal* are "strengthened negators," hence differing from canonical negatives. The denial they contribute operates on a scalar model of propositions ordered by pragmatic entailment, by selecting a propositional alternative on the scale which is pragmatically more informative than the cp: The proposition expressed by the sentence containing the inverted approximative entails the negation of cp.

5. Conclusions

In this paper, we have analyzed the inverted readings of *hardly* and *mal* as NCNs. We have shown that their felicitous use displays information-structure constraints like other NCNs (e.g. minimizers in bipartite negative constructions). We have argued that the notion of "strengthened negation" can be fleshed out in terms of constraints on the discourse structure that involve pragmatic scales, thereby providing an empirical basis for the widespread view that NCNs are "emphatic" negators. Further research on these topics should explore the relation between the inverted readings of *almost* approximatives (as explored e.g. by Schwenter 2002) and *hardly* approximatives such as those investigated in this paper.

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Negation and the Untransitive Category in Karitiâna

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0. Introduction

This work describes aspects of negation in Karitiâna (K henceforth), a Tupí language spoken by approximately 260 people in the state of Rondônia, Brazil. K is one of two languages in the Arikém branch of Tupí, the other of which is now extinct (cf. Rodrigues 1999). The language, which is transitivizing (in the sense of Nichols et al. 2004), split-ergative, and head-marking (cf. Storto 1999, Everett 2006), employs several different morphemes for clausal and constituent negation. Below I provide an overview of clausal negation, focusing on the manner in which clauses with semantically transitive verbs are negated. In doing so, I will demonstrate the manner in which negated transitive predicates resemble affirmative intransitive predicates. Furthermore, it will be seen that clauses with these two sorts of predicates resemble clauses with negated imperative predicates, as well as those with negated interrogative predicates. Morphologically, there is a certain degree of isomorphism among these clause types, as well as a shared semantic feature. The semantic similarity of such clause types is reflected in the structure of other languages, in which imperatives, negatives, and interrogatives are subsumed under an irrealis mood (cf. e.g. Payne 1997). However, in this case the data cannot be described so simply, since realis-like intransitive clauses also fall into the relevant semantic category in K. I conclude by providing a synchronically-oriented account of the category, which I refer to as the untransitive.

1. Relevant Background on K Morphosyntax

Before delving into the clausal negation data, some general comments on K grammar are in order. With respect to grammatical relations, the language is split-ergative. As Everett (2006, chapter 15) notes, morphological phenomena in the language are generally oriented according to an ergative-absolutive distinction, while syntactic phenomena are generally oriented according to a nominative-accusative distinction. For instance, verbs tend to agree with the absolutive referent in a clause, as evidenced by pronominal affixation, irregular number agreement, as well as aspect agreement. In the latter case, the aspect marking of a particular verb often denotes a particular body posture as well, and this body

posture describes the position of the absolutive referent. The nominative-accusative alignment, meanwhile, surfaces in syntactic phenomena such as controller-pivot relationships, quantifier float, and word order in simple declarative clauses. The association of morphology and ergativity, and conversely between syntax and nominativity, is of course not unique to K. Furthermore, it has been previously noted that in many languages with overwhelmingly ergative morphology, the distinction between intransitive and transitive predicates is significant to the language's morphosyntax (though Dixon 1994:216 suggests this correlation is often overstated). Perhaps not surprisingly, then, the distinction between semantically intransitive and semantically transitive predicates surfaces in K in a number of ways. As we will see, the morphological reification of this distinction is quite relevant to the patterns of clausal negation in the language.

All verbs in K are classified as either semantically intransitive or semantically transitive. More accurately, we might state that all verbs are either classified as semantically monovalent, in which case their argument structure requires one and only one semantic macrorole (i.e. "actor" or "undergoer" in the sense of Van Valin 2005), or semantically multivalent, in which case their argument structure requires at least two, but possibly more, semantic macroroles. Since the vast majority of semantically multivalent verbs are semantically transitive, requiring only two arguments, I will refer to the distinction as one between semantically intransitive and semantically transitive verbs. This distinction surfaces in a variety of ways in K morphology. For example, semantically intransitve predicates receive different inflections, vis-à-vis semantically transitive ones, in interrogative, imperative, and negated clauses. For a survey of the relevant distinctions, I refer the reader to Everett (2006). Some of these distinctions were also described in Landin (1984) and Storto (1999). Interestingly, the distinction between semantically intransitive and semantically transitive verbs also surfaces in some declarative clauses. This fact, which will prove quite relevant for the rest of this discussion, was not described until Everett (2006), for reasons that will become clear shortly.

There are several basic declarative clause construction types in K, most of which fall outside our present purview. Crucially, one of these construction types only occurs with semantically intransitive predicates, which are inflected in such cases with an *i-* prefix denoting their intransitive status. Semantically transitive predicates cannot be inflected with this prefix in declarative clauses, and must be inflected instead with a *na(ka)-* or *ta(ka)-* prefix.[1] In (1) I provide a sample list of short declarative clauses and their translations, in order to illustrate the morphological differences between semantically intransitive and transitive declarative clauses in K. All `verbs` are inflected for the basic nonfuture tense (*-t/-ø*) and occur with the first person singular pronoun *ɨ̃n*.

[1] For a detailed discussion of this prefix set, I refer the reader to Everett (2006:409-423). Note that this prefix set is also attached to semantically intransitive verbs. However only semantically intransitive verbs can occur with *i-* prefixation instead in declarative clauses.

(1) **Examples of semantic valency distinction in K.**

Intransitive Verb	**Translation**
ɨ̃n i-taktãŋã-t	'I swam'
ɨ̃n i-sombak	'I looked'
ɨ̃n i-hãːnã-t	'I breathed'
ɨ̃n i-sẽŋa-t	'I crouched'
ɨ̃n i-mbik	'I sat'
ɨ̃n i-pɨkɨna-t	'I ran'
ɨ̃n i-taɾɨka-t	'I walked'
ɨ̃n i-tat	'I went'
ɨ̃n i-kɨsep	'I jumped'

Transitive Verb	**Translation**
ɨ̃n naka-mĩː-t	'I hit X'
ɨ̃n naka-kiːp	'I cut X'
ɨ̃n naka-ʔɨ-t	'I ate X'
ɨ̃n naka-mʔa-t	'I made X'
ɨ̃n naka-mhip	'I cooked X'
ɨ̃n naka-hĩ̃ɾã-t	'I smelled X'
ɨ̃n naka-hiːt	'I gave X'
ɨ̃n naka-piːt	'I took X'
ɨ̃n naka-pɨdn	'I kicked X'

The examples in (1) suggest that the semantic basis offered above for the distinction between intransitive and transitive verbs, is generally accurate. Clearly the clauses in the left-hand column of (1) denote events that generally occur with one participant/referent, while those in the right-hand column denote events that most typically occur with two participants/referents. While other semantic factors often correlate with this distinction, this is the only factor that needs to be appealed to in describing this basic distinction in K grammar. Other aspects of scalar transitivity (cf. Hopper and Thompson 1980), e.g. telicity, kinesis, volitionality, and agency are of course relevant to the distinction, but primarily as they relate to the one-participant vs. two-participant distinction. For instance, two participant actions tend to involve volitional agents and telic actions, but there are many clause-level exceptions in which a transitive verb describes e.g. an atelic non-punctual event.

It is worth noting that there are many more semantically intransitive verbs in the language, both in terms of number of lexemes and in terms of tokens in discourse. This is true of language more generally, however, as authors such as Thompson and Hopper (2001) and Everett (2009) have noted.

2. Specific Morphosyntactic Data

2.1. Negation of Semantically Intransitive Verbs

Landin (1984) pointed out a very interesting aspect of the negation of intransitive predicates. Specifically, he noted that such clauses are in many cases less-marked than their affirmative counterparts. For instance, consider the two clauses in (2) and (3), the second of which is an example of a negated intransitive predicate.[2]

(2) ɨ ta-otɨ-j ɨ̃n
1S SAP-bathe-FUT 1S.ABS
'I will bathe.'

(3) ɨ-otɨ-ɨ̃n
1S-bathe-1S.ABS
'I will not bathe.' (Landin 1984:237)

Note that the negated intransitive in (3) is less marked, morphologically, than the affirmative intransitive in (2). It is also unmarked prosodically, since the intonation associated with declarative clauses (falling on the final syllable) is maintained in negative clauses in K.

This less marked status of (3) is not characteristic of all negated intransitives, however. For instance, in (4) we see that monosyllabic intransitive verbs in negative clauses are prefixed with *ɾɨ-*, and we also observe that consonant-final intransitive verbs in such clauses are suffixed with *-ɨ*, when negated.

(4) ɨ-ɾɨ-tat-ɨ ɨ̃n
1S-NEG-go-NEG 1S.ABS
'I will not go.'

Furthermore, I should note that examples such as (3) and (4), while grammatical, are unusual in that negated intransitive verbs are almost always followed by the free morpheme *padni*. When asked how to back-translate the Portuguese version of (3), for instance, all K respondents tested employed *padni*. It is unclear whether this morpheme was as prevalent at the time Landin collected his data, in the 1970s.

2.2. Negation of Semantically Transitive Verbs

In this paper we are concerned primarily with the negation of semantically transitive predicates, since in such cases similarities between negated transitives and declarative semantically intransitive verbs surface, as in examples (5)-(13), in

[2] The gloss SAP in example (2) refers to speech act participant. As noted in Everett, verbs inflected with *ta(ka)-* occur with a speech-act-participant as the absolutive referent. Those inflected with *na(ka)-* occur with a non-speech-act participant as the absolutive referent.

which the verbs once again occur with the first person singular pronoun and nonfuture tense affixation.

(5) ɨ̃n i-hãːnã-t
'I breathed'

(6) ɨ̃n i-tat-ø
'I went'

(7) ɨ̃n i-ɨɾɨt-ø
'I came'

(8) ɨ̃n i-seŋa-t
'I crouched'

(9) ɨ̃n i-otʃak-ø
*'I bit it'
'I didn't bite it'

(10) ɨ̃n i-pajop-ø
* 'I scraped it'
'I didn't scrape it'

(11) n i-kɨndop-ø
*'I opened it'
'I didn't open it'

(12) ɨ̃n i-sokɨ-t
*'I broke it'
'I didn't break it'

As we see in these examples, declarative clauses with the basic intransitive inflection, such as (5)-(8), may be isomorphic with clauses with negated transitive verbs, such as (9)-(12). In examples (9)-(12), there is no overt second participant. However, there is an implicit second participant that, if not recoverable from context, may be understood in these cases to represent an inanimate 3rd person referent. (See also the examples in (1) above.)

The semantic motivation for this structural isomorphism will be discussed below. First, however, it is worth noting that examples similar to those in (9)-(12) have been accounted for in a different manner in K, both in Landin (1984) and Storto (1999). It appears, however, that in crucial ways the significance of such examples has been missed.

Landin (1984:238) posits a rule of direct object epenthesis, in which the more patientive argument of a transitive clause is represented pre-verbally via *i*, the third person pronoun in K, which is unmarked for gender or animacy. Landin provides the following example[3]:

(13) ɨ̃n i paka-ø ɨ̃n pɨkɨp
I it clean I clothes
'I will not clean the clothes.'

There are two reasons such an account does not quite fit the K data. Before detailing these, it is worth mentioning that K does have a 3rd person pronoun *i*.

[3] For the examples taken from Landin (1984) and Storto (1999), which are transcribed orthographically in the original works, I maintain my phonetically-oriented transcriptions for the sake of transparency. The glosses are taken directly from the relevant works.

This pronoun could be used as in the following two examples, which can be contrasted with (6) and (10), respectively:[4]

(14) i i-tat-ø
3 INT-go-NFUT
'S/he/it went.'

(15) ɨ̃n na-pajop-ø i
1S NSAP-scrape-NFUT 3
'I scraped it/him/her.'

This free pronoun *i* differs synchronically from the *i-* prefixation evident in (5)-(12), however, though perhaps there is a diachronic relationship. For one thing, the two forms are not actually homophonous. The *i-* prefix in (5)-(12) generally is a more reduced form of the high front vowel, as evidenced by a frequently lowered second formant that reveals a more retracted position in the F1-F2 vowel space. Furthermore, a sampling of ten *i-* prefixes and ten *i* free pronouns revealed that the pronouns are generally 20-30 ms longer than the prefixes in question. The obvious motivation for the less reduced phonetic features of the *i* pronoun is that it is not prefixal, and therefore is a monomorphemic word and receives word-level stress. The *i-* prefix is never stressed since word-level stress is typically root final in K. For a more complete discussion of stress and an acoustic analysis of K vowels, see Everett (to appear).

The other reason the previous treatment of the *i-* form in negated transitive clauses does not work is that the form can grammatically occur in clauses without any 3rd person referent, for example (16).

(16) ɨ̃n i-mĩː padni ãn
1S NEG.TRANS-hit NEG 2S
'I did not hit you.'

Storto (1999:121) echoes Landin's analysis, glossing the *i-* prefix as '3', for instance in the following example:

(17) taso i-oky-t boroja
man 3-kill-NFUT snake
'The man killed the snake.' (non-decl)

She notes that such a clause is a non-declarative clause, but does not note that it is actually a case of clausal negation. All K speakers I have presented with this clause note that it must be interpreted as meaning the man in question did not kill the snake.

It seems clear, then, that the *i-* negational prefix cannot be interpreted as a 3rd person pronoun. The similarity between this negational prefix and the *i-* prefix attached to semantically intransitive verbs has not been discussed in detail until

[4] The prefix glossed NSAP in (15) is employed when the absolutive referent of a clause is not a speech act participant, i.e. not a 1st or 2nd person referent.

now. These two forms *are* in fact homophonous with each other, but not with the stressed 3rd person pronoun. Furthermore, both prefixes occur in clauses (such as (5)-(8) and (16)) without any 3rd person referents.

2.3. Other Relevant Features of Clauses with Negated Transitives

Word order in K is flexible (cf. Storto 1999, Everett 2006). However, in declarative clauses with intransitive verbal inflection, as well as in clauses with negated transitive verbs, the verb typically follows any overt 'S' or 'A' arguments. This is apparent in a number of the examples above. One way in which these two clause types do differ, however, is that a second nominal in a semantically intransitive clause must occur with an enclitic, frequently the *-tɨ* oblique marker. In negated transitive clauses with an overt second argument, no oblique marking is necessary. Consider first the following example of a declarative clause with an oblique-marked NP following the verb:

(18) ɨ̃n i-diwɨt-ø manga-tɨ
1S INT-forget-NFUT mango-OBL
'I forgot the mango.'

A semantically transitive verb cannot occur with this enclitic in an affirmative clause:

(19) ɨ̃n na-ʔasɨka-t pikõmo (*-tɨ)
1S NSAP-shoot-NFUT wooly monkey-OBL
'I shot the wooly monkey.'

This restriction also holds in negative clauses with transitive verbs:

(20) ɨ̃n i-ʔasɨka-t pikõmo (*-tɨ)
1S NEG.TRANS-shoot-NFUT wooly monkey-OBL
'I didn't shoot the monkey.'

There is a clear structural similarity between intransitive clauses marked for valence and negated transitive clauses. While such clause types are not identical, i.e. they vary in terms of oblique marking, there is a clear similarity between them in terms of morphology and word order. This similarity is all the more notable considering that there are numerous ways in which declarative clauses with intransitive verbs differ from declarative clauses with transitive verbs in K. The permissibility (or lack thereof) of *i-* verbal prefixation is only one of many such

structural reflections of the distinction. For the sake of space, I refer the reader to Everett (2006, part II) for a more detailed consideration of these reflections.[5]

2.4. Data from Interrogatives and Imperatives

Interestingly, semantically intransitive clauses such as those in the left-hand column of (1) are also similar to other clause types, namely transitive interrogatives and transitive imperatives. Not insignificantly, researchers such as Payne (1997:245) have noted that, "Interrogative and imperative clauses are likely to be irrealis, since they do not assert that X did happen, but order it to come about, or question whether it will or did come about." The correlation between irrealis and intransitivity has also been noted in the literature, for instance in Hopper and Thompson's (1980) work on scalar transitivity.[6]

The similarity between declarative clauses with semantically intransitive predicates and interrogative clauses with semantically transitive predicates is apparent in (21)-(22), two yes/no questions:

(21) ãn i-ɨ ŋgok-(o) (hɨ̃)
2S NEG.TRANS.Q-eat manioc-Q.NOM Q
'Did you eat the manioc?'

(22) ãn i-mhip hĩm-(o) (hɨ̃)
2S NEG.TRANS.Q-cook meat-Q.NOM Q
'Did you cook the animal meat?'

Note that these interrogatives do differ from the negated transitives considered above in that they may occur with a clause-final question particle. However, this particle, like the suffix attached to the O noun in (21) and (22) is not required. What is required, however, is the *i-* prefix attached to the verb. This prefixation characterizes predicates in content-word questions as well:

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[5] To cite just one example, declarative copular clauses can only occur with predicate nominals, predicate adjectives, and with participle-like semantically intransitive predicates, as in the following example.

i na-aka-t i-kɨsep-∅
3 NSAP-COP-NFUT INT-jump-COP.AGR
'He's jumping.'

Crucially, such copular clauses cannot occur with semantically transitive predicates.

[6] These authors consider 'Mode', i.e. the realis-irrealis distinction, to be one of the ten defining features of scalar transitivity.

(23) mõr̃ãsõŋ ãn i-ɨ ŋgok-(o) (hɨ̃)
why 2S NEG.TRANS.Q-eat manioc-Q.NOM Q
'Why did you eat the manioc?'

Similarly, *i-* prefixation is required for transitive verbs in imperative clauses. (24) contains a sample list of such imperatives with an optional 2nd person singular pronoun. Note that consonant-final imperative verbs occur with an *-a* suffix. Vowel-final imperative verbs, however, are only distinguishable morphologically by the presence of the *i-* prefix.[7]

(24) **Examples of transitive imperative verbs**

Transitive Imperative	**Gloss**
(ãn) i-pɨdn-a	'kick (it)!'
(ãn) i-mhiw-a	'cook (it)!'
(ãn) i-mʔa	'make it!'
(ãn) i-paka	'clean (it)!'
(ãn) i-mĩ:	'hit (it)!'
(ãn) i-opĩ	'cut (it)!'

This i- prefixation also occurs with hortatives, i.e. first-person imperatives such as the following:

(25) ɨ:tʃa i-okɨ (pikõm)
1PL IMP.TRANS-kill (*macaco prego*)
'Let's kill it.' or 'Let's kill the *macaco prego/wooly monkey*.'

Based on all the examples considered so far, as well as other similar examples in my data, it seems clear that there is a remarkable similarity between the form of declarative clauses with semantically intransitive verbs and the form of semantically transitive negative, interrogative, and imperative clauses. The motivation for this structural isomorphism is discussed in the following section.

3. Untransitivity

Faced with the data presented above, we are left to wonder what motivates the described structural similarity between the relevant clause types. Put another way, why is it that (26) is ambiguous, meaning either 'shoot it', 'you did not shoot it', or 'did you shoot it?'

(26) ãn i-ʔasɨka
2S i-shoot

[7] As Landin (1984) first noted, however, pitch is increased on the stressed syllable of imperative verbs.

The desired interpretation is differentiated by prosody (for imperatives) as well as optional post-verbal morphemes (for negatives and interrogatives), nevertheless there is clearly a gross similarity across the structure of the relevant clause types.

Reflections of semantic transitivity or valency in the morphosyntax of a language are in some sense universal (cf. e.g. Dixon 1994). However the extent to which the semantically intransitive/transitive distinction surfaces in the structure of a language varies significantly cross-linguistically. In the case of Tupí languages, the distinction is usually readily apparent in the morphology. As Rodrigues notes, these languages "typically have one pronominal prefix to the verb indicating a core argument and may also have a prefix that marks change in valency" (1999:114). In the largest branch of the family, Tupí-Guaraní, languages generally distinguish between semantically transitive and semantically intransitive verb types (Jensen 1999:154).

While the accounts of semantic valency in the literature vary somewhat, it is generally agreed that such valency is primarily concerned with the number of participants that must be 'on stage' in the scene expressed by the verb (Payne 1997:169-170).

In the case of K, the distinction surfacing is not one of simple semantic intransitivity/transitivity, since the number of participants that must be 'on stage' is clearly not defined on a lexico-semantic basis alone. When one considers data such as those in (1) alone, this approach to the factors involved works. However, when other data are considered, in particular those related to the negation of semantically transitive predicates, it becomes clear that the relevant distinction is not one of mere semantic valency. Instead, the crucial factor correlating with the distribution of the *i-* prefix is the absence of an *affected* second participant (O-type argument) in a particular construction. That is, those constructions that preclude the existence of a real, already-affected second participant, be they intransitive declaratives or semantically transitive negatives, interrogatives, and imperatives, are tied together via the *i-* prefix, which highlights a feature they all share. That feature is not simply one of lexico-semantic intransitivity, since all verb roots can be inflected with the *i-* prefix, in accordance with utterance-specific factors. It is also not one of syntactic intransitivity, since in many cases the relevant clauses have two overt syntactic arguments. Instead, the shared feature might be termed *un*transitivity, the absence of an affected participant associated with a particular instance of the verb.[8]

Despite a significant amount of work on semantic valency over the last few decades, it is not always clear why distinctions such as that described above are so prevalent in languages. Prototypically transitive clauses are exceedingly rare in discourse (Thompson and Hopper 2001, Dahl 2000, Everett 2009). Nevertheless,

[8] The presence of an affected participant is one of the ten features of scalar transitivity noted by Hopper and Thompson (1980). For the K data, we see that this feature is *the* crucial feature distinguishing the two relevant categories, and for that reason I choose to adopt a new term. Also, the term is warranted by the fact that the semantically intransitive/transitive distinction more aptly applies to K declarative clauses, as seen in (1).

events can clearly be divided quite productively according to semantic parameters such as presence or absence of an affected second argument. This distinction has been shown to be particularly relevant to the grammar of K. The distinction in question has surfaced through the examination of a correlation between various clause types, particularly negatives, interrogatives, imperatives, and declaratives with semantically intransitive verbs. While similar correlations between such clause types have been observed for inter-linguistic data, K allows us to consider a particularly clear correlation in a set of intra-linguistic data. In the above analysis, this correlation began to crystallize most clearly via the examination of the negation of semantically transitive verbs, which proved essential to uncovering the putative category of *un*transitivity.

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NPIs Pragmatically*

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0. The Licensing Question

Following Ladusaw (1980), NPIs are (widely) held to be licensed in downward entailing (DE) contexts:

(1) a. I do*(n't) see **anyone**.
b. Every/*some student(s) with **any** sense asked for help.
c. If you **ever** see a copy of this book, get it for me, please.
d. I doubt/*believe that **anyone** really knows how things will be next summer.

Some contexts are more obviously downward entailing than others. Thus, it is clear that the negation in (1a) creates a DE context, but it is not quite as clear that the *if* in (1c) does. Moreover, some NPIs only like certain kinds of DE contexts and which ones occur in which contexts is an interesting question which has received considerable attention in the literature. We would like to abstract away from these issues here, however, and address another one: Why should NPIs be limited to semantically negative contexts, contexts that invert the direction of entailment (Fauconnier 1975)? Recent analyses attempt to answer this question by exploiting the semantics of NPIs (cf. Krifka 1995, Lahiri 1998, Chierchia 2006). We argue that while the distributional restrictions of NPIs are indeed *related to* their meanings, the distributional restriction of NPIs cannot be *derived from* for their meanings.

1. A Semantic Answer to the Licensing Question?

Instead of describing the details of the various analyses which try to answer the Licensing Question by exploiting the semantics of NPI, we focus on the basic idea underlying these accounts (For some details see the appendix):

* The authors would like to thank the audience at the Berkeley Linguistics Society meeting for their comments and questions.

(2) Semantic answer to the Licensing Question:
NPIs are low scalar elements that come with an operator requiring them to be the semantically strongest alternative.

By low scalar elements we mean those elements that occupy the bottom rung on a Horn scale (Horn 1972). For instance, *some* is the bottom element of a scale of quantifiers including *many, most* and *all.* In non-negative contexts, *some* is the weakest of these scalar alternatives (i.e. a sentence with *many* entails an alternative with *some*). But in negative contexts, *some* is the strongest of the alternatives, as negation inverts the direction of entailment (Fauconnier 1975). Since low scalar elements are semantically strong in precisely those contexts that are DE, then, if one assumes (2), it follows that NPIs are limited to DE contexts.

Several versions of (2) involve the presence of some form of *even*, either a concrete one (Lahiri 1998, see also Lee and Horn 1994) or an abstract one (e.g. Chierchia 2006). To sketch the workings of the semantic answer to the Licensing Question, it is thus useful to first look at *even*.

The analyses mentioned above assume, with Kartunnen and Peters (1979), that 'even' picks out the least likely of the alternatives. (3), for instance, is said to give rise to the inferences in (4), which in Kartunnen and Peters's account are phrased as conventional implicatures:

(3) Even DEBBIE thought they had gone too far.

(4) a. Conventional scalar implicature:
Debbie was the least likely among the relevant people to think that they had gone too far.
b. Existential implicature:
Someone other than Debbie thought that they had gone too far.

There is a relationship between likelihood and entailment or semantic strength for scalar terms: If a sentence A that employs a scalar term is less likely than a sentence B, where B employs an alternative on the same scale, then the truth of A guarantees the truth B, i.e. A entails/is semantically stronger than B. This means that if NPIs are composed of 'even' and low scalar elements, as (2) hypothesizes, then the relevant low scalar element has to offer the least likely or semantically strongest alternative. Since this is only the case in DE contexts, it follows that *even* + a low scalar element is restricted to these contexts. When applied to our initial example in (1a) this analysis works as follows:

(5) I don't see anyone. (= 1a)

The sentence implicates that for the speaker to not see one person is less likely than for him or her not to see several people. This makes sense because not seeing one person entails not seeing several. By the same token, if the negation is absent,

the implicature generated by *even* and the entailment properties of the sentence clash; for the speaker to see one person is not less likely than for him or her to see several people, but rather more likely because whenever you see two or more persons, you also see one.

Despite its elegance, the semantic answer to the licensing questions faces a number of difficulties (Herburger and Mauck 2007, Herburger to appear). Two, relatively minor ones concern *even*. Even though some languages use an overt *even* as part of their NPIs (e.g. Hindi), there are many NPIs which lack a visible instance of *even*, for example *any* and *ever.* For these, a tacit *even* (feature) has to be posited (cf. Chierchia 2006). Also, *even* may not pick out the least likely of the alternatives, but the most informative one (Kay 1990, Herburger 2000). If so, an operator other than *even* must actually be posited to pick out the semantically strongest alternative (cf. Chierchia's 2006 and Krifka's 1995 abstract operators). This somewhat weakens the appeal to cases where NPIs contain an overt form of *even*.

There are also four more serious problems. First, for the *even* analyses to work, it has to be stipulated that the licensing operator takes scope *over* the element responsible for the DE context, no matter how far away that element is. Second, unlicensed NPIs actually seem to result in ungrammaticality rather than pragmatic infelicity, contrary to what these analyses would predict (see also Gianniakidou 2001). Third, note that the presence of the licensing operator does not follow from the low scalar nature of NPIs—not all low scalar expressions are NPIs. This, however, means that the licensing operator has to be effectively stipulated. Fourth, a number of NPIs are not low scalar elements, e.g. *much* (in its NPI usage) and Spanish *gran cosa.* (Israel 1996). The *even* analyses do not extend to these in any obvious way.

(6) a. I do*(n't) have **much** time.
b. La película no fue **gran** **cosa**.
The film not was big thing
'The film wasn't good.'

Given these issues, it may be worthwhile to contemplate an alternative to the semantic answer to the licensing question in (2). In what follows, we argue that it is not the semantics of NPIs that directly accounts for their distribution, but ultimately the presence of a lexical feature. The presence of this feature relates to the pragmatic usefulness of these expressions in certain contexts.

2. On the Pragmatics of NPIs

The pragmatics of NPIs and the role it might play in their licensing has not gone unnoticed. In particular, Israel (1996, 1997) develops an analysis of NPI licensing that does not only recognize that not all NPIs are low scalar elements but also pays close attention to how they function in discourse. We take his analysis as a point of departure.

2.1. Israel's (1996) Q- and I-Values

Israel (1996) points to the heterogeneity of NPIs and accounts for the licensing of two classes of NPIs, namely low scalar NPIs like *any* and relatively high scalar NPIs like *much*, by positing two values, a q-value and an i-value. The q-value encodes the rung of the NPI on a Horn scale (Horn 1972); it is high if the NPI is high on the scale and low if it is low. The i-value, in turn, signals emphasis and semantic strength. A high i-value means that the 'text proposition' (TP; the sentence containing the NPI) entails an alternative 'context proposition' (CP), where the CP involves a mid-scalar expression (the 'scalar norm'). A low i-value does the opposite. It encodes understatement and requires the TP to be entailed by the CP. Using these values, Israel proposes to lexically classify the two kinds of NPIs he discerns in the following way:

(7) a. low q-value + high i-value = low scalar NPIs (*any, ever, budge an inch*)
b. high q-value + low i-value = high scalar NPIs (*much*, *gran cosa, long*)

The central point is that the classification in (7) predicts that NPIs will only appear in DE contexts. To see why this is so, let us first consider the low scalar NPIs described in (7a). A TP in which a low scalar element appears will only entail a CP involving a mid scalar element if both are negative:

(8) I can't see **anyone**.
TP: I can't see one(some) person.
CP: I can't see two or more persons.
High i-value: TP entails CP

Turning now to the high scalar NPIs described in (7b), note that a TP with a high scalar element will only be entailed by a CP involving a mid scalar element, as demanded by the high i-value, if both TP and CP are negative:

(9) I don't have **much** time.
TP: I don't have a large amount of time.
CP: I don't have a medium amount of time.
Low i-value: CP entails TP

As appealing as this account is, it, too, raises some issues. First, what is the scalar norm? Sometimes what is at the bottom of the scale may in fact be what is 'normal,' but Israel is forced to appeal to a CP that indicates the middle of a scale, no matter what 'normal' in a given context may be. Second, **all** low scalar elements, regardless of whether they are NPIs are not, lead to semantically strong and hence potentially emphatic claims in DE contexts. Likewise, **all** high scalar expressions lend themselves to semantically weak and hence potentially understating claims in

DE contexts. This just follows from the nature of scales and the semantics of negation.

(10) a. I can't see one (ONE) person.
b. I can't see two people.
c. One person has to volunteer to drive him back to the airport.

(10a) entails (10b), showing that *one* is semantically stronger than *two,* but (10c) shows that it is not an NPI. If, then, emphasis or the lack thereof follows directly from the scalar rung, the i-value does not really mark (lack of) emphasis, despite its name, but ultimately marks (in combination with the 'right' q-value) that the element in question is an NPI. Might we then not call things by their name and say that NPIs are lexically marked as NPIs?

2.2. The Pragmatic Road to Formal NPI-hood

The discussion of both the semantic licensing accounts and Israel's more pragmatically flavored account lead us to the following conclusion regarding the Licensing Question (Herburger and Mauck 2007, Herburger to appear):

(11) A syntactic answer to the Licensing Question:
An NPI differs from a non-NPI in carrying a formal feature.
For concreteness, let us call it [u-neg].

While we believe that NPI licensing is a syntactic phenomenon, there is clearly a relationship between scales and NPIs. The rung an NPI occupies on a scale does not derive its distribution, but it 'merely' has pragmatic consequences that help explain how the distribution could come about.

Beginning with low scalar NPIs, we saw earlier that low scalar elements in negative contexts are semantically strong. This makes them pragmatically useful when one wants to make a strong or emphatic claim (Jespersen 1917). We believe that this pragmatic usefulness can lead some low scalar elements to being lexically restricted to negative contexts. Which ones are, however, is to some extent arbitrary. Consider in this context for instance the difference between *any* and *some*; both arguably denote existential quantifiers and occupy the bottom rung of a quantity scale (assuming that *any* is a low scalar element, cf. Carlson 1980, and also the appendix), but only *any* is an NPI.

As for relatively high scalar elements, they are pragmatically valuable in DE contexts in a different way: they allow for a rather weak, evasive claim and, as a consequence, they also allow for understatement. (12) thus can be taken to mean that the speaker has some but not much time (weak claim) or that she has no time at all (understatement):

(12) I don't have **much** time.

The weak claim follows from a regular scalar implicature (Levinson 2000): Quantity implicates the negation of stronger alternatives. Since negation reverses the direction of entailment, the stronger alternative to *much* in (12) is *some*, i.e. (12) implicates that it is not the case that the speaker does not have some time, which amounts to saying that she has some time. The understated claim, we argue, arises when Quantity is suspended, and the speaker did not say everything there was to say. Since Quantity is inoperative, no scalar implicature is generated and (12) does not implicate the negation of 'I don't have some time'. In sum, we both expressions that lead to strong claims in negative contexts (low scalar expressions) and those that lend themselves to understated claims are pragmatically useful. Some, because of this, become restricted to such contexts. Those that do, bear a feature marking them as NPIs ([u-neg]).

2.3. The Relative Arbitrariness of NPI-hood

On our view, any expression with the 'right' scalar value can in principle be an NPI but does not have to. Because being an NPI amounts to nothing more than bearing a feature, we expect that over time expressions might change their status. Thus, it would not be surprising if the same element could be an NPI at one point in time and not in another. There may indeed be evidence for this, as we would like to show now.

According to Jäger (2006, 2007), the existential German *einig-* 'some', which can nowadays freely occur in non-DE contexts, used to be an NPI in Old High German.

(13) buuzssan einigan zuuiuun ist dhanne archennit, dhazs
Without any doubt is then recognized that
'It is recognized without any doubt that…' (OHG; Isidor VI.5)

The fact that in Modern High German, *einig-* still has an existential meaning but no longer the distribution of an NPIs suggests, in our terms, that *einig-* used to have a [u-neg] feature, but no longer does.

Similarly, Greek *kanenas* 'anyone' derives from *kai* 'even' and *henas* 'one'. Strikingly, while it is employed in many dialects of Modern Greek as a typical *even* NPI, it is also used as a simple, positive indefinite in some dialects, notably Cretan (Kiparsky and Condoravdi 2006). For us this means that in Cretan *kianenas* does not bear a [u-neg] feature. (Note that it also supports the claim that it is not the *even* in *even* NPIs that is responsible for their distribution.)

(14) kianenas perastikos da perase ki ēkopse ta portokalia
some passerby here passed-by and cut the oranges

In the two examples we have discussed so far, a lexical item that has the NPI feature [u-neg] loses it at some point in its history. One might also wonder if it is possible for [u-neg] to become [i-neg], that is if it is possible for an uninter-

pretable feature, which simply demands the presence of a negative element elsewhere, to change into an interpretable feature, which makes a clear semantic contribution of its own namely negation. We think that this may indeed be possible. More specifically, we think it offers a way of conceptualizing part of the Jespersen Cycle, where an NPI over the course of time comes to be negative element in its own right. For instance, *nobody*, which used to function as an NPI in Middle English and still does so in many dialects, became a negative element in many dialects of early Modern English and is used this way today in standard English dialects. In other words, depending on the dialect/era, (1a) (*I didn't see anyone*) can be expressed by either (15a) or (15b):

(15) a. I didn't see nobody. dialectal, historical
b. I saw nobody. standard

If what we argue in this paper is correct, the fact that *nobody* was historically an NPI and is now (standardly) a negative quantifier amounts to saying that *nobody* historically bore a [u-neg] feature but now bears an [i-neg] feature.

Interestingly, the Jespersen Cycle also seems to be taking place in at least one language that has *even* NPIs, namely Modern Hebrew, which has morphologically complex NPIs containing an instance of *even* (*af*).[1] Though these NPIs generally require negation to be licensed, this is not the case in elliptical answers, as shown in (16). This might suggest that these elements are on their way to becoming negative expressions in their own right, similar to English *nobody*.

(16) A: mi ba?
who came
'Who came?'
B: af exad (*lo)
even one not
'No one.'

What further lends credence to this suspicion is the fact that in the speech of some children and teenagers, *af exad* is starting to be used without negation in preverbal positions, even though it still requires a negation when it appears in a postverbal position:

(17) af exad oxel et ha-uga
even one eats acc the-cake
'No one is eating the cake'

[1] While *afilu* (literally *af* 'even' + *ilu* 'counterfactual conditional') has replaced *af* as 'even' in standard oral Hebrew, *af* is still used in high register and newspaper Hebrew, and can be understood as meaning 'even' by those who learn these varieties of Hebrew (which are taught in school).

This change would seem to be unexpected if the distribution of NPIs depended on *even*, but can be understood if, as we have proposed, NPIs are somewhat arbitrarily marked by a syntactic feature that can change over time. In particular, we can surmise that currently *even* expressions of the relevant sort in Hebrew are ambiguous at this point and marked either [u-neg], in which case they function like NPIs, or [i-neg], in which case they are negative. A similar account can be extended to n-words in languages like Spanish if they are ambiguous between NPIs and genuinely negative expressions (Herburger 2001).

3 . Conclusion and an Open Question

We have argued in this paper that what makes a particular item with the requisite scalar (and hence pragmatic) disposition an NPI is 'merely' a formal feature, [u-neg] and that NPI licensing ultimately amounts to a process of feature checking. We also speculated that expressions of the right scalar sort cannot only acquire this feature in the course of history, they can also lose it. Moreover, the feature can acquire semantic content and turn into [i-neg]. This offers a way of conceptualizing part of the Jespersen Cycle. If NPI licensing amounts to feature checking, this of course raises the question of how this feature checking works. One possible answer might involve substantive decomposition of NPI licensors into [neg] + something else, cf. Ludlow's L* (Herburger and Mauck 2007). We are currently exploring whether and how this would offer an account of the syntactic licensing of NPIs.

4. Appendix: Some Semantic Licensing Accounts

In this section we very briefly summarize some of the *even* accounts mentioned earlier in the paper and some of their precursors. Our discussion is meant to illustrative rather than exhaustive.

4.1. Kadmon and Landman (1993)

While Kadmon and Landman's (1993) account does not posit that NPIs contain an *even* or trigger the presence of an *even*-like operator, it does use the internal semantics of NPIs to explain their distribution and would seem to have inspired many of the proposals that followed it. According to Kadmon and Landman, *any*, on both its NPI and free choice interpretation (the latter of which we will not discuss) is an indefinite, like *some*, but with added features of 'widening' and 'strengthening'. The widening applies to the domain of quantification of the noun the NPI modifies. For instance, according to Kadmon and Landman, *some potatoes* might normally rule out very small potatoes or moldy potatoes, but *any potatoes* includes in its domain of quantification all potatoes, including the marginal ones. The strengthening induced by *any* then requires that the widening it induces be a stronger statement, i.e. that the statement on the widened interpretation will entail the statement on the normal, narrow interpretation (much as *even* requires the sentence it appears in to entail a weaker alternative). This will happen only in downward entailing environments. To see this, consider:

(18) I don't have any potatoes.

If *any* induces widening, (18) states that the speaker does not have potatoes, normal ones or very small ones. This entails a statement without the widening, that the speaker does not have normal potatoes. Now consider a sentence without negation:

(19) *I have any potatoes.

If the same widening is involved, the requirement for strengthening is not satisfied, because the wide meaning of 'I have potatoes of some kind (normal or very small)' does not entail the narrow meaning of 'I have normal potatoes'. Thus, the NPI is excluded. Of course, much on this account depends on *any* having a larger quantificational domain than *some*. Several authors have voiced skepticism (Krifka 1995, Lahiri 1998), pointing out that only stressed *any* seems to induce something that can be called widening, whereas 'normal' unstressed *any* seems to have a quantificational domain similar to that of *some.*

4.2. Lee and Horn (1994)

Lee and Horn (1994) claim that the distribution of *any* results from the fact that it is an indefinite with an incorporated *even*, where *even* has the meaning described in section 1. Rather than making use of the implicatures that *even* generates, however, Lee and Horn make use of the fact that these implicatures require the existence of a scale of likelihood associated with the sentence. They then posit that *any* is licensed only where such a scale can be constructed. Whether or not a scale can be constructed can be determined by whether or not *even a single* or *even* + a superlative can appear in a sentence. Thus, pointing to examples like (20) and (21), Lee and Horn predict that *any* can occur in a sentence if *even a single* or *even* + a superlative can occur in the same position in that sentence:

(20) a. *There is any boy running around in the garden.
b. *There is even a single boy running around in the garden.

(21) a. There isn't any boy running around in the garden.
b. There isn't even a single boy running around in the garden.

Lee and Horn also noted that many languages, such as Hindi, Modern Hebrew, Korean, and Turkish include an instance of *even* as part of their NPIs, a fact that would be important in some of the accounts of NPI licensing that followed theirs.

4.3. Krifka (1995)

Krifka (1995) assumes that NPIs are low scalar expressions that trigger alternatives. He furthermore assumes that the sentences they appear in are interpreted in terms of structured meanings where the NPI is 'foreground' and the rest of the

clause is abstracted over and represents the 'background'. He then posits that the alternatives for 'weak' NPIs (e.g. *any, ever*) include more specific instances, e.g. books, pencils for *anything*. The alternatives for 'strong' NPIs (e.g. *ANYthing, at all, a drop*) are the same with the additional proviso that no marginal cases are included (cf. Kadmon and Landman 1993). He then posits that weak NPIs trigger the presence of Scal.Assert and strong NPIs that of Empahtic.Assert.

Scal.Assert is an operator that gives rise to an implicature, in particular the implicature that no alternatives to the weak NPI result in true assertions. On this account, a sentence like (22) is ruled out because of an implicature that conflicts with the meaning; if Mary saw something then it is true, rather than false, contrary to what the implicature triggered by Scal.Assert would demand, that she saw something specific, e.g. a pencil. (23), in contrast, is acceptable because the implicature generated by Scal.Assert is consistent with the meaning of the sentence:

(22) *Mary saw anything.
(23) Mary didn't see anything.

Like *even*, Emphatic.Assert requires that the proposition asserted be less likely than any alternative proposition and, furthermore requires that it also be less likely than the conjunction of all alternative proposition involving minor entities. The result is that the asserted proposition has to be extremely unlikely and that minor entities are excluded (a la Kadmon and Landman 1993).

4.4. Lahiri (1998)

Lahiri (1998) observes that in Hindi NPIs consist of a low scalar element + *bhii* 'even.'

(24) koii bhii nahiiN aayaa
some even not came
'No one came.'

He argues that *bhii* is a focus particle with a meaning similar to that of *even* and which picks out the least likely and hence semantically strongest of the focus alternatives. As we saw in section 1, this predicts that the relevant expressions are only felicitous in those contexts where low scalar elements are the strongest, namely DE contexts (Lahiri also extends his analysis to free choice context, but we will not go into that here.).

4.5. Chierchia (2006)

Finally, Chierchia (2006) maintains that the NPI *any* is an existential quantifier with a widened domain (cf. Kadmon and Landman 1993), which comes with alternative domains involving subsets of the original quantificational domain. He furthermore assumes that the occurrence of the NPI *any* triggers the presence of

an *even*-like operator E_c. E_c requires that the proposition expressed by the sentence entail all alternative propositions derived with the help of the alternative domains (cf. Krifka's 1995 Emphatic.Assert, cf. *even*). The operator thus has the meaning in (25):

(25) $E_c(p) = p \wedge \forall q \in C\ [p \subseteq q]$

Since the alternative domains are smaller than the original, widened one, a proposition involving an element in the original domain will only entail a proposition involving an element from a smaller alternative domain if it is embedded in a DE context. This has the desired effect of restricting NPIs to DE contexts.

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Hypernegation, Hyponegation, and *Parole* Violations

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The classical law of *Duplex negatio affirmat,* adopted into English grammar by Bishop Lowth (1762), has always had its dissenters.[1] While negative concord has been widely studied in the grammar of non-standard English, a number of less familiar mismatches between overt negative markers and interpretable logical negation beyond the clausal boundary emerge from the investigation of varieties of spoken English. I will briefly survey here two sets of constructions that respectively contain an apparently superfluous, uninterpreted negative marker or fail to contain an expected one. These are the two categories that I will term HYPERNEGATION and HYPONEGATION respectively.[2]

The most familiar variety of hypernegation is negative concord, when the expression of sentence negation spreads to indefinites within the clause, as is the rule in many Romance and Slavic languages as well as most varieties of vernacular English. Examples include (1a,b) (here and below, **highlighting** is added).

(1) a. It **ain't no** cat **can't** get into **no** coop. (Labov 1972:773)
(= standard Eng. 'No cat can get into any coop')
b. I **can't** get **no** satisfaction. (Jagger & Richards 1965)

As the http://en.wikipedia.org/wiki/(I_Can't_Get_No)_Satisfaction wiki-entry on the Rolling Stones' rock anthem notes, "The title line is an example of a double negative resolving to a negative, a common usage in colloquial English."

The cross-linguistic distribution of negative concord (NC) constructions has received a good deal of attention in recent work, much of it devoted to the relation of NC to negative polarity, the interpretive status of N-WORDS (indefinites with negative force, e.g. *nessuno* 'nobody' and *niente* 'nothing' in Italian) and the

[1] Even when double negations affirm, there is a great deal of variation on just WHAT they affirm. The varieties of "logical double negation" and their semantic and pragmatic motivations are surveyed in Horn (1991).

[2] Martin (2004) uses "hypernegation" in a different sense that traces back to the Neoplatonic tradition. The Language Loggers (cf. Zimmer 2005 and links in Whitman 2007) use OVER- and UNDERNEGATION to correspond to what I term HYPER- and HYPONEGATION respectively.

diachronic reanalyses encapsulated by Jespersen's cycle. These studies include Zanuttini 1997, Martins 2000, Herburger 2001, de Swart and Sag 2002, Alonso-Ovalle and Guerzoni 2002, Schwenter 2005, Falaus 2007, Espinal 1992, 2007, and Floricic and Mignon 2007 on Romance; Giannakidou 2006 on Greek; Postal 2004 on English; Zeijlstra 2007 on Dutch; Bayer 2006 on German; and Watanabe 2004 drawing on several languages. My remarks here will focus on a subtype (or constellation of subtypes) of non-cancelling negation outside the purview of NC that I will refer to as HYPERNEGATION.

Within this general category, Jespersen (1917:75) begins by singling out a species he terms PARATACTIC NEGATION, in which

> a negative is placed in a clause dependent on a verb of negative import like 'deny, forbid, hinder, doubt.' The clause is treated as an independent sentence, and the negative is expressed as if there had been no main sentence of that particular type.

Such cases, variously termed pleonastic, expletive, or—in Smyth (1920)'s evocative term—sympathetic negation, are often attributed to the mental fusion or blend of two propositions, a positive clause in the scope of higher negation (hypotaxis) and a clause whose negative import is directly signaled (parataxis). This construction, frequent in Old English in which such verbs as *tweo-* 'doubt', *forebead-, forber-, geswic-* 'stop', and *wiðcweð-* 'refuse' all govern paratactic or pleonastic negation (PN), persists into Middle English and Early Modern English:

(2) a. Nature **defendeth** and **forbedeth** that **no** man make himself riche.
[Chaucer]

b. First he **denied** you had in him **no** [= any] right.
[Shakespeare, *Com. Errors*]

c. You may **deny** that you were **not** [= that you were] the mean of my Lord Hastings late imprisonment. [Shakespeare, *Richard III*]

Romance languages typically allow or require PN after verbs of fearing or forbidding, certain inherently negative adverbs (= 'unless', 'before', 'since', 'without'), and comparatives. In French, embedded clauses with (optional) pleonastic *ne* are distinct from those with full sentential negation with *ne…pas*:

(3) a. Je crains qu'il **ne** vienne. 'I'm afraid he's coming'
(cf. Je crains qu'il **ne** vienne **pas**. 'I'm afraid he's not coming')
b. avant/à moins qu'il **ne** vienne 'before/unless he comes'
c. plus que je **ne** pensais 'more than I thought'
d. depuis que je **ne** t'ai vu 'since I've seen you'

In his classic study of *"négation abusive,"* Vendryes (1950:1) rejects the more standard label of *"négation explétive"* for such cases on the grounds that these negations are not grammatically on all fours with, say, the expletive dative

pronoun in *Prends moi ça* 'Take that for me', which he sees as extrinsic to the primary assertion; such a sentence telescopes the two distinct clauses 'Take that' + 'you will give me pleasure'. The negation in (3), on the other hand, is an inherent part of the expression, extending from its own domain into that of its neighbor (i.e. the embedded clause). While his label will not be adopted here (given the rather prescriptive import of *abusive* in English), Vendryes offers a useful catalogue of "abusive" pleonastic negation in a range of languages (Sanskrit, Ancient Greek, Latin, German, Baltic, Slavic, Amharic). His exposition of the logic of the relevant constructions recapitulates Jespersen and Benveniste: *X is Aer than Y* = 'X is A to an extent that Y is not', *unless* = 'if not', *before* = 'when still not', and so on. Typically, a main clause governing PN will imply the non-accomplishment, falsity, or undesirability of the embedded clause.[3]

In addition to the contexts surveyed above, we find expletive negatives in other environments, including concessive (un)conditionals in Yiddish and Russian (courtesy of Ellen Prince and Martin Haspelmath respectively):

(4) a. Es iz mir gut vu ikh zol **nit** zayn. 'I'm fine wherever I am'
it is to.me good where I SBJV NEG *be*
b. Mne xorosho gde by ja **ni** byl. 'I'm fine wherever I am'
to.me good where SBJV *I* NEG *be*.PAST

Similarly, PN appears in main clause exclamatives and interrogatives in a variety of languages, as in the Paduan examples of (5) from Portner and Zanuttini (2000) and their now somewhat quaint English counterparts as in (6a), cited by Jespersen. Along the same lines, we can still find the upper register pleonastic negation in embedded modal contexts like (6b) in the upper literary register.

(5) a. **No** ga-lo magnà tuto! 'He ate everything!'
NEG *has*-S.CL *eaten everything*
b. Cosse **no** ghe dise-lo! 'What things he's telling him!
What NEG *him say*-S.CL

(6) a. How often have I **not** watched him!
b. The Church of England…was so fragmented that there was **no knowing** what some sects might **not** have come to believe, but he doubted whether the christening of animals was encouraged.
[P. D. James, *The Children of Men,* on the christening of kittens]

[3] Note that this formulation suggests, although it does not coincide with, anti-veridicality (Giannakidou 1998) or at least robust non-veridicality, as when verbs of doubting and forbidding are negated or questioned. As is well known, non-veridicality is also implicated in the use of the subjunctive and the distribution of negative polarity items; indeed, much recent research on negation in Romance and other languages is devoted to the exploration of the interaction of mood, NPIs, and pleonastic negation.

In the examples of (3) and (6), the use of "sympathetic" negation tends to correlate with higher registers, whence the somewhat formal or archaizing feel of such turns. On the other hand, sympathetic negation is alive and well in colloquial speech, to the consternation of authorities like Fowler (1926:383-4), who disparages a negative "evoked in a subordinate clause as a mere unmeaning echo of an actual or virtual negative in the main clause" as "wrong and often destructive of the sense." Alas, he concedes, "We all know people who habitually say *I shouldn't wonder if it didn't turn to snow* when they mean *if it turned.*" Thus too:

(7) a. **Don't** be **surprised** if it **doesn't** rain. [standard weather warning]

b. I **won't** be **shocked** if every single game is **not** a sellout.
[radio sports talk host Craig Carton, predicting that fans **will** fill Yankee Stadium during its last year of operation in 2008]

c. I would **not** be **surprised** if his doctoral dissertation committee is **not** composed of members from several departments within a university.
[Letter of recommendation for applicant to graduate school]

d. **Don't** be **surprised** if the Suns **don't** come back and push the series to five games. [NYT story on NBA playoffs, 2 May 1991]

Along the same lines, and equally anathema to the Fowlers of the world, are the sympathetic negations after *keep (NP) from* and *miss,* (8a-c) via Google:

(8) a. Well, really, how can I **keep from not** worrying?
b. I can't **keep from not** thinking about the impending doom of it all.
c. doing yoga every day…**kept me from not** thinking about dying
d. "We sure **miss not** seeing you every day, Bob."
[Lori Laughlin to Bob Saget on "Full House" reunion show]

On that far from infrequent *miss not* turn in (8d), Lederer (2008) sniffs:

> Let's look at a number of familiar English words and phrases that turn out to mean the opposite or something very different from what we think they mean: **I really miss not seeing you**. Whenever people say this to me, I feel like responding, "All right, I'll leave!" Here speakers throw in a gratuitous negative, *not*, even though *I really miss seeing you* is what they want to say.

In fact, a Jespersen-style fusion or parataxis analysis is eminently plausible here: (8d) = 'I miss seeing you' + 'I regret not seeing you'. Despite its "gratuitous" nature, the truth-conditionally pleonastic negative is not without its grammatical effect, in that the weakly negative *miss* cannot license NPIs without its help:

(9) I miss *(not) seeing you around anymore.

While PN is arguably grammaticalized (at least in some dialects) with *surprised, keep (from),* and *miss,* it is attested elsewhere in *parole:*

(10) a. I'm going to try to **avoid not** getting bogged down. [J. S. Horn, 1/5/09]

b. I don't know if I can **hold** myself **back** from **not** watching it.
[Boomer Esiason on anticipated Mets debacle, 9/17/08]

c. It's been ages since I haven't posted anything here. [Google example]

Note the parallel between the contexts in which such PNs occur in English *parole* and those in which pleonastic *ne* is formally required or preferred in French, e.g. after verbs like *éviter* 'avoid' or adverbs like *depuis* 'since'. And while modern French PN takes the form of solo *ne,* Vendryes (1950) observes that its counterpart for the classical 17th century dramatists Racine, Corneille, and Molière did indeed employ full sentence negation with *ne…pas* or *ne…point,* yielding all the ambiguity such constructions allow in English. To be sure, context will in general distinguish between compositional and PN readings of such embedded negations,[4] and even in modern French we get triples like *Prends garde de tomber, Prends garde de ne tomber,* and *Prends garde de ne pas tomber,* all of which can only be understood as warning the hearer to take care NOT to fall.

The hackles of prescriptivists, if elevated by the pleonastic negatives of (7) and (8), are raised to the rafters by the tendency of speakers and writers to lose track of the number of negations in a sentence. If *Duplex negatio affirmat,* we would predict that *Triplex negatio negat***,** and indeed we do find instances in which three semantically autonomous negatives yield the force of one negation:

(11) a. The Mets did **not not** re-sign Mike Hampton because they **didn't** want to pay him the money.
(= It wasn't because they didn't want to pay him that they didn't re-sign him.)
[Suzyn Waldman, WFAN sports radio host, 10 May 2001]

b. Even Susan Sontag, a former PEN president, who supports the leadership against Ms. Komisar,…hesitated when asked about Mr. Ovitz's role. "I'm **not** saying I'm **not unhappy**," she said, but added that quibbles might be "frivolous." [NYT, 12 March 1997]

But given the conceptual markedness of even simple negation and its concomitant difficulty for the language processor, as verified in extensive empirical studies by Clark, Wason, and others (see Horn 1989: Chapter 3 for an overview), the interaction of the three negations is more accurately characterized as *Triplex negatio confundit.* The tendency for a triple negation to convey a positive is especially prevalent when at least one of the negatives is incorporated into an adverb like *too* or *beyond* or as expressed in an inherently negative predicate like *surprised, avoid, deny,* or *doubt,* as seen in the examples below (cf. also the links

[4] Thus, the opening line of the Hootie and the Blowfish song "I'll Come Running," "It's been such a long time since I haven't seen your face," must be interpreted compositionally, given the verses that follow, but virtually the same line occurring in a song by Ras Midas, lyrics posted at http://www.rasmidas.com/suchalongtime.html, can only have a pleonastic interpretation.

at Liberman 2004 and Whitman 2007). In these cases, the reinforcing ("illogical") double negation cancels out an ordinary negation, effectively yielding a positive; alternately, one negation can be viewed as pleonastic.

(12) a. "I would **not** ever want to say that there are **not** people on our campus that at first are **not** hard to understand, at least until students get used to them."
[Bloomington (IL) Pantagraph, cited in *The New Yorker*]

b. "There **isn't** a man there who **doesn't** think they **can't** do it."
[Radio commentator Suzyn Waldman on Yankees' confidence, 2 Oct. 2000]

c. "I would **not** ever want to say that there are **not** people on our campus that at first are **not** hard to understand, at least until students get used to them," Watkins said.
[Bloomington (IL) Pantagraph, cited in *The New Yorker*]

d. **No** detail was **too** small to **overlook**.
[*New Yorker* 12/14/81, Words of One Syllable Department]

e. People knew **too** little about him **not** to vote **against** him.
[Bill Moyers on why voters in 1984 primaries voted FOR Gary Hart]

f. **Nothing** is **too** small or too mean to be **disregarded** by our scientific economy.
[R. H. Patterson, *Economy of Capital* (1865), cited in Hodgson 1885:219]

g. I **can't** remember when you weren't there,
When I **didn't** care/For **anyone but** you...
[Opening lines of 1981 Kenny Rogers pop song "Through the Years"]

h. It's a deed that should **not** go **unforgotten.**
[Lewiston (ID) Morning Tribune, cited in *The New Yorker*]

i. It is **not impossible** that some aspect of sound-making efficiency might **not** have played into the mechanism of natural selection during the history of the species.
[Eric Lenneberg, *Biological Foundations of Language*, 1967]

j. Citing an **unwillingness** to **not** go **quietly** into retirement as the crowned princesses of the East, No. 1-seeded Connecticut battered No. 5 Notre Dame, 73-53.
["Uconn's Big Message: Rout Is Just First Step," NYT 3/3/98]

k. "Let's go out and see what the boys have in store for us tonight. They've **never ceased** to **let us down.**"
[Buck Showalter, Texas Rangers manager, quoted in NYT 10 Aug. 2004]

It is not for nothing that Hodgson (1885:218) observes that "Piled-up negatives prove easy stumbling-blocks",[5] while Fowler (1926:375) less genially concedes that "Blunders with negatives are extremely frequent." But while, as Vendryes (1950:15) puts it, "il est naturel que les purists la [= PN] proscrivent au nom de la logique," we can nevertheless understand the motivation for the retention of "grammatical" PN in some languages and the periodic eruption of "ungrammatical" PN weeds in linguistic gardens elsewhere.

This emerges from the distribution of another variety of apparently redundant negation that Jespersen (1917:72-3; 1924:334) dubs RESUMPTIVE negation:

> [A]fter a negative sentence has been completed, something is added in a negative form with the obvious result that the negative effect is heightened…[T]he supplementary negative is added outside the frame of the first sentence, generally as an afterthought, as in "I shall never do it, not under any circumstances, no on any condition, neither at home nor abroad", etc.

In fact, the supplementary negation can precede rather than follow the main clause. Examples of both types abound in both literary and colloquial language:

(13) a. He **cannot** sleep, **not** even after taking an opiate. [Jespersen]
b. **Not** a creature was stirring, **not** even a mouse. [C. C. Moore]
c. **Not** with my wife, you **don't**. [cf. Lawler 1974]

Recent discussions of this phenomenon include those of Lawler (1974), van der Wouden (1997), and especially Dowty (2006), who persuasively makes the case for the original clause and "afterthought" as constituting separate assertions:

> Resumptive Negation is an elliptical form of assertion revision: that is, it indicates a new assertion which is intended to replace the assertion made in the core clause; it may be either a strengthening or a weakening of the original assertion…Neither negation is in the scope of the other, nor is one of the negations merely pleonastic. (Dowty 2006:5-6)

A related construction is that of negative parentheticals, in which negation can appear pleonastically within a parenthetical based on one of a range of neg-raising propositional attitude predicates *(believe, suppose, imagine)* following the expression of main clause negation (cf. Horn 1978:190ff.):

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[5] Such stumbling blocks don't stop at the courthouse door. In an Alabama case from 1912 recounted by Bryant (1930: 264), Aletha Allen, a 80-year-old deaf woman, was killed by a train after having been warned not to go onto the track. When her estate sued the railway company involved, the jury acquitted the defendant, but a new trial was granted on the grounds that the jurors had been instructed to find for the defendant **unless** the evidence showed that the engineer **did not** discover the peril of the woman in time to **avoid** injury. The higher court invoked *Triplex Negatio Confundit,* ruling that both the original charge to the jury and its interpretation by the jurors was based on what was meant, not what was said. (Cf. Horn 1991 for further details.)

(14) a. The Republicans **aren't**, I (**don't**) think, going to support the bill.
b. The Republicans, I (***don't**) think, aren't going to support the bill.

The crusaders curiously seem inclined to take both the resumptive and parenthetical negatives of (13) and (14a) in stride. Indeed, Jespersen (1924:333-4) invokes the tacit tolerance of prescriptivists toward resumptive negation in his defense of negative concord against the standard charge of faulty logic:

> No one objects from a logical point of view to "I shall never consent, not under any circumstances, neither at home nor abroad"; it is true that here pauses, which in writing are marked by commas, separate the negatives, as if they belonged to so many different sentences, while in "he never said nothing"…the negatives belong to the same sentence. But it is perfectly impossible to draw a line between what constitutes one, and what constitutes two sentences; does a sentence like "I cannot goe no further" (Shakespeare) become more logical by the mere addition of a comma: "I cannot goe, no further"?

Jespersen's quotation in this passage refers to a scene in the very same Forest of Arden that serves as a locus classicus for exhibiting the relatively free variation often attested in the distribution of hyper- and standard negation:

(15) a. CELIA. I pray you, bear with me. **I cannot go no further.**
[*As You Like It,* from opening of **II.iv** in Arden Forest]

b. ADAM. Dear master, **I can go no further.**
[*As You Like It,* from opening of **II.vi**, in "another part of the forest"]

Relatedly, code-switching between variants is not uncommon, as when the now defunct electronics chain "The Wiz" promulgated its commercial jingle "Nobody beats the Wiz/Ain't nobody gonna beat the Wiz," presumably to capture the full range of potential consumers. Another illustration is Dylan's celebrated apothegm with its hide-and-seek NC. Pinker (2009) has recently lambasted the legal opinions of Chief Justice John Roberts for having "altered quotations to conform to his notions of grammaticality, as when he excised the 'ain't' from Bob Dylan's line 'When you ain't got nothing, you got nothing to lose'." But in the version of "Like a Rolling Stone" published in *The Definitive Dylan Songbook* (Dylan 2001), the original version of the line appears as "When you got nothing, you got nothing to lose." Perhaps it's not a matter of Justice Roberts removing NC to meet his strictures of properness as much as Mr. Zimmerman inserting NC to conform to metrical considerations and/or the perceived sociolinguistic expectations of his listeners.[6]

As we have seen, both PN in general and NC in particular have long aroused the purist's wrath for the arrant violation of *Duplex negatio affirmat.* For the

[6] In the other direction, Emmylou Harris's 1992 cover of Jimmy Davis's 1926 bluegrass classic "Nobody's Darling But Mine" alters the pleonastic line "Promise me that you will never/Be nobody's darlin' but mine" to "Promise me that you will always/Be nobody's darlin' but mine" in two of the three renditions of the refrain.

linguist, negative concord—as it name suggests—is essentially no more illogical than subject-verb agreement or vowel harmony, a spreading of the negative force of a statement to indefinites within the same clause. But what of other varieties of pleonastic negation, which do not instantiate concord and, as expletive elements, might be expected to be semantically empty? Extraneous (expletive) material that results in two diametrically opposed readings for an embedded clause would appear to violate both the "Avoid ambiguity" and "Be brief" submaxims of manner (or the Q and R principles that respectively subsume them; cf. Horn 1989), so why does it not just subsist but flourish?

Psychological explanations have been offered, from Damourette and Pichon (1928) on the motivation for PN in French to Wason and Reich (1979) on the pragmatic factors facilitating the plausible but wrong interpretation of statements like *No head injury is too trivial to be ignored.* We have seen that the use of PN may affect NPI licensing (recall (10) above) and may also raise or lower the register, as in modern French or colloquial English. But in addition, while not affecting truth conditions, PN is not always semantically and pragmatically inert.[7] For example, Zeijlstra (2008) observes that although standard Dutch is basically a double negation rather than NC language, it contains certain NP-internal constructions (e.g. *niemand niet* 'nobody not', *nooit geen* 'nothing no') that are understood as single but emphatic negations, rather than simply canceling out. He analyzes these as lexical items, not as true instances of NC.

In addition to such emphatic functions, PN may sometimes introduce presuppositions, although the data are subtle. In their influential paper on Italian comparatives, Napoli and Nespor (1976) explore the constraints on the use of what they term non_2 in comparatives and indirect questions as illustrated in (16):

(16) a. Maria è piu intelligente di quanto {è/non sia} Carlo.
'Maria is more intelligent than Carlo is'
b. Maria è piu intelligente di quanto tu {credi/non creda}.
'Maria is more intelligent than you believe'
c. Chissà che {ti sposi/non ti sposi}.
'Who knows if {he'll/he might not} marry you'

In the first two pairs, the speaker of the latter variant—with PN and subjunctive mood—presupposes that her comparative contravenes a previously held belief, while in (16c), the PN version "is used when the speaker expects the negated proposition to surprise someone, or to be contrary to prior expectations" (Napoli and Nespor 1976:836). Zanuttini (1997) offers a similar take on *non V mica* in Italian, while Schwenter (2005) argues that the relevant property for licensing

[7] Indeed, it is this property that renders PN a happier fit than EN for our category, given the OED's glosses of *pleonasm* ('redundancy of expression either as a fault of style or as a rhetorical figure **used for emphasis or clarity**' [emphasis added]) and *expletive* ('a word or phrase…used for filling up a sentence, eking out a metrical line etc. without adding anything to the sense').

secondary, non-canonical double sentential negation in Brazilian Portuguese is the discourse-old status of the proposition denied.

Other non-truth-conditional differences between unmarked and PN-bearing embedded clauses have been posited in various languages. Thus Espinal (1992:336, 1997:75) points to minimal pairs in Catalan like (17) in which the speaker of (17a) regards the arrival as likely, while the speaker of (17b) is more neutral or doubtful about the occurrence of the event.

(17) a. Tinc por que arribaran tard. 'I'm afraid they will arrive late.'
have fear that arrive+FUT late

b. Tinc por que no arribin tard. 'I'm afraid they might arrive late.'
arrive+SUBJ

More controversially, Yoon (2008) has argued that in Japanese and Korean, PN under verbs of hoping as well as verbs of fearing is associated with speaker's assessment of uncertainty and/or undesirability, but her data have been challenged by other native speakers. To be sure, as pointed out by Vendryes (1950:5), the specific conditions on the use of PN are subtle and hard to pin down. Given that a natural account of such conventional but non-truth-conditional components of speaker meaning would invoke Gricean conventional implicature, this result should not be surprising; cf. Potts (2007) and Horn (2008b) on the "descriptive ineffability" of conventional implicatures.

Besides conveying emphasis and introducing presuppositions, another function—or in any case, result—of hypernegation is to reinforce regional identity within a speech community. A shibboleth of New England speech is *so don't I,* or more generally *so AUXn't NP*. The most complete inventory for this "Massachusetts negative positive" (see 1999 cite below) is the draft entry for *so* that will appear in the *Dictionary of American Regional English* when the 4th volume of *DARE* is published.[8]

So adv **chiefly N[ew]Eng[land]**
In neg constr following positive constr: used to express agreement with the positive const—often in phr *so don't I* 'so do I'.
1962 *NYT Book Rev.* 28 Jan. 16/1, This expression [= 'don't be surprised if he doesn't visit you one of these days] is akin to the old jocular negative in the following piece of dialogue: "I wish I had an orange." "So don't I." Here again, the speaker means a strong "So do I."
1980 *Daily Hampshire Gaz.* 9 Sept 16/2, And just as the mood of the once-solemn convocation has changed over the past few years, so hasn't the opening address by President Jill Ker Conway.

[8] I am grateful to *DARE* editor Joan Houston Hall for allowing me access to the data included here; see also the archived ads-l threads [http://listserv.linguistlist.org/cgi-bin/wa?S1=ads-l] from 1998 to 2001, in particular the postings by Frank Abate, Jason Eisner, Beverly Flanigan, Bryan Gick, Dan Johnson, and Mark Liberman, for remarks on the origin, development, and distribution of *so don't I* and its cousins.

1998 *NADS Letters* nwPA (as of c. 1980), The standard response indicating agreement was "so don't I" (as in A: "I like ice cream." B: "Mmmm. So don't I!" Also "so didn't I", "so doesn't she", etc.)

1999 *DARE* File—Internet [Boston Online *The Wicked Good Guide to Boston English*], *So don't I*—An example of the Massachusetts negative positive. Used like this: "I just love the food at Kelly's." "Oh, so don't I!"

While this construction is frequently taken to be ironic (or "jocular"), both cites and speaker intuitions falsify this claim, as noted by John Lawler (p.c.), who also points out its extension to pockets (like Illinois) far from its New England base. In recent unpublished work, Jim Wood uses elicited data to argue that *so don't/can't NP* cancels the exhaustiveness implicature of the corresponding affirmative.

Another question regarding this construction is whence. In recent work by Freeman (2004) and Pappas (2004), *so do not I* and the like are tracked to Shakespeare (*Twelfth Night,* III.iv; *Richard III,* I.iv, II.ii) and Beaumont & Fletcher, with—so it is claimed—pleonastic (non-)force sometimes intended. But in fact these arguments are unconvincing. Even in the most favorable environment, the cite from *Twelfth Night*,

(18) VIOLA: Methinks his words do from such passion fly,
That he believes himself: so do not I.

the negation has its ordinary force. As the full context of the passage indicates, Viola's meaning here is 'I, unlike Antonio, do not (believe him)'. No fronting or inversion would be possible in this context in Present-Day English, where the only possible syntax would be *I do not do so.*

Midland's negative-positive answer to *so AUXn't NP* is the regionally restricted reading of *don't care to* reflected in this entry from Montgomery (2004):

care *verb* To be willing or agreeable to (usu. in phr. *I don't care to*, a response to a suggestion or invitation). The verb may range in sense from the understatement "not to mind if one does" or "to be pleased if one does."

1929 Chapman *Mt Man* 510 "I don't care for work" means "I like to work—I don't mind working." And "I'd not care to drive a car" means "I am not afraid to—I'd like to drive a car." Yet outlanders who have lived years in the mountains are still taking these comments in the modern sense, and advertising that the mountain man is lazy and that he is shy of modern invention.

1939 Hall *Recording Speech* 7 Examples of *not to care to* for *not to mind*, as in a sentence spoken by an Emerts Cove man, "She don't care to talk," meaning "She doesn't mind talking," are found in both the sixteenth and seventeenth centuries.

1998 Brewer *Words of Past* Another East Tennesseism is the practice, when asking somebody to do something, of adding "if you don't care to" when the meaning is exactly opposite of the plain English. An example would be, "Would you carry me to work, if you don't care to?"

In retrospect, this (non-)development should not be surprising; essentially, *don't mind* and *don't care,* compositionally equivalent, went their different ways for speakers of the standard dialect, just as *horrific* and *terrific* have become anto-

nyms. Midland and related varieties simply preserve the status quo ante. Here is the historical record as displayed in the OED entry:

> **care**, 4b: Not to mind (something proposed); to have no disinclination or objection, be disposed to. Now only [sic—but see above] with *if, though.*
>
> **1526** *Pilgr. Perf.* (W. de W. 1531) 18 Some for a fewe tythes, with Cayn, careth not to lese the eternall rychesse of heuen.
> **1597** SHAKES. *2 Hen. IV*, I. ii. 142, I care not if I be your Physitian.
> **1611** FLORIO, *Scrócca il fuso*..a light-heeled trull that cares not to horne hir husband.
> **1748** RICHARDSON Clarissa (1811) Will you eat, or drink, friend? I dont care if I do.

Note in particular the 1611 cite, in which the complaisant trollop in question doesn't object in the least to furnishing her husband with metaphorical horns.

Another regional variant also largely localized to Midland U.S. English reflects not the negative positive but the jack-in-the-box "Positive Negative," as related in Frazier's (1997) missive from "Sure Don't America":

> Normally the negative is expressed by the word "no". But for some people, and in some places, "no" is not part of the vocabulary. Instead speakers use an upbeat substitute that nevertheless conveys the same meaning—hence, the "Positive Negative". For example, if you go into a convenience store…and you ask the salesperson if they have any cat food, he or she will reply, cheerful as can be, "We sure don't!" The last word is spoken with rising inflection, as if the expression were a positive one ending with the word "do". Sometimes the word "sure" is accented with a regretful but still good-humored shake of the head…The Positive Negative can be adapted to any situation in which the answer is no: "Will you be back later?" "I sure won't!" "Can you give me a jump start?" "I sure can't".

Hypernegation proper extends from the syntactic cases we have surveyed here to lexical instances of the phenomenon. This catalogue can begin with double negative affixes with single negative meaning, as in the adjectival cases in which prefixal and suffixal negation do not cancel out. This occurred more productively in earlier (16^{th} and 17^{th} century) times, as seen in redundant formations like *unmatchless* ['unmatched', 'matchless'], *unguiltless, unhelpless, unmerciless* and so on (OED **un**[1], 5a; cf. also Horn 1988:224), but survives in present-day *irregardless* or German *unzweifellos* 'doubtless', lit. 'undoubtless'.

While hypernegated adjectives are now marginal, their verbal counterparts, involving an *un-/de-/dis-* prefixed verb that reinforces rather than reverses the meaning of the stem, are robust. Standard examples include such (ir)reversatives as *unthaw (= thaw, unfreeze), unloose(n) (= loose(n), untighten), unravel, dissever,* and *disannul* and denominals like *unpeel, unshell, unpit, deworm, debone.* I have argued (Horn 1988, 2002b) that these forms are motivated by the fact that *un*-verbs unambiguously signal a source-oriented reading in which the object or theme is returned to a state of nature (helping entropy along). A speaker may not know whether boning a chicken involves inserting or removing the bones or whether raveling the threads of a fabric entangles or disentangles them, but with *deboning* and *unraveling* only one meaning is possible. Ironically, this disambiguation function of redundant affixation has been compromised by technologi-

cal advances; with the emergence of means to reverse deletions and erasures, previously entropic verbs like *unerase, undelete,* or *unsort* can now be interpreted compositionally, although the redundant readings are still attested.

We now turn to HYPONEGATION, in which there are more (rather than fewer) negatives available for interpretation than are actually expressed. Remaining within the lexical domain, consider the haplology of *unpacked,* as seen in (19):

(19) a. My suitcase is **still unpacked** and my plane leaves in an hour!
b. My boxes are **still unpacked** and I've been living here for a year!

In (19a), I'm not yet packed, but in (19b) I'm not yet **un**packed, i.e. still packed (Horn 1988, fn. 17). Similarly, the potential threat posed by the Giants' (then) newly obtained star receiver in (19′) remained **un**-unveiled due to his injuries.

(19′) [Because of Plaxico Burress's injuries] The big-play threat the Giants hoped he would provide Eli Manning **remains unveiled**.
[NYT 5 Aug. 2005, D1]

A rich crosslinguistic vein for mining both hypernegation (which doesn't count when it "should") and hyponegation (which counts when it "shouldn't") is that of the INVERSE READINGS of proximatives like *almost* and *barely* (Horn 2002a, Ziegeler 2006, Amaral 2007), where the same expression can yield either 'almost' or 'barely' (= 'almost not') interpretations, depending on the context:

(20) Mandarin Chinese (cf. Li 1976, Biq 1989)
Wo chadianr mei chi. a. 'I almost didn't eat', 'I barely ate'
I miss-a-little not eat b. 'I almost ate' [= Wo chadianr chi le]

(21) Spanish (cf. Schwenter 2002, Pons Bordería & Schwenter 2005)
a. Por poco sale. 'She almost left'
b. Por poco no sale. 'She almost didn't leave' (= She barely left)

(21′) a. Por poco se mata. 'She was almost killed'
b. Por poco no se mata. ≠ (i) 'She almost wasn't killed'
= (ii) 'She was almost killed'

(22) Valencia Spanish (Schwenter 2002)
a. ¡Casi salgo!" 'I almost didn't get out' [lit. 'I almost get out']
b. ¡Casi llegas! 'You barely made it!' [lit., 'You almost arrive!']

While the effect in (21′b) is hypernegation, that in (22b) is hyponegation, as it is in Swiss German, where *fasch* normally corresponds to Standard Ger. *fast* 'almost' but also allows an inverted 'barely' sense. In English too, we can use *near miss* in a similar Janus-faced way both for disasters just avoided and goals just attained, to the consternation of language maven William Safire, whose "On

Language" column of 2 January 2005 assails the "nonsensical" use of *near miss:* "Some of us patiently but uselessly pointed out that the writer meant 'near hit'."

The most notorious instance of hyponegation in English is undoubtedly *could care less* 'couldn't care less', which dates back at least to Shirley Povich's comment in 1955 (written just before the Brooklyn Dodgers finally vanquished Stengel's Yankees in the World Series), "Casey Stengel could care less about the Dodgers' reputation for beating southpaws." I won't try to sort out the development here—sarcasm? frozen irony? reanalysis from an understood (or formerly understood) *As if/Like I could care less?* The sarcasm position is advocated by Pinker (1994:377) and rejected in Lawler (1974) and Liberman (2004); Liberman's Language Log post and links from it explore the intonational issue raised by Pinker as well as the formal and sociolinguistic distribution of the hyponegative.

The alternation between the equipollent variants *I could care less* and *I couldn't care less* is reminiscent of the class of SQUATITIVES (*squat* and its kin, including *doodly-squat, diddly-shit, jack shit, zilch, beans,* et al.), a set of minimizers with peculiar properties explored in Horn (2001; where the sources for (23) and (24) are provided, along with related examples) and Postal (2004); see also Postma (2001) for a related class of drecative NPIs in Dutch. A licensed squatitive is essentially an NPI like *anything* or *a damn thing:*

(23) a. He then looked into a career as a newspaper reporter but discovered writing didn't pay **squat**.
b. The designated hitter or DH: A player who is designated to bat for the pitcher, who, with rare exceptions, can't hit for **squat**.
c. We're all professionals, we understand the season's over. We happened to be 15-3, that doesn't mean **squat** now.

Unlicensed *squat* is an n-word like *nothing, nada,* or *niente:*

(24) a. All the talk of a resurrected Yeomen football program the past two seasons will mean **squat** if the team fumbles its opportunity to make the playoffs.
b. When the more sophisticated students complain that they are learning **squat**, I would direct the professor to remind them that tutoring builds the self-esteem of both tutor and tutee.
c. My dad got'em [football tickets] for free. He works at the university. They pay him **squat** so they give him perks.

A unified analysis of squatitives would either take the sentences in (23) to be hypernegations or take those in (24) to be hyponegations—but not both.

In some varieties of English, one version or the other may predominate; Inspector Diamond in Peter Lovesey's mystery series is consistent in wielding his *bugger all*s, *sod-all*s, and *sweet FAs* as unlicensed squatitives only:

(25) a. "What did they do about it? **Bugger all**?"
"No. They showed some responsibility."
b. "What is comes down to is the result that whatever the result it's **bugger-all** use without a hair from the suspect to match."
c. "Two innocent people died for **bugger all**?"
"I'm afraid that's true."

One possible approach to *could care less* (CCL) would treat it essentially as a squatitive, appearing as an NPI in the scope of negation or unlicensed bearing its own negative force. This would amount to pursuing the analogy in (26):

(26) I couldn't care less : I could care less :: It's not worth squat : It's worth squat

Postal (2004:361) collects squatitives and CCL under the same umbrella, and takes both CCL and its compositional counterpart *couldn't care less* to exclude negative polarity items from their scope; the judgments in (27) are Postal's.

(27) a. She could not (*at all/*ever) care (*at all) less about their/*anyone else's agenda) (*at all).
b. She could care less about their/*anyone else's agenda) (*at all).

In fact, though, a quick googling disconfirms this claim. Among the >1000 Google hits for *any, ever*, or both in the scope of *could/couldn't care less* are:

(28) a. I couldn't care less about **anyone** or **anything anymore**.
b. These people clearly couldn't care less about **anyone** but themselves.
c. I could care less about **anyone** else's sexual fantasy life
d. I couldn't care less about **ever** going back to school.
e. I could care less about **ever** having a No. 1 single
f. EOM staffers could care less about **ever** again hearing **anything** about the Department of Justice's Executive Office for Immigration Review

While there are roughly twice as many hits for CCL than for its compositional counterpart, this is presumably an artifact of the current (web-attested) preference for the "illogical" formation in general. In any case, the evidence from both my own intuition and the Google hits is at odds with Postal's antipathy towards (any) NPI licensing by CCL or its negative counterpart, but consistent with his point that the presence or absence of overt negation is irrelevant.

Similar remarks apply to another classic hyponegation with a more clearly sarcastic origin: *That'll teach you to VP* with the sense of 'that will teach you not to VP'. In Lawler 1974, the negative and hyponegative versions of this rebuke are not syntactically interchangeable, since the invisible negation in (29) fails to license even the weakest NPIs, *any* or *ever;* the indicated judgment is Lawler's.

(29) That'll teach you *(not) to say anything.

But in fact, precisely as with CCL, googling confirms that *that'll teach you* does indeed readily license NPIs like *ever* (1270 hits), *any(thing),* or both:

(30) a. "That'll teach you to **ever** fuck with me again," I said with a smirk.
b. Aw, sorry to hear Expatria, but that'll teach you to **ever** leave Boston.
c. That'll teach you to do **anything** without a spreadsheet.
d. That'll teach you to **ever** come up with **anything** that doesn't fit within the status quo of [sic] as defined by the internet community!
e. That'll teach him to **ever** say **anything** degrading about girls in your presence.

Nor is this surprising, since NPIs are regularly triggered in ironic or sarcastic contexts, as noted in Horn (2001):

(31) a. Fat chance I'd **ever** open **any** attachment that didn't come from one of my clients.
b. A fat lot of good THAT **ever** did **anyone**.
c. Like you'**d ever lift a finger** to help **anyone** around the house.
d. As if I **give a {damn/shit/flying fuck}** about any of that.
e. Small thanks you get for THAT, **either**.

Indeed, NPIs can be licensed by invisible negation in non-ironic contexts as well (see Horn 2001: §2 for additional examples, sources and extensive discussion):

(32) a. Exactly four people in the whole world have **ever** read that book.
b. "I'm anything but happy with THAT analysis, **either**."
c. "In one of the two conversations that I **ever** had with Raven McDavid, Jr. (this one in an elevator) he talked about feist dogs..."
d. "The tone [of an attack on manufacturers of vaginal deodorants] wasn't light-hearted, which might have justified touching the subject **at all**."
e. "Judge, the reason I know about this **at all** is by accident."
[Michael Connelly, *The Brass Verdict,* 2008, p. 335]

In Horn (2001) the implicit triggering effect in the contexts of (31) or (32) is dubbed FLAUBERT LICENSING, in allusion to the novelist's edict that "The artist should be in his work like God in Creation, invisible and all-powerful; let him be sensed everywhere, but let him not be seen." Like the deist God and the Flaubertian author, so too with the immanence of negativity in contexts of hyponegation: everywhere present yet nowhere visible.

In many of these contexts, there is felt to be an implicit 'only' or upper bound in the hyponegation. But not every exhaustivity-implying hyponegation licenses NPIs; clefts and other focus constructions, which have sometimes (e.g in É. Kiss

1998) been analyzed as entailing and/or asserting exhaustivity, fail to license NPIs in the absence of a dedicated exhaustivity marker like *only:*

(33) a. Of all our presidents, it's only [$_F$Bush] who (ever) proposed (any) tax cuts in wartime.
b. Of all our presidents, it's [$_F$Bush] who (*ever) proposed (*any) tax cuts in wartime.
c. [$_F$BUSH] (*ever) proposed (*any) tax cuts in wartime.

The key factor here is that in the acceptable examples, the speaker's point is to assert or communicate the relevant negative proposition, which is not the case for (*only*-less) clefts or in-situ focus. NPIs are permitted if exhaustivity (and not just identity) is asserted, even if (as in (31) and (32)) it's not directly expressed.

While an invisible negative can license NPIs, the visible but non-functional negative of *so don't I* evidently cannot, as Jim Wood (p.c.) points out. As shown by examples drawn from both *langue* and *parole,* the appearance of a hypertrophic negative marker or the nonappearance of a functional one can be a poor guide to the syntactic and semantic polarity of the statement in which it occurs—or fails to occur. After all, negation is the un-wizzywig of grammatical categories, where all too often what you see is what you don't get—and vice versa.[9]

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Bipolar Items and Attitude Predicates

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0. Introduction

This paper discusses *bipolar items* (BPIs) which share the features of *negative polarity items* (NPIs) as well as *positive polarity items* (PPIs). I will argue that both overt and covert factive emotives license BPIs. The Dutch *ooit* 'ever,' Serbo-Croatian *i*-series 'and/even,' and Hungarian *is*-series 'and/even' are anti-licensed by clausemate negation and licensed by extra-clausal negation (van der Wouden 1997, Progovac 1994, Szabolcsi 2002) or non-monotonic negative (and positive, for Serbo-Croatian) emotives. I maintain that the Japanese sentence focus *mo* 'also/even,' Korean wide-scope *to* 'also/even,' and Chinese *ye* 'also' in simple sentences are BPIs licensed by covert emotives. BPIs check their bipolar features with weak or medium negation but cannot check them with strong negation. Adding an NPI rescues BPIs in uncomfortable clausemate negation.

1. Bipolar Items

Two kinds of polarity items have been widely discussed so far: negative polarity items (NPIs) and positive polarity items (PPIs). This article focuses on another kind of rarely discussed polarity items, which van der Wouden (1997) called *bipolar items* (BPIs). These items show NPI and PPI features.

It is well known that NPIs are licensed in the scope of downward entailing (DE) environments (Fauconnier 1975a, Fauconnier 1975b, Ladusaw 1979).[1] For example, in (1a), the NPI *budge an inch* is licensed by *not*, which is strongly negative, because the omission of *not* makes it ungrammatical (1b). On the contrary, in (2), PPIs such as *already* are anti-licensed in a negative environment (Baker 1970).

[1] For example, the NPI *any* is licensed in the scope of the downward entailing operator *no fisherman*. *No* itself is also a downward entailing operator:

(i) a. No fisherman caught any fish. |= No fisherman caught any sillaginoid.
b. No fisherman caught any sillaginoid. |≠ No fisherman caught any fish.
(ii) a. No fisherman caught fish. |= No Sunday fisherman caught fish.
b. No Sunday fisherman caught fish. |≠ No fisherman caught fish.

(1) a. John did not budge an inch.
b. *John budged an inch.
(2) a. Simon has already arrived.
b. *Simon has not already arrived.

With respect to BPIs, the Dutch *ooit* 'ever,' Serbo-Croatian *i*-series 'also/even,' and Hungarian *is*-series 'and/even' demonstrate NPI-hood by being licensed in medium and weak negative environments but demonstrate PPI-hood when anti-licensed by strong clausemate negation (Szabolcsi p.c., van der Wouden 1997, Progovac 1994, Szabolcsi 2002).[2]

The Dutch *ooit* 'ever' requires weak or medium negativity but dislikes anti-morphic environments in (3). *Ooit* is licensed by extra-clausal negation in (4).[3]

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[2] The classification of negative environments as strong, medium and weak originates in Zwarts (1996, 1997). Anti-morphic determiners or noun phrases are strongly negative, anti-additive or anti-multiplicative expressions are medium negative, and monotone decreasing scope is weakly negative. Anti-morphism is De Morgan negation, which is a combination of anti-additivity and anti-multiplicativity.

(iii) Monotone decreasingness:
Let B be a Boolean algebra. A quantifier Q on B is said to be monotone decreasing iff for each two elements X and Y of the algebra B: if $X \in Q$ and $Y \subseteq X$, then $Y \in Q$.
(iv) Anti-additivity:
Let B and B* be two Boolean algebras. A function f from B to B* is said to be anti-additive iff for each two elements X and Y of the algebra B: $f(X \cup Y)=f(X) \cap f(Y)$
(v) Anti-multiplicativity:
Let B and B* be two Boolean algebras. A function f from B to B* is said to be antimultiplicative iff for each two elements X and Y of the algebra B: $f(X \cap Y)=f(X) \cup f(Y)$
(Zwarts 1996)

[3] Hoeksema (1998) discusses the current loss of polarity sensitivity of *ooit*. According to his observations, *ooit* has become ambiguous between the NPI *ooit* and the non-sensitive *ooit,* which is also used as an existential temporal adverb, nowadays. The latter appears in non-negative contexts.

(vi) a. Jan heeft het ooit geweten.
Jan has it once known
'Jan once knew it.'
b. Hier stond ooit een molen.
here stood once a mill
'A mill stood here, once.'

Jack Hoeksema also pointed out, at the Swarthmore Workshop on Negation and Polarity in 2006, that it is the Blocking Effect (Aronoff 1976) that makes *ooit* ungrammatical in a strong negative context. The presence of another lexical item *nooit* blocks *ooit* from a strong negative context. However, van der Wouden (1997) argues that *ooit* also dislikes anti-morphic operators other than *niet*:

(vii) a. *Een van de kinderen gaat allesbehalve ooit bij oma op bezoek.
One of the children goes anything-but ever with granny on visit
b. *Een van de kinderen gaat allerminst ooit bij oma op bezoek.
One of the children goes not at all ever with granny on visit

(3) a. **Geen** van de kinderen gaat **ooit** bij oma op bezoek.
none of the children goes ever with granny on visit
'None of the children ever visits granny.'
(Anti-additive)

b. **Weinig** kinderen gaan **ooit** bij oma op bezoek.
few children go ever with granny on visit
'Few children ever visit granny.'
(Monotone decreasing)

c. *Een van de kinderen gaat **niet ooit** bij oma op bezoek.
one of the children goes not ever with granny on visit
(Anti-morphic; van der Wouden 1997:132–133)

(4) Het is **niet** zo dat een van de kinderen **ooit** bij oma op bezoek gaat.
it is not so that one of the children ever with granny on visit goes
'It is not the case that one of the children ever visits granny.'
(van der Wouden 1997:133)

Similarly, the Hungarian *is*-series and Serbo-Croatian *i*-NPIs are ungrammatical with clausemate anti-morphic negation (5a) but grammatical in monotone decreasing contexts (5b) or with extra-clausal negation (5c).

(5) a. ***Nem** értettél valamit **is**.
not understood-you something also/even
'You didn't understand anything.'
(Hungarian, anti-morphic)

b. **Kevés** ember értett valamit **is**.
few people understood something also/even
'Few people understood anything.'
(Monotone decreasing)

c. **Nem** hiszem, hogy valamit **is** értettél.
not think-I that something also/even understood-you
'I don't think that you understood anything.'
(Extra-clausal anti-morphic, Szabolcsi p.c.)

Thus, BPIs dislike clausemate negation and demand either weak or medium negative contexts or extra-clausal negation.

2. Non-Monotonic Emotives as BPI Licensers

Licensers of BPIs are not limited to extra-clausal negation or clausemate medium or weak negation: negative emotives license BPIs in (6). The Serbo-Croatian data in (7) indicates that not only negative but also positive attitude predicates license BPIs.

(6) a. Ik **betreur** (het) dat ik dat **ooit** gedaen heb.
I regret it that I that ever done have
'I regret of what I have ever done.'
(Dutch, den Dikken p.c.)

b. **Sajnálom**, hogy valamit **is** adtam neki.
regret-I that something-ACC also/even gave-I to-him
'I regret that I gave him anything.'
(Hungarian, Szabolcsi p.c.)

(7) a. **Sumnja**-m da Milan voli **i(t)ko-ga**/***ni(t)ko-ga**.
doubt-1SG that Milan loves anyone-ACC / no-one-ACC
'I doubt that Milan loves anyone.'
(Progovac 1994:64)

b. **Sretan** sam da Milan **i(t)ko-ga** voli.
happy be.1SG that Milan anyone-ACC loves
'I am happy that Milan loves anyone.'

The monotonicity of emotives such as *doubt*, *be happy*, *be surprised*, and *regret* has posed a problem in Fauconnier-Ladusaw's DE analysis of NPI licensing contexts, because these attitude predicates are not straightforward DE (Asher 1987, Heim 1992, von Fintel 1999). For instance, *I am happy that Mary bought a car* does not imply *I am happy that Mary bought a Honda*, since the car Mary bought could be a Toyota. Similarly, the latter does not imply the former, for the speaker could be happy about the Honda and not necessarily glad that Mary spent money on a new car.

(8) I am happy that Mary bought a car. <=/=>
I am happy that Mary bought a Honda.

Without additional devices such as weakened DE (Asher 1987) or Strawson DEness (von Fintel 1999), attitude predicates are non-monotonic. Both weakened DE and Strawson Entailment add additional assumptions such that the complement clause of the conclusion is also believed.

(9) I am happy that Mary bought a car.
Mary bought a Honda.

∴ I am happy that Mary bought a Honda

Thus far, we have seen that BPIs dislike clausemate negation and demand weak or medium negative contexts, extra-clausal negation, or superordinate emotives. While Dutch and Hungarian BPIs are only licensed by negative emotives, Serbo-Croatian BPIs can be licensed by positive emotives. Considering the

attitude predicates to be non-monotonic, BPI licensing contexts range from nonmonotonic to monotone decreasing and anti-additive environments.

3. Implicit Non-Monotonic Emotives License BPIs

This section argues that not only overt emotives such as *regret* or *be sorry* but also covert emotives license BPIs. The Japanese *mo* 'also/even,' Korean *to* 'also/even' and Mandarin *ye* 'also' behave as BPIs when anti-licensed by clause-mate negation or licensed in monotone decreasing contexts. Crucially, these BPIs can be licensed by implicit speaker attitudes.

3.1. Sentence Focus *mo* 'also/even' in Japanese

The Japanese additive *mo* 'also/even' usually requires an explicit antecedent, as does the English additive *also/too*; for example, *John* is the antecedent of *Mary* in *John came, and Mary came too* (see (10) for the same example in Japanese). 'Even' appears when *mo* 'also/even' attaches to a noun phrase that refers to a scalar endpoint; for instance, in (11), *John* is the least likely person to come.

(10) John-ga ki-te, Mary-**mo** ki-ta.
John-NOM come-and Mary-also come-PAST
'John came and so did Mary.'

(11) JOHN-**mo** ki-ta.
John-even come-PAST
'(Surprisingly,), even John came.'

When *mo* attaches to *wh*-words, it forms *any*-type strong NPIs (Kato 1985, Nam 1994, Kato 2000) or negative concord items (Watanabe 2004).[4]

There is a third kind of *mo* 'also/even,' which has, so far, not been discussed much. Numata (2000) claims that this *mo* 'also/even' takes a wide scope over a proposition and triggers presupposed implicit events. I characterize it as a *discourse initial mo* or a *propositional attitude mo*, which can appear discourse initially, out of the blue, and does not require a discourse antecedent. Instead, this *mo* requires certain speaker attitudes:

(12) a. Yo-**mo** fukete-ki-ta. Mo neru-to shi-yo.[5]
night-also late-become-PAST already sleep-COMP do-will
'It's become late (at night). It's time to go to bed.'
b. Shikuramen-**mo** karete-ki-ta. Mo haru-da.
cyclamen-also wither-come-past now spring-be
'The cyclamens have withered. Spring is already here.'

[4] Japanese grammarians have considered *mo* polysemous (Sadanobu 1997).
[5] Modified from Sadanobu (1997). I am grateful to Norihiro Ogata for suggesting this example.

c. Ko-no saifu-**mo** furuku-nat-ta.
this-GEN wallet-also old-become-PAST
'This wallet has become old.'
d. Mari-**mo** kashiko-i.
Mari-also smart-be
'Mary is indeed smart.'
e. Soto-**mo** hiete-ki-ta.
outside-also cold-ASP-PAST
'It has become cold outside.'
f. Tabi-**mo** owari-ni chikazuite-ki-ta.
trip-also end-to approach-ASP-PAST
'The trip is coming to an end.'
g. Omae-**mo** aho-ya-na.
you-also silly-be-EXC
'You are indeed silly.'

This *mo* has *sentence-focus structures* in the sense of Lambrecht (1994). As an answer to the question *what happened*, the entire proposition *my car broke down* is new information and is therefore focused on.

(13) a. What happened?
My CAR broke down.
b. Presupposition: _
c. Assertion: 'speaker's car broke down'
d. Focus domain: 'speaker's car broke down'
e. Focus: S

(Lambrecht 1994:233)

The discourse-initial *mo* is a BPI which shows PPI-hood when anti-licensed by clausemate negation, as in (14a) and (15a). Moreover, extra-clausal strong negation, (14b) and (15b); monotone decreasing numeral, *at most n* (16); and nonmonotonic emotives can be its licensers (17).

(14) a. *Yo-**mo** sue-ja-**nai**.
world-also end-be-NEG
'This is not the end of the world.'
b. Yo-**mo** sue-da-to-iu-koto-wa-**nai**.
world-also end-be-COMP-say-fact-TOP-NEG
'It is not true that this is the end of the world.'
(15) a. *Tabi-**mo** owari-ni chikazuite-ko-**nai**.
trip-also end-DAT approach-ASP-NEG
'The trip is not drawing to an end.'

b. Tabi-**mo** owari-ni chikazuite-ki-ta wake demo-**nai**.
trip-also end-DAT approach-ASP-PAST reason be-NEG
'It is not that the trip is drawing to an end.'

(16) **Seizei** **5**-nin-no gakusei-**mo** tsukare-ta.
at most 5-CL-GEN student-also tired-PAST
'At most five students grew tired.'

(17) a. Yo-**mo** fukete-ki-te **zannen-da**.
night-also late-become-PAST.and regretful-be
'I am sorry that it got late (at night).'
b. Shikuramen-**mo** karete-ki-te **kanashii**.
cyclamen-also wither-come-PAST.and sad
'I am sad the cyclamens have withered.'

Even though the typical *mo*-sentences of this sort are simple declarative sentences, the speaker's sentimental emotions, either negative or positive, is indispensable:

(18) a. (Zannenna-koto-ni) yo-**mo** fukete-ki-ta.
regretful-fact-GOAL night-also late-become-PAST
'(I am sorry that) it's become late (at night).'
b. (Shimijimi-to) Ko-no saifu-**mo** furuku-nat-ta.
heartily-COMP this-GEN wallet-also old-become PAST
'(Heartily) This wallet has become old.'

(19) (Ureshii-koto-ni) haru-**mo** takenawa-ni nari-mashi-ta.[6]
(happy-fact-GOAL) spring-also peak-GOAL become-HON-PAST
'(I'm glad that) spring has reached its peak.'

Therefore, the BPI licensing environments in Japanese are: (i) downward entailing scope, (ii) extra-clausal antimorphic negation, (iii) extra-clausal non-monotonic emotives, and (iv) covert superordinate emotives. Covert superordinate emotives are peculiar to Japanese as well as to Korean and Chinese BPIs.

3.2. Korean *to* 'also/even'

The Korean *to* 'also/even' follows the same pattern as the Japanese BPI *mo*. The sentence focus *to* 'also/even' is triggered by implicit emotions such as *be sad* or *regret* when anti-licensed by clausemate negation.[7]

(20) a. Pom-**to** wat-ta.
spring-also come-PAST
'Spring has come.' (That's why I'm so sad.)

[6] The body of this sentence is taken from Numata (2000), even though Numata does not discuss speaker attitudes toward the propositions.
[7] My thanks to Hejeong Ko for providing the Korean examples.

b. #Pom-**to** ogi **anat**-ta.
spring-also come NEG-PAST
'Spring has not come.' (That's why I'm so sad.)

3.3. Chinese *ye* 'also'

Sentence focus *ye* 'also' in Mandarin Chinese is also a BPI, for it is licensed by speaker feelings, as in (21a); however, clausemate negation interferes with it in (21b).[8] Clausemate negation does not interfere with *ye* 'also' as shown in (21c):

(21) a. Qiutian **ye** lai-le.
fall also come-PERF
(In view of the foregoing events) 'Fall has come.'
b. #Qiutian **ye** **bu** lai-le.
fall also NEG come-PERF
'Fall is not here.'
c. Lingling bu lai-le. Shu **ye** **bu** lai-le.
Lingling NEG come-PERF Shu also NEG come-PERF
'Lingling did not come. Neither did Shu.'

The monotone decreasing operator *at most* licenses the BPI *ye* 'also' in (22), as do non-monotonic emotives in (23).

(22) Zhangsan **zuiduo** **ye** zhi neng he san bei jiu.
Zhangsan at most also only can drink three glass liquor
'Zhangsan can drink three glasses of liquor at the most (it's a pity).'

(23) a. **Keqi** qiutian **ye** likai-le.
sorry fall also leave-PERF
'I'm sorry that fall is over.'
b. **Xinhao** qiutian **ye** likai-le.[9]
glad fall also leave-PERF
'I'm glad that fall is over.'

4. Modal-like Elements or an NPI Rescues BPIs with Negation

The insertion of an NPI rescues BPIs in otherwise uncomfortable anti-morphic environments, as in (24).[10] Moreover, (25) indicates that the presence of a modal-like element also rescues otherwise uncomfortable BPIs under negation.[11]

[8] I owe most of the following Mandarin examples to Chih-hsiang Shu.
[9] My thanks to Pei Jung Lee for the judgment.
[10] I thank Heejeong Ko for bringing this to my attention.
[11] Thanks to Hiroshi Mito for suggesting example (25).

(24) Ko-no saifu-**mo** #(zenzen/amari) tsukawa-**nakat**-ta.
this-GEN wallet-also at all/much use-NEG-PAST
'I have not used this wallet at all/much.'

(25) a. Kare-**mo** kekkon-seikatsu-**mo** **umaku** **ika-nakat**-ta-ne.
he-also marriage-life-also well go-NEG-PAST-PAR
'His married life did not go well, did it?'
b. Kono hon-**mo** yoku **wakara-nakat**-ta-ne.
this book-also well can.understand-NEG-PAST-PAR
'This book was also hard to understand, wasn't it?'
c. Ano baito-**mo** **tsukae-nakat**-ta.
that part-time-worker-also can.use-NEG-PAST
'That part-time worker was not usable, either.'

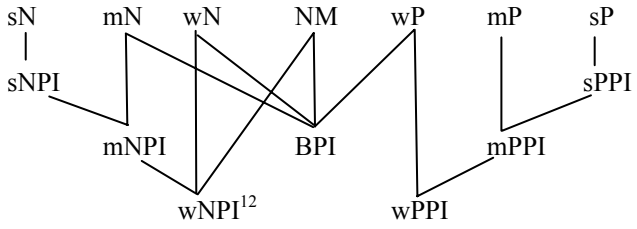
(24) seems to suggest that the negation that anti-licenses the BPI licenses the NPI *zenzen/amari*, so that it no longer anti-licenses the BPI. In (25), the presence of non-monotonic modal-like elements licenses the illegitimate clausemate BPI.

5. BPI Licensing Contexts

BPI licensers are either monotone decreasing, anti-additive, extra-clausal anti-morphic negation, or non-monotonic explicit/implicit emotives; therefore, BPI licensing contexts can be summarized as in (26). The distribution of polarity items including the BPIs coincides with the feature inheritance hierarchy, which is not bound (cf. Carpenter 1992) in (27).

(26) a. [MD...BPI...]
b. [AA...BPI...] (Dutch)
c. $NEG_{antimorphic}[_{CP}...BPI...]$
d. *$[NEG_{antimorphic}...BPI...]$
e. $PRED_{emotive}$ $[_{CP}...BPI...]$
f. ± $(PRED_{emotive})[_{CP}...BPI...]$ (Japanese, Korean, Chinese)
g. ± $PRED_{emotive}[_{CP}...BPI...]$
(Serbo-Croatian, Japanese, Korean, Chinese)
h. −$PRED_{emotive}[_{CP}...BPI...]$ (Dutch, Hungarian)
(MD: monotone decreasing, AA: anti-additive, PRED: predicate, +: positive, −: negative, ( ): implicit)

(27)



[12] Weak NPIs such as *any* and *ever* can appear in non-monotonic scope (Nishiguchi 2003, 2004).

The distributions of BPIs can be explained by the feature checking mechanism. As Bernardi (2002) incorporates NPI licensing relations and monotonic properties into a lexical entry in Categorial Type Logic, the BPI is assigned the feature [mN⊓wN⊓NM⊓wP], which is the meet of medium negative (mN), weak negative (wN), nonmonotone (NM), and weak positive (wP) in the notation of combinatory categorial grammar (Steedman 2000, among others). The BPI feature can be checked in the wN, NM, or medium negative [wN⊓mN] context; for example, a Hungarian monotone decreasing determiner *kevés* 'few' returns a quantifier that selects VP with the BPI feature, as shown in (29). However, the BPI feature cannot be checked with the strong negative [sN⊓mN⊓wN].[13]

(28) Lexical entry:

BPI	NP-*also*: $S_{[mN⊓wN⊓NM⊓wP]}/(NP\S)$; *anything*: $((NP\S)/NP)\(NP\S_{[mN⊓wN⊓NM⊓wP]})$
non-monotonic emotive	*regret*: $(NP\S)/S_{[mN⊓wN⊓NM⊓wP]}$
weak negation	*few*: $(S/(NP\S_{wN}))/NP$
medium negation	*none*: $(S/(NP\S_{mN⊓wN}))/NP$
strong negation	*not*: $(NP\S_{sN⊓mN⊓wN})/(NP\S)$

(29)

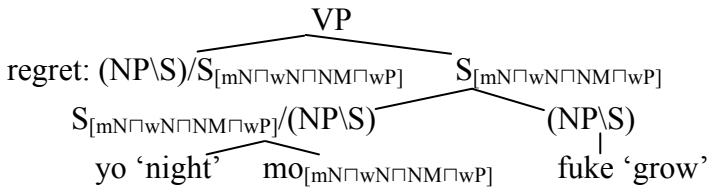
Kevés	ember	értett	valamit is
'few'	'people'	'understood'	'anything'
: $(S/(NP\S_{wN}))/NP$	: NP	: $(NP\S)/NP$	:$((NP\S)/NP)\(NP\S_{[mN⊓wN⊓NM⊓wP]})$

Laka (1994) assumes that negative predicates such as *deny* and *doubt* select a negative complementizer with [+neg], which licenses NPIs in embedded clauses.

(30) a. The witnesses denied that anybody left the room before dinner.
b. *The witnesses denied anything.
c. $[_{TP}$The witnesses$[_{T0}[T[_{VP}$deny$_{[uNeg]}$ $[_{CP}[_{C[Neg]}$ that $[_{TP}$ anything...$]]]]]]$

Applying Laka's theory, we assume that emotives select S with the BPI feature in (31).

(31)

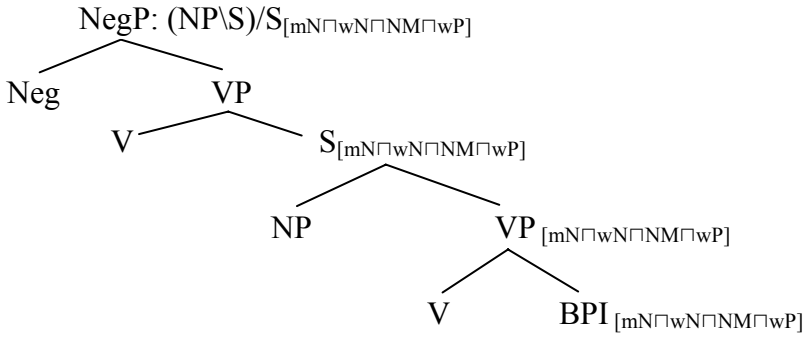


The BPI returns S with the [mN⊓wN⊓NM⊓wP] feature when composing with the predicate. Then, the S with the BPI feature combines with non-monotonic

[13] My thanks to Raffaella Bernardi for the discussion.

emotives that select S with the BPI feature. On the other hand, the negative predicate in the matrix clause also selects S with the BPI feature, as in (32).

(32)



6. Conclusion

This article discussed BPIs which share the features of both NPIs and PPIs. As NPIs, BPIs are licensed in anti-additive or monotone decreasing contexts. As PPIs, BPIs are ungrammatical with clausemate negation. BPIs are licensed by extra-clausal explicit or implicit non-monotonic factive emotives as well as superordinate negation. Adding an NPI rescues BPIs in clausemate negation.

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Focused N-Words and Double Negation Readings in Negative Concord Languages*

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0. Introduction

The study of negation has long been a central issue in linguistic theory, as negation is employed in every language, yet there is no universal system for negation. In other words, there are many different patterns and intricate systems of negation found in different languages. This paper aims to investigate the interaction of negative operators and focus operators when negative words (n-words) are focused in Non-Strict Negative Concord languages.

Negative Concord (NC) languages use multiple instances of n-words in order to express negation:

(1) Gianni *(**non**) ha telefonato a nessuno [Italian: Non-Strict NC]
G. not did call to nobody
'Gianni called nobody'

(2) Nessuno (***non**) ha telefonato
nobody not did call
'Nobody called'

(3) Milan *(**ne**)vidi **nikoho** [Czech: Strict NC]
M. neg.sees nobody
'Milan doesn't see anybody'

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(4) Dnes **nikdo** *(**ne**)volá
Today nobody neg-calls
'Today nobody is calling'

A Non-Strict Negative Concord language, such as Italian, employs a pre- and post-verbal asymmetry, in which n-words occurring post-verbally require overt sentential negation, as in (1), while pre-verbal n-words forbid overt sentential negation, as in (2). A Strict Negative Concord language, such as Czech, has no such asymmetry and sentential negation is required for all n-words, regardless of position, as in (3) and (4). This paper concentrates on Non-Strict Negative Concord languages only.

When an n-word in a Non-Strict NC language is focused, a Negative Concord reading does not arise; the only reading that is available is a Double Negation reading:

(5) $[\text{Nessuno}]_F$ ama nessuno [Italian]
Nobody loves nobody
'Nobody loves nobody' = 'Everybody loves somebody' (DN, *NC)

This paper concentrates on the Double Negation reading that arises with the interaction between focus and negation. I argue here against a previous analysis for this data (Zeijlstra 2004) and present a new approach that will account for a larger variety of focused n-word data.

The paper is organized as follows: the next section introduces the reader to Zeijlstra's (2004) syntactic analysis of Negative Concord, beginning first with his proposal for basic Negative Concord readings and then moving on to focused n-words that yield a Double Negation readings in NC languages. Section 2 presents a new piece of data that is left unaccounted for under Zeijlstra's proposal. A new proposal for focused n-words, one that employs the alternative semantics of Rooth (1992), is presented in Section 3. Section 4 concludes the paper.

1. Zeijlstra (2004) and Negative Concord

1.1. Zeijlstra's Syntactic Analysis of NC

Zeijlstra (2004) argues that n-words in Negative Concord languages are inherently non-negative. He proposes a syntactic agreement solution, in which n-words are non-negative indefinites that are syntactically marked for negation; that is, they carry a [uNEG] feature. This [uNEG] feature must be properly licensed by a [iNEG] feature.

In Non-Strict Negative Concord languages, such as Italian, the [iNEG] feature can be sentential negation (6) or a null negative operator (7):

(6) Non ha telefonato a nessuno
neg has called to nobody
'He hasn't called anybody'
$[_{\text{NegP}}\ [\text{non}_{[\text{iNEG}]}\ [_{\text{vP}}\ \text{ha telefonato a nessuno}_{[\sout{\text{uNEG}}]}]]]$

(7) Nessuno ha telefonato
nobody has called
'Nobody called'
[$_{NegP}$ [*Op*¬$_{[iNEG]}$ Nessuno$_{[\sout{uNEG}]i}$ [$_{vP}$ t$_i$ ha telefonato]]]

In (6), the [iNEG] feature of the sentential negation *non* checks the [uNEG] feature of the post-verbal n-word *nessuno*. In (7), on the other hand, the [iNEG] feature of the pre-verbal n-word *nessuno* is licensed by a null operator, since it is not properly c-commanded by an [iNEG] feature otherwise. In both (6) and (7), the [iNEG] undergoes syntactic agreement with the n-word carrying a [uNEG] feature.

1.2. Zeijlstra's Treatment of Focused N-Words in NC

As we saw above, Double Negation readings arise when n-words in Negative Concord languages are focused. According to Zeijlstra (2004), post-verbal n-words that are focused move covertly to FocusP, above the sentential negation, where the [uNEG] feature of the moved n-word is no longer licensed. As a repair strategy, a null negative operator, carrying an [iNEG], is inserted above the n-word:

(8) Non ho telefonato a [nessuno]$_F$ [Italian]
Neg have called to nobody
'I didn't call nobody' = 'I called somebody'
[$_{FocP}$ *Op*¬$_{[iNEG]}$ [nessuno$_{[\sout{uNEG}]i}$ [$_{NegP}$ non$_{[iNEG]}$ ho telefonato t$_i$]]]

As a result, there are two [iNEG] features (one from the inserted null negative operator and one from the sentential negation) and a Double Negation reading results.

The same account can be used for focused pre-verbal n-words, such as (5) above, repeated here:

(9) [Nessuno]$_F$ ama nessuno
Nobody loves nobody
'Nobody loves nobody' = 'Everybody loves somebody' (DN, *NC)
[$_{FocP}$ [*Op*¬$_{[iNEG]}$ Nessuno$_{[\sout{uNEG}]i}$ [$_{TP}$ [*Op*¬$_{[iNEG]}$ t$_i$ [$_{vP}$ t$_i$ ama nessuno$_{[\sout{uNEG}]}$]]]

The n-word *nessuno* begins in SpecVP, and moves to SpecTP, where there is a null negative operator that checks its [uNEG] features, identical to regular, unfocused n-words in subject position. In this derivation, however, the n-word is focused and thus moves even further to SpecFocP, according to Zeijlstra (2004).

The n-word is now left unlicensed once again. As a repair strategy, another null negative operator needs to be introduced into the structure. We are left with two *Op*¬, both bearing [iNEG] features; the two negations cancel each other out as in classical logic and a Double Negation reading arises.

At this point, it seems as if Zeijlstra's (2004) proposal for focused n-words is equipped to handle the Double Negation reading in both the pre-verbal and the post-verbal environments. However, there is another possible structure in Italian that is left unaccounted for in Zeijlstra's (2004) treatment of focused n-words. I turn to this issue in the following subsection.

2. Drawbacks to Zeijlstra's Proposal

There are a few problems concerning Zeijlstra's (2004) proposal for Double Negation readings of focused n-words in Negative Concord languages, which I highlight in this subsection. In section 3, I propose a new approach to the focus data.

Although Zeijlstra's (2004) proposal outlined in the previous subsection can account for pre-verbal and post-verbal focused n-words, a problem arises when we consider data as in (10):

(10) [Nessuno]$_{F}$ non ama nessuno
Nobody not loves nobody
'Nobody loves nobody' = 'Everybody loves somebody'

It appears as if the addition of the sentential negation *non* does not change the semantics of the construction, since (9) and (10) have the same Double Negation reading. Recall that Non-Strict Negative Concord languages, such as Italian, require sentential negation with post-verbal n-words yet prohibit sentential negation with pre-verbal n-words. What is interesting about the data found in (10) is that both a pre-verbal n-word and a post-verbal n-word are present. In this construction, sentential negation is optional. This optional sentential negation causes troubles for Zeijlstra's (2004) proposal, since his approach will not be able to account for the DN reading, as can be seen in (11):

(11) [$_{FocP}$ [*Op*¬$_{[iNEG]}$ Nessuno$_{[\sout{uNEG}]i}$ [$_{TP}$ [*Op*¬$_{[iNEG]}$ t$_i$ [$_{vP}$ non$_{[iNEG]}$ ama nessuno$_{[\sout{uNEG}]}$]]]

The derivation of (10) will be the same as for (9) above, only this time there is an additional [iNEG] from the sentential negation *non*. With the presence of three [iNEG] features, two of them will cancel each other out, leaving one [iNEG] for a negative reading. Therefore, according to the Zeijlstra-type approach, we should expect a Negative Concord reading for (10), which is unattested.

There are two possible ways that Zeijlstra could address this issue, in order to save his proposal in the face of this data. Since the problem lies in the fact that the structure in (11) has three [iNEG] features when it should only have two in order to get the proper Double Negation reading, it seems as if Zeijlstra must dispense of one of these negative operators. It may be possible to eliminate one of the [iNEG] features that license the pre-verbal n-word. Perhaps the [uNEG] feature of the pre-

verbal n-word can be checked by the sentential negation's [iNEG] feature, as in (12), thus making the null operator in SpecTP unnecessary, as shown in (13):

(12) $[_{NegP}$ non$_{[iNEG]}$ $[_{VP}$ nessuno$_{[\text{~~uNEG~~}]}$ ama nessuno$_{[\text{~~uNEG~~}]}]]$

(13) $[_{FocP}$ $[Op\neg_{[iNEG]}$ Nessuno$_{[\text{~~uNEG~~}]i}$ $[_{TP}$ t_i $[_{vP}$ non$_{[iNEG]}$ t_i ama nessuno$_{[\text{~~uNEG~~}]}]]]$

In (13), there are only two [iNEG] features, thus the proper Double Negation reading would arise. However, if this were the case, it is unclear how Zeijlstra (2004) would rule out this ungrammatical structure:

(14) *Nessuno non ha visto Gianni
nobody not has see G.
'Nobody saw Gianni'

(15) *$[_{NegP}$ non$_{[iNEG]}$ $[_{VP}$ nessuno$_{[\text{~~uNEG~~}]}$ ha visto Gianni]]

If (13) were a possible derivation, then (15) would be an equally possible derivation. However, (15) is not a possible derivation and (14) is an ungrammatical sentence in Italian. It is ungrammatical to have sentential negation with only a pre-verbal n-word in Non-Strict Negative Concord languages. Zeijlstra (2004) rules out sentences such as (14) by arguing that a pre-verbal n-word cannot be checked by sentential negation at some early point in the derivation; the pre-verbal n-word must be checked in its SpecTP position by a null operator. Since this null operator carries an [iNEG] feature, in order to check the [uNEG] feature of the n-word, it cannot co-occur with sentential negation, since this [iNEG] feature would cancel out the [iNEG] feature of the sentential negation and the proper Negative Concord reading would never arise. Since Zeijlstra (2004) must argue that (15) is not a proper derivation, he must also argue that (13) is not a proper derivation.

Another approach that Zeijlstra could take to this problem is to argue that the sentential negation in (10) is non-negative. If that were the case, Zeijlstra (2004) would be able to predict the proper Double Negation reading since there would be two [iNEG] features, instead of three, which caused the wrong Negative Concord reading in (16):

(16) $[_{FocP}$ $[Op\neg_{[iNEG]}$ Nessuno$_{[\text{~~uNEG~~}]i}$ $[_{TP}$ $[Op\neg_{[iNEG]}$ t_i $[_{vP}$ t_i non$_{\mathbf{[uNEG]}}$ ama nessuno$_{[\text{~~uNEG~~}]}]]]$

However, if we argue that the sentential negation in this case is non-negative, then we undermine the pillar of Zeijlstra's (2004) typological approach to Negative Concord languages. Zeijlstra argues that the difference between Strict Negative Concord languages and Non-Strict Negative Concord languages is that the sentential negation in the former is non-negative, while the sentential negation in the latter is negative. Therefore, if we argue that the sentential negation *non* in

(10) is non-negative, then we are arguing that a Non-Strict Negative Concord language like Italian also has non-negative sentential negation. By doing so, we not only lose the distinction between the two types of Negative Concord systems, but we also lose the concise explanation of the pre-verbal/post-verbal asymmetry in Non-Strict Negative Concord languages. In Zeijlstra's treatment of Non-Strict Negative Concord, a pre-verbal n-word cannot co-occur with sentential negation since both the pre-verbal n-word and sentential negation carry [iNEG] features, and thus the proper Negative Concord reading would not arise:

(17) *Nessuno non ama Gianni
Nobody not loves G.
'Nobody loves Gianni'
*[$_{TP}$ [*Op*$\neg_{[iNEG]}$ Nessuno$_{[\text{~~uNEG~~}]}$ [$_{vP}$ non$_{\mathbf{[iNEG]}}$ ama Gianni]]]

Zeijlstra (2004) is able to rule out the ungrammatical structure in (18) by arguing that the sentential negation in Italian, a Non-Strict Negative Concord language, is negative, and thus cannot co-occur with a pre-verbal n-word since there would be two [iNEG] features. Therefore, Zeijlstra argues that sentential negation in Italian is negative. As a result, the possible solution proposed above in (13), which requires a non-negative sentential negation, is not possible.

We have now seen that it is important for Zeijlstra's (2004) proposal to assume that the sentential negation in Italian is negative. But how then, are we going to get the proper interpretation of (10)?

The option of eliminating one of the [iNEG] features in (11) by allowing the pre-verbal n-word to be licensed by the sentential negation is not available, nor can we allow the sentential negation to be non-negative. We are once again in the situation where Zeijlstra's (2004) theory cannot account for the Double Negation reading of structures such as (10). As a result, we are forced to posit a new approach to these Double Negation readings in Negative Concord languages.

3. A New Proposal of Focus and Negative Concord

3.1. Alternative Semantics and Focus

In this paper, I assume that the focus operator introduces a set of alternatives containing both the proposition and at least one other proposition of the same form, à la Rooth (1992).

Rooth appeals to alternative semantics in order to account for focus data, which is similar to the question-answer paradigm. More specifically, the position of focus in an answer correlates with the question position in *wh*-questions and the position of disjoined alternatives in alternative questions:

(18) Does Ede want tea or coffee? Ede wants [coffee]$_F$
Who wants coffee? [Ede]$_F$ wants coffee

The question *Does Ede want tea or coffee* determines the possible answers *Ede wants tea* and *Ede wants coffee*. Similarly, the focus phrase in the answer *Ede wants [coffee]*$_F$ indicates that there are alternative answers of the form *Ede wants x*.

Semantically, focus introduces an additional focus semantic value: $[[\alpha]]^f$, where α is a syntactic phrase. This can be seen below in (19):

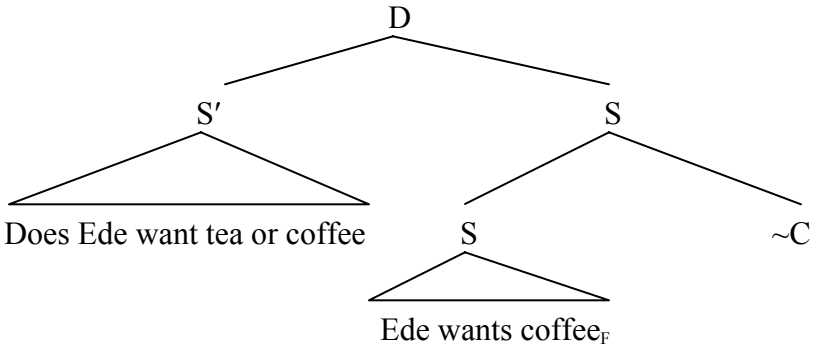
(19) $[[$ Ede wants $[\text{coffee}]_F$ $]]^f$ = the set of propositions of the form *Ede wants y*
$[[$ $[\text{Ede}]_F$ wants coffee $]]^f$ = the set of propositions of the form *x wants coffee*

Rooth argues that the alternative semantics approach makes a weak claim because it relies on construction-specific rules. What is missing from the alternative semantics theory, according to Rooth, is the key fact that the alternative set has a different semantic status from the ordinary semantic value. The question-answer congruence introduces the set of alternatives by virtue of the semantics and pragmatics of questions (questions determine the set of possible answers), whereas focus seems to introduce this set of alternatives through presupposition. As a result, Rooth proposes a single focus operator, ~, which introduces a presupposed alternative set:

(20) Where *Φ* is a syntactic phrase and *C* is a syntactically covert semantic variable, *Φ*~*C* introduces the presupposition that *C* is a subset of $[[\Phi]]^f$ containing $[[\Phi]]^O$ and at least one other element.

In the case of (19), the constraint introduced by the focus operator ~ is that *C* be a set of propositions of the form *Ede wants y* containing *Ede wants coffee* and at least one other proposition:

(21)



If the answer had focused on *Ede* instead, the focus operator would introduce the set of propositions of the form *x wants coffee*, which would be inconsistent with the information contributed by the question.

The advantage of this focus operator is that it does not rely completely on question-answer configuration. Instead, the focus operator, ~, introduces a variable which needs to pick out an antecedent, either from the linguistic context or from the discourse.

3.2. Returning to Focused N-Words in NC

In light of Rooth's (1992) theory of focus, we can now re-analyze the data presented above in (9). The focus operator introduces a set of alternatives containing *nobody loves nobody* and at least one other proposition of the same form, namely *x loves nobody*:

(22) [[[Nessuno]$_F$ ama nessuno]]^f
=={nessuno [non ama nessuno], ognuno [non ama nessuno], qualcuno [non ama nessuno]}
=={'nobody loves nobody', 'everybody loves nobody', 'somebody loves nobody'}

By focusing the pre-verbal n-word *nessuno*, in (22), we are introducing a set of alternatives. An important question arises at this point: what can qualify as an alternative? Since the list of alternatives is a set of utterances that *could* have been uttered, I assume here that an alternative must be grammatical. Since Italian is a Non-Strict Negative Concord language, sentential negation is required for post-verbal n-words. Therefore, it is ungrammatical for an alternative to include a post-verbal n-word without sentential negation, as in (23):

(23) *Qualcuno ama nessuno
Somebody loves nobody
'Somebody loves nobody'

Therefore, we cannot simply take the focus value of (22) to be *x ama nessuno*. Sentential negation *must* be inserted in order to make a grammatical alternative, a grammatical utterance that could have been said, as in (24):

(24) Qualcuno non ama nessuno
Somebody not loves nobody
'Somebody doesn't love anybody'

Furthermore, the predicate in the set of alternatives must also express the same semantics as the predicate of the actual asserted proposition. The proposition in (22) expresses negation; therefore, the set of alternatives must also express negation. The only way for the alternative predicates to have the same negative semantics as the original proposition is to add sentential negation in order to yield *x non ama nessuno*.

Therefore, in order for the alternatives to be grammatical, and in order to express the proper semantics, the set of alternatives must include sentential negation. Although the original focused version of (22) does not have overt sentential negation, I propose that *non* is inserted for the alternatives to properly license the n-word in object position, to express the proper negative meaning of the sentence, and also to unsure that the alternatives are grammatical. The result is a coherent

list of alternatives, with a negative predicate *non ama nessuno*. It is the addition of this extra negation in the predicate, whose presence was triggered by the focus operator, which gives rise to the Double Negation reading with focused n-words, as we will see below.

By focusing the subject n-word *nessuno*, the statement in (22) asserts that *nobody* has this property of *loving nobody*. The semantic value of this proposition is as follows:

(25) $[[\ [\text{Nessuno}]_F \text{ ama nessuno }]]^O$
$= \neg\exists x.\forall y[\neg \text{loves}(x,y)]$
$= \forall x.\exists y[\text{love}(x,y)]$

Since there are two negative operators, one in the predicate and one in the subject n-word, the two negatives cancel each other out and a DN reading arises. This approach yields the same reading as Zeijlstra (2004), and therefore, the reader may ask why one should abandon Zeijlstra's approach in favour of a Rooth-style system if both approaches yield the same results.

The advantage of adopting Rooth's theory of focus becomes apparent when we consider the data in (10) that Zeijlstra could not account for, repeated here:

(26) $[\text{Nessuno}]_F$ non ama nessuno
Nobody not loves nobody
'Nobody loves nobody' = 'Everybody loves somebody' (NC, *DN)

Recall that Zeijlstra (2004) could not account for the Double Negation reading of such a construction. I argue here that (26) can be accounted for with Rooth's theory of focus:

(27) $[[\ [\text{Nessuno}]_F \text{ non ama nessuno }]]^O$
$= \neg\exists x.\forall y[\neg \text{loves}(x,y)]$
$= \forall x.\exists y[\text{love}(x,y)]$

If we assume that the predicate *non ama nessuno* is a regular Negative Concord predicate with one negative operator (the sentential negation) and that the n-word *nessuno* in object position is an inherently non-negative NPI-like constituent, then the structure in (27) has two negative operators (one in the predicate and one in the subject n-word). In other words, the predicate *non ama nessuno* contains one negative operator and means *x loves nobody* (the same as in the case of (25)). The proposition in (26) asserts that nobody has this property of loving nobody. The two negative operators will cancel each other out as in classical logic and thus we predict the proper Double Negation reading.

4. Conclusion

In this paper, I have investigated the interaction between n-words in Non-Strict Negative Concord languages and another scope-bearing element, namely focus operators.

When considering novel focus data, we uncovered drawbacks to Zeijlstra's (2004) proposal. His account is only able to predict a Double Negation reading when sentential negation is present with a post-verbal n-word and a focused pre-verbal n-word, a reading that is unattested.

As a result, I provided an alternative proposal using Rooth's (1992) alternative semantics, in which the predicates in the set of alternatives require sentential negation. The focused n-word then provides another negation, yielding two negative operators. The extra negation in the predicate, whose presence is triggered by the focus operator, together with the negative operator of the focused n-word, gives rise to the Double Negation reading by canceling each other out.

What is left for future research is the interaction between negative operators and focus in Strict Negative Concord languages, such as Czech and Russian. In this slightly different system of multiple negation, a Double Negation reading does not arise when an n-word is focused:

(28)	Nikto ne lubit nikogo nobody not loves nobody 'Nobody loves anybody'	[Russian] (NC)
(29)	$[\text{Nikto}]_F$ ne lubit nikogo nobody not loves nobody 'Nobody loves anybody' *'Everybody loves somebody'	 (NC) *(DN)

Perhaps the lack of Double Negation reading in (29) can be attributed to the negative status of the n-words in Strict Negative Concord languages. In other words, n-words in Russian might all be inherently non-negative (à la Zeijlstra 2004) or NPIs (à la Ladusaw 1992), thus never yielding the two negative operators required for the Double Negation reading. I leave this for future research.

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On French Negation

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0. Introduction

French is a language that exhibits two particular characteristics with respect to the expression of (sentential) negation. First, it is a so-called Negative Concord (NC) language: A clause-internal combination of elements that can independently induce a semantic negation together only yield one semantic negation, as illustrated in (1) below.[1]

(1) a. Personne (ne) mange
N-body neg eats
'Nobody eats'
b. Jean (ne) mange rien
Jean neg eats n-thing
'Jean doesn't eat anything'
c. Personne (ne) mange rien
Nobody neg eats n-thing
'Nobody doesn't eat anything'

Apart from that, French also displays Embracing Negation (EN), a phenomenon in which Standard French has not one, but two negative markers (preverbal *ne* and postverbal *pas*) that normally 'embrace' the finite verb (see (2)). *Ne* is mostly a feature of formal French; in colloquial registers it is almost always dropped.

(2) Marie (ne) mange pas
Marie neg eats neg
'Marie doesn't eat'

[1] Under special intonation multiple negative constructions also allow Double Negation (DN) readings. (1c) can thus also have the reading 'nobody eats nothing' (cf. Corblin et al. 2004). However, crucial for the analysis in this paper is that (1c) allows for an NC interpretation.

Interestingly, French *ne* and *pas* differ quite drastically from each other in the sense that whereas *ne* may participate in any NC construction and may be combined with *pas*, while yielding a single semantic negation, no combination of *pas* and an *n-word* (i.e. a negative indefinite such as *personne* or *rien*) gives rise to an NC reading. Inclusion of *pas* in a sentence containing one or more n-words always yields an additional semantic negation:

(3) Personne (ne) mange pas (rien)
N-body neg eats neg n-thing
'Nobody doesn't eat (anything)'

This leads to the following question: What are the properties of n-words, *ne* and *pas*, such that *ne* can combine with both n-words and *pas*, while still yielding a single semantic negation, whereas *pas* and n-words may not be combined in such a way?

This paper is set up as follows: First I discuss two previous analyses that have dealt with this problem; after that I argue that *ne* should not be analyzed as a concordal element or as a negative marker, but rather as a plain Negative Polarity Item (NPI); finally I argue that once *ne* is taken to be an NPI, it follows straightforwardly that *pas* and n-words cannot establish an NC relation: Adopting Zeijlstra's (2004, 2008) approach that takes NC to be an instance of syntactic agreement, every element that can participate in an NC relation should carry a formal negative feature; however, there is no evidence for language learners of French that *pas* must carry such a formal negative feature as well.

1. Previous Analyses

1.1. De Swart and Sag (2002)

In order to evaluate De Swart and Sag's (2002) account for the incompatibility of French *pas* to participate in NC relations, first their treatment of NC should be clarified. According to De Swart and Sag, NC readings result from quantifier resumption, i.e. the process where *n* unary quantifiers merge into 1 *n*-ary quantifier. A sentence like (1c) then receives an additional reading saying 'there is no pair x, y such that x, y stand in an eating relation'. Every sentence containing two n-words is strictly speaking ambiguous between an iterative DN reading and a NC reading that is the result of quantifier resumption (disambiguation being either the result of principles of language usage (De Swart and Sag (2002)) or of additional language specific filters (De Swart (2010)). The question then immediately rises as to how to deal with negative markers (such as *ne* and *pas*) in this framework, as these markers are not quantifiers over individuals. De Swart and Sag argue that negative markers should be thought of as so-called zero-quantifiers, quantifiers that bind no variable. Being quantificational and negative in nature, negative markers can then participate in NC relations (as is the case in most languages). However, since negative markers in NC construction do not bring in any new semantic contribution (as they do not bind variables), languages

may also choose to leave negative markers out of NC. French would then be an example of a language that forbids one of its negative markers, namely *pas*, to participate in NC relations.

This analysis of French *pas* faces a number of problems. Apart from the general problems that it inherits from De Swart and Sag's treatment of NC in terms of quantifier resumption (see Giannakidou 2006, Zeijlstra 2004, 2008, De Swart 2010 for an overview and evaluation of different approaches to NC), the analysis seems to be too general, as it suggests that a salient subset of NC languages allow negative markers to be banned from NC constructions. However, to the best of my knowledge, only French exhibits this particular behavior. No other NC languages, even languages close to French, share this property. The examples below show that in other Romance languages the negative marker is always obligatorily present in NC constructions (Romanian) or at least in the case of n-words appearing in postverbal position only (Italian). Also, languages that exhibit EN (Tamazight Berber, West Flemish) allow or require their negative markers to participate in NC constructions, and moreover, older or current varieties of French (such as Quebecois) allow *pas* to enter NC relation as well.

(4) a. Nimeni *(nu) suna — Romanian
N-body neg calls
'Nobody calls'

b. Gianni *(non) ha ditto niente — Italian
Gianni neg has said n-thing
'Gianni didn't say anything'

c. Sha-ur 3lix wali — Tam. Berber
Neg-neg see.perf.1sg n-thing
'I didn't see anything'

d. Valère (en) was ketent van niemand (nie) — West Flemish
Valère neg was pleased of n-body neg
'Valère wasn't pleased by anybody'

e. On ne veut pas rien faire ici qui vous déplaise — 17th cent. Fr.
We neg want neg n-thing do that you displeases
'We don't want to do anything that displeases you'

f. Je juge pas personne — Quebecois
I judge neg n-body
'I don't judge anybody'

So, it appears to be a property of contemporary French that *pas* cannot participate in NC constructions. But it is unclear under De Swart and Sag's proposal how this is motivated and more importantly how this property of French *pas* is lexically encoded. What property is it that French *pas* has that all other negative markers in NC languages lack?

1.2. Penka (2007)

Penka (2007) addresses these above-mentioned questions and argues that it is not so much a special property of French *pas* that it cannot establish NC relations with n-word, but rather a special property of French n-words themselves. Penka adopts Zeijlstra's (2004, 2008) analysis of NC that takes NC to be an instance of syntactic agreement. Zeijlstra proposes that n-words in all NC languages carry an uninterpretable negative feature [uNEG] that needs to be checked off by a c-commanding element carrying an interpretable negative feature [iNEG]. Negative markers can either carry [iNEG] or [uNEG]. For reasons that will not be discussed here, Zeijlstra proposes that in languages such as Italian (where only postverbal n-words can establish an NC relation with the negative marker) the negative marker carries [iNEG]. In languages where the negative marker may be combined with n-words, regardless of their clausal position, Zeijlstra takes it to carry [uNEG]. The [iNEG] feature, then, is brought in by an abstract negative operator $Op_{\neg}$. To illustrate this mechanism, the underlying representations are shown for sentences (4a-b).

(5) a. $Op_{\neg[iNEG]}$ $Nimeni_{[uNEG]}$ *($nu_{[uNEG]}$) suna
b. Gianni *($non_{[iNEG]}$) ha ditto $niente_{[uNEG]}$

Prima facie, such an analysis cannot extend to French, Penka argues, since regardless of the feature status of *pas* ([iNEG] or [uNEG]) *pas* should be able to participate in at least some NC relations, contrary to fact. In order to solve this problem, Penka proposes that n-words in French do not carry a feature [uNEG] but rather a feature [uNEGØ] that states that n-words can only be checked by an abstract negative operator (which in French she says carries the corresponding feature [iNEGØ]). French *ne*, in her system, carries a general feature [uNEG] that does not specify the phonological status of its checker. *Pas*, finally, is an overt negator, thus carrying [iNEG]. Now the patterns simply follow: N-words and *ne* can be checked by one single abstract operator, yielding an NC reading (6a); *ne* can have its [uNEG] feature checked against *pas*' [iNEG] feature (6b); and finally, a combination of (one or more) n-words with *pas* yields a DN reading, as *pas* cannot check the n-words' [uNEGØ] features (6c) and thus an additional abstract negative operator is required:

(6) a. $Op_{\neg[iNEGØ]}$ $Personne_{[uNEGØ]}$ ($ne_{[uNEG]}$) mange $rien_{[uNEGØ]}$
b. Marie $ne_{[uNEG]}$ mange $pas_{[iNEG]}$
c. $Op_{\neg[iNEGØ]}$ $Personne_{[uNEGØ]}$ ($ne_{[uNEG]}$) mange $pas_{[iNEG]}$ $rien_{[uNEGØ]}$

Although Penka's proposal seems to be an improvement of Zeijlstra's (2004, 2008) system, as it can handle the French patterns illustrated above, it is problematic for two reasons. First, the analysis is ad hoc, as independent motivation is lacking for the existence of [iNEGØ] and [uNEGØ] features. This is especially striking since no other NC languages seems to exhibit such features,

which is the same problem as De Swart and Sag have been facing. But more fatally, Penka's analysis also makes a wrong prediction, namely that if *ne* can be licensed by Op¬ it should be able to negate a sentence by itself, contrary to fact.[2]

(7) *Marie ne mange

2. On *ne*

The observation in (7) is important as it shows that *ne* only appears to be a concordal element. Since NC is the phenomenon where elements that may induce a semantic negation by their own together only yield one semantic negation, *ne* by definition cannot appear in NC constructions (see also Breitbarth (2009) for a similar observation). If NC is taken to be an instance of syntactic agreement, instantiated by an underlying feature system, it follows as well that *ne* cannot have any formal negative feature at its disposal. The question then rises: What properties exactly does *ne* exhibit? Two properties immediately come to mind: First, *ne* is semantically non-negative, as it is unable to induce a semantic negation by itself; second, it may appear in negative sentences. Whereas the first property seems to be undisputed, some questions may be raised concerning the second property. Clearly, *ne* may occur in negative sentences, i.e. sentences marked for negation by either the presence of one or more n-words, or by the presence of *pas*. But, as Godard (2004) and Rooryck (2008) amongst many others have shown, these are not the only contexts in which the presence of *ne* is allowed. *Ne* may also appear in all kinds of other (Strawson-) Downward Entailing contexts, such as restrictive focus (8a), comparatives (8b), complement clauses of expressions of fear (8c), denial or doubt (8d), conditionals (8e) and temporal before clauses (8f), as shown below (all examples have been taken from Rooryck (2008:3-4)).

(8) a. Jean (ne) voit que Marie
Jean neg sees comp Marie
'Jean only sees Marie'

b. Jean est plus malin que Pierre (ne) l'est
Jean is smarter Pierre neg it is
'Jean is smarter than Pierre is'

c. Il a barricadé la porte de peur/ crainte qu'on (n) entre chez lui
He has blocked the door of fear that they neg enter with him
'He blocked the door for fear that people might come in'

d. Nie/ doute-t-il que je (ne) dise la vérité?
Denies/doubts he that I neg tell.subj the truth?
Does he doubt/ deny that I am telling the truth?

[2] There are a few known cases where *ne* actually may negate a sentence by itself, such as *je ne sais* ('I don't know'), but these expressions form a closed class and are generally analyzed as idiosyncratic properties of French, presumably remainders of a previous stage of the language.

e. Je viendrai à moins que Jean (ne) soit là
I will-come to less that Jean neg is.subj there
'I will come unless Jean is there'
f. Il est parti avant que nous (n') ayons mange
He is left before that we neg have eaten
'He left before we ate'

The contexts where *ne* may appear without being supported by an n-word or by *pas* and without giving rise to a semantic negation, are all contexts that are known to license NPIs. Thus, the most natural question at this point is to ask whether *ne* is not a plain NPI (like English *any*-terms). At first sight, two arguments seem to counter such an analysis, as has been argued e.g. by Godard (2004): First, *ne* may appear in contexts where it is not c-commanded by its licenser; second, *ne* is not allowed to appear in all NPI-licensing contexts. Closer inspection on the behavior of NPIs, however, reveals that these arguments are illicit.

Concerning the first argument, *ne* clearly violates the constraint, initially proposed by Ladusaw (1992), that NPIs have to be licensed under c-command by a proper licenser both at the level of surface structure and at the level of LF. The second conjunct of this constraint prevents sentences like (9) being ruled in:

(9) *Anybody has not been hit
Intended: 'Nobody has been hit'

Ne on the other hand may appear to the left of its licenser:

(10) a. Jean ne mange pas
Jean neg eats neg
'Jean doesn't eat'
b. Jean ne mange rien
Jean neg eats n-thing
'Jean doesn't eat anything'

However, as Van der Wouden (1994, 1996, 1997) and Hoeksema (1993, 2000), have observed, Ladusaw's surface constraint is much weaker than Ladusaw's LF roofing constraint (i.e. the constraint that NPIs must be commanded by a proper licenser at the level of LF). The latter turns out to be valid in all cases, the former is not valid for all instances of NPI licensing. Dutch universal modal NPI *hoeven* (as well as its German and English counterparts *brauchen* and *need* (without *to*)) can appear in a higher position than negation, as can English *as of yet*:

(11) a. Hij hoeft *(niet) te eten
He needs neg to eat
'He doesn't have to eat'
b. As of yet, they *(don't) have to go

The argument that French *ne* cannot be an NPI due to its relative surface position with respect to its licenser is therefore not valid. The same holds for the second argument, namely that French *ne* cannot occur in all contexts that license NPIs.

If *ne* is an NPI, it must be a weak one, since it can occur in all kinds of weak NPI contexts; if it were a strong NPI it could not occur in the examples in (8) (perhaps with the exception of temporal *before* clauses, which in general allow licensing of strong NPIs). But weak NPIs, such as English *any*-terms, are allowed to occur in all Downward Entailing contexts. This is however not the case for French *ne*, which, for instance, may not occur in the first argument of a universal quantifier:

(12) a. Everybody who owns a car, likes it
b. Tous le monde qui (*n') aime Marie, aime Paul aussi
All the world that neg loves Marie, loves Pierre too
Intended: 'Everybody who loves Marie, loves Pierre as well'

Again, this argument is invalid, as it is a general property of NPIs that they may not occur in all contexts that are Downward Entailing. The reader is referred to Van der Wouden (1994, 1997) and Hoeksema (2000) for a series of examples, but I will provide two examples from Dutch as well.

(13) a. *Iedereen die een auto hoeft te hebben, wil er een
Everybody who needs a car to have, wants prt one
Intended: 'Everybody who needs to have a car, wants one'
b. *Hij heeft nauwelijks ooit hard gewerkt
He has hardly ever.npi hard worked
Intended: 'He has hardly ever worked hard'

It is especially striking that modal auxiliaries, such as Dutch *hoeven*, and particles like French *ne*, share a number of interesting properties in terms of their NPI behavior, calling for future research. For now, it suffices to say that there are no theoretical or empirical objections to claiming that French *ne* is an NPI. In fact, it immediately solves the problem that French *ne*, contrary to n-words or *pas*, cannot induce semantic negation by itself: No NPI can do that, not even in fragmentary questions:

(14) a. Who did you see? *Anybody
Intended answer: 'Nobody'
b. Qu'est-ce-que tu fais? Ne manger
What you do? Neg eat
Intended answer: 'Not eating'

But taking French *ne* to be an NPI does not directly solve the initial problem: Why is it that French *ne* and n-words and *ne* and *pas* may be combined but n-

words and *pas* may not (whilst yielding a single negation)? The first problem is solved now: Whatever is responsible for the single negation that n-words invoke, this negation can also license *ne*. And *pas*, which always brings in a negation of its own, can license *ne* as well. In the next section I argue, though, that as a side-effect of *ne*'s NPI status it actually does follow that *pas* cannot participate in NC constructions at all.

3. On *pas*

3.1. Diachronic Observations

In order to understand the syntactic and semantic behavior of French *ne*... *pas*, and the exact role that *pas* plays given that *ne* must be considered an NPI, it first needs to be discussed how the French negative marker *pas* came into being. As is widely known, French *pas* developed from a noun meaning 'step' via a minimalizer ('a bit') into a full negative marker (cf. Deprez (1997), Rowlett (1998), Roberts and Roussou (2003)), a development not uncommon to other languages and generally referred to as Jespersen's Cycle (Jespersen (1917), Dahl (1979)). Whereas Old French only had negative marker *ne* at its disposal, during the period of Middle French *ne* got combined more and more often by the additional minimalizer *pas*, until EN *ne* ... *pas* became the standard way of expressing sentential negation. Schematically:

(15)	a. Je ne di	Old French
	b. Je ne dis (pas)	Middle French
	c. Je ne dis pas	Standard French
	d. Je dis pas	Colloquial French
	'I don't say'	

For reasons that will not be fully discussed here (but see Roberts and Roussou (2003) and Condoravdi and Kiparsky (2005) for an overview and analyses), at some point in the history of Middle French, *ne* was no longer felt to be able to express sentential negation by itself. Therefore initially an indefinite minimalizer was always added to reinforce *ne*.[3] However, in cases where there was already an indefinite reinforcer present, there was no need for *pas* to strengthen *ne*. And this was exactly the case with n-words. Thus combinations with *ne* and n-words did not need an additional reinforcer *pas* and therefore combinations of *ne* with an n-word and combinations of *ne* with *pas* have both been frequently attested. Note that this does not entail that it must have been forbidden by then to reinforce combinations of an n-word and *ne* by an additional minimalizer *pas*. Such combinations have indeed be attested, such as the famous follow-up of example (4e) suggests, both repeated in (16) below:

[3] Initially *pas* was not the only candidate for this reinforcement. Other minimalizers, such as *point* ('point'), *grain* ('grain'), *goutte* ('drop') and *mie* ('crumb') have also been attested.

(16) a. On ne veut pas rien faire ici qui vous déplaise … 17th cent. Fr.
We neg want neg n-thing do that you displeases …
'We don't want to do anything that displeases you …'
b. … de *pas* mis avec *rien* tu fais la récidive,
et c'est, comme on t'a dit, trop d'une negative
… with pas put with rien you do the repeat,
and it.is as one you.has said too.many of.one negative
'… with *pas* put together with *rien*, you commit a repeat offense?,
and it is as one says a negation too many'

From the 17th century onwards, French exhibited only combinations of *ne* and n-words, or *ne* and *pas*; the need to reinforce *ne* was absent in cases where *ne* already had been reinforced by an additional indefinite, and could only lead to extremely strong emphasis.

3.2. Synchronic Observations

Since combinations of n-words, *ne,* and *pas* hardly occurred after the reanalysis of *pas* as a plain negative marker, such occurrences could never be robust enough to form a cue for language learners that such constructions were possible as well (Lightfoot (1999)). Consequently, language learners could only base themselves on either constructions that contained *ne* and n-words, or *ne* and *pas*. Also, since constructions where *ne* could negate a sentence on its own (except for a handful of idiosyncratic expressions) were lacking, there was no evidence for language learners that *ne* could be a concordal element, so the only way that language learners could then analyze *ne* was in terms of *ne* being an NPI. Note that this implies that constructions containing *ne* and *pas* only formed proper evidence that *pas* was a semantic negation. Since *pas*, for its part, only occurs in sentences where it combines with *ne* or on its own, the conclusion that French *pas* must be a semantic negation is not falsified by any other type of construction.

The case of French n-words is rather complicated, as n-words can independently induce a semantic negation, but together they may yield only one semantic negation. Adopting Zeijlstra's (2004, 2008) mechanism, this means that n-words are equipped with an uninterpretable formal negative feature that may be licensed by an abstract negation. Since n-words can appear on their own, this licenser may be abstract; application of this mechanism to French n-words is illustrated for the sentences in (1), repeated as (17). Note that *ne* is not equipped with such a feature as it is an NPI, not a concordal element.

(17) a. $Op_{\neg[iNEG]}$ $Personne_{[uNEG]}$ (ne) mange
N-body neg eats
'Nobody eats'
b. $Op_{\neg[iNEG]}$ Jean (ne) mange $rien_{[uNEG]}$
Jean neg eats n-thing
'Jean doesn't eat anything'

c. $Op_{\neg[iNEG]}$ $Personne_{[uNEG]}$ (ne) mange $rien_{[uNEG]}$
Nobody neg eats n-thing
'Nobody doesn't eat anything'

But now the question rises again why, instead of the abstract operator, $Op_{\neg}$, *pas* cannot be the checker of an n-words [uNEG] feature. Why is, for instance, (18) impossible with an NC reading?

(18) *Jean (ne) mange $pas_{[iNEG]}$ $rien_{[uNEG]}$
Jean neg eats neg n-thing
'Jean doesn't eat anything'

Before, I argued that the fact that *pas* would have only occurred in the language input in combination with *ne*, and that *ne* was not a concordal element (but a plain NPI instead) formed evidence that *pas* was a semantic negation: Its lexical semantic representation contains a negation. But *pas*' lexical semantic status does not entail that *pas* must carry a formal negative feature as well (regardless of whether such a formal feature would be semantically interpretable or not). Acquisition of formal features can only take place if there is evidence for a language learner to assign a formal feature to a particular lexical item. However, there is no construction available in current French that would provide such evidence. Hence *pas* cannot be said to carry an interpretable formal feature [iNEG] and for that reason it is unable to check off any [uNEG] feature of an n-word. *Pas* is semantically, but not formally negative.

Instead, whenever an n-word and *pas* co-occur in one and the same clause, it must be the abstract negative operator $Op_{\neg}$ that checks off the n-word's [uNEG] feature and the sentence thus contains two semantic negations: Once introduced by $Op_{\neg}$ and one by *pas*. In fact, even stronger, when one n-word precedes and one n-word follows *pas*, there is still one abstract negative operator that checks off both n-words'[uNEG] features, whereas *pas* introduces a semantic negation of its own. The fact that *pas* does not act as an intervener in the agreement relation between $Op_{\neg}$ and the two n-words follows straightforwardly: Since *pas* is morphosyntactically not marked for negation, any morphosyntactic process must be blind to *pas*' semantic negation. Examples of both constructions are given below:

(19) a. $Op_{\neg[iNEG]}$ Jean (ne) mange pas $rien_{[uNEG]}$
Jean neg eats neg n-thing
'Jean doesn't eat nothing'

b. $Op_{\neg[iNEG]}$ $Personne_{[uNEG]}$ (ne) mange pas $rien_{[uNEG]}$
N-body neg eats neg n-thing
'Nobody doesn't eat anything'

4. Conclusions

In this paper I argued French *pas* is semantically negative, but not equipped formally with any negative feature, i.e., morpho-synatcically, *pas* is not negative. N-words, on the other hand, form in a way the mirror image of *pas*: They are semantically non-negative, but only equipped formally with a negative feature: They carry an uninterpretable formal negative feature, which needs to be checked off by an element that carries an interpretable formal feature. This also explains why *pas* and n-words cannot yield any NC reading: Since *pas* is formally non-negative, it can never check any n-word's [uNEG] feature. These features can thus only be checked off by an abstract negative operator, carrying an interpretable negative feature [iNEG], which has to be assumed to be present in the sentence as well. Consequently, combinations of n-words and *pas* always induce two negations. I have demonstrated that French *ne* is a plain NPI in the sense that it must always be licensed by a proper Downward Entailing licenser (though not every Downward Entailing operator proves to be a valid licenser). In negative sentences *ne* can thus be licensed by the purely semantic negation *pas* or by the abstract negative operator Op¬ that carries an interpretable formal feature [iNEG]. Finally, I have argued that these assumptions concerning the nature of *ne*, *pas* and n-words are not postulated in order to make the system work, but rather follow straightforwardly from the development of French negation (along the lines of Jespersen's Cycle) and from independent principles of language acquisition.

This study has a few theoretical consequences. First, it provides more evidence for theories of NC in terms of syntactic agreement, such as Zeijlstra's (2004, 2008) approach. The French facts follow immediately once formal properties (like the feature system underlying NC) are thought to be distinct from semantic properties (such as NPI licensing). Second, it also shows that there is no 1:1 correspondence between formal and semantic properties. Some lexical items, such as *pas*, can have a particular semantic property, which is not reflected in their formal representation, and vice versa, some lexical items, such as n-words in most languages, have formal properties that are not manifested in their lexical semantics.

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