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Special Session

Learnability

Parasession

Austronesian Linguistics

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Foreword

This monograph contains 24 of the talks given at the 42nd Annual Meeting of the Berkeley Linguistics Society, held in Berkeley, California, February 5-7, 2016. The conference included a General Session, a Special Session on Learnability, and a Parasession on Austronesian Linguistics. The meeting was organized by the second-year graduate students of the Department of Linguistics at the University of California, Berkeley: Geoff Bacon, Andrew Cheng, Emily Clem, Virginia Dawson, Erik Hans Maier, Alice Shen, and Amalia Horan Skilton.

The papers in this volume were edited for style by the members of the Executive Committee. Resubmitted papers were edited further, as necessary, by the Executive Committee and compiled into the final monograph by Emily Clem. This final monograph was reviewed by Virginia Dawson, Alice Shen, and Amalia Horan Skilton.

The BLS 42 Executive Committee
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General Session

Babanki coda consonant deletion and vowel raising: A case of allomorphy*

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1 Introduction

The purpose of this paper is to account for two phonological alternations that occur on nouns, verbs, deverbal adjectives, and pronouns in Babanki, a Grassfields Bantu language spoken in Cameroon.¹ The alternations involve the deletion of certain coda consonants between two underlying vowels and vowel raising. Mutaka and Chie (2006) have noted that there is vowel raising in associative, possessive, and certain verbal constructions in the language. This can be illustrated in (1) where the deletion of /ŋ/ is accompanied by a counterfeeding opacity (Kiparsky, 1973; McCarthy, 1999, 2006) raising of /a/ to [o] and, separately, /o/ to [u].²

(1) *Deletion of ŋ*

àsáŋ	‘corn’	əs̄o: ghómá	‘my corn’	/ə-sáŋ ə-ghómá/
əsóŋ	‘tooth’	əs̄u: ghómá	‘my tooth’	/ə-sóŋ ə-ghómá/
àkwáŋ	‘arms’	àkw̄ə: ghómá	‘my arms’	/ə-kwáŋ ə-ghómá/

The data above show that a noun root undergoes a number of changes when modified by a possessive adjective. The velar nasal is deleted, /a/ and /o/ become [o] and [u] respectively and are lengthened, and the high tone becomes mid. Counterfeeding opacity is seen in the data in that while /a/ goes to [o], /o/ goes to [u] separately, allowing a surface [o] which would otherwise have gone up to [u].

One question that arises from (1) is: Does the possessive adjective prefix ever surface, or is it an abstract underlying form chosen to make the $V_{\eta} \sim V$ alternation work out? I return to the issue in Section 4 where I illustrate that this vowel actually surfaces.³

The changes above fail to occur if /ŋ/ is not followed by a vowel in the underlying representation (UR), as illustrated in the second example in (2).

(2) *No deletion of ŋ*

əkájŋ	‘dishes’	əkó: wì?	‘dishes of person’	/ə-kájŋ é wìk/
kəkájŋ	‘dish’	kəkájŋ ^h ké wì?	‘dish of person’	/kə-kájŋ ké wìk/

There are two possible ways to account for these changes, namely, a rule- or constraint-based phonological analysis which starts with an input from which an output is derived, and a precompiled

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¹Although native speakers of the language prefer to use Kejom when referring both to the language and the two villages where it is spoken, I have chosen Babanki, the administrative name by which the language and the people are widely known.

²The data in this paper are drawn from Mutaka and Chie (2006) and a lexical database of 2,005 entries in Filemaker Pro™.

³ə- is the class prefix for most noun classes. In some classes there is also a class suffix: ə-ghóm-é ‘class 5 and 8’, ə-kóm-ké ‘class 7’, ə-shóm-sé ‘class 10’, ə-tyóm-té ‘class 13’, é-fwóm-fé ‘class 19’ while class 1 and 9 are not marked: ə-ghóm. Class 6 alone has à-: à-ghóm-é. For more on the Babanki noun class system, see Akumbu and Chibaka (2012).

phonology approach in which allomorphs are listed with appropriate frames where they are inserted (Hayes, 1990). In the first approach, I would propose underlying segmental forms equivalent to the isolation forms, for example, /ə-sáj/ ‘corn’, /ə-ghómá/ ‘my’.⁴ However, the conditions that specifically determine the vowel changes do not lend themselves to an elegant account within a phonological framework such as rule ordering or constraint interaction. I therefore propose an account positing allomorphs and argue that for every word involved in the alternations, the grammar automatically generates allomorphs marked for specific phonological instantiation frames (Pater et al., 2012; Archangeli and Pulleyblank, 2015).

After an introduction to the phonology of Babanki in Section 2, I provide an overview of phrasal allomorphy in Section 3. In Section 4, I discuss the different contexts where these coda consonants are deleted and then show how allomorph selection is accomplished in Babanki. A brief conclusion ends the study in Section 5.

2 Babanki phonology

Babanki has 25 phonemic consonants (3), 8 vowel phonemes (4) and two underlying tones: /H/ and /L/.⁵

(3) Consonant phones

	Bilabial	Labiodental	Alveolar	Postalveolar	Palatal	Velar
Stops	b		t, d			k, g
Nasals	m		n		ny [ɲ]	ŋ
Fricatives		f, v	s, z	sh [ʃ], zh [ʒ]		gh
Affricates		pf, bv	ts, dz	ch [tʃ], j [dʒ]		
Liquids			l			
Glides	w			y [j]		

(4) Vowel phones⁶

	Front	Central	Back
High	i	ɨ	u
Mid	e	ə	o
Low		a	

Syllable structures in Babanki include V, CV, CGV, CVC and CGVC, where G stands for glide. Words in the language mostly consist of a monosyllabic root with a possible V or CV prefix and/or suffix. Stems always begin with a consonant, while the only vowels that can occur at the beginning of a word are the prefixes *a-* and *ə-*. Nouns can take a prefix or (in class 10) a suffix while verbs can have a prefix (infinitive) or other suffixes and extensions. All of the consonants in (3) can occur stem-initially. Six consonants (/f, s, k, m, n, ŋ/) may occur in stem-final (coda) position. In this position, /k/ is realized as a glottal stop [ʔ]. Coda consonants are shown in (5).

⁴The exact tonal representations are more complex than are generally shown in this paper so as not to distract from the discussion. See Hyman (1979) and Akumbu (2016) for a detailed description.

⁵On the surface, Babanki contrasts three level tones, H, M, L, plus a downstepped High (⁴H). It also has contrast between a falling and a level low tone before pause (Akumbu, 2016).

⁶In Babanki, /e/ and /o/ are realized as [ɛ] and [ɔ] respectively in closed syllables (Mutaka and Chie, 2006, p. 75).

- (5) *Coda consonants*⁷
- ə-wúm ‘egg’
 - fə-nyín ‘bird’
 - jìn ‘hunger’
 - á-⁺chíf ‘to advise’
 - á-bìs ‘to scatter’
 - á-⁺kú? ‘to climb’

The following table shows vowels that contrast before each of the six coda consonants.

- (6) *VC rimes*

	m	n	ŋ	f	s	ʔ
i		əfwín ‘leg’			á-bìs ‘to scatter’	əbwíʔ ‘hit’
e	əbèm ‘belly’	á ⁺ bén ‘dance’		kəfyèf ‘thickness’	áchès ‘pour’	əbèʔ ‘seize’
a	əbàm ‘heat’	əbàn ‘hate’	əbàŋ ‘scrape’	əwàf ‘frighten’	əbàs ‘cut open’	əbàʔ ‘take off’
ə	ədèm ‘to grunt’	á ⁺ lyón ‘slide’	əlyəŋ ‘bamboo’	ádýəf ‘be long’		əkòʔ ‘face’
i	lím ‘husband’		jìŋ ‘hunger’	á ⁺ líf ‘to hurry’		əlìʔ ‘poison’
ʉ	kətəm ‘odor’			kəntùf ‘stomach’	á ⁺ dús ‘to emit’	əlùʔ ‘raffia palm’
o	á ⁺ kóm ‘to clean’	ntòn ‘pot’	ətónŋ ‘navel’	əfwóf ‘wind’	əfwòs ‘to fart’	əbòʔ ‘to open’
u	əwúm ‘egg’	wín ‘tattoo’	á ⁺ búŋ ‘to melt’	égùf ‘to drive’	əlùs ‘to be blunt’	əkúʔ ‘ladder’

3 Phrasal allomorphy

This work draws on phrasal allomorphy developed and argued for by Zwicky (1985, 1987), Pullum and Zwicky (1988), and extended by Hayes (1990). According to Hayes (1990, p. 92), ‘Phrasal allomorphs may be derived by phonological rule within the lexical phonology, so that whole classes of words will have multiple precompiled allomorphs.’ Allomorphy uses the notion of phonological instantiation which ‘...suggests that words appear in syntactic representations in rather abstract form, consisting of a kind of place marker, lacking in phonological content’, and are filled in post-syntactically with phonemic material. Frames exist in the lexicon of a language and serve as the contexts for the realization of allomorphs. In other words, if the grammar of a language generates more than one allomorph of a word, each of them will have a particular phonological frame where it can be inserted, making it possible to explain those morphological alternations that cannot be insightfully accounted for using phonological rules. A frame for the allomorphs of the indefinite article *a/an* in English will be as follows.

⁷In final position /n/ is realized as ny [ɲ] after all vowels in the Kejom Ketinguh dialect of Babanki.

(7) *English indefinite article*

Allomorphs: [ən, ə]
 [ən]/ [_V]
 [ən] elsewhere

Phonological instantiation is governed by the Elsewhere Condition (Kiparsky, 1973) ‘which insures that the most specific insertion context that is applicable in any particular environment takes precedence over more general insertion contexts’ (Hayes, 1990, p. 92-93).

As I will describe in considerable detail in the next section, the coda consonants /n/ and /ŋ/ are regularly deleted when they occur in intervocalic position, and the second vowel is found after a morpheme or word boundary. I begin in Section 4 with /ŋ/ since specific vowel changes accompany its deletion.

4 Babanki coda consonant deletion

As stated in Mutaka and Chie (2006), ‘when the possessive adjective is used with the nouns ending in ŋ, this ŋ deletes and this is accompanied by vowel raising, namely the vowel a that raises to [o] and the vowel o/ɔ that raises to [u]’. They have further stated that the same alternation is observed when these nouns are in an associative (possessive) construction and in certain verbal constructions. I show below that velar nasal deletion with vowel raising is attested in many more contexts than previously identified. I also demonstrate that in addition to the velar nasal, four other coda consonants also drop in specific contexts. While /ŋ/ deletion is accompanied by vowel raising under the conditions described in Section 4.1 below, it is not possible for vowel raising to occur when the rest of the coda consonants are deleted. Of the six coda consonants, five can be deleted intervocalically leaving only /m/ unaffected. The different grammatical contexts in which consonant deletion occurs are shown in (8).

As seen, these contexts have been arranged into six groups, which are discussed in turn. The deletion of /ŋ/ with vowel raising and /n/ without vowel raising is presented in Section 4.1 while in Section 4.2 instances of exceptional deletion of /n/, /f/, /k/ and /s/ in some words are used to make the case for allomorphy. Cases of /ŋ/ and /n/ deletion without vowel raising are discussed in Sections 4.3-4.6. In Section 4.7 I present data to show that /m/ is not deleted.

(8) *Contexts of coda consonant deletion (and vowel raising)*

++ = Coda consonant deletion and vowel raising

+ = Coda consonant deletion only

		ŋ	n	k	f	s
1	Noun + possessive pronoun	++	+			
	Noun + noun	++	+			
	Noun + interrogative	++	+			
	Noun + ‘a certain’	++	+			
	Noun + all	++	+			
	Noun + numeral	++	+			
	Noun + how many	++	+			
	Noun + interrogative ‘whose’	++	+			
	Noun + deverbal adjective	++				
	Progressive aspect	++				
2	In the words vèwéné ‘them’, féné ‘where’, zéné ‘when’		+			
	Deverbal adjective ghók ‘big’			+		
	Deverbal adjectives dyəf ‘long’ and byif ‘bad’				+	
3	First person plural exclusive pronoun yès					+
	CwVN sequence in both nouns and verbs	+	+			
	Disyllabic roots	+	+			
4	Personal and animal names	+	+			
	Noun + demonstrative pronoun áCV	+	+			
	Before relative marker á	+	+			
	Before prepositions á (locative, adverbial)	+	+			
5	Before preposition à (indirect object)	+	+			
	Subject (pro)noun+agreement (includes immediate future á)	+	+			
	Verb + object	+	+			
6	Serial verbs	+	+			
	Imperative with low toned verbs	+	+			

4.1 Group 1: deletion of /ŋ/ plus vowel raising, and deletion of /n/

In group 1, a single + indicates that /ŋ/ and /n/ drop out, while ++ indicate that the deletion of /ŋ/ is accompanied by the raising of /a/ to [o] and, separately, /o/ to [u]. These processes occur in the noun phrase when modifiers are added to the noun, as well as in progressive verb forms. /ŋ/ deletion with vowel raising is exemplified in (9) while /n/ deletion is shown in (10).

- (9) a. *Noun + possessive pronoun*
 əsō: ghómá ‘my corn’ /ə-sáj ə-ghómá/
 əsū: ghómá ‘my tooth’ /ə-sój ə-ghómá/
- b. *Noun + noun possessor*
 əsó: nyàm ‘corn of animal’ /ə-sáj ó nyàm/
 əsú: nyàm ‘tooth of animal’ /ə-sój ó nyàm/
- c. *Noun + interrogative ‘which’*⁸
 əsò: kò ‘which corn’ /ə-sáj ə-kò/
 əsù: kò ‘which teeth’ /ə-sójə-kò /

⁸As stated in footnote 6 above, [ɔ] is expected in closed syllables. However, there are a few grammatical words in the language where it occurs in open syllables: kò ‘which’, ghò ‘what’ and mbò ‘attention signal’.

- d. *Noun + interrogative ‘how many?’*
 àsò: shè? ‘how many corn?’ /à-sáj à-shèk/
 àsù: shè? ‘how many teeth?’ /à-sój à-shèk/
- e. *Noun + interrogative ‘whose?’*
 àsó: ndê ‘whose corn?’ /è-sáj é ndè/
 àsú: ndê ‘whose tooth?’ /è-sój é ndè/
- f. *Progressive*⁹
 mà yĩ nsò: ɲkò? /
 mà yì é ɲ-sàɲ ə ɲkòk /
 1S P2 SM N-dry PROG c6a.wood
 ‘I was drying wood.’
- g. *Progressive*¹⁰
 mà: lú ɲkù: wù /
 mà è lú` ɲ-kòɲ ə wù /
 1S SM F3 N-like PROG 2S
 ‘I will be loving you.’

The next set of examples show /n/ deletion in identical contexts without vowel raising.

- (10) a. *Noun + possessive pronoun*
 kèbā: kóm ‘my fufucorn’ /kè-bán è-kóm/
 kèzò: kóm ‘my spear grass’ /kè-zòn è-kóm/
- b. *Noun + noun possessor*
 ɲgà: nyàm ‘story of animal’ /ɲgàn è nyàm/
 ntò: nyàm ‘pot of meat’ /ntòn è nyàm/
- c. *Noun + interrogative ‘which’*
 wā: byí ‘bad child’ /wàn é-byí/
 fō: fí ‘new fon (king)’ /fòn é-fí/

A general observation about (9) and (10) is that the roots lose their nasals when there is a following schwa which can be (i) the prefix of the possessive adjective, (ii) an associative (possessive) marker (AM), or (iii) a marker of the progressive form of verbs. It should be noted that this vowel occurs on the surface when the possessive adjective precedes the noun (11a) or when it occurs alone (11b), (11c).

- (11) a. èghómē: sáj ‘my corn’ /è-ghómé è-sáj/
 èghómē: sój ‘my tooth’ /è-ghómé è-sój/
- b. àsó: ndê ‘whose corn?’ / è-sáj é ndè/
 èghómé ‘mine’
- c. àkwé: ndê ‘whose arms?’ /è-kwéj é ndè/
 àghómé ‘mine’

⁹The progressive marker is shown without a tone in the underlying form because it seems to be toneless and takes its tone from the verb root, being low with low tone verbs and high with high tone verbs.

¹⁰The nasal has simply been glossed ‘N’ because its status remains unclear in Babanki like in Kom (Shultz, 1997; Tamanji, 2009) where it has been analyzed as induced by the verb or as an aspect marker respectively.

Returning to vowel raising which accompanies only η -deletion, a previous account has proposed that the process ‘is the result of the association of the floating features [+hi, +ATR, +bk] which constitute the underlying features of the vowel í that never surfaces after the η sound’ (Mutaka and Chie, 2006). I suggest that vowel raising is conditioned by the [+hi, +bk] features of the velar nasal, which relink to the root vowel as part of the η -deletion process. Notice in particular that the [+bk] feature persists and ensures that *a > o [ɔ] instead of ə.

One could prefer to treat it as vocalization, in which case the resulting vowel would be expected to bear some of the place features of the original consonant. The problem with this alternative comes from instances where the deletion of η is not followed by vowel raising, showing that there is a consonant deletion process accompanied, only in some contexts, by vowel raising.

This synchronic process mirrors a diachronic change that happened in the language. At least two Proto-Grassfields coda consonants have been lost in Babanki, and, as shown in (11), this was followed by the raising of the open-syllable root vowels, /a/ and /o/ to [o] and [u] respectively.¹¹ It happens then that when η drops out in the contexts above, leaving /a/ and /o/ in open syllables of roots, they are also raised in a similar manner.

- (12) *Raising*
- | | | |
|-----|-----------|-------|
| àkó | ‘money’ | *káb |
| ásù | ‘to stab’ | *sòb |
| òlò | ‘bridge’ | *dàl` |
| zhù | ‘snake’ | *yól |

The following coda consonant deletion rule will be formalized in a traditional input-output account.

- (13) *Coda consonant deletion*
 [+cons] → ∅ / V ___ # V

However, an attempt to capture the environment where /a/ and /o/ are raised to [o] and [u] respectively is immediately challenged by cases where the vowels occur syllable-finally after coda consonant deletion but are not raised. To overcome the difficulty encountered in deriving the forms in a specific phonological or morphological context, I propose that the alternations are best viewed as allomorphs inserted in specific frames. The data in (9) show that the nouns (a)-(e) and verbs (f)-(g) each have two allomorphs, one with a raised vowel without a velar nasal and the other without vowel raising and the velar nasal. The allomorphs are then inserted as follows.

- (14) *Allomorphs:*
- | | |
|--------------------------------------|--------------------------------------|
| -sáj ‘corn’ | -kòŋ ‘like’ |
| [so, saŋ] | [ku, kɔŋ] |
| [so] / [_ #ə] _[FRAME 1] | [ku] / [_ #ə] _[FRAME 1] |
| [saŋ] elsewhere | [kɔŋ] elsewhere |

Frame 1 refers to the contexts listed in group 1-2 while Frame 2 (illustrated next) refers to those contexts in group 3-6. The data in (10) show that there is an allomorph with deletion and no vowel raising which requires a second frame given in (15).

¹¹Open syllable raising did not happen in all Central Ring Grassfields languages e.g. *-fá > kà-fó ‘thing’ (cf. Okukā-fā), *-bó > kà-vú ‘hand’ (cf. Okukā-wó).

- (15) *Allomorphs:*
- | | |
|--------------------------------------|--------------------------------------|
| ɲgan ‘story’ | -lon ‘beg’ |
| [ɲga, ɲgan] | [lɔ, lɔn] |
| [ɲga] / [_ #V] _[FRAME 1] | [lɔn] / [_ #V] _[FRAME 1] |
| [ɲgan] elsewhere | [lɔn] elsewhere |

The most specific insertion context of the allomorph that has undergone /ɲ/ deletion and vowel raising takes precedence in Frame 1 (14) while that of deletion without vowel raising does so in Frame 2 (15). Following that, the more general allomorph that has the nasal is then inserted elsewhere (Kiparsky, 1973). It should be mentioned that these are instances of opaque (input-driven) allomorph conditioning (Paster, 2006) since the vowel that conditions the selection of each allomorph doesn’t surface.

The allomorph approach is further justified by the fact that while the nasals obligatorily drop as illustrated above, there are coda consonants whose deletion is not predictable and should best be viewed as allomorphs. In the next section, I present such cases, represented in group 2 above.

4.2 Group 2: Deletion in exceptional lexical items

Group 2 presents strong arguments for allomorph selection in that it contains instances of the deletion of /n/, /k/, /f/, and /s/ only in some lexical items and also confirms that deletion is lexical. In this section, I illustrate that each of these coda consonants is deleted only under specific circumstances.

4.2.1 Deletion of /n/

The alveolar nasal exceptionally drops out in the following grammatical words.

- (16) a. vèwé: zhíó
vèwénó zhí ɔ
3P eat PROG
‘They are eating.’
- b. wù tsíó fé:
wù tsí ɔ fénó
2S live PROG where
‘Where do you live?’
- c. wù kú?ó zé:
wù kú? ɔ zénó
2S climb PROG when
‘When are you coming up?’

4.2.2 Deletion of /k/

The voiceless velar stop is deleted in Babanki only in one deverbal adjective *ghók* ‘big’.

- (17) a. nyàmó †ghó:
nyàm ó ghók ɔ
c9.animal SM big PROG
‘a big animal’

- b. kə̀tyí †kó ghó: †kó
 kə̀-tyí kó ghók ə kó
 c7.stick SM big PROG AM
 ‘a big stick’
- c. nyàm yì ghó? mã: mbá?lɔ́
 nyàm yì ghók mà é m-bák-lɔ́
 c9.animal P2 big 1S SM N-sell-EXT
 ‘An animal grew fat and I sold.’

This is an exceptional property of the adjective form only, not of the progressive as the voiceless velar [glottal] stop is retained in progressive forms as in (18).

- (18) nyàm é ghók ə
 c9.animal SM big PROG
 ‘The animal is big.’

4.2.3 Deletion of /f/

Two deverbal adjectives *dyèf* ‘long’ and *byíf* ‘bad’ obligatorily lose their /f/ as follows.

- (19) a. wì?ó dyě:
 wìk é dyèf ə
 c1.person SM long PROG
 ‘a tall person’
- b. kə̀tyí †kó dyó: †kó
 kə̀-tyí kó ghók ə kó
 c1.person SM long PROG
 ‘a long stick’
- c. nyàmó †byí:
 nyàm é byíf ə
 c9.animal SM bad PROG
 ‘a bad animal’

However, other deverbal adjectives do not lose their /f/ coda in the same phonological environment as illustrated in (20).

- (20) a. nyàmó chófó
 nyàm é chóf ə
 c9.animal SM wild PROG
 ‘wild animal’
- b. kə̀shí kó †záfó
 kə̀-shí kó záf ə
 c7-wound SM hurt PROG
 ‘A wound is hurting.’

4.2.4 Deletion of /s/

The voiceless alveolar fricative is deleted only when the first person plural exclusive pronoun *yès* occurs before /ə/.

- (21) a. yě: kù:
yès ó kòŋ ə
1p(EXCL) SM love PROG
'We are loving.'
- b. yě: shwó:
yès ó shwóŋ ə
1p(EXCL) SM suck PROG
'We are sucking.'
- c. nyàmé kó tə kòŋ yès
nyàm ó kó tə kòŋ yès
c9.animal SM NEG P3 love 1p(EXCL)
'The animal didn't like us.'

In (21a)-(21b) s drops when the subject pronoun is followed by /ə/ and in (c)-(d) it does not drop when it occurs finally or is followed by a consonant.

The behavior of group 2 must be accounted for by allomorph selection because deletion targets only a few words. For example, *yès* 'we' must be listed with two allomorphs: [yɛ] and [yɛs] inserted as follows.

- (22) *Allomorphs:*
yɛs 'we'
[yɛ, yɛs]
[yɛ] / [_ #ə]_[FRAME 1]
[yɛs] elsewhere

In the next four sub-sections I show similar phonological contexts like those in group 1 where /ŋ/ is deleted but vowel raising does not occur. While this is accounted for using Frame 2 (15 above), it reveals a number of conditions which need further explanation.

4.3 Group 3: Deletion of /ŋ/ and /n/ in roots with special properties

Group 3 is made up of contexts where deletion is conditioned by special properties of the roots involved. First, note in (23a) that vowel raising is blocked when the input is /Cwəŋ/ or /Cwoŋ/.

- (23) a. *CwVŋ sequence in both nouns and verbs*
kəfwā: kóm 'my animal tract' /kə-fwáŋ ə-kóm/
shwó: lâmsə 'sucking an orange' /shwóŋ ə lâmsə/
b. *Personal and animal names*
mənà: ghóm 'my Menang' /mənàŋ ə-ghóm/
ŋgô: ghóm 'my Ngong' /ŋgóŋ ə-ghóm/
c. *Disyllabic roots*
kənsāŋsā: kóm 'my sugarcane' /kə-nsáŋsáŋ ə-kóm/
kəŋgəŋgə: kóm 'my ant' /kə-ŋgóŋgóŋ ə-kóm/

The failure of the resulting Cwa and Cwo to be raised after /ŋ/ deletion is related to the fact that the sequence [Cwu] is disallowed in the language. It appears that /Cwa/ could have been raised to [Cwo], but the inability of /Cwo/ to go to [Cwu] blocks the raising of both.

The examples in (23b) show that personal names resist raising, presumably to keep a name more faithful to its pronunciation in isolation. The restriction is such that a name should not be changed extensively because, if after consonant deletion, the vowel is also changed, the name will sound too different.¹²

The disyllabic roots in (23c) are reduplications and the constraint there is to keep the vowel identical in both the stem and the reduplicant. A personal or animal name or a reduplication can be viewed as a fixed form that cannot be tampered with and so do not contradict the diachronic analysis of vowel raising provided above. The examples in (24) show similar examples involving /CwVn/ stems, which would in any case not have been expected to undergo raising after /n/ deletion.

- (24) a. *CwVn sequence in both nouns and verbs*
 əfwā: ghómá ‘my stream’ /ə-fwán ə-ghómá/
 mà chwá: kətýí ‘I am cutting a stick’ /mà chwán ə kətýí` /
- b. *Personal names*
 àbà: ghóm ‘my Abain’ /àbàn ə-ghóm/
 ŋgò: ghóm ‘my Ngoin’ /ŋgòn ə-ghóm/
- c. *Disyllabic roots*
 kəmbāmbā: kóm ‘my Adam fruit’ /kə-mbámán ə-kóm/
 fəŋgwöbà: fwóm ‘my monitor lizard’ /fə-ŋgwöbàn ə-fwóm/

4.4 Group 4: Deletion of /ŋ/ and /n/ before /a/

Group 4 contains a number of morphemes of the shape /á/. They include the post-nominal demonstrative pronoun *á-Ci*, the relative clause marker /á/ which also occurs after the noun, two prepositions: locative/adverbial /á/, indirect object /à/, and the yes-no question marker /à/. It is evident that what they have in common is that the vowel that follows the nasal is [a] rather than [ə]. In this case, there is deletion of the nasals without any vowel raising as shown in the following sets of data.

- (25) *Noun + demonstrative pronoun /á-Ci/¹³ the ‘one referred to’*
- a. mbă yì ‘that walking stick’ /mbàŋ á-yì/
 ndõ: yì ‘that potato’ /ndòŋ á-yì/
- b. wă: yì ‘that child’ /wàn á-yì/
 fõ: yì ‘that fon (king)’ /fòn á-yì/

¹²The name ‘God’ as used by local Christians undergoes both ŋ deletion and vowel raising: nyèngù: ghòm ‘my God’ /nyèngòŋ ə ghóm/. Jeff Good (personal communication) has suggested to me that this is probably so because this word was used to refer to pre-Christian traditional gods and it has retained common noun properties from its historical source (just as, in English, one can still use ‘god’ in lowercase to refer to a traditional god).

¹³The consonant depends on the noun class of the modified noun. It is [y] for classes 1, 3, 5, 6, and 9; [v] for classes 2 and 8; [m] for class 6a; [k] for class 7; [ʃ] for class 10; [t] for class 13; and [f] for class 19.

(26) *Relative clauses*

- a. àsā: ghē: fǝŋkè
 à-sáj á ghó fǝŋ-kè
 c6-corn REL SM fall-EXT
 ‘the corn that is falling’
- b. ntǝ: mà báʔlè
 ntòn á mà bák-lè
 c9.pot REL 1S sell-EXT
 ‘the pot that I am selling’
- c. kètám á mà báʔlè
 kè-tám á mà bák-lè
 c7-trap REL 1S sell-EXT
 ‘the trap that I am selling’

(27) *Prepositional phrases*

- a. mà yì tēm ághó: kǝ⁺bǝŋ
 mà yì tém à-ghóŋ á kè-bǝŋ
 1S P2 shoot c6-spear PREP c7-outside
 ‘I shot spears outside.’
- b. kû: nà: mò
 kú è-nàn à mò
 give c3-happiness PREP me
 ‘Give me happiness.’

(28) *Locative and adverbial phrases*

- a. fá: shè
 fáj á shè
 stay PREP here
 ‘Remain here.’
- b. só: ŋkàyn
 són á ŋkàn
 fight PREP well
 ‘Fight well.’

(29) *Indirect object*

- a. kú: sâ: mò
 kú è-sáj à mò
 give c5-corn PREP me
 ‘Give me corn.’
- b. kú ntǝ: mò
 kú ntòn à mò
 give c1.pot PREP me
 ‘Give me a pot.’

(30) *Yes-no questions*

- a. wù tẹ̀ vì nẹ̀ mbà:
 wù tẹ̀ vì nẹ̀ mbàŋ à
 2s P3 come PREP c9.stick QUES
 ‘Did you come with a stick?’
- b. mà kú: ntò:
 mà kú ntòn à
 1s P3 c1.pot QUES
 ‘Should I give a pot?’

Vowel raising probably fails to apply here because of the complex nature of the structures involved. Note that the demonstrative pronoun in (25 above) is the only one that has the *á-Ci* bimorphemic structure, the others being CV(C) as in (31).

(31) *Demonstrative pronouns*

- mbàŋ yèn ‘this stick (near speaker)’
 fɔ̀n yì ‘that fon (near listener, far from speaker/listener)’
 nyàm áyì ‘that animal (the ‘one referred to’)’

The rest of the constructions that make up group 4 are considered to have phrasal boundaries between them and therefore are postlexical, disallowing raising, which is a lexical process.

4.5 Group 5: Deletion of /ŋ/ and /n/ in major argument relations

Group 5 contains instances of deletion between a subject and its agreement marker, between a verb and its object, and in serial verbs.

(32) *Subject pro(noun) + agreement*

- a. ghǎ: vù
 ghàŋ ó kùm ə
 2P SM touch PROG
 ‘You are touching.’
- b. tsǒ: vù
 tsòŋ ó kùm ə
 c1.thief SM touch PROG
 ‘A thief is touching.’
- c. nyàmó vù
 nyàm ó kùm ə
 c9.animal SM touch PROG
 ‘An animal is touching.’
- d. kǎ: fɔ̀ŋkè
 kàn ó fɔ̀ŋ-kè
 c1.monkey SM fall-EXT
 ‘A monkey is falling.’
- e. ntǒ: fɔ̀ŋkè
 ntòn ó fɔ̀ŋ-kè
 c1.pot SM fall-EXT
 ‘A pot is falling.’

(33) *Immediate future tense*¹⁴

- a. ̀̀sá: fwè
 ̀̀-�áŋ á fwè
 c5.corn F1 rot
 ‘The corn will rot.’
- b. ntǔ: bòŋ
 ntòn á bòŋ
 c1.pot F1 good
 ‘The pot will be nice.’

(34) *Verb + object*

- a. mà kē: ká: ⁴sáŋ
 mà kóŋ ə káj ̀̀-�áŋ
 1S want PROG fry c5-corn
 ‘I want to fry corn.’
- b. mà kē: tí: ⁴lém
 mà kóŋ ə tín ̀̀-lém
 1S want PROG cut c6-yam
 ‘I want to cut yams.’

(35) *Serial verbs*

- a. kâ: pfí? ‘fry and chew’ /káj ̀̀ pfík/
 bô: pfí? ‘pick and chew’ /bóŋ ̀̀ pfík/
 bô: kâ: pfí? ‘pick, fry, and chew’ /bóŋ ̀̀ káj ̀̀ pfík/
- b. chwá: pfí?ó ‘cutting and chewing’ /chwán ̀̀ pfíkó/
 ló: pfí?ó ‘begging and chewing’ /lón ̀̀ pfíkó/
 chwá: ló:pfí?ó ‘cutting, begging, and chewing’ /chwán ə lón ̀̀ pfíkó/

The nasals (except /m/ in 32c) are deleted as expected, but vowel raising does not occur with ŋ-deletion even when the nasals are followed by schwa. This further shows that vowel raising can be predicted by a consistent difference in syntactic structure. Otherwise, how can one explain raising in ̀̀sú: nyàm ‘tooth of animal’ from /̀̀sóŋ ́ nyàm/ but not in tsǔ: kùmè ‘a thief is touching’ from /tsòŋ ́ kùm ə/ with identical phonological composition? In the case of ‘noun of noun’ and ‘noun my’ expressing possession (as in 9 above), the schwa goes onto the preceding noun, suggesting that there is a word boundary between the noun and its possessor. On the other hand, in arguments (32)-(34) there is a phrase boundary between the verb and the argument of the clause. This relationship is expressed in the former allowing raising and the latter prohibiting it.

4.6 Group 6: Deletion of /ŋ/ and /n/ in the imperative

Group 6 contains imperative forms where the schwa that causes the deletion of the nasal is not underlying.

¹⁴The immediate future is the only tense in Babanki marked by [a]. The tense markers in the language are immediate past [lí], hodiernal past [yí], distant past [tè], remote past [N], present tense [Ø], immediate future [á], hodiernal future [né] and remote future [lí].

(36) *Imperatives*

- a. sǎ: ŋkòʔ ‘dry wood’ /sàŋ ´ ŋkòk/
 bǎ: wíʔ ‘hate someone’ /bàn ´ wík/
- b. kàfə wíʔ ‘beckon someone’ /kàf ´ wík/
 kòsə ntòn ‘take off pot’ /kòs ´ ntòn/
- c. chúŋ byí ‘tether a goat’ /chúŋ ´ byí/
 bén kəbén ‘dance’ /bén ´ kə-bén/
- d. wáf kəmbòº ‘carry a bag’ /wáf ´ kə-mbò´/
 tóf nāntô ‘become very wise’ /tóf ´ nāntô/

As I show in the derivation below, the schwa that is after the nasals in low-toned verbs is epenthetic, inserted to take the imperative high tone and avoid a rising tone in closed syllables. High-toned verbs do not require the schwa, since the imperative high tone merges with that of the root (35c)-(35d). It seems that raising is blocked in order to maintain the distinction between progressive and imperative forms. The imperative is derived as follows.

- (37) a. sàŋ ŋkòk → sàŋ é ŋkòk → sàé ŋkòk → sǎ: ŋkòʔ ‘dry wood’
 b. chúŋ byí → chúŋ byí ‘tether a goat’

4.7 No deletion of /m/

I have mentioned that /m/ is the only coda consonant in Babanki that is not deleted under any circumstance. The data below confirm that it fails to drop in similar contexts where the other coda consonants are deleted.

 (38) a. *Noun + possessives*

èghámó nyàm ‘mat of animal’ /èghàm é nyàm/
 jòmè ghóm ‘my dream’ /jòm è-ghóm/

 b. *Progressive*

nyàmó tsámó
 nyàm é tsám ə
 kc9.animal SM chew PROG

‘An animal is chewing.’

- c. kəfó †kə fwómó: †kə
 kə-fó` kə fwóm ə kə
 c7-thing SM nice PROG AM

‘a nice thing’

 d. *Deverbal adjective*

nyàm sè nyìmè
 nyàm sè nyìm ə
 animal PRES green PROG

‘An animal is becoming green.’

- e. *Imperative*
 bàámé ɲkòʔ
 bàám ʼ ɲkòk
 heat IMP c6a.wood
 ‘Heat wood.’
- f. kóm kèlàɲ
 kóm ʼ kè-làɲ
 clean IMP c7-cocoyam
 ‘Clean a cocoyam.’

4.8 Summary

The two frames and different contexts where 1) coda consonant deletion is accompanied by vowel raising, and 2) coda consonants are deleted without vowel raising are exemplified in (39).

It is seen in the table that vowel raising accompanies /ɲ/ deletion in Frame 1 contexts but not in identical phonological Frame 2 contexts. A rule- or constraint-based approach would have to consider all the contexts in group 3-6 as exceptions whereas the allomorphy approach proposes to list the allomorphs with separate frames for their insertion as follows.

- (39) ++ -sáj ‘corn’
Allomorphs:
 [so, saɲ]
 [so] / [_ #ə]_[FRAME 1] əsō: mùʔ ‘one corn’ /ə-sáj ə-mùk/
 [saɲ] elsewhere pfiʔ əsáj ‘eat corn’ /pfiʔ ʼ əsáj/

- (40) + -ɲgan ‘story’
Allomorphs:
 [ɲga, ɲgan]
 [ɲga] / [_ #V]_[FRAME 2] ɲgà: ghóm ‘my story’ /ɲgàn ə-ghóm/
 [ɲgan] elsewhere ɲgàn yì ‘that story’ /ɲgàn yì/

5 Conclusion

In this study, I have shown that there are many contexts in Babanki where five of the six coda consonants are deleted in intervocalic position. In certain contexts, the deletion of /ɲ/ is accompanied by the raising of /a/ to [o] and, separately, /o/ to [u]. It has also been demonstrated that four of the coda consonants /n, k, f, and s/ are deleted only in a few words in the language. Because these morphophonological processes select a wide range of contexts where they apply, it is particularly difficult to specify the phonological or morphological conditions for their application. I have therefore proposed a solution that lists allomorphs with appropriate instantiation frames, thereby providing support for precompiled phrasal phonology (Hayes, 1990).

(41) *Coda consonant deletion (and vowel raising) contexts*

Frame	Context	Illustration
Frame 1 (Group 1-2) 1. Deletion of /ŋ/	Noun + possessive pronoun	ə̀sò: ghómé 'my corn' /ə̀-�áj ə̀-ghómé/
	Noun + noun possessor	ə̀sú: nyàm 'tooth of animal' /ə̀-�ój é nyàm/
	Noun + 'a certain'	ə̀sò: tsé: 'a certain corn' /ə̀-�áj ə̀-tsené/
	Noun + all	ə̀sú: tsəm 'all the teeth' /ə̀-�ój ə̀-tsem/
	Noun + numeral	ə̀sú: tá? 'three teeth' /ə̀-�ój ə̀-ták/
	Noun + interrogative 'which'	ə̀sò: kò 'which corn' /ə̀-�áj ə̀-kò /
	Noun + interrogative 'how many?'	ə̀sò: shè? 'how many corn?' /ə̀-�áj ə̀-shèk/
	Noun + interrogative 'whose'	ə̀sú: ndé 'whose tooth?' /ə̀-�ój é ndé/
	Noun + deverbal adjective	ə̀sú:fl 'ghó 'new tooth' /ə̀sój ə̀-fghé/
	Progressive aspect	mà sò: ñkà? 'I am drying wood' /mà sáj ə̀ ñkòk/
2. Deletion of /n, ʔ, f, s/	In the words vòwéné 'them', zéné 'when'	vòwé: kúʔó zé: 'When are they coming up?' /vòwéné kúk ə̀ zéné/
	Deverbal adjective ghó? 'big'	nyàmé 'ghó: 'a big animal' /nyàm é ghók ə̀/
	Deverbal adjectives dyəf 'long' & byí? 'bad'	wʔó dyə: 'a tall person' /wík é dyəf ə̀/
	First person plural exclusive pronoun yès	yé: kù: 'we are loving' /yès é kòŋ ə̀/
	CwVN Sequence in nouns and verbs	mbwò: ghóm 'my maggot' /mbwój ə̀-ghóm/
	Disyllabic roots	kə̀ŋgə̀ŋgə̀: kóm 'my ant' /kə̀-ŋgə̀ŋgój ə̀-kóm/
	Personal and animal names	mànà: ghóm 'my Menang' /mànáj ə̀-ghóm/
	Noun + demonstrative pronoun ácu	wá: yí 'that child' /wàn á-yí/
	Subject (pro)noun + agreement	ə̀sá: fwè 'the corn will rot' /ə̀-�áj á fwè/
	Verb + object	mà kə̀: ká: 'sáj 'I want to fry corn' /mà kə̀ŋ ə̀ káj ə̀-�áj/
Frame 2 (Group 3-6) Deletion of /ŋ/ and /n/	Indirect object	kú ntò: mò 'give me a pot' /kú ntòn à mò/
	Yes-no questions	mà kú: ntò: 'Should I give a pot?' /mà kú ntòn à/
	Serial verbs	bò: ká: pfi? 'pick, fry and chew' /bój ə̀ káj ə̀ pfi/
	Imperative with low toned verbs	bá: wi? 'hate someone' /bàn ' wík/

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Realis is real: Evidence from Initial Change in Arapaho*

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1 Introduction

This paper aims to investigate the morphophonological process of infixation in Arapaho traditionally known in the Algonquian literature as Initial Change (IC or infix henceforth). There has been a debate in the literature as to whether Algonquian languages grammatically mark the [\pm realis] distinction (cf. Frantz, 1991; Ritter and Wiltschko, 2010). This paper contributes to the debate by presenting novel paradigms which suggest that [\pm realis] contrast is marked in Arapaho. Specifically, I argue for the following hypothesis.

(1) *Hypothesis*

The morphophonological process in verbs traditionally known as Initial Change marks [+realis] in present and future tenses and in perfective aspect in Arapaho.

The ultimate goal of this paper is to provide an analysis of the allomorphy observed in verb stems (in present tense), tense prefixes (in future and past), and aspect prefixes (imperfective and perfective).

1.1 Data

Data used in this paper come from several sources. Firstly, a lot of examples in this paper are adapted from the fullest existing descriptive grammar of the language: Cowell and Moss (2008). Secondly, a large portion of data come from analysis of the narratives and naturally occurring colloquial speech collected in the Arapaho Language Archives section of the Center for the Study of Indigenous Languages of the West (CSILW) at the University of Colorado, some of which are available at www.colorado.edu/csilw/ (Cowell and Moss, 2006). Thirdly, I used the corpora collected by Conathan (2006). In addition, field notes and recordings of A. Cowell have been used.

1.2 The process of IC

The process of Initial Change in Arapaho is illustrated in (2).

(2) a. STEM¹: X-niibéi - ‘to sing’

n<én>iibéi-noo

IC.sing-1SG

‘I am singing.’

Alternation: n<én>iibéi- / -niibéi-

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¹Notations: ‘X-/form/’ is used to mark a morpheme which is pre-accented; ‘3’ in Arapaho orthography is used to express /θ/; apostrophe in the orthography is used for /ʔ/ (glottal stop). The following glosses are used throughout the paper: ADV=Adverb; AO=Affirmative order; HAB=Habitual; IC=Initial Change; IMP=Imperfective; INCHOAT=Inchoative; INTER=Interrogative; NA=Noun Animate; NAO=Non-Affirmative Order; OBV=Obviative; SUBJ=Subjunctive.

- b. STEM: betéee- ‘to dance’
 b<e>etéee-noo
 IC.dance-1SG
 ‘I am dancing.’

Alternation: b<e>etéee- / -betéee

Initial Change only occurs in the left-most syllable of the verb form. IC infixes /Vn/ into the first syllable of the verb if that syllable contains a long vowel, and it infixes /V/ if the vowel in the first syllable is short. (3a) captures the data in (2a), and (3b) describes the example in (2b).

- (3) a. [CV1 CV2...]
 1 2 3 4... → 1Vn234... where Vn is either /en/ or /on/ depending on vowel harmony
 Condition: V1 is long
- b. [CV1 CV2...]
 1 2 3 4... → 12234...
 Condition: V1 is short

The quality of the vowel is determined by rules of back harmony across the nasal in a syllable with a long vowel (3a), and full vowel harmony in a syllable with a short vowel (3b). I posit /V/ as the underlying form of the infix and /Vn/ as derived by the rule of [n]-epenthesis to avoid hiatus.

- (4) $\emptyset \rightarrow [n] / [\text{ROOT C} [\text{INF V } _] \text{ VV}..$

1.3 Affirmative and Non-Affirmative orders of agreement

It has been noted that in Algonquian languages, ‘we are dealing with a system in which the grammatical mechanism of agreement has been elaborated to an extreme degree’ (Oxford, 2014, p. 4).

Two systems (‘orders’) of agreement exist in the language: the so-called Affirmative and Non-Affirmative agreement orders (AO and NAO, respectively).

- (5) *Distribution of Affirmative vs. Non-Affirmative agreement orders*

Agreement	Context
Non-Affirmative Order	Negative clauses
	Interrogative clauses
	Clauses with dubitatives/evidentials
	Narrative past tense
Affirmative Order	Positive clauses
	Subjunctive

Morphologically, the difference between the two agreement orders is twofold. Firstly, the two orders have two distinct sets of agreement affixes; secondly, in Affirmative order person, number and obviation markers are suffixed to the verb stem while in Non-Affirmative order person markers are prefixed, not suffixed, and number and obviation are indicated by suffixes. Compare the examples in (6).

(6) *Affirmative vs. Non-Affirmative orders*

Affirmative	Non-Affirmative
a. beetéee- n dance - 2Sg You(Sg) are dancing	c. héí -hoowú-betéee- Ø 2-NEG-dance-Sg You(Sg) are not dancing
b. beeteéé- nee dance - 2Pl You(Pl) are dancing	d. héí -hoowú-beteéé- be 2-NEG-dance-Pl You(Pl) are not dancing

Among Algonquian languages, Arapaho presents an innovative system. The distinction between Affirmative and Non-Affirmative orders in Arapaho is closely related but is not parallel to the Independent/Conjunct contrast found in other Algonquian languages (on the latter distinction see Goddard, 1967, 1974; Campana, 1996; Cook, 2007, 2008, a.o.). Some of the detailed analyses of the prefix/suffix alternation in agreement in Independent and Conjunct orders presented in the literature on other Algonquian languages are not directly applicable to the Arapaho data because the morphosyntactic conditions which govern this alternation appear to be quite different (on prefix/suffix alternation in Algonquian see Brittain, 2001; Richards, 2004; Oxford, 2013, 2014). Abstracting away from particular morphosyntactic details which are beyond the scope of this paper, in both Arapaho and other Algonquian languages, there are two patterns of agreement.

- (7) a. Highly fusional suffixal agreement
b. Prefix + suffix agreement

In the next section, I provide evidence for an intriguing tense- and aspect-related asymmetry: verbs in present and future tenses and in perfective aspect are marked for $[\pm\text{realis}]$ and for the contrast between Affirmative/Non-Affirmative agreements, while verbs in past tense and imperfective aspect morphologically only mark the latter and do not take part in the $[\pm\text{realis}]$ distinction.

2 IC and tense/aspect morphology

In this section, I present the general distribution of application of IC across tenses and aspects in Arapaho. Data presented in this section lead to the following empirical observation.

- (8) With respect to the application of the process of IC, present and future tenses and perfective aspect pattern in the same way while past tense patterns together with imperfective aspect.

I argue that while verbs in present and future tenses and in perfective aspect participate in $[\pm\text{realis}]$ contrast, verbs marked for past and imperfective do not, instead they morphologically mark the Affirmative/Non-Affirmative distinction.

2.1 Infixation in present tense

In this section I will claim that IC in verbs in present and future tenses and in perfective aspect marks the $[\pm\text{realis}]$ distinction situated in C.² In particular, I propose that IC morpheme is spelled out as V- in $[\text{+realis}]$ contexts and as \emptyset in $[\text{-realis}]$.

²For evidence and a detailed analysis of the IC being one instantiation of the C head in the language see Bogomolets (to appear).

Evidence for this claim comes from the distribution of IC - the cases where IC does not occur, despite having the right phonological environment for it to apply, can be grouped together under the traditional term [-realis] or irrealis, namely: (i) negative statements and questions (9b)-(9c), (ii) subjunctive (9d), (iii) imperatives (9e), and (iv) clauses with dubitatives and evidentials (see (11a) below). Contrast (9a), where IC does apply, with (9b)-(9e), where it does not.

- (9) a. b<e>etéee-noo
IC.dance-1S
'I am dancing.'
- b. ne-ihoowú-betéee
1-NEG-dance
'I am not dancing.'
- c. koo-ne-betéee
INTER-1-dance
'Am I dancing?'
- d. betéee-noo-hók
dance-1S-SUBJ
'If I dance'
- e. betéee
dance
'Dance!' (2S)

The following table summarizes the distribution of IC in present and future tenses and in perfective aspect.

(10) *Distribution of the infix in verbs marked for present or future tenses*

Infixation	Context
No Initial Change	Negative clauses
	Interrogative clauses
	Subjunctive
	Imperative
	Clauses with dubitatives/evidentials
Initial Change	Positive clauses

Although blocking of IC frequently coincides with NAO morphology, IC does not simply mark the contrast between Affirmative and Non-Affirmative agreement orders.

As tables in (5) and (10) and examples in (6) show, the Affirmative/Non-Affirmative distinction is signaled both by choice of agreement affixes and by affix order, but it only partially correlates with IC. The Affirmative order shows IC only when the verb is [+realis], and not when it is [-realis]. I present two kinds of evidence in favor of this claim.

I. *Affirmative clauses with evidential markers*

Consider the following examples of clauses with particle *wootíí*. In both (11a) and (11b), verbs are marked with Affirmative order agreement affixes, however, in (11a), the verb *hesooku'oo3i'* does not undergo IC while in (11b), the verb *hoo3í'eebéénoo* does.

- (11) a. STEM³: esooku'oo - 'to watch s.t.'
 wootii hesooku'oo-3i'
 like watch-s.t.-3PL
 'It seems they are watching.'
- b. STEM: o3i'eebee - 'to be asked to do s.t.'
 nenéeni-noo wootíí h<o>o3i'eebéé-noo héét-niiteheib-é3e-n
 to-be-1SG like/as IC.to-be-asked-to-do-s.t.-1SG FUT-help-1SG-2SG
 'I will help you as I am asked to do.'

The explanation for the difference between (11a) and (11b) is the following. Particle *wootíí* can have two different meanings: (a) Evidential marker: 'it seems'; (b) Comparative particle: 'like'. As predicted by the realis hypothesis, no infixation occurs in clauses under the reading (a) because the evidential marker makes it [-realis], while the verb is infixed under the reading (b).

II. *Subjunctive*

The second piece of evidence for my claim that IC does not mark the distinction between Affirmative and Non-Affirmative agreement orders comes from verbs marked with Subjunctive. These verbs take Affirmative order agreement affixes. However, verbs in Subjunctive are never infixed.

- (12) betéee-noo-hók
 dance-1SG-SUBJ
 'If I dance'

In (12), the verb takes the Affirmative order agreement suffix but no IC occurs, which can be explained by the realis hypothesis proposed here if Subjunctive is one of the [-realis] contexts in the language.

2.2 Infixation in future tense

The patterns described above are exactly parallel for the verbs marked for future tense. The future tense prefix alternates between two allomorphs.

- (13) /het-/ - /heet-/

In [+realis] contexts the form of the future prefix is infixed with a vowel (14a) while in [-realis] contexts, that is, in clauses with Non-Affirmative agreement, imperative and conditional clauses as well as when used with the so-called dubitative particles, verbs are prefixed with the unfixed form of the future morpheme (14b)-(14d).

- (14) a. h<e>etn-oosóó-'
 FUT-rain-3SG
 'It will rain.'

³Words in Arapaho cannot start with a vowel, any underlyingly vowel-initial morpheme is epenthesized with an /h/ if word-initial.

- b. het-cih-nohkúseic-ó'oo.
FUT-to-here-morning-INCHOAT
'Come early in the morning!'
- c. *nih*-niitóbee-noo hét-no'úsee-hé-hk.
PAST-hear-news-1SG FUT-arrive-3SG-SUBJ
'I heard that he will come.'
- d. noh hetn-ei-hoow-bii3ihi ce'-iihi'
and FUT-3-NEG-eat again-ADV
'And once again he won't get to eat.'

2.3 Infixation in perfective aspect

Finally, consider alternation observed in the prefix marking perfective aspect.

- (15) /hiis-/ - /h<en>iis-/

Alternation in (15) shows regular IC morphology: infixing <Vn> in a syllable with a long vowel, and it applies in all the same contexts as in verbs in present and future tenses.

- (16) a. wó'o'oto' woow **h<en>iis**-3ífkone'éis-oot núhu'iní3e'éénin.
right-then already **IC.PERF**-scalp-s.o.-3SG/4 this-4SG-hair-OBV
'He has just now finished scalping the enemy's head.'
- b. h<en>iis-too- t
IC.PERF-do- 3SG
'He has done it.'
- c. hoow-**uus**-iini
NEG-**PERF**-eat
'He has not [eaten it] yet.'
- d. tóót-e-ení-'ihoon **hiis**-cebiéte-**hkó**-ni'
where-2SG-FUT-go **PERF**-compete-3PL.**SUBJ**
'Where shall we go after the game (is over)?'

Application of the process of IC is cyclic in nature, that is, it applies to the morpheme that is locally interacting with the C head. In case one or more nodes in the derivation between vP and CP have null exponents, the pruning (Embick, 2010) rule applies.

- (17) $\sqrt{\text{ROOT}}\text{-}[x, -\emptyset], [x, -\emptyset]\text{-Y} \rightarrow \sqrt{\text{ROOT}}\text{-Y}$

Given (17), we will predict, for instance, that in case no overt morphemes intervene between the Root and the C head, IC will apply to the stem in [+realis] contexts.

- (18) $[_{\text{CP}} \text{C}[\pm\text{realis}] [_{\text{TenseP}} \text{T} [_{\text{AspP}} [_{\text{vP}} v [_{\sqrt{\text{P}}} \text{ROOT}]]]]]]]$

- (19) n<en>iibéí?-it
 IC.sing-3SG
 ‘He is singing.’

Structure: [C [+realis] [T [pres] [$\sqrt{\text{NIIBEI?}}$ -]]]

Vocabulary Insertion:

- | | |
|------------------|---|
| a. -niibeí?- | $[\sqrt{\text{NIIBEI?}}-]$ |
| b. -Ø -niibeí?- | [T [pres] [$\sqrt{\text{NIIBEI?}}-$]] |
| c. V-Ø -niibeí?- | [C[+realis][T[pres][$\sqrt{\text{NIIBEI?}}-$]]] |

Pruning: V-Ø -niibeí?- → V-niibeí?-

Phonology:

- | | |
|-----------------|----------------|
| a. -n<V>iibeí?- | INFIXATION |
| b. n<Vn>iibeí?- | /N/-EPENTHESIS |
| c. n<en>iibeí?- | VOWEL HARMONY |

If an overt aspect prefix is present but no overt tense marking, it is the aspect prefix that will undergo IC.

- (20) h<en>iis-niibeí?-it
 IC.PERF-sing-3SG
 ‘He has sung.’

Structure: [C [+realis] [T [pres] A[perf] [$\sqrt{\text{NIIBEI?}}$ -]]]

Vocabulary Insertion:

- | | |
|----------------------|--|
| a. -niibeí?- | $[\sqrt{\text{NIIBEI?}}-]$ |
| b. -iis-niibeí?- | [A [perf] [$\sqrt{\text{NIIBEI?}}-$]] |
| c. -Ø -iis-niibeí?- | [T [pres] [A [perf] [$\sqrt{\text{NIIBEI?}}-$]]] |
| d. V-Ø -iis-niibeí?- | [C[+realis][T[pres] [A [perf] [$\sqrt{\text{NIIBEI?}}-$]]]]] |

Pruning: V-Ø -iis-niibeí?- → V-iis-niibeí?-

Phonology:

- | | |
|----------------------|----------------|
| a. h<V>iis-niibeí?- | INFIXATION |
| b. h<Vn>iis-niibeí?- | /N/-EPENTHESIS |
| c. h<en>iis-niibeí?- | VOWEL HARMONY |

Finally, if an overt tense marker is present, it is that tense marker that will undergo IC and aspect marking will have no effect. These predictions are borne out.

- (21) h<é>ét-niibeí?-it
 IC.FUT-sing-3SG
 ‘He is going to sing.’

Structure: [C [+realis] [T [fut] [$\sqrt{\text{NIIBEI?}}$ -]]]

Vocabulary Insertion:

- | | |
|------------------|--|
| a. -niibeí?- | $[\sqrt{\text{NIIBEI?}}-]$ |
| b. -et-niibeí?- | [T [fut] [$\sqrt{\text{NIIBEI?}}-$]] |
| c. V-et-niibeí?- | [C[+realis] [T[fut] [$\sqrt{\text{NIIBEI?}}-$]]] |

Phonology:

- | | |
|---------------------|--------------------|
| a. e<V>t-niibei?- | INFIXATION |
| b. e<e>t-niibei?- | FULL VOWEL HARMONY |
| c. he<e>t- niibei?- | /H/-EPENTHESIS |

In the next section, I present the following claim: IC does not apply to verbs in past tense and in imperfective aspect, that is, there exists a tense- and aspect-related asymmetry whereby verbs in past and imperfective do not participate in the same contrast as verbs in present and future tenses and in perfective; instead they are marked only for the contrast between Affirmative and Non-Affirmative agreement.

2.4 Tense- and aspect-related asymmetry

Past tense in Arapaho is marked with the prefix *ih-*. In what follows, I first discuss allomorphy in the simple past tense prefix arguing that the observed allomorphy does not originate from the same contrast as the alternation between infixes and unfixed verb forms in present and future. I then proceed to the argument that imperfective aspect patterns together with past tense and hence verbs in imperfective do not mark [\pm realis] either.

2.5 Allomorphy in the simple past tense and agreement orders

The simple past prefix in Arapaho alternates between two allomorphs: *nih-/hih-*. It has been claimed that this alternation reflects the same contrast as IC in present and future tenses: ‘This is an irregular form of initial change (...) when [the past tense prefix] occurs word-initially where initial change does not occur (as in non-affirmative verbs), it occurs as *hih-*’ (Cowell and Moss, 2008, p. 256). This description states that the distribution of the allomorphy in the past tense prefix is reflecting the same contrast as the distribution of the [+realis] infix in present and future tenses, where the *nih-* forms correspond to the infixes in present and future.

However, this generalization does not hold. I argue that the distribution of the infix in future and present tenses and the distribution of the allomorphs *nih-/hih-* for past differ in the following systematic way.

In present and future, the [+realis] infix has no one-to-one relation to Affirmative/Non-Affirmative agreement orders, as shown in (11) and (12) above. However, allomorphy in the simple past prefix is sensitive to precisely this contrast (compare also to the table in (10)).

(22) *Distribution of simple past allomorphs*

Simple past allomorph	Context	Agreement order
<i>hih-</i>	Negative clauses Interrogative clauses Clauses with dubitatives/evidentials	Non-affirmative
<i>nih-</i>	Positive clauses Subjunctive	Affirmative

This account predicts that in any clause with Affirmative order agreement, past tense will be marked with the *nih-* prefix, even in [-realis] contexts. This prediction is borne out. Contrast examples of verbs marked with subjunctive in present (23a), future (23b), and past (23c).

- (23) a. *betéee-noo-hók*
 dance-1SG-SUBJ
 ‘If I dance’
- b. *nih-niitóbee-noo hét-no’úsee-hé-hk.*
 PAST-hear-news-1SG FUT-arrive-3SG-SUBJ
 ‘I heard that he will come.’
- c. a *hiiwo’ nih-* *biici3ei-nin-ehk*
 a so PAST-bead things-2SG-SUBJ
 ‘Ah! So you knew how to sew!’ / (meaning: I didn’t know you knew how to sew!)

Subjunctive is one of the [-realis] contexts in the language, hence verbs marked for subjunctive never undergo infixation in present and future (23a-b), however, verbs in Subjunctive are marked with Affirmative order agreement affixes, and as predicted by table in (22), past tense is marked with the *nih-* prefix (23c).

2.6 Allomorphy in imperfective aspect

There is a reason to believe that *nih-* is in fact compositional where /*n*/ marks AO and combines with the past tense prefix *ih-*. The same alternation /*n*/-/*h*/ appears in the Imperfective prefix: *nii-/hii-*.

The distribution of the imperfective allomorphs is exactly parallel to the distribution of the simple past prefix: *nii-* occurs exclusively in AO clauses and *hii-* is prefixed to verbs marked with NAO affixes.

- (24) A [IMPERF] ↔ *hii-* / NAO
 A [IMPERF] ↔ *nii-*

Compare examples below. In (25a)-(25b), imperfective aspect is marked with *nii-* while in the NAO interrogative clause in (25c), imperfective is marked with *hii-*.

- (25) a. *nii-neyéi3éi-t*
 IMPERF-go-to school-3SG
 ‘S/he goes to school.’
- b. ***hii-****hoow-niisi3ei*
 IMPERF-NEG-work
 ‘S/he doesn’t work, doesn’t have a job.’
- c. *toot-hei-hii-tisee*
 where-2SG-IMP-come from
 ‘Where did you come from?’

As noted in the previous section, the crucial point of difference between infixation in present and

future tenses and in perfective aspect, and the /n/-/h/⁴ alternation in past tense and imperfective aspect is observed in subjunctive. Being sensitive to the AO/NAO distinction and not to the [\pm realis] distinction, the imperfective prefix, just like the past tense prefix, has the /n/-initial form in subjunctive.

- (26) *nii'eihii-ho' nii-no'oteihi-ehko-ni'*
 eagle-NA.PL IMP-tough/strong-SUBJ-PL
 'Wohei they say that birds are powerful.'

2.7 Initial Change and irrealis

The connection between IC and the [\pm realis] contrast has been noted for a number of Algonquian languages (Brittain, 2001; James, 1982, 1991; Rogers, 1978). Given the data presented in previous sections, the list of contexts where IC is blocked due to semantic reasons has to include past tense and imperfective (habitual) aspect.

- (27) $C_{[\pm\text{realis}]} \leftrightarrow \emptyset / _ \{ \text{PAST, IMPERF} \}$
 $C_{[\pm\text{realis}]} \leftrightarrow V-$

Past tense and imperfective aspect have been reported to pattern together in a number of ways crosslinguistically (e.g. Bjorkman and Halpert, 2013; James, 1991). At this point, I will make a stipulation that past and imperfective are inherently [-realis] in Arapaho and therefore cannot undergo IC. Crosslinguistic evidence supporting this stipulation comes from the widely documented and analyzed fact: two kinds of morphology are used in vast majority of the languages of the world to express the most prototypical case of irrealis, namely, in counterfactual clauses (e.g. Hale, 1969; Steele, 1975; James, 1982; Fleischman, 1989; Iatridou, 2000; Van Linden and Verstraete, 2008). Consider the following examples from English, which regularly employs past morphology to express counterfactual semantics (28), and from Hindi, which uses imperfective morphology for the same semantic purpose (29).

- (28) a. (I don't think he will take my advice, but...)
 If he took my advice, he would get the job.
 b. (He isn't friendly, but...)
 If he were friendly, I would invite him.
 c. (I didn't have the car yesterday, but...)
 If I had had the car, I would have gone for a drive in the countryside.
 (adapted from Legate 2003, p. 155)

Clauses marked with past tense morphology in English can thus receive future (28a), present (28b), or past (28c) counterfactual interpretation.

In Hindi, imperfective (habitual) morphology appears to be required in counterfactual clauses (Iatridou, 2009).

⁴Recall from footnote 3 that any vowel-initial morpheme is epenthesized with an /h/ when word-initial. The *hiih*-allomorph of the simple past prefix and the *hii*-allomorph of the imperfective aspect could then perhaps be analyzed as /ih/ and /ii/ respectively with initial /h/-epenthesis. However, see example (25c), where imperfective aspect prefix is realized with an /h/ even though it is not word-initial. This could be indicating that two alternants are in fact /n/-/h/ and not /n/- \emptyset .

- (29) Agar vo macchlii khaa-**taa** ho-**taa**, to use yeh biimaarii nahiiN ho-tii
 If he fish eat-**HAB** be-**HAB** then he.DAT this illness NEG be-HAB.F
 ‘If he ate fish, then he would not have this disease.’ (adapted from Iatridou 2009, p. 12)

The relation between past and [\pm realis] crosslinguistically seems to be more complex than in future and present. A number of languages have been reported to have a single (proto-) morpheme for past tense and [-realis]. For instance, Proto-Uto-Aztecan Mood [-realis] and T [past] are reconstructed as a single proto-morpheme (Steele, 1975). In the Algonquian language Moose Cree, the morphemes *-pan* and *-htay* have come to form a single ‘preterit paradigm’ which has two usages: an imperfective past use and an irrealis modal usage which indicates ‘that the proposition is unreal or hypothetical as opposed to real and factual’ (James, 1991, p. 285). In the closely related Plains Cree language, preterit and irrealis are also reported to be indicated by a single morpheme (Wolfart, 1973). A clear connection between past tense morphology and irrealis morphology has been shown for the Fox language in the Algonquian family as well (Dahlstrom, 1991). Languages of the world tend to have ‘a morpheme which indicates both past time and some notion of irrealis’ (Steele, 1975, p. 201).

It has been proposed that past tense and irrealis are universally related (Iatridou, 2000; Legate, 2003; Hale, 1969; Steele, 1975). In the morphosemantic line of research on this matter, past tense morphology is crucially implicated in the theory of irrealis. The prototypical case of irrealis – counterfactual clauses – is usually discussed. The central idea for understanding the so-called ‘fake past’ morphology, that is, cases when past tense morphology is not used to express temporal relations, is the idea of *remoteness* from the speaker’s present reality which can be either temporal or modal. Such an approach suggests that past and counterfactuals share a feature which forms the basis of post-syntactic insertion of a single morpheme in both contexts. Iatridou (2000) proposes to analyze the past tense morpheme as an exclusion feature (ExclF). The past tense morpheme is taken to be underspecified and can be interpreted either as past tense when it ranges over times or as counterfactual if it spans over worlds (Iatridou, 2000, p. 246).

- (30) ExclF = T(x) excludes C(x)
 T(x) stands for ‘Topic(x)’ (i.e. ‘the x that we are talking about’). C(x) stands for ‘the x that for all we know is the x of the speaker.’
- a. ExclF(t) = the topic time excludes the time of utterance (‘the time interval that we are talking about excludes the time interval that for all we know is the time of the speaker’)
 - b. ExclF(w) = the topic worlds exclude the actual world (‘the worlds that we are talking about exclude the worlds that for all we know are the worlds of the speaker’)

Alternatively, it has been proposed that counterfactual semantics can be derived from a purely temporal past (Ippolito, 2002; Arregui, 2009).

Taking into account data in the previous section of the current paper, which show that verbs in past tense never undergo IC, and assuming analysis of IC as [+realis] morpheme in the language, I propose that past tense in Arapaho is inherently [-realis] and thus is incompatible with IC for semantic reasons. An additional (although indirect) piece of evidence for this claim comes from examples like the following.

- (31) wohei ciitei-3i’ niinon-e’
 well enter-3PL tepee-LOC
 ‘Well, they went inside the tepee.’

The verb *ciitei3i*’ in (31) exhibits [-realis] morphology, that is, it does not undergo IC; it is not prefixed for past and yet it gets the past tense interpretation.⁵ This way of forming past tense is usual and productive among speakers (Cowell and Moss, 2008), and it can receive an explanation if past tense is indeed inherently [-realis] in the language: in Arapaho [-realis] morphology (i.e. no infixation) can be used to express past.

Similar to the analyses proposed in the field for the ‘fake past’, a wide range of analytical proposals has been offered to explain the use of imperfective in counterfactual clauses. Imperfective has been claimed to occur in irrealis contexts simply because it is a crosslinguistically default aspect (Iatridou, 2009), or because perfective is incompatible with counterfactual semantics (Arregui, 2004), or because imperfective (like past) contributes to the semantics of irrealis (Ferreira, 2011). Finally, there exists a line of analyses proposing that past and imperfective are two language-specific realizations of a single universal irrealis (counterfactual) operator (Bjorkman and Halpert, 2013).

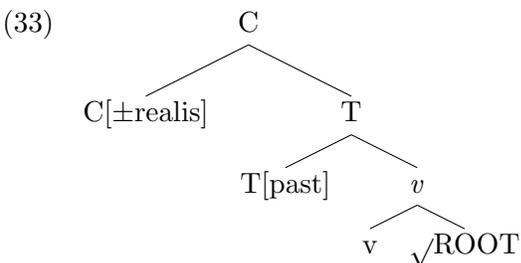
Iatridou (2000, 2010) establishes a crosslinguistic generalization that imperfective marking (more precisely, habitual marking) is one of the key grammatical ingredients of counterfactuals. Imperfective (habitual) aspect in counterfactuals, similar to past morphology in languages which employ past to express irrealis, does not give the usual progressive or habitual meaning but rather contributes the counterfactual semantics.

- (32) An eperne to farmako, tha ginotan kalitera
 If take-PAST-IMP the medicine, FUT become-PAST-IMP better
 ‘If s/he took the medicine, s/he would get better.’ (adapted from Iatridou 2010)

In this case, we are dealing with ‘fake imperfective’ since examples such as (32) are not understood as progressive or habitual, and outside of a counterfactual environment they would have been marked with perfective morphology.

Without advocating for a particular semantic analysis of the connection between past, imperfective, and irrealis, I take the crosslinguistic data presented in this subsection to suggest that such connection exists, and I use it to support my claim that in Arapaho, past and imperfective have the feature [-realis]. The spell-out of the $C_{[\pm\text{realis}]}$ head is contextually determined, as shown in (27).

Since neither T nor A are cyclic heads (Embick and Marantz, 2008; Embick, 2010), the C head and T and A heads are in the same cycle and at the relevant point of derivation their features are accessible and can trigger allomorphy on C forcing it to be spelled-out as \emptyset in the context of T [past] or A [imp].



⁵These data are reminiscent of the so-called optional past tense found in a number of languages and discussed for example in Bochnak (2015) for Washo and in Cable (2015) for Tlingit. In optional tense languages, there is no presupposition placed on the value of the temporal pronoun, hence morphologically tenseless clauses are predicted to be compatible with past, present, or future time reference. Although this topic is beyond the scope of the current paper, crucial for understanding the relations between past tense and the category of irrealis in Arapaho is the fact that a morphologically tenseless clause can be compatible with past tense reading only if it does not undergo IC, that is, only if it is morphologically [-realis].

The spell-out of the C[±realis] in this context will then be locally determined by interaction with the T[past], and the C head will be spelled out as \emptyset by (27). A sample derivation of a past tense verb *nihniibéí'it* ‘he sang’ is given in (34).

- (34) *nih-niibéí'it*
 PAST-sing-3SG
 ‘He sang’

Structure: [C [±realis] [T [past] [$\sqrt{\text{NIIBEI?}}$]]

Vocabulary Insertion:

- | | |
|---------------------------------------|---|
| a. -niibeí'- | $[\sqrt{\text{NIIBEI?}}]$ |
| b. - <i>nih</i> -niibeí'- | [T [past] [$\sqrt{\text{NIIBEI?}}$]] |
| c. \emptyset - <i>nih</i> -niibeí'? | [C[±realis][T[past][$\sqrt{\text{NIIBEI?}}$]] |

The irrealis C head gets spelled out as \emptyset due to the local interaction with the past tense morpheme underlyingly specified with a [-realis] feature. Essentially the same derivation is proposed for verbs prefixed with imperfective (habitual) aspect. In case imperfective is local, or adjacent, to the C head, the C head is spelled out as \emptyset .

- (35) *nii-niibéí'it*
 IMP-sing-3SG
 ‘He sings’ (habitually)

Structure: [C [±realis] [A [imp] [$\sqrt{\text{NIIBEI?}}$]]

Vocabulary Insertion:

- | | |
|---------------------------------------|--|
| a. -niibeí'- | $[\sqrt{\text{NIIBEI?}}]$ |
| b. - <i>nih</i> -niibeí'- | [A [imp] [$\sqrt{\text{NIIBEI?}}$]] |
| c. \emptyset - <i>nii</i> -niibeí'? | [C[±realis][A[imp][$\sqrt{\text{NIIBEI?}}$]] |

The claim that the C head and the past or imperfective morpheme must be in a local relation in order for the irrealis C head to be spelled out (i.e. C head to be spelled out as \emptyset), predicts that in case this local interaction is blocked by an intervening element, C might in principle be spelled out as [+realis] even in an imperfective verb form. This prediction is borne out.

- (36) *h<é>ét-nii-ni?i3ecóó-noo*
 IC.FUT-IMP-happy-1SG
 ‘I will be happy’

Structure: [C [±realis] [T [fut] [A[imp] [$\sqrt{\text{NI?I3ECCO}}$]]]]

Vocabulary Insertion:

- | | |
|--|---|
| a. -ni?i3ecoo- | $[\sqrt{\text{NI?I3ECCO}}]$ |
| b. - <i>nii</i> -ni?i3ecoo- | [A[imp] [$\sqrt{\text{NI?I3ECCO}}$]] |
| c. - <i>et</i> - <i>nii</i> -ni?i3ecoo- | [T [fut] [A[imp] [$\sqrt{\text{NI?I3ECCO}}$]]] |
| d. V- <i>et</i> - <i>nii</i> -ni?i3ecoo- | [C[±realis][T[fut][A[imp][$\sqrt{\text{NI?I3ECCO}}$]]]] |

Phonology:

- | | |
|--------------------------|----------------|
| a. e<V>t-nii-ni?i3ecoo- | INFIXATION |
| b. e<e>t-nii-ni?i3ecoo- | VOWEL HARMONY |
| c. he<e>t-nii-ni?i3ecoo- | /H/-EPENTHESIS |

In (36), the [-realis] feature on the imperfective prefix does not affect the spell out of C since the aspect prefix and the C head are not in a local relationship, hence C is spelled out as [+realis] - the future prefix undergoes IC.

3 Conclusion

This paper addresses morphosyntactic properties of a pervasive process in the verbal morphology of Arapaho - *Initial Change*. The analysis presented here attempts to explain the patterns of allomorphy observed on the left edge of word-initial verb stems, and in tense and aspect prefixes in Arapaho. This study argues for the existence of a previously unattested grammatical contrast in the language, and it provides an analysis of the grammatical function of a morphophonological process which has not been explained elsewhere. The main claim of this paper is that IC is the morphological manifestation of the [\pm realis] contrast in the language. I present and analyze a tense- and aspect-based asymmetry in the language. Contrary to what has been claimed (Cowell and Moss, 2008), I show that allomorphy observed in simple past and in imperfective aspect does not reflect the same contrast as the process of IC in present and future tenses and in perfective aspect, instead it marks the contrast between Affirmative vs. Non-Affirmative agreement. This account explains otherwise unexplained differences in distribution of past tense allomorphs and [\pm IC] in present and future tenses. More broadly, this paper contributes to the discussion of Algonquian mood morphology and to the debate about interrelations between past tense/imperfective aspect and irrealis.

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The scope taking behavior of numeral quantifier phrases

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1 Introduction

It is well known that doubly quantified sentences in English can display scopal ambiguity. Consider the two interpretations, shown in (1a) and (1b), for the sentence: *A dot is over every box.*

- (1) a. *A dot is such that it is over every box.* ($\exists x[\text{Dot}'(x) \wedge \forall y[\text{Box}'(y) \rightarrow \text{Over}'(x, y)]]$)
b. *Every box is such that a dot is over it.* ($\forall x[\text{Box}'(x) \rightarrow \exists y[\text{Dot}'(y) \wedge \text{Over}'(y, x)]]$)

(1a) is called the SURFACE SCOPE interpretation. The linear order of the quantifiers (QPs) respects their c-command domains at LF (e.g. May, 1985; Fox, 2000; Reinhart, 2006; Szabolcsi, 2010). In (1b), we see what is called the INVERSE SCOPE interpretation. That is, a scope interpretation where the linear order of the QPs does not respect their c-command domains at LF. In order to account for this discrepancy between the surface order of the QPs and their resultant interpretations, Quantifier Raising (QR) is invoked by May (1985). QR allows any QP to (covertly) move at LF, enlarging its c-command domain; thus, inverse scope may be accounted for with a scope shifting operation. Research suggests that QR may not be as free as suggested by May (1985); for example, it may be clause-bound,¹ there may be environments that exhibit FROZEN SCOPE (Bruening, 2001), and QR may not affect all QPs equally (Szabolcsi, 2010, among others).

Consider numeral QPs. Numeral QPs may be divided into two distinct classes: bare numerals and modified numerals. Bare numerals like *8*, *67*, and *5309* are different from their modified numeral (e.g. *more than 3*, *at least 7*, *17 or more*) counterparts in at least one respect: modified numerals are claimed to disallow inverse scope interpretations, while bare numerals are free to take either surface or inverse interpretations (Beghelli and Stowell, 1997; Szabolcsi, 1997). If this claim can be corroborated, then our theories of scope taking must be reevaluated. A lexical restriction on a formal operation is commonly thought to be undesirable from a generative perspective. Not all English speakers agree with this claim, however. For example, consider the following sentence in (2) along with its two possible interpretations. Beghelli and Stowell (1997) and Szabolcsi (1997, 2010) claim that (2) can only be understood with a surface scope interpretation, thus the interpretation in (2b) ought to be semantically ill-formed; however, at least some speakers of English find this to be perfectly grammatical.

- (2) There is a circle directly above at least 2 squares.
a. **Surface Scope:** There exists a circle such that it is directly above at least 2 squares.
b. **Inverse Scope:** At least 2 squares are such that they have a circle directly above them.

Szabolcsi (2010) notes that scope judgments are extremely fragile and difficult to elicit. For this reason, it ought to be confirmed experimentally whether or not the claims about the inability of modified numerals to take inverse scope are tenable. Although the experimental literature is not especially robust, there are several key papers germane to the investigation at hand.

Ionin (2010) investigated the scope of several indefinite expressions using an experimental paradigm where subjects rated whether a continuation sentence matched with a given context.

¹But, see Syrett (2015) for a recent discussion on non-clause bound QR in antecedent contained deletion constructions.

In this paper, it was discovered that modified numerals seemed capable of taking inverse scope. Unfortunately, this finding is undermined by a confound present in the stimuli used.

In the contexts used by Ionin (2010), sentences that were intended to embody only the inverse scope for modified numerals are such that they entail the surface scope interpretation. This scope confound is known as ‘Reinhart’s Riddle’ (Ruys, 2002). Consider the following context and accompanying sentence.

- (3) IND-wide: context matches widest-scope reading of indefinite (Ionin, 2010, p. 248)
- a. The teenagers who live in this neighborhood are film buffs, and closely follow the film reviews in the local newspaper. The newspaper has two reviewers, Paige and Robert, and the teenagers tend to trust Paige’s judgment more. This week, for instance, Paige and Robert recommended entirely different sets of films; the teenagers watched all the movies recommended by Paige, but they completely ignored Robert’s recommendations.
 - b. Every teenager watched every film that *at least one reviewer* had recommended.

As can be confirmed, the inverse reading of the modified numeral *at least one* entails the surface reading. That is, if it is true that at least one reviewer is such that every teenager watched every film by that reviewer, then it is necessarily true that every teenager is such that they watched every film recommended by at least one reviewer. It might be noted that the surface reading is not as pragmatically felicitous with the situation described above where there is a single reviewer; while this may be the case, there is no logically possible way to rule out the possibility that speakers refused the surface scope.

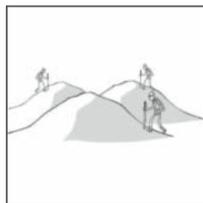
Given this confound, we cannot be certain that subjects were not accessing the surface scope only. Despite this shortcoming, Ionin (2010) suggests an interesting finding: bare numerals and modified numerals do not take scope equally. It was found that bare numerals (e.g. *one*) took long distance scope more readily than modified numerals (e.g. *at least one*). That is, it appears that bare numerals may take inverse scope more easily than modified numerals.

There are two other studies which investigate scope experimentally that also suffer the same confound. Raffray and Pickering (2010) investigated the priming of scope interpretations using a sentence-picture verification task. Consider a representative stimulus picture and sentence from the study (Raffray and Pickering, 2010, p. 1092). From this, we can confirm that the inverse scope interpretation of the sentence entails the surface scope.

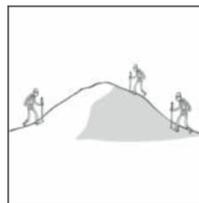
- (4) *Existential-wide context entails universal-wide context*

Target Sentence and Pictures

Universal-Wide Response



Existential-Wide Response



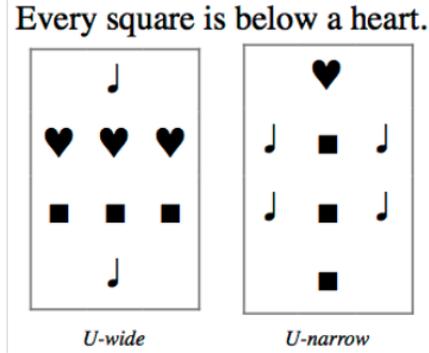
Every hiker climbed a hill

In the figure in (4), we see two pictures of hikers climbing and an accompanying sentence. The ‘existential wide’ condition picture corresponds with the inverse scope interpretation, and the

‘universal wide’ condition corresponds with the surface scope. As can be confirmed, the ‘existential-wide’ condition picture is compatible with a surface scope reading of the sentence. For this reason, it is not clear whether a subject, when selecting this picture to go with the example sentence, was truly accessing the surface scope.

A third example of this confound can be found in Chemla and Bott (2015). This study was a follow up to the study of Raffray and Pickering (2010). Again, the researchers utilized a sentence-picture verification task. Their stimuli suffered from the same scope confound. This is illustrated in the figure in (5) (Chemla and Bott, 2015, p. 6).

- (5) *Universal-narrow compatible with surface-scope interpretation*



In the figure in (5), we see that the image associated with a narrow (inverse) interpretation for the universal quantifier *every* is compatible with a surface scope reading for the sentence. Again, this confounds the findings of the study given that we cannot be sure as to which scope interpretation was being accessed by the subjects.

Thus it remains an open question whether or not modified numerals are incapable of taking inverse scope, and whether bare numerals and modified numerals take scope equally.

2 Methods

To investigate the scope taking behavior of numeral quantifiers, a sentence-picture verification task was chosen. Sentence-picture verification provides a simple and intuitive task for the subjects. When presented a sentence-picture pair, the meaning of the sentence can be quickly checked against the picture. This may potentially ameliorate the problem with obtaining reliable scope data (Szabolcsi, 2010), given that the abstract nature of scope can be difficult to elicit in purely introspective settings (i.e. consulting one’s own intuitions).

2.1 Subjects

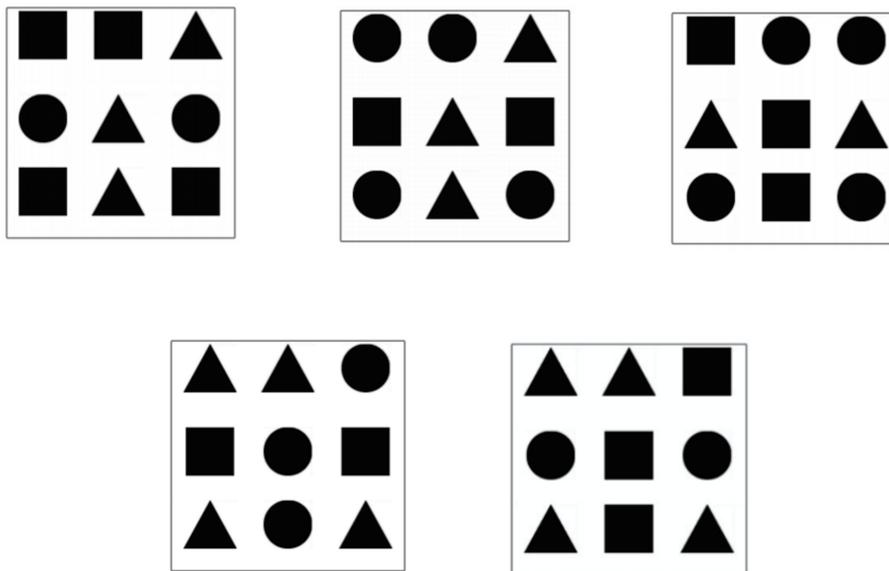
29 subjects were recruited from introductory linguistics classes at a large American university. The experiment was open to all individuals over the age of 18; however, only self-reported native English speakers were included in the analysis. Subjects were offered credit in their courses for participation in the study.

2.2 Stimuli

The stimuli used in the study consist of solid black geometric shape (circles, squares, and triangles) arranged in 3×3 grids with no lines imposed upon them. This was done in an effort to make the

images as simple to process as possible. There were a total of 20 test items and 20 fillers. All fillers were excluded in analysis. Fillers were such that they used geometric shapes in grids and were paired with sentences that used quantifiers. None were scopally interesting. All stimuli pictures used in the study are pictured below in the figure in (6).

(6) *Stimuli and conditions to investigate scope.*



Condition 1: circles directly above squares (top left), **Condition 2:** squares directly above circles (top center), **Condition 3:** triangles directly above circles (top right), **Condition 4:** squares directly above triangles (bottom left), **Condition 5:** circles directly above triangles (bottom right)

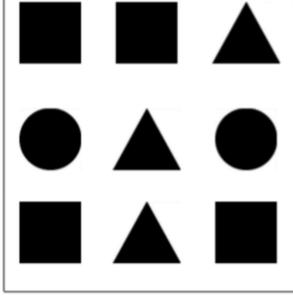
Each stimulus picture appeared with a sentence that was true of the picture. The four sentences were such that they investigated the surface (S) and inverse (I) scope of two different quantifiers *two* and *at least two*, a bare numeral (BN) and modified numeral (MN) respectively, thus, a 2×2 design with quantifier type [BN–MN] and scope order [S–I] as factors. The sentence frames testing surface and inverse scope for the two quantifier types are presented in (7).

(7) Sentence frames for testing scope and quantifier type

- Surface Scope
 - BN** There are two x directly above a y .
 - MN** There are at least two x directly above a y .
- Inverse Scope
 - BN** There is an x directly above two y .
 - MN** There is an x directly above at least two y .

Given the findings of Michaelis and Francis (2007), it was decided that all sentences should begin with the word *there*. This was done for two reasons. (1) Michaelis and Francis (2007) report that indefinites in initial position are marked in English, and (2) usage of *there* allowed all sentences to be maximally identical in length and content. For example, instead of using a sentence like ‘A circle is directly above two squares’, I used ‘There is a circle directly above two squares’. An example trial is presented in the figure in (8), showing a picture with its respective sentences.

(8) *Example trial with picture and all four conditions*



- BN–S There are two circles directly above a square. *or*
- MN–S There are at least two circles directly above a square. *or*
- BN–I There is a circle directly above two squares. *or*
- MN–I There is a circle directly above at least two squares.

The stimuli used in this study are importantly different from stimuli used in previous studies for they avoid ‘Reinhart’s Riddle’. Ruys (2002) discusses Reinhart’s Riddle as an especially pernicious confound that appears in discussions of scope. Reinhart (1976) discusses scope and correctly reaches the conclusion that certain doubly quantified sentences are restricted to their *surface scope* interpretation because the *inverse scope* interpretation entails the surface scope. The confound exists between and any two quantifiers \forall and \exists such that they appear in the linear order: $\forall \dots \exists \dots$. Let us consider a natural language example.

- (9) Reinhart’s Riddle illustrated.
- a. Every boy loves some girl.
 - b. **Surface:** $\forall x[\text{boy}'(x) \rightarrow \exists y[\text{girl}'(y) \wedge \text{love}'(x, y)]]$
 - c. **Inverse:** $\exists y[\text{girl}'(y) \wedge \forall x[\text{boy}'(x) \rightarrow \text{love}'(x, y)]]$

Example (9a) is restricted to a surface scope interpretation because the inverse scope reading is simply a subcase of the surface scope. That is, the surface scope reading of (9a) does not a priori preclude a situation where all of the boys happen to love the same girl. Whenever this case arises, we can never be sure which representation is accessed by speakers. The stimuli from previous research are all such that they suffer this confound, leaving uncertainty as to which scope reading was truly accessed.

2.3 Procedure

An online survey was designed within *Qualtrics*. The link to the survey was sent to introductory linguistics instructors for dissemination to students willing to participate. At the beginning of the survey, participants were shown the text in (10) explaining the task.

(10) *Introductory screen to survey*

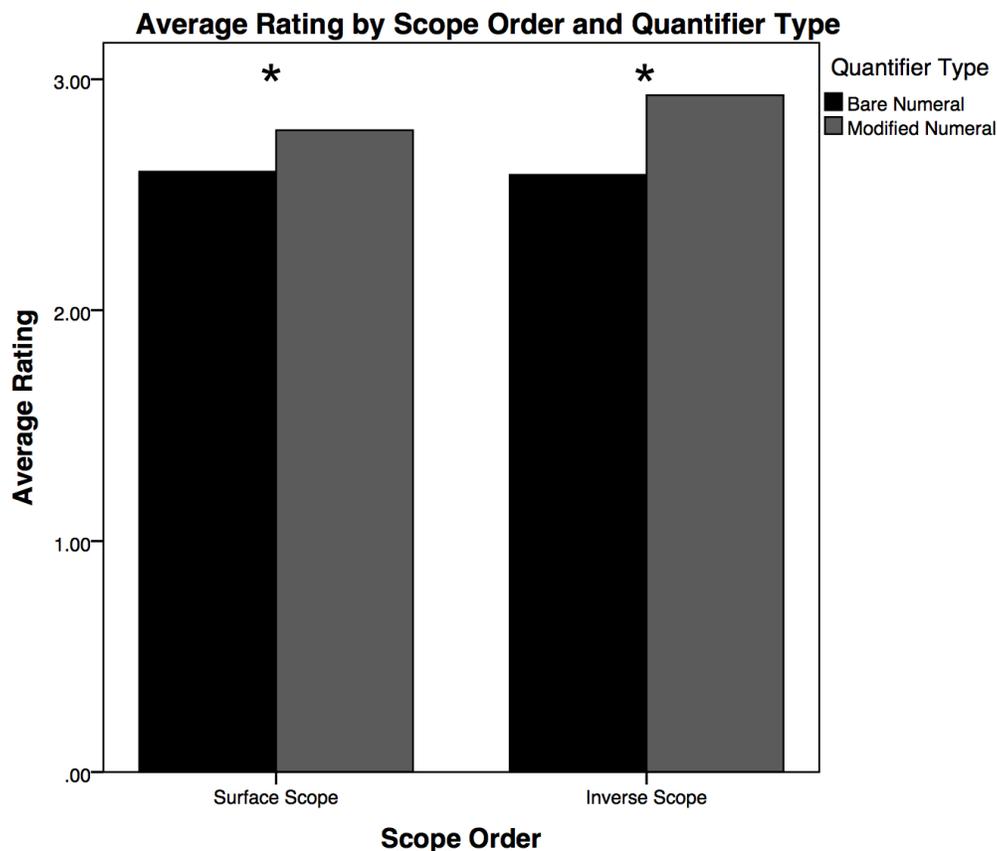
In the following study you will be shown pictures that are paired with a sentence.
Your task is to judge how well each sentence describes the picture.
 You will rank each sentence on a 4 point scale. **A score of 1 indicates that the sentence describes the picture badly, a score of 4 indicates that the sentence describes the picture well.**
 The test should take no longer than 10 minutes. Please complete the survey in one sitting and try your best!

Participants then acknowledged their willingness to participate in the survey. If a participant did not consent, the survey immediately concluded. Next, they were asked if they were native speakers of English. Regardless of response, the survey proceeded. This was done so that non-native speakers could still complete the survey for credit; however, they were excluded from all analysis.

After this, the subjects were shown a total of 40 sentence-picture pairs in random order. 20 trials were fillers excluded from analysis, and 20 were actual test items. In order to advance through the survey, a response had to be given. There were no time restrictions; however, the average completion time for the survey was 12 minutes.

3 Results

(11) *Mean score by condition*



Subjects' responses were submitted for analysis in SPSS and R (R Core Team, 2015). The figure in (11) shows mean scores for sentences across the four conditions.

A two-way repeated measures ANOVA was conducted. There was a main-effect of quantifier type such that BNs ($\bar{x} = 2.59$, $\sigma_M = .128$) were rated significantly worse than MNs ($\bar{x} = 2.86$, $\sigma_M = .123$). RM ANOVA: $F(1,28) = 9.13$, $p = .005$, $\eta_p^2 = .246$.

Across conditions, inverse scope ($\bar{x} = 2.76$, $\sigma_M = .142$) was statistically identical to surface scope ($\bar{x} = 2.69$, $\sigma_M = .15$): RM ANOVA: $F(1,28) = .159$, $p = .693$, $\eta_p^2 = .006$; this indicates

identical performance, and by proxy the ability of modified numerals to take inverse scope (contra the claims in the literature).

If the claims in the literature were correct, we would have observed the following interaction:

- Inverse scope conditions degraded the acceptability of modified numerals more than bare numerals.

This interaction, however, did not emerge.

4 Discussion

The results gleaned from the study suggest that MNs are indeed able to take inverse scope given that there was no statistical difference between inverse scope and surface scope, and the main effect of quantifier type was such that MNs were statistically rated higher than BNs.

That MNs appear to be able to take inverse scope is a surprising finding given the claims in the literature. It is possible that the supposed ungrammaticality of MNs in inverse scope conditions may actually be a form of markedness. That is, inverse scope interpretations may not be outright illicit, but perhaps difficult to form. This idea is corroborated by theoretical discussions of Fox (2000) and Reinhart (2006). They claim that in order to form an inverse scope interpretation, one must invoke a formal mechanism that can reorder quantifiers at the level of semantic interpretation: LF (Chomsky, 1995). Not only must a formal mechanism be invoked, but a ‘logical’ calculator must also be involved. The job of this logical calculator is to determine whether the rearrangement of quantifiers at LF results in a semantically distinct object. If the resultant operation does not create a semantically distinct object, then the quantifier shifting operation is not allowed to occur.

There are reasons to believe that such an operation is computationally costly (Reinhart, 2006). For example, children do not appear to access inverse scope until they mature (*ibid.*). I believe that a follow-up study is warranted that examines the reaction times for judging the sentences in the study, the idea being that if inverse scope is somehow computationally costly, then it would take longer for subjects to provide a rating for inverse scope than for surface scope sentences.

Regarding the main effect of quantifier type, such an effect is very surprising. A priori, there appears to be no explanation for why such an effect would be obtained. Wendell Kimper (*p.c.*) brought the following to my attention. Namely, MNs like *at least two* are true in more situations than BNs like *two*. Consider the following:

(12) *Looking at specials in a coffee shop*

There are 5 drinks on the special menu. 3 of them are caffeinated, and it is late, so you don’t want to drink anything with caffeine. You then think, ‘*there are at least 2 drinks I cannot order.*’

The internal dialogue above makes sense because there are exactly 3 drinks on the special menu that you cannot order, so the thought that there are ‘at least 2’ that you cannot order is true. If on the other hand, you had thought, ‘*There are 2 drinks I cannot order*’, you would perhaps be dishonest. Namely, you know that there are 3 drinks you can’t order, but you proclaimed that there were ‘2’ drinks you can’t order: if not a lie, it is underinformative.

Discussions on the semantics of numerals would take us too far afield; however, it will suffice to say that the field is divided on whether the meaning of a numeral is an ‘at least’ semantics, or an ‘exact’ semantics. That is, whether a word like *four* means simply $\llbracket 4 \rrbracket$ or $\llbracket \geq 4 \rrbracket$ (see Geurts (2006) for an excellent discussion of this issue). I hazard to suggest that my findings here provide

evidence in favor of either position on numeral semantics; however, I do suggest that there may be something about the meaning of an MN that is more accommodating of more situations than BNs. This might be simply a pragmatic effect where subjects wanted to ‘hedge’ their interpretations as much as possible. This perhaps might explain why MNs were rated as higher.

Why MNs were rated higher than BNs, and whether a difference between inverse scope and surface scope can be detected ought to be carried out. I suggest a reaction time study to see if difference between scopes can be detected. As for the numerals, a sentence-picture verification task could be conducted, and it could be seen whether or not subjects find ‘at least x ’ numerals to be true in a greater number of situations than simple x numerals. This is all in service to investigate the possible causes for my findings herein suggesting that MNs are in fact capable of taking inverse scope (contra the claims in the literature) and that overall, MNs were rated higher than BNs.

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Unifying long distance binding: Icelandic reflexive *sig* is clause-bounded, or logophoric*

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1 Introduction

Should the formulation of Condition A of the Binding Theory be parameterized: are there different binding domains for anaphors (Manzini and Wexler, 1987, a.o.)? And if so, is the domain size correlated with the morphological complexity of anaphors (Pica, 1987, a.o.)? One of the best-known cases for positive answers to both of these questions is based on the reported contrast between the morphologically simple Icelandic anaphor *sig* and the morphologically complex English reflexive *x-self*: unlike *x-self*, which has to be bound within its clause, *sig* is usually argued to be bindable from outside infinitive and subjunctive clauses (Thráinsson, 1976; Maling, 1984; Anderson, 1986; Sigurðsson, 1990; Reuland and Sigurjónsdóttir, 1997; Reuland, 2006a; Thráinsson, 2007, a.o.).¹

The goal of this paper is to show that under closer scrutiny, it is warranted to treat the English and the Icelandic anaphors alike, once we carefully take into account the perspectival properties of these anaphors: there is no difference in binding domain size, but the only condition exempting anaphors from locality requirements (namely from Condition A; cf. Chomsky, 1986, a.o.) is logophoricity. This removes a major obstacle to adopting a parsimonious theory based on a unique binding domain for all anaphors.

We will first discuss the general issue of non-locally bound anaphors in Section 2, before providing in Section 3 three arguments from Icelandic *sig* showing that so-called long distance binding boils down to exemption from Condition A due to logophoricity.

2 The issue of exempt anaphora

Anaphors such as English *x-self* in (1) or Icelandic third-person *sig* and possessive *sinn* in (2) are standardly assumed to obey locality requirements stated as what we will call the ‘standard’ Condition A of the Binding Theory (Chomsky, 1986): they must be bound within their clause (this approximation, which here stands for the various formulations of Condition A that have been proposed, will be sufficient for our current purposes; but see Chomsky, 1986; Reinhart and Reuland, 1993; Charnavel and Sportiche, 2016, a.o., for more specific formulations of Condition A and discussion about their differences).

- (1) a. [The girl]_{*i*} is looking at herself_{*i*} in the mirror.
b. [The moon]_{*i*} spins on itself_{*i*}.
- (2) a. Egill_{*i*} rakaði sig_{*i*}.
Egil shaved REFL²
‘Egil_{*i*} shaved himself_{*i*}.’

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¹This simple description ignored the fact, now well-documented, that English *x-self* can in fact also behave logophorically, as we discuss below.

- b. Egill_i tók bókina sína_i.
 Egil took the-book REFL
 ‘Egil_i took his_i (own) book.’ (Thráinsson, 2007)

But it has been observed that in various languages, some instances of anaphors do not seem to satisfy locality conditions imposed by this standard Condition A. For instance, English *herself* in (3) is not c-commanded by its antecedent *her*, and English *himself* in (4) and Icelandic *sig* in (5) are bound from outside their clause. Such anaphors have been variously called free anaphors, long distance anaphors, or exempt anaphors.

- (3) In her_i opinion, physicists like herself_i are rare. (adapted from Kuno, 1987)

- (4) Bill_i said that [the rain had damaged pictures of himself_i].
 (adapted from Pollard and Sag, 1992)

- (5) Jón_i segir [að María elski sig_i].
 John says that Mary loves-SUBJ REFL
 ‘John_i says that Mary loves him_i.’ (Thráinsson, 1976)

2.1 Exempt anaphors vs. long distance bound anaphors?

More precisely, anaphors that do not obey the standard Condition A have been classified into two categories: exempt anaphors and long distance anaphors.

Exempt anaphors are not subject to any structural constraint: they do not require a c-commanding antecedent as illustrated in (3), nor a local antecedent as shown in (4); in fact, the antecedent does not even need to be in the same sentence as is the case in (6) below, which is an instance of free indirect discourse.

- (6) John_i was going to get even with Mary. That picture of himself_i in the paper would really annoy her, as would the other stunts he had planned. (Pollard and Sag, 1992)

Such exempt anaphors must meet certain discourse conditions related to perspective: roughly, their antecedents must be perspective holders (see Sells, 1987; Pollard and Sag, 1992, a.o.). In addition to English reflexives, it is now known that Mandarin *ziji* (Huang and Liu, 2001), or Icelandic *sig* (Thráinsson, 1976; Maling, 1984; Sigurðsson, 1990, a.o.) can behave as exempt anaphors under appropriate discourse conditions.

Long distance anaphors require c-commanding antecedents, but allow them to be outside their clause without requiring any particular discourse conditions: they can be long distance bound (see Pica, 1987; Cole et al., 2006; Reuland, 2006a,b, a.o.). This is reported to be the case of Icelandic *sig* bound from outside its infinitive clause in (7).³

- (7) Jón_i skipaði Pétri [að raka sig_i á hverjum degi].
 John ordered Peter that shave-INF REFL on every day
 ‘John_i ordered Peter to shave him_i every day.’ (Reuland and Sigurjónsdóttir, 1997)

²The following glosses are used throughout the paper: CL=classifier; IND=indicative; INF=infinitive; PERF=perfective; PRON=pronoun; REFL=reflexive; SUBJ=subjunctive.

³It is unclear at this point whether *sig* in (5), bound from outside its subjunctive clause, is behaving as exempt or as long distance. We will return to this question in Section 3.

Furthermore, this difference in behavior between long distance anaphors and anaphors that can be exempt has been claimed to correlate with morphological complexity. On the one hand, complex anaphors such as English *x-self* or French *x-même* (\approx ‘x-self’) and *son propre* ‘his own’ are clause-bound in the general case, but can be exempt from Condition A under perspective-related conditions (Pollard and Sag, 1992; Reinhart and Reuland, 1993; Charnavel and Sportiche, 2016, a.o.). On the other hand, simplex anaphors such as Icelandic *sig* or Mandarin *ziji* – when not exempt – always need to be bound, but not necessarily within their clause, and they are moreover subject-oriented (Pica, 1987; Cole et al., 2006; Reuland, 2006a,b, a.o.). This leads to some parameterization of Condition A. Specifically, the binding domain of some of these long distance anaphors is unbounded (Mandarin *ziji* can be bound from outside any type of clause), while other long distance anaphors are more restricted (Icelandic *sig* must be bound within its tensed clause: as we will see in more details in Section 3, it has been claimed to be bindable from outside infinitive, and, by some, from outside subjunctive clauses, but not from outside indicative clauses).

(8) *The standardly reported contrast between long distance and regular anaphors*

	Long Distance Anaphors	Regular Anaphors
Morphology	simplex	complex
Local Binding Domain	a. tensed clause (Icelandic) b. sentence (Mandarin)	clause
Exemption from Local Binding	under appropriate discourse conditions	under appropriate discourse conditions
Subject Orientation	yes	no
	Icelandic <i>sig</i> Mandarin <i>ziji</i>	English <i>x-self</i> French <i>x-même</i>

2.2 Problems of the distinction

To account for the behavior of these two types of anaphors disobeying Condition A, namely exempt and long distance anaphors, at least two types of hypotheses need to be made.

First, different binding domains have to be postulated, and it must be assumed that the domain size correlates with the morphological complexity of anaphors: complex anaphors have to be bound within their clause, while simplex anaphors can be bound in a domain bigger than their clause (Manzini and Wexler, 1987; Reuland, 2006b, a.o.).

Second, a theory of exemption from Condition A has to be built for anaphors that do not have to be locally bound under certain discourse conditions. Specifically, the most commonly adopted hypothesis (Sells, 1987; Kuno, 1987; Pollard and Sag, 1992, a.o.) is that anaphors can be exempted from Condition A if they are anteceded by logophoric centers, that is, perspective centers similar to the ones relevant for logophoric pronouns in West-African languages (Clements, 1975, a.o.). For instance, *herself* does not need to be bound in (3) repeated below because its antecedent expresses an opinion, and *himself* can be long distance bound in (4) because the antecedent Bill is the subject of a verb of saying.

(9) In her_i opinion, physicists like herself_i are rare. (adapted from Kuno, 1987)

(10) Bill_i said that [the rain had damaged pictures of himself_i].
(adapted from Pollard and Sag, 1992)

This raises both empirical and theoretical problems.

On the theoretical side, the issue is one of analytic parsimony: the hypotheses mentioned above imply that we need at least four types of explanation for (i) anaphors that are bound within their clause, (ii) anaphors that are bound within their tensed clause, (iii) anaphors that are bound unrestrictedly, and (iv) anaphors that are not bound. Obviously, if tenable, it would be desirable to maintain that the binding domain of anaphors is crosslinguistically uniform.

There are also issues on the empirical side. While some authors (Anderson, 1986; Pica, 1987; Manzini and Wexler, 1987, a.o.) assume, contrary to what we stated above, that simplex anaphors cannot be exempt, this is not the case. Mandarin *ziji* and Icelandic *sig* do not have to be bound under perspective-related conditions as illustrated in (11)-(15). This clearly shows that monomorphemicity does not necessarily correlate with long distance binding behavior: simplex anaphors can also behave like complex anaphors that can be exempt from Condition A under logophoric conditions.

- (11) Zhangsan_i de jiao-ao hai-le ziji_i.
 Zhangsan DE pride hurt-PERF REFL
 ‘Zhangsan_i’s pride hurt him_i.’
- (12) Zhe-ge xiangfa chule ziji zhiyou san-ge ren zancheng.
 this-CL idea besides REFL only three-CL people agree
 ‘As for this idea, besides myself, only three other people agree.’ (Huang and Liu, 2001)
- (13) Skoðun Jóns_i er að sig_i vanti hæfileika.
 opinion John’s is that REFL lacks-SUBJ talents
 ‘John_i’s opinion is that he_i lacks talents.’ (Maling, 1984)
- (14) Formaðurinn_i varð óskaplega reiður. Tillagan væri svívirðileg og
 the-chairman became furiously angry the-proposal was-SUBJ outrageous and
 væri henni beint gegn sér_i persónulega. Sér_i væri sama...
 was-SUBJ it aimed against REFL personally REFL was-SUBJ indifferent
 ‘[The chairman]_i became furiously angry. The proposal was outrageous and it was aimed
 against him_i personally. He_i was indifferent...’ (Sigurðsson, 1990)

Furthermore, it is not the case that long distance anaphors are never subject to discourse conditions. For example, it has been shown that just like exempt anaphors, Mandarin *ziji* has to be logophoric to be long distance bound. The contrast between (15) and (16) demonstrates that *ziji* can be bound from outside the relative clause containing it only when the antecedent *Zhangsan* can be a perspective center (i.e. is alive) in that clause: *ziji* is deviant in (16) because *Zhangsan* cannot be aware of the event or even of the plot of his killing (Huang and Liu, 2001).

- (15) Zhangsan_i kuajiang-le changchang piping ziji_i de naxie ren.
 Zhangsan praised-PERF often criticize REFL DE those persons
 ‘Zhangsan_i praised those people who criticize him_i a lot.’ (Huang and Liu, 2001)
- (16) ?? Zhangsan_i kuajiang-le houlai sha si ziji_i de naxie ren.
 Zhangsan praised-PERF later kill die REFL DE those persons
 ‘Zhangsan_i praised those people who later killed him_i.’ (Huang and Liu, 2001)

Moreover, it turns out that all the reported cases of long distance bound *sig* in Icelandic – that is, cases in which *sig* does not obey the standard Condition A – involve centers of perspective as antecedents: for example, *Jón* in (5) and (7) repeated below is the subject of an attitude verb.

- (17) Jón_i **segir** [að María elski sig_i].
 John says that Mary loves-SUBJ REFL
 ‘John_i says that Mary loves him_i.’ (Thráinsson, 1976)
- (18) Jón_i **skipaði** Pétri [að raka sig_i á hverjum degi].
 John ordered Peter that shave-INF REFL on every day
 ‘John_i ordered Peter to shave him_i every day.’ (Reuland and Sigurjónsdóttir, 1997)

All these problems lead us to hypothesize that all the cases of non-locally bound anaphors can be unified. Instead of assuming that the behavior of simplex long distance anaphors should be accounted for in a different way than that of complex exempt anaphors – thereby losing both crosslinguistic and cross-anaphoric uniformity –, we want to test the hypothesis that all anaphors that disobey the standard Condition A (both exempt and long distance anaphors, both simplex and complex anaphors) behave alike. Specifically, there is only one binding domain for anaphors obeying Condition A (the clause, roughly, as mentioned at the beginning of Section 2), and there is only one condition allowing exemption from Condition A, namely, logophoricity. Thus, crosslinguistic uniformity of binding domains and cross-anaphoric uniformity are preserved. The fact that anaphors have a twofold behavior (some instances of a given anaphor have to obey Condition A, others do not) seems to remain an infringement to theoretical parsimony, but we will see in the concluding section that even this can be derived from a unique principle once the conditions for exemption (i.e. logophoricity) are better understood.

- (19) *General hypothesis about anaphors (tested on Icelandic sig in this paper)*
- a. Condition A is uniform: there is no variation in the size of binding domains across languages or/and across anaphors.
 - b. Exemption from Condition A is uniform: the only condition that can exempt anaphors from locality requirements is logophoricity.

3 Long distance binding is exemption: arguments from Icelandic

Icelandic is a privileged language to investigate the issue of the uniformity of non-locally bound anaphors as the reflexive *sig* has been assumed to behave both like a long distance anaphor and like an exempt anaphor. Specifically, it is claimed to exhibit a threefold behavior (Reuland, 2006a, a.o.):

- (i) when it occurs in an indicative clause, it cannot have an antecedent from outside this indicative clause as shown in (20);
- (ii) when it appears in an infinitive clause, it can be long distance bound (i.e. it can be bound from outside this infinitive clause) as illustrated in (21) (but it must obey condition (i) above);
- (iii) when it sits in a subjunctive clause, it is exempt from Condition A if it is logophoric as exemplified in (13) repeated in (22).⁴

- (20) Jón_i veit [að Pétur_k rakar {*sig_i/sig_k} á hverjum degi].
 John knows that Peter shaves-IND REFL on every day
 ‘John_i knows that Peter_k shaves him_{*i/k} every day.’ (Reuland, 2006a)

⁴Whether condition (i) must nevertheless be satisfied is discussed in footnote 5.

- (21) Jón_i skipaði Pétri_k [að raka {sig_i/sig_k} á hverjum degi].
 John ordered Peter that shave-INF REFL on every day
 ‘John_i ordered Peter_k to shave him_i/himself_k every day.’ (Reuland, 2006a)
- (22) Skoðun Jóns_i er [að sig_i vanti hæfileika].
 opinion John’s is that REFL lacks-SUBJ talents
 ‘John_i’s opinion is that he_i lacks talents.’ (Maling, 1984)

This description of the facts entails that to account for the distribution of *sig*, we need to postulate both that it has a larger binding domain than other anaphors like English *x-self* (the tensed clause instead of the clause), and that perspectival properties can exempt it from locality requirements. The former hypothesis addresses the behavior of *sig* in indicative and infinitive clauses, the latter its behavior in subjunctive clauses.

One approach that does not lead to such an uneconomical conclusion, namely Anderson (1986), only adopts the first hypothesis, by taking both infinitives and subjunctives as extending the domain within which *sig* must be anteceded by a binder. But this has been convincingly refuted based on the crucial role that logophoricity plays for *sig* in subjunctive clauses (see Thráinsson, 1976; Maling, 1984; Sells, 1987; Sigurðsson, 1990; Reuland and Sigurjónsdóttir, 1997; Thráinsson, 2007, a.o.) as illustrated in (22) above and (14) repeated below.

- (23) Formaðurinn_i varð óskaplega reiður. Tillagan væri svívirðileg og
 the-chairman became furiously angry the-proposal was-SUBJ outrageous and
 væri henni beint gegn sér_i persónulega. Sér_i væri sama...
 was-SUBJ it aimed against REFL personally REFL was-SUBJ indifferent
 ‘[The chairman]_i became furiously angry. The proposal was outrageous and it was aimed
 against him_i personally. He_i was indifferent...’ (Sigurðsson, 1990)

In what follows, we defend the reverse hypothesis, so far never seriously entertained, which takes *sig* anteceded from outside its clause in both infinitive and subjunctive clauses to be cases of logophoric uses. We will argue that *sig* in infinitive clauses does not obey a modified version of the standard Condition A by being bound within its tensed domain, but rather is exempt from the standard Condition A due to logophoricity. In other words, we hypothesize that *sig* has a twofold behavior: in the general case, it obeys the standard Condition A and is bound within its clause; under logophoric conditions, it can be exempt from Condition A and can thus take an antecedent out of infinitive and subjunctive clauses.⁵ This means that what has been claimed to be long distance binding (in the case of infinitive clauses) is in fact exemption due to logophoricity (just like in the case of subjunctive clauses). The rest of the section will provide three arguments supporting this hypothesis.

- (24) *Our hypothesis about the Icelandic reflexive sig*
 a. *Sig* obeys the standard Condition A: just like other anaphors, its binding domain is (roughly) the clause.

⁵In principle, this hypothesis also implies that *sig* can be exempt when it occurs in indicative clauses as long as it is logophoric, which seems to be refuted by examples such as (20). We briefly return to the case of indicative clauses at the end of this paper, but two remarks are here in order. First, the facts are subject to dialectal variation: Sigurðsson (1990, p. 313) shows that some speakers do accept *sig* in configurations similar to (20); that is, according to the speakers of this dialect (indicative dialect or I-dialect), *sig* is acceptable in indicative clauses even if it is not locally bound as long as it is logophoric. Second, the impossibility of exemption of *sig* in indicative clauses for the other speakers does not invalidate our hypothesis, but indicates that the indicative mood forbids a logophoric interpretation for these speakers.

- b. *Sig* can be exempt from Condition A when it is logophoric, especially in both infinitive and subjunctive clauses.

(25) *Comparison between three accounts for the (absence of) binding possibilities of Icelandic sig out of different types of clauses*

	Indicative Clauses: No Long Distance Binding	Subjunctive Clauses: Long Distance Binding Possible	Infinitive Clauses: Long Distance Binding Possible
Anderson (1986)	Condition A	Condition A (parameterized)	Condition A (parameterized)
Reuland and Sigurjónsdóttir (1997)	Condition A	Logophoricity	Condition A (parameterized)
Our hypothesis	Condition A	Logophoricity	Logophoricity

3.1 Logophoricity of *sig* in infinitives

The first prediction made by hypothesis (24) is that long distance *sig* occurring in infinitive clauses has to be logophoric, or in other words, that nonlogophoric *sig* cannot be bound from outside an infinitive clause. At first glance, this hypothesis is hard to test given that all documented examples of such a configuration use attitude holders as antecedents, that is, subjects of verbs like ‘order’, ‘ask’, or ‘believe’; furthermore, the notion of logophoricity – and that of perspective center that is associated with it – remains unclear in the literature. But crucially, inanimates can be used to test this prediction: under any notion of logophoricity, an inanimate cannot be a perspective center given that it lacks a mental state (cf. Charnavel and Sportiche, 2016, for the use of the inanimacy strategy to determine Condition A based on French anaphors). We therefore predict that inanimate *sig* cannot be bound from outside its infinitive clause while defenders of the long distance binding hypothesis predict the opposite.

Example (26) below shows that inanimate *sig* is in principle available when it is locally bound. Example (27) illustrates the correctness of our prediction: inanimate *sig* in an infinitive cannot be long distance bound.⁶ It is important to note that just like in the subjunctive case in (28), an

⁶Reuland and Sigurjónsdóttir (1997) report the following sentences, which involve inanimate long distance *sig* in infinitives, to be acceptable:

- (i) a. Jón sagði [þetta vandamál]_i hafa neytt okkur til að leysa sig_i.
 John said this problem have-INF forced us to that solve-INF REFL
 ‘John said [this problem]_i to have forced us to solve it_i.’
 b. [þetta vandamál]_i var sagt hafa neytt okkur til að leysa sig_i.
 this problem was said have-INF forced us to that solve-INF REFL
 ‘[This problem]_i was said to have forced us to solve it_i.’

We have not been able to duplicate this judgment and Reuland himself (2006a, endnote 13) questions the rating of these sentences, which he changes into ‘??’. He nevertheless adds that the following sentences are perfect:

- (ii) a. Jón sagði [þetta vandamál]_i hafa minnt á sig_i.
 John said this problem have-INF reminded of REFL
 ‘John said [this problem]_i has reminded (us) of it_i.’
 b. [þetta vandamál]_i var sagt hafa minnt á sig_i.
 this problem was said have-INF reminded of REFL
 ‘[This problem]_i was said to have reminded (us) of it_i.’

But in (ii), inanimate *sig* is not long distance bound from outside its infinitive clause, but is locally bound within it (by the subject of ‘remind’).

inanimate pronoun is acceptable in the position of *sig*, showing that the sentence is well-formed with an inanimate.

- (26) [þetta vandamál]_i minnir okkur stöðugt á sig_i.
 this problem reminds us constantly of REFL
 ‘[This problem]_i constantly reminds us of itself_i.’ (Thráinsson, 2007)

- (27) [þetta alvarlega vandamál]_i fékk Jón til [að leita lengi lausnar á {*sér_i/ því_i}].
 this serious problem made John to that search-INF long solution on REFL
 PRON
 ‘[This serious problem]_i made John look for its_i solution for a long time.’

- (28) [þetta vandamál]_i krafðist þess [að við hugsuðum stöðugt um {*sig_i/ það_i}].
 this problem demanded this that we thought-SUBJ constantly about REFL
 PRON
 ‘[This problem]_i demanded that we constantly thought about it_i.’ (Sigurðsson, 1990)

The contrast between the unacceptability of long distance bound inanimate *sig* and the acceptability of long distance animate *sig* when the binder is a perspective holder clearly demonstrates that *sig* has to be logophoric when it takes a long distance antecedent out of its infinitive clause.

Furthermore, some cases of animate *sig*, such as (29) below, might corroborate this conclusion.

- (29) *Eg hótaði Jóni_i [að lemja sig_i].
 I threatened John that hit-INF REFL
 ‘I threatened John_i to hit him_i.’ (Reuland and Sigurjónsdóttir, 1997)

In this sentence, the long distance antecedent *Jóni* is not an attitude holder. If it does not qualify as a licit logophoric antecedent, the ungrammaticality of *sig* is derived. It is however not totally clear that *Jóni* cannot be considered as a logophoric center in (29) (other types of logophoric centers than attitude holders have been shown to be relevant for exempt anaphora: see Sells, 1987; Kuno, 1987; Charneval, 2014, a.o.). In addition, it could be argued that there is an independent

factor making the sentence ungrammatical,⁷ that is, *sig* has to be anteceded by a subject.⁸ The same problems arise in a sentence like (30) involving the subjunctive.

- (30) *Jón sannfærði Maríu_i um [að ég hefði gleymt sér_i].
 Jon convinced Mary of that I had-SUBJ forgotten REFL
 ‘John convinced Mary_i that I had forgotten her_i.’ (Sigurðsson, 1990)

In sum, sentences with inanimate *sig* such as (27) are decisive: in these cases, the only factor explaining the ungrammaticality of long distance *sig* is the absence of logophoricity, thereby supporting our hypothesis.

3.2 Availability of unbound *sig* in infinitives

Conversely, hypothesis (24) predicts that as long as it is logophoric, *sig* does not have to be bound, or in other words, that unbound logophoric *sig* is acceptable in infinitive clauses.

⁷Reuland and Sigurjónsdóttir (1997) argue that (29) shows that *sig* in infinitives cannot take a non-c-commanding DP as an antecedent, even if it is a possible perspective holder. Independent tests would however be required to test whether *Jóni* is indeed not a c-commander of *sig* in that position, which seems dubious here. Note that the fact that a pronoun is acceptable here in the position of *sig* does not prove anything (see the arguments against Condition B effects in those cases in Section 3.3.).

Reuland and Sigurjónsdóttir (1997) also provide the following contrast to argue that *sig* can take an antecedent out of an infinitive clause (as opposed to a subjunctive clause) even if it is not a perspective holder: in (b), the derived subject of the passive is a possible antecedent for *sig* when it appears in an infinitive clause, but not in a subjunctive clause.

- (iii) a. Jón_i sagði Maríu_k hafa látið mig þvo sér_{i/k}.
 John said Mary have-INF made me wash-INF REFL
 ‘John_i said Mary_k to have made me wash him_i/her_k.’
 b. María_k var sögð (af Jóni_i) hafa látið mig þvo sér_{k/*i}.
 Mary was said (by John) have-INF made me wash-INF REFL
 ‘Mary_k was said (by John_i) to have made me wash her_k (=Mary).’
- (iv) a. Jón_i sagði Pétru_k að ég elskaði sér_{i/*k}.
 John told Peter that I loved-SUBJ REFL
 ‘John_i told Peter_k that I loved him_i/himself_{*k}.’
 b. Pétru_k var sagt (af Jóni_i) að ég elskaði sig_{*i/*k}.
 Peter was told by John that I loved-SUBJ REFL
 ‘Peter_k was told (by John_i) that I loved him_{*i/*k}.’

There is however a crucial difference between (iiib) and (ivb): in (iiib), Mary antecedes *sér* as the trace subject of the infinitive ‘have made’, not as the subject of the passive ‘was said’.

⁸Examples like the following are claimed to argue against the hypothesis that *sig* is generally subject-oriented:

- (v) Ég sendi Ólafi_i nýjan einkennisbúning á sig_i.
 I sent Olaf new uniform for REFL
 ‘I sent Olaf_i a new uniform for himself_i.’ (Thráinsson, 2007)
- (vi) Skoðun Jóns_i er að sig_i vanti hæfileika.
 opinion John’s is that REFL lacks-SUBJ talents
 ‘John_i’s opinion is that he_i lacks talents.’ (Maling, 1984)

But even if these cases do not involve sentential subjects, they could be argued to involve subjects of other types of predication (subject of one of the VP-shells in (v), subject of the noun ‘opinion’ in (vi)). Nevertheless, the example that we provide in (37) seems to confirm that *sig* is not necessarily subject-oriented, which would imply that the ungrammaticality of (29) is indeed due to non logophoricity. Further investigation of the subject orientation of *sig* is however needed to buttress this conclusion.

Based on contrasts such as that between (31) and (32) below, Reuland and Sigurjónsdóttir (1997) argue that this is not borne out, and therefore conclude that the long distance use of *sig* in subjunctive clauses is fundamentally different from the long distance use of *sig* in infinitive clauses: the former is ruled by discourse factors while the latter is ruled by syntactic principles.

- (31) *Skoðun Jóns_i virðist [vera hættuleg fyrir sig_i].
 opinion John's seems be-INF dangerous for REFL
 'John_i's opinion seems to be dangerous for him_i.' (Reuland and Sigurjónsdóttir, 1997)
- (32) Skoðun Jóns_i er [að sig_i vanti hæfileika].
 opinion John's is that REFL lacks-SUBJ talents
 'John_i's opinion is that he_i lacks talents.' (Maling, 1984)

There is however a crucial confound in (31). It has been suggested (Clements, 1975; Sells, 1987; Anand, 2006, a.o.) that a logophor must be included in a constituent expressing the point of view of the perspective holder antecedent of this logophor. John is indeed a perspective holder (specifically, an attitude holder) in both (31) and (32) since it is the subject of the noun 'opinion', but only in (32) does *sig* appear in the attitude context corresponding to that center. Unlike what is seen in (32), the clause containing *sig* in (31) does not express the content of John's thoughts; it is according to the speaker (the evidential source of 'seem'), not according to John, that his opinion is dangerous to him.

The same holds in the other examples provided by Reuland and Sigurjónsdóttir (1997):⁹

- (33) *Ósk Jóns_i er líkleg til að hafa slæmar afleiðingar fyrir sig_i.
 wish John's is likely to that have-INF bad consequences for REFL
 'John_i's wish is likely to have bad consequences for him_i.'
 (Reuland and Sigurjónsdóttir, 1997)
- (34) *Álit Jóns_i er sagt hæfa sér_i vel.
 belief John's is said suit-INF REFL well
 'John_i's belief is said to suit him_i well.' (Reuland and Sigurjónsdóttir, 1997)

It is worth pointing out that this very restriction has been observed for the subjunctive case: (35) below contrasts with (31) because in (35), it is not the antecedent of *sig*'s perspective (i.e. John's) that is reported in the clause containing *sig*, but the speaker's.¹⁰

- (35) *Skoðun Jóns_i fær mig til að halda að sig_i vanti hæfileika.
 opinion John's leads me to that believe that REFL lacks-SUBJ talents
 'John_i's opinion leads me to believe that he_i lacks talents.' (Maling, 1984)

This array of data allows us to make the relevant notion of logophoricity for exemption more specific: it is not sufficient to suppose that an exempt anaphor has to be anteceded by a perspective center, it should also occur in the clause expressing the perspective of its antecedent.

⁹Reuland (2011, p. 320) attributes to an anonymous reviewer the remark that these examples are not decisive since the complement clause is not interpreted as in the scope of the attitude noun, so that ideally, one should test structures of the form 'Jon's wish is for *sig* to have talent'. But he adds that Sigga Sigurjónsdóttir informed him that this kind of structure does not exist in Icelandic. The examples we provide in (37)-(39) however solve this issue.

¹⁰Thráinsson (1976, p. 229) similarly suggests that only a certain type of subjunctives allows *sig* to take a long-distance antecedent, in particular, subjunctives which imply 'a report from the higher subject's "point of view"', not a report from the speaker.

(36) *Logophoricity of exempt anaphors*

An anaphor can be exempt from Condition A if:

- a. it is anteceded by a perspective center;
- b. it is contained in a clause expressing the perspective of that center.

Once we control for this, we find that our prediction is borne out: (37)-(39) demonstrate that *sig* in infinitive clauses does not have to be bound when it is logophoric. Crucially, in (37) involving the expression *samkvæmt* ‘according to’, *sig* is contained in an infinitive clause expressing the antecedent’s thoughts; the same holds in Gärtner’s (2015) examples in (38)-(39).

(37) Samkvæmt Haraldi_i þá fékk lagið hans Maríu til [að hugsa til sín_i].
 according-to Harold then made the-song his Mary to that think-INF to REFL
 ‘According to Harold_i, his song made Mary think about him_i.’

(38) Krafa Jóns_i til okkar er [að styðja sig_i við þessar aðstæður].
 request John’s to us is that support-INF REFL with these conditions
 ‘John_i’s request from us is to support him_i in this situation.’ (Gärtner, 2015)

(39) Ráð(legging) Jóns_i (til okkar) var [að vitna í sig_i á hverri blaðsíðu].
 advice John’s to us was that cite-INF in REFL on every page
 ‘John_i’s advice (to us) was to cite him_i on every page.’ (Gärtner, 2015)

3.3 The difference between *sig* and *hann* with respect to *de se* readings

Finally, there is a further argument supporting the hypothesis – which we argue against with hypothesis (24) – that the binding domain of *sig* is the tensed clause (Anderson, 1986; Manzini and Wexler, 1987, a.o.), not the clause, so that binding of *sig* from outside an infinitive clause is an instance of compliance with Condition A, not of exemption from it: the reflexive *sig* and the pronoun *hann* seem to be in complementary distribution in infinitive clauses (Maling, p.c.). For instance, while *sig* is acceptable in (40) when bound by *Jón* outside its infinitive clause, the pronoun *hann* is not. Conversely, only the pronoun can be anteceded by non-c-commanding *Jón* in (41): *sig* is deviant.

(40) Jón_i skipaði mér [að raka {sig_i/ *hann_i}].
 John ordered me that shave-INF REFL PRON
 ‘John_i ordered me to shave him_i.’ (Anderson, 1986)

(41) Skoðun Jóns_i virðist [vera hættuleg fyrir {*sig_i/ hann_i}].
 opinion John’s seems be-INF dangerous for REFL PRON
 ‘John_i’s opinion seems to be dangerous for him_i.’ (Reuland and Sigurjónsdóttir, 1997)

We have discussed in the previous section why *sig* is unacceptable in (41), and the acceptability of the pronoun is expected under any account, since it is not c-commanded by the antecedent. But the unavailability of the pronoun *hann* in (40) could indeed seem to be an instance of (a nonstandard) Condition B, thereby suggesting that the tensed clause is after all the binding domain within which *sig* should be bound and *hann* cannot. Our hypothesis (24) can account for why *sig* is acceptable in (40), but does not say anything about the behavior of the pronoun *hann*.

Crucially, the data in (40) and (41) do not take into account the distinction between *de se* and *de re* readings. To explain the deviance of (40) with the pronoun *hann*, we hypothesize that it is

not Condition B, but a competition based on this distinction that is responsible for the contrast between *sig* and *hann* in (40).

First, the examples in (42) below show that *sig* needs to be read *de se* in infinitive clauses, while *hann* cannot.

- (42) *Mary and others have taken part in a recorded song competition. John listens to the recordings and states that Mary's song is his favorite.*
- a. Context 1 (*de se*): *Mary hears John say 'this song is my favorite' and realizes it is her own song.*
- María_i telur Jón [kjósa fremur {sig_i/ *hana_i}].
 Mary believes John elect-INF rather REFL PRON
 'Mary_i believes John to prefer her_i song.'
- b. Context 2 (non *de se*): *Mary hears John say 'this song is my favorite' but does not realize it is her own song.*
- María_i telur Jón [kjósa fremur {*sig_i/ hana_i}].
 Mary believes John elect-INF rather REFL PRON
 'Mary_i believes John to prefer her_i song.'

An account based on a nonstandard Condition B could not explain the well-formedness of (42b) with the pronoun *hana*. We take this to mean that if *hann* is reported to be unacceptable in (40) as opposed to *sig*, it is because the sentence is by default read *de se*, which forces the use of the reflexive.

This conclusion is corroborated by example (27) repeated in (43), which involves an inanimate. Clearly, with an inanimate antecedent, the *de se* reading is unavailable. In this case, the pronoun is fine, a fact that could not be accounted for in terms of a nonstandard Condition B either:

- (43) [þetta alvarlega vandamál]_i fékk Jón til [að leita lengi lausnar á {*sér_i/ því_i}].
 this serious problem made John to that search-INF long solution on REFL PRON
 ' [This serious problem]_i made John look for its_i solution for a long time.'

This interpretively driven complementarity follows, we assume, from a general preference for more specified forms (cf. Schlenker, 2005): if the more specified form is available, it must be used. Given that *sig* is the specialized form for *de se* readings, it blocks the use of the pronoun every time the sentence is read *de se*, which is the unmarked case in infinitive clauses and therefore what is documented by default when the distinction between *de se* and *de re* readings is not taken into account as in (40).

To finish, we could wonder why this competition between *sig* and *hann* with respect to *de se* and *de re* readings does not seem to be reflected in subjunctive and indicative clauses. Both *sig* and *hann* are commonly reported to be available in subjunctive clauses as illustrated in (44), while only the pronoun is reported to be acceptable in indicative clauses as in (45).

- (44) Jón_i heldur [að þú hatir {sig_i/ hann_i}].
 John believes that you hate-SUBJ REFL PRON
 'John_i believes that you hate him_i.' (Thráinsson, 2007)

- (45) Jón_i veit [að Pétur rakar {**sig_i*/ hann_i} á hverjum degi].
 John knows that Peter shaves-IND REFL PRON on every day
 ‘John_i knows that Peter shaves him_i every day.’

As suggested in footnote 5, (for some speakers) the indicative mood prevents a logophoric interpretation of *sig*, which is therefore unacceptable in indicative clauses, and cannot block the use of pronouns. Given clause (b) of the generalization in (36), it is tempting to speculate as follows, attributing the behavior of indicatives to a failure of perspectivization.

In (42a) or (42b), the content of the infinitive is necessarily presented from the perspective of the attitude holder. If a pronoun refers *de se* to the attitude holder *María*, the more specified option *sig* blocks the use of the pronoun. If *María* holds a belief *de re non-de se*, *sig* is excluded and the pronoun becomes possible. Such a speculation is compatible with the well-known observation that the infinitive mood is specified for *de se* readings in appropriate contexts.

In turn, we can take the behavior of the indicative (for the relevant speakers) to illustrate the following property of the indicative: the propositional content of an embedded indicative as in (45) is not and cannot be presented from the perspective of the attitude holder *Jón*. As a consequence, *sig* is excluded.

The case of the subjunctive is trickier: given that the subjunctive mood licenses a logophoric interpretation of *sig*, we could think that *sig* should enter in competition with *hann* with respect to *de se* readings as in the case of infinitives: there appears to be no reason why the default interpretation that is reported would not be the *de se* reading just as in the case of infinitive clauses; nevertheless, both *sig* and *hann* are commonly reported to be acceptable in subjunctive clauses. Continuing this speculation, a natural suggestion also attributes this difference to a perspectivization difference: subjunctives are ambiguous; they may, but need not, unlike infinitives, present their propositional content from the perspective of the attitude holder. In (44), suppose that the embedded subjunctive is presented from *Jón*’s perspective. Then *sig* blocks *hann* under the default interpretation in which the pronominal forms report a *de se* reading. Suppose however, as we assume possible, that the embedded subjunctive is not presented from *Jón*’s perspective (just like in the indicative). Then *sig* is disallowed, and *hann* becomes possible (even if the reported situation would warrant the other alternative with *sig* and *Jón*’s perspective).

Needless to say, further investigation is needed, about *de se* and *de re* readings in Icelandic infinitive, subjunctive and indicative clauses among other things, to precisely understand the import of these moods and the competition between the pronominal forms with respect to *de se* readings. At this point, it is sufficient for our purposes to observe the competition between *sig* and *hann* in infinitive clauses in this respect, which derives their apparent complementarity in this type of clause, and therefore buttresses our hypothesis that it is not the tensed clause that is the binding domain of *sig*: it is not Condition B, but the preference for *de se* readings, that explains the ungrammaticality of the pronoun in most infinitive clauses.

4 Conclusion

In sum, we have argued in this paper that the reason why Icelandic reflexive *sig* can be bound from outside infinitive clauses is not that the binding domain of *sig* is the tensed clause (a larger binding domain than is assumed in the standard Condition A), but that *sig* is logophoric in such cases, which exempts it from Condition A. In fact, *sig* cannot take an antecedent out of its infinitive clause when it is not logophoric (e.g. when it is inanimate) and conversely, *sig* in infinitive clauses does not need to be bound when it is logophoric; moreover, the apparently complementary distribution of the reflexive and the pronoun in infinitive clauses can be derived from their different specifications

for *de se* readings. This means that contrary to what is usually assumed, the long distance use of *sig* in infinitive clauses is no different than the long distance use of *sig* in subjunctive clauses: both are due to logophoricity. More generally, this suggests that the parsimonious hypothesis that all cases of non-locally bound anaphors can be derived in a uniform way is viable: we do not need to suppose both long distance binding (that is, assume that binding domains can have different sizes) and exemption (that is, hypothesize that anaphors can be exempt from Condition A if logophoric), but long distance binding can be reduced to exemption. At least, this is what the Icelandic facts suggest, once we carefully examine them, but a meticulous investigation of other languages with so-called long distance anaphors would be necessary to be able to generalize this conclusion. This is a topic for future work.

A further pressing issue, especially given ideals of theoretical parsimony, is to understand the relation between logophoricity and exemption. We have observed and hypothesized that logophoricity exempts anaphors from Condition A. But given that instances of anaphors that obey Condition A and instances of anaphors that are exempt from it have the same form (e.g. *sig*), how can we explain (i) on the one hand, that exempt anaphors can escape locality conditions (Condition A) when logophorically interpreted, and (ii) on the other hand, that exempt anaphors have to be logophorically interpreted? Of course, it could simply be stipulated that as opposed to locally bound anaphors, exempt anaphors are lexically marked for logophoricity and are not subject to locality conditions. But this would entail that exempt anaphors do not have the same lexical entry as locally bound anaphors, and that their morphological identity is therefore accidental. Given that the identity in form between exempt anaphors and locally bound anaphors is crosslinguistically pervasive (e.g. Mandarin *ziji*, English *himself*, French *son propre*, Japanese *zibun*, etc.), this would thus mean that massive homonymy has to be assumed contrary to ideals of theoretical parsimony (see Charneval, 2014).

Instead, we here adopt the logophoric operator hypothesis defended by Charneval (2014) to solve this issue. That is, using the notion of logophoric operator first proposed by Koopman and Sportiche (1989) and then adapted by Anand (2006), among others, we consider this logophoric operator as an intermediate element between the antecedent and the exempt anaphor so that it locally binds the anaphor as represented in (46). This crucially means that exempt anaphors are in fact not exempt, but obey the standard Condition A via local binding by a silent operator. That's why exempt anaphors and locally bound anaphors have the same form: they are instances of the same element subject to Condition A.

- (46) Krafa **Jóns_i** til okkar er [**OPLOG**_{-i} að styðja **sig_i** við þessar aðstæður].
 request John's to us is to support-INF REFL with these conditions
 'John_i's request from us is to support him_i in this situation.' (Gärtner, 2015)

This also crucially explains the logophoric interpretation of exempt anaphors if we assume that the logophoric operator involves coreference with a perspective center (i.e. the antecedent) and codes the fact that the propositional content of the clause it c-commands (boxed in (47)) is expressed from that center's perspective.¹¹ Recall that this derives the difference between (31) and (38) repeated below.

- (47) Krafa **Jóns_i** til okkar er [**OPLOG**_{-i} að styðja **sig_i** við þessar aðstæður].
 request John's to us is to support-INF REFL with these conditions
 'John_i's request from us is to support him_i in this situation.' (Gärtner, 2015)

¹¹It is this very notion that we use in speculating about the differences between infinitive, subjunctive and indicative clauses at the end of Section 3.2.

- (48) *Skoðun Jóns_i virðist [vera hættuleg fyrir sig_i].
 opinion John's seems be-INF dangerous for REFL
 'John_i's opinion seems to be dangerous for him_i.' (Reuland and Sigurjónsdóttir, 1997)

In sum, the threefold behavior of an anaphor such as *sig* can be derived uniformly: the anaphor always needs to obey Condition A, that is to be bound locally, and the appearance of long distance binding and exemption comes from the presence of silent logophoric operators that can locally bind the anaphor and thus enrich its interpretation. It remains to be seen whether this account can be extended to all cases of so-called long distance and exempt anaphors so as to obtain crosslinguistic and cross-anaphoric uniformity.

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Language, race, and vowel space: Contemporary Californian English*

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1 Introduction

California is a populous, ethnically diverse state with high percentages of residents claiming Asian, Pacific Islander, Native American, Latino, and/or Hispanic heritage. Individuals of Asian and Latin American descent comprise a large portion of California's population: 14.4% and 38.6%, or twice and three times the national average, respectively.¹ Nearly 44% of Californians are native speakers of a language other than English, and of those speakers, 74% speak English natively, meaning that they were raised multilingually (Modern Language Association, 2010). In California, languages other than English frequently spoken in the home include Spanish, Mandarin, Cantonese, Tagalog, Vietnamese, Korean, and Persian (Farsi). While roughly 20.7% of households in the United States report speaking a language other than English in the home, 43.7% of California households report the same (United States Census Bureau, 2010).

Studies of Californian English have assumed historical leveling (given California's long history of White immigration from other parts of the United States), but have also demonstrated the rise of certain phonological patterns distinct to California. Investigations into Californian English began in earnest with the 1986 seminar that first proposed the California Vowel Shift (Hinton et al., 1987; Luthin, 1987) by comparing vowel qualities in contemporaneous elicitations to those described in Reed's Linguistic Atlas of the Pacific Coast (1952). Subsequent research has confirmed the California Vowel Shift among White Californians in urban and rural locations (Hagiwara, 1997; Podesva et al., 2015a), debated the presence of its features in Chicano English (see Fought, 1999; Eckert, 2008a), and connected its use to gender identity (Kennedy and Grama, 2012) and the indexing of a gay male persona (Podesva, 2011).

Despite this work, the majority of research on the California Vowel Shift reports on the speech of White Californians. Less attention has been given to English speakers who self-identify as non-White Hispanic, Black, Asian, or Native American. In the earliest studies, Asian American speakers in particular were generalized into the 'Anglo' category. However, more recently some studies have examined differences in vowel quality by ethnicity, including Mendoza-Denton and Iwai (1993), who compared Japanese Americans and White Americans, and Hall-Lew (2011), who found evidence that Asian-identifying San Franciscans may be leading a change that marks the California Vowel Shift (/u/-fronting).

1.1 The California Vowel Shift

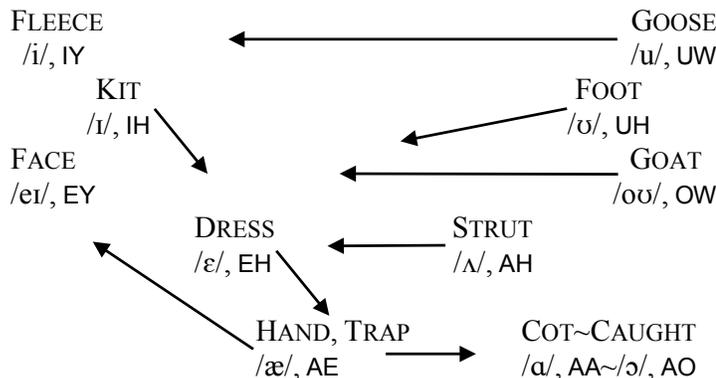
The California Vowel Shift (CVS), as evidenced by historical and contemporary studies of the English spoken by ethnically Caucasian, Asian, and Latino residents of California, is most marked by fronted back vowels /u, ʊ, ʊʊ/, lowered and backed lax front vowels /ɪ, ɛ/, and the merger of low back vowels /ɑ/ and /ɔ/ (the COT-CAUGHT merger). As a whole, this resembles a counter-clockwise shift in the vowel space: back vowels front, lax front vowels lower, and low front vowels

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¹Demographic information taken from the US Census acknowledges that 'Asian' is a race and 'Hispanic or Latino' are ethnic categories, so some overlap for Californians who identify as both Asian and Latino is possible.

open and back. In addition, the low front vowel /æ/ is subject to a phonologically-conditioned split: raising and fronting before coda nasal consonants (HAND-raising, as in *lamb* or *handstand*), while lowering and opening elsewhere (TRAP-backing). (1) illustrates CVS; IPA transcription, representative English words, and ARPABET encoding for each vowel are provided.

(1) *California Vowel Shift, adapted from Hall-Lew (2009)*



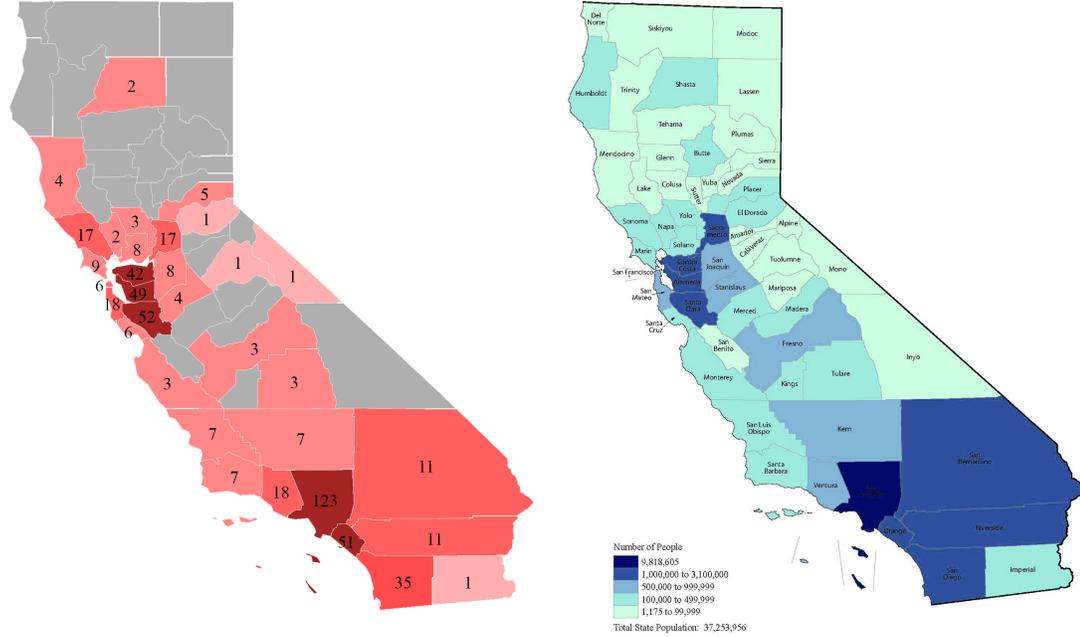
Social attributes of speakers such as ethnicity, class, and social network structure may affect the degree of CVS-related shift observed, regardless of (or in addition to) a speaker’s age (see Fought, 1999; Eckert, 2008a; Podesva, 2011; Podesva et al., 2015b). In light of California’s considerable population diversity, this effect is potentially under-investigated. The current study aims to address how the ethnic group membership of Californians mediates adoption of CVS characteristics, at the level of self-identified ethnic group membership. This large-scale analysis of a broad, diverse population may permit better assessment of CVS and allow us to approach some of the traditional assumptions of dialectology and sociophonetics in a new light.

2 Methods

2.1 The Voices of Berkeley Corpus

The Voices of Berkeley project (Johnson and Sprouse, 2011) collected speech samples from 786 incoming university students, aged 16 to 61 (mean: 19, median: 18); all volunteered and gave informed consent. Participants were asked to provide basic demographic information, most importantly self-determined ethnicity (SDE). This field was open-ended (i.e. not a checkbox or multiple-choice question). Also included in participant-provided metadata were age, gender, place of residence (country, state, county, city), languages spoken (up to four) and estimated age of acquisition, the occupations of up to two caregivers and up to four ‘grandparent’ caregivers, and caregivers’ native languages. Participants originated from around the United States and a number of other countries. A total of 535 (354 F) speakers were from California and gave sufficient demographic information to include in the finished data set. This group’s stated Californian counties of residence roughly align with the population distribution of California from the 2010 Census (see the figure in (2)).

- (2) *Left: number of study participants by California county. Right: population density of California by county (US Census Bureau). Darker colors indicate larger population.*



Audio recording was performed by participants using their own personal computers (with a built-in microphone and Internet access), which enabled the logging of geographic location in latitude and longitude at the time of participation. Stimuli were six simple sentences (see Appendix A) designed to elicit the use of several vowels relevant to expression of CVS characteristics. Participants were shown each sentence and then given unlimited opportunities to practice and record the sentence before moving on to the next sentence.

2.2 Participant demographics

- (3) *Voices of Berkeley SDE groups (n=506)*

White (WHT)	Latino (LAT)	Chinese (CHN)	Korean (KRN)
158 F	49 F	53 F	14 F
82 M	37 M	17 M	10 M
Mid. Eastern (MDE)	South Asian (SOU)	Vietnamese (VTM)	Filipino (FLP)
14 F	12 F	8 F	6 F
7 M	4 M	4 M	4 M
Hapa (HAP)	Black (BLK)	Japanese (JPN)	Native Am. (NDN)
7 F	6 F	5 F	4 F
2 M	2 M	1 M	0 M

Californian participants were sorted into twelve SDE groups in (3) based on their response and the experimenters' reasoning. For example, participants who reported 'White', 'Caucasian', or a combination of European heritages such as 'Irish/German' were categorized as 'White'. 'Chinese' and 'Chinese American' were both considered 'Chinese'—keeping in mind that all participants were Californian. Participants who identified as mixed-race Asian and European were combined into a 'Hapa' SDE group. Other participants who responded in ways not conducive to by-group statistical analyses—particularly nonspecific 'multiracial' responses—were excluded from analysis. Of the remaining 506 participants, 44.9% identify as White, 28.4% as Asian (inclusive of East

Asian, Southeast Asian, South Asian/Indian, and Middle Eastern), and 15.5% as Chicano, Latino, and/or Hispanic. The table in (4) compares these percentages to the racial/ethnic compositions of the UC Berkeley undergraduate student body and the state of California.

(4) *Voices of Berkeley participant demographics*

	Californians in VoB		UCB census		CA census
White	44.9%	(240)	30%	(7,746)	73.2%
Asian	28.4%	(152)	39%	(10,145)	14.4%
Chicano/Latino, Hisp.	15.5%	(83)	12%	(3,136)	38.6%
Black/Afr. American	1.5%	(8)	3%	(892)	6.5%

Participants identified up to four non-English languages that they speak. 165 (106 F) Californian speakers identified English, and no other language, as their L1. The next most common languages listed as L1 or L2 were Spanish, Mandarin, Korean, Cantonese, Farsi, Vietnamese, and Hindi. No participants listed a non-English language as their only language (i.e. all participants spoke English).

Due to the ambiguity inherent in asking for ‘first language’ and ‘second language’ in a forced-choice survey of this kind, the ‘L1’/‘L2’ distinction in participants’ responses was collapsed. For example, a speaker who identified Cantonese as their L1 and English as their L2 and a speaker who identified English as their L1 and Cantonese as their L2 were put into the same category. In this way, all speakers could be categorized as English monolinguals or bilinguals of English and some other language. However, participants who listed Spanish as an L2 were not included in the ‘bilingual’ categorization, due to the frequency of Californian students learning Spanish in school and not (or at least rarely) attaining true bilingualism.

2.3 Acoustic analysis

Each recording was screened by one or more trained phoneticians for audio quality. Usable recordings were automatically given ARPABET transcriptions with the Penn Forced Aligner (Rosenfelder et al., 2011). Using an Inverse Filter Control method (Ueda et al., 2007), measurements for F1 and F2 were taken at eight evenly-spaced time points through the duration of each vowel token. Formant measurements were logmean-normalized by gender (Adank et al., 2004).

The F1–F2 measurements were subjected to two types of analysis of variance: a smoothing-spline (SSANOVA) model (Davidson, 2006; Nycz and de Decker, 2006) that sought effects of SDE group on F1 and F2, as well as interaction effects of time point and SDE group on F1 and F2, and a one-way repeated measures ANOVA. For the SSANOVA, group effects model the impact of SDE group membership on vowel quality when compared to the average formant contours of the entire California group for that vowel, and interaction effects model time-varying impact of SDE group on vowel quality compared to this hypothetical average contour.

3 Results

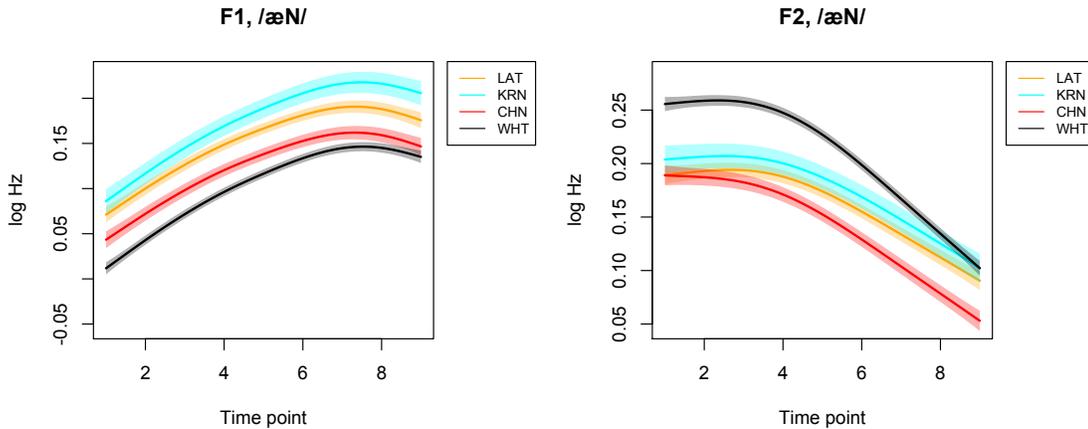
In Sections 3.1 through Section 3.4 we report effects from the SSANOVA model, focusing on the largest SDE groups and on group and interaction effects from the model that meet a $p < 0.05$ threshold of statistical significance.

3.1 Model results: /æ/

The observed pattern for the low front vowel /æ/ is, in keeping with previous studies of the CVS, a phonologically conditioned split depending on the presence of a nasal consonant coda. (We will refer to this pre-nasal variant of /æ/ as /æN/.) A clear effect of SDE group, as well as an interaction of group and time point, can be seen in the F1 and F2 values for /æ/ in this study. However, different SDE groups show different patterns of greater or lesser advancement in the direction of each vowel variant’s CVS-related changes.

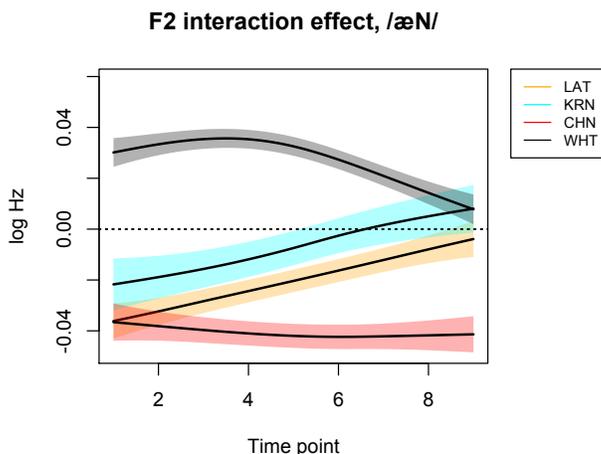
(5) plots SSANOVA splines for the F1 and F2 trajectories of /æN/ across the eight time points, with the 95% confidence interval represented by the shaded region surrounding each line. Group formant values of significant difference at the $p < 0.05$ threshold are indicated by non-overlap of these confidence intervals. Thus, for example, the LAT group has a significantly higher F1 value for /æN/ (indicating less tongue body raising for this vowel) than the WHT group. The KRN and CHN SDE groups are also shown to have higher F1 than the WHT group, as well as lower F2 (less fronting).

(5) Normalized F1 (L) and F2 (R) log mean of /æN/ over time: LAT, KRN, CHN, WHT



Overall, the WHT group (as well as BLK, not pictured) shows a more fronted /æN/ than other SDE groups. Of particular interest in (5) is the trajectory of WHT’s F2 over time. In the first half of the vowel, WHT mean log F2 is above average: greater than the LAT group’s values. However, the vowel’s trajectory does not run parallel to the other three groups’, and by time point 8, the F2 value for the WHT group has fallen significantly, matching the value for LAT, KRN, and other ethnic groups. We expect all groups to exhibit the generalized formant trajectory illustrated here, since the HAND vowel is generally slightly diphthongized in this phonetic context, but the WHT group’s diphthongization also appears to be the greatest of all SDE groups. This distinction can be seen in the SSANOVA model’s by-group interaction effects for F2 of /æN/ in the figure in (6).

(6) *Interaction effect for selected SDE groups and time point of vowel for F2 of /æN/*



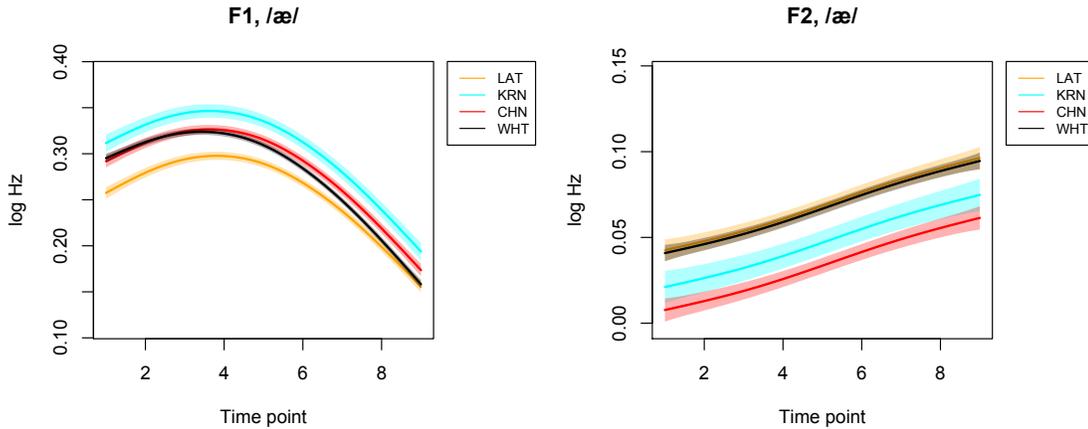
(7) summarizes the direction of group effects for HAND-raising: if ‘Average’, a group effect does not fall outside one standard error of an effect size of 0. For this particular vowel, lower F1 and higher F2 indicate a raised and fronted HAND-vowel, and thus greater participation in this particular aspect of CVS. The LAT and KRN groups consistently ‘lag’ in this change—that is to say, their tokens of this vowel were less raised than the average for the corpus. BLK and WHT groups consistently ‘lead’ the change. It is important to note that the model results are relative to overall CVS observed among all Californian speakers, not relative to any outside standard of American English vowel formant measurements.

(7) *Participation in /æN/ changes for selected SDE groups*

	Lag (hi F1, lo F2)	Average	Lead (lo F1, hi F2)
/æN/ F1 (raising)	LAT, KRN	CHN, VTM	NDN, BLK, WHT
/æN/ F2 (fronting)	LAT, KRN, CHN	VTM, NDN	BLK, WHT

The counterpart to HAND-raising in CVS is the lowering and backing of /æ/ in non-pre-nasal contexts, which we refer to as TRAP-backing. In this case, a higher F1 and lower F2 indicate more participation in the established CVS changes. SSANOVA splines for F1 and F2 trajectories for selected SDE groups are provided in (8) for /æ/ in non-pre-nasal contexts.

- (8) *Normalized F1 and F2 log mean of non-pre-nasal /æ/ over time: LAT, KRN, CHN, WHT*



In comparison to its distinct profile for HAND-raising, the WHT group does not appear to be the one with the most advanced change. The groups that actually appear to exhibit TRAP-backing (‘leading’ in the nomenclature introduced for (7)) are KRN, CHN, and NDN. The VTM group leads in lowering (F1-related), but lags in backing (F2-related), while the BLK and LAT groups consistently lag behind the other SDE groups in these dimensions. These findings are summarized in (9) below.

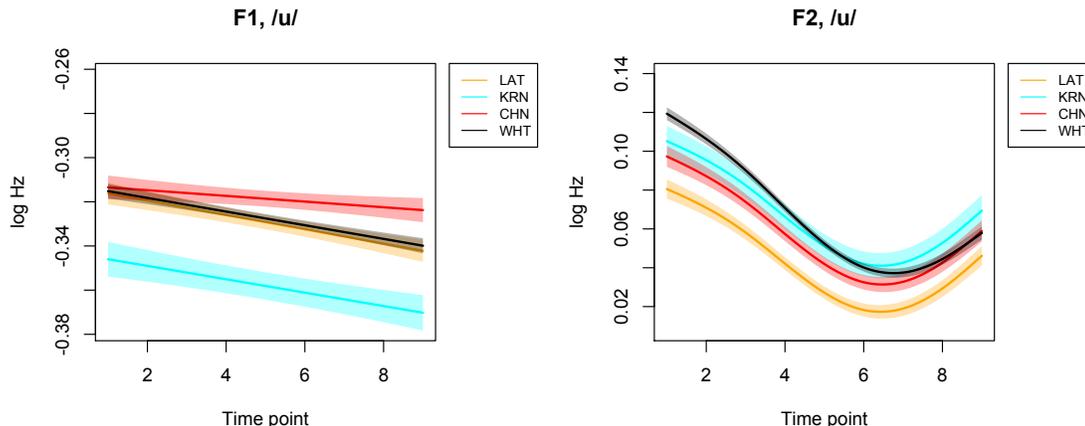
- (9) *Participation in /æ/ changes by SDE group*

	Lag (lo F1, hi F2)	Average	Lead (hi F1, lo F2)
/æ/ F1 (lowering)	LAT, BLK, WHT	CHN	VTM, KRN
/æ/ F2 (backing)	LAT, BLK, VTM, WHT		CHN, KRN, NDN

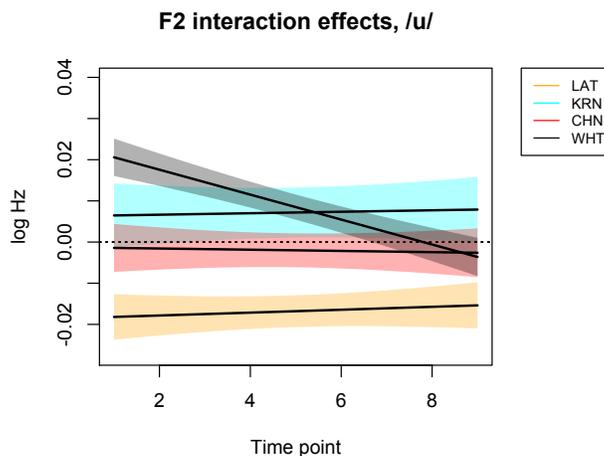
3.2 Model results: /u/ and /ou/

The previously established CVS pattern of back vowel fronting for /u/ and /ou/ is present for speakers of this study, and there are interesting and significant interaction effects for /u/ in the SSANOVA model. (10) below plots the SSANOVA splines for /u/’s F1 and F2 trajectories across all time points. LAT speakers exhibit by far the lowest F2 values, indicating the least fronted /u/ among the study population. KRN speakers exhibit significantly higher F2 compared to WHT speakers, except in the second half of /u/. There is also a significant difference in F1, or the height of /u/, when comparing WHT or LAT speakers to KRN speakers (as well as BLK and VTM, not pictured). These group-dependent differences in /u/’s F2 trajectory are captured by the appropriate interaction effects from the SSANOVA model in (11).

(10) *Normalized F1 and F2 log mean of /u/ over time: LAT, KRN, CHN, WHT*



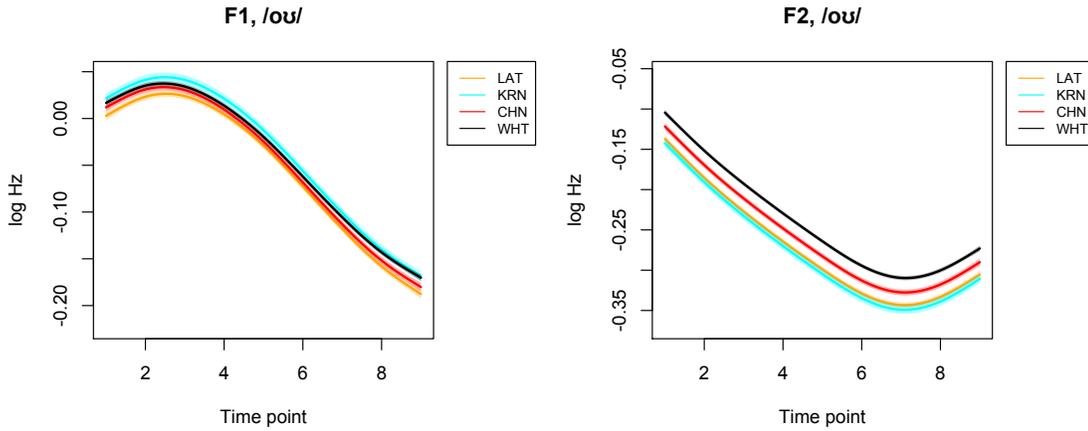
(11) *Interaction effect for selected SDE groups and time point for F2 of /u/*



As a group, the SDE groups of BLK, KRN, and WHT exhibit globally higher F2 values for /u/. However, CHN, and especially LAT and VTM speakers, have much lower global F2 values. Furthermore, as (10) demonstrates, the contours of these vowels also differ. These results suggest that there may be two distinct /u/ variants present in members of the study population, analogous to the differently diphthongized variants found in Koops (2010).

As for /oʊ/, (12) presents this vowel's trajectory data as SSANOVA splines. Unlike /u/-fronting, some group effects for both formants are significant, but no interaction effects reach significance; that is, all groups have similarly shaped F1 and F2 trajectories at different global formant levels. The NDN SDE group (not pictured) has the largest magnitude of F2 advancement. WHT and BLK speakers also exhibit overall high F2 levels, while LAT speakers show the lowest F2 values. In addition, while KRN speakers lead in /u/-fronting, they are shown here to lag in /oʊ/-fronting. A summary of back vowel fronting for all SDE groups run through the SSANOVA is presented in (13).

(12) Normalized F1 and F2 log mean of /ou/ over time: LAT, KRN, CHN, WHT



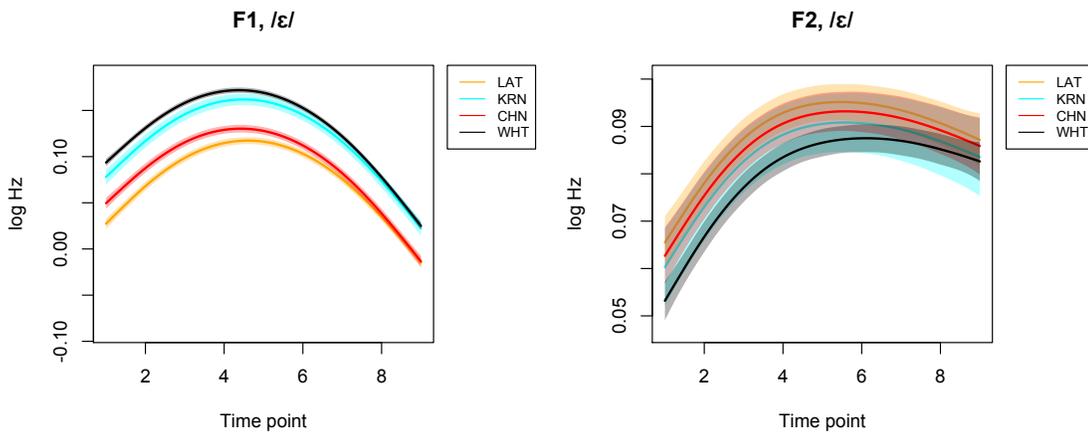
(13) Participation in back vowel fronting by SDE group

	Lag (lo F2)	Average	Lead (hi F2)
/u/ F2 (fronting)	LAT, VTM	CHN, BLK	KRN, WHT, NDN
/ou/ F2 (fronting)	LAT, KRN	CHN, VTM	BLK, WHT, NDN

3.3 Model results: /ε/

In CVS, the front lax vowels /ɪ/ and /ε/ are backed and lowered. Our SSANOVA model was not run on the /ɪ/ vowel due to insufficient tokens, but it did find significant group effects in F1, corresponding to vowel height, for the DRESS vowel. (14) below shows that across all time points of /ε/, LAT and CHN speakers and the BLK group (not pictured) have lower F1 values and correspondingly less lowered tokens; they participate in lowering to a lesser degree than a typical White speaker.

(14) Normalized log mean of F1 and F2 of /ε/ over time: LAT, KRN, CHN, WHT



3.4 Summary of SSANOVA results

(15) lists seven² of the twelve SDE groups used to generate the SSANOVA model and their results regarding more or less advanced participation (+), average participation (0), or lagging participation (-) in certain formant value changes characteristic of CVS. These results are taken from the raw data for group effects, not interaction effects or statistical tests run on the model. A score of (+) or (-) represents a difference of at least one standard error away—positive or negative, respectively—from an effect size of zero. Generally, the average LAT speaker can be taken to participate less in the examined aspects of the CVS, while the average WHT speaker participates more. The CHN, KRN, and VTM groups vary in their participation in CVS, but tend to participate less, depending on the vowels in question.

(15) *Participation in certain vowel changes of CVS by self-determined ethnicity group*

SDE	/æ/ hi F1	lo F2	/æN/ lo F1	hi F2	/u/ hi F2	/ou/ hi F2	/ε/ hi F1
LAT	-	-	-	-	-	-	-
CHN	0	+	0	-	0	0	-
BLK	-	-	+	+	0	+	-
VTM	+	-	0	0	-	0	0
KRN	+	+	-	-	+	-	+
NDN	-	+	+	0	+	+	0
WHT	-	-	+	+	+	+	+

3.5 ANOVA results

To confirm the findings of the SSANOVA model, additional one-way repeated measures ANOVAs were run on the vowels that undergo specific changes within CVS. These models were run on the same normalized formant data as the SSANOVA model and tested for effects of ethnicity, background language, and caregiver language on vowel quality. However, the ANOVAs were only run on one time point of the vowel (time point 5, at 50% of normalized duration). A selection of ANOVA results are presented in this section.

There was a significant effect of SDE group for F2 of /æN/ ($F(11,832)=2.16$, $p = 0.0148$). Post-hoc tests using subset ANOVA were run to determine which SDE groups differed the most significantly. The WHT and CHN SDE groups, which in (5) are the furthest apart at time point 5 (and all other points in the vowel), were found to be significantly different ($F=13.51$, $p < 0.0001$).

The same battery of ANOVA tests was run on the data to test for effects of ethnicity, background language, and caregiver language on the formant values of /u/. The one-way repeated measures ANOVA did not find significant differences between ethnic groups for F2 at timepoint 5 (time-normalized midpoint). However, another ANOVA run for time point 2 of that vowel (approximately 25% of normalized vowel duration) found a significant difference ($F(11,2337)=2.094$, $p = 0.018$) in F1. This is broadly consistent with the SSANOVA model's findings of a strongly time-varying effect on the F1 of /u/ that is limited to the beginning portion of the vowel. Post-hoc tests using subset ANOVA showed that WHT and VTM speakers differed significantly at an alpha level of $p = 0.005$, as well as JPN versus CHN speakers ($F=4.201$, $p = 0.041$) and VTM versus CHN speakers ($F=4.653$, $p = 0.032$).

The ANOVA conducted on the midpoint F2 values of /ou/ also found ethnicity to be a significant predictor ($F(11,2794)=3.233$, $p < 0.001$). Post-hoc tests using subset ANOVA showed that WHT

²Data from the remaining five SDE groups—JPN, FLP, MDE, SOU, and HAP—are not reported here, but our complete data is available upon request.

speakers' F2 values of /ou/ differ significantly from BLK, LAT, and CHN speakers ($p < 0.001$, $p < 0.001$, and $p = 0.012$, respectively). Similarly, BLK speakers had significantly different F2 values from KRN ($p = 0.001$) and LAT speakers ($p = 0.027$). (16) summarizes these results.

(16) *Post-hoc tests for inter-ethnic differences in F2 of /ou/*

SDE / Vowel	/ou/ F2
WHT-BLK	F=11.49, $p < 0.001$
WHT-LAT	F=13.18, $p < 0.001$
BLK-KRN	F=10.63, $p = 0.001$
BLK-LAT	F=4.917, $p = 0.027$
WHT-CHN	F=6.331, $p = 0.012$

Furthermore, repeated measures ANOVA tests found that ethnicity was a significant predictor of F1 of /ε/ (F(11, 2300)=2.114, $p = 0.017$), which in CVS is lowered (as well as backed). When comparing WHT speakers to BLK and LAT speakers using a subset ANOVA as a post-hoc test, both were found to be significant ($p = 0.042$ and $p = 0.088$, respectively), corroborating the SSANOVA model's findings that these two groups lag in comparison to WHT speakers in the changes that are occurring with front vowels in CVS.

Lastly, the ANOVA tests also showed that the F1 of /ε/ varied significantly by background language (F(6,1268)=2.35, $p = 0.029$), as did the F2 of pre-nasal /æN/ (F(6,458)=2.321, $p = 0.032$). A subset ANOVA post-hoc test was run comparing English-Mandarin bilingual speakers and English-Cantonese bilingual speakers and found a significant effect of background language on /æN/ F2 (F=9.402, $p = 0.002$). There was also a significant difference found when comparing English-Mandarin bilingual speakers and English monolingual speakers (F=8.834, $p = 0.003$). No significant difference was found between English-Cantonese bilingual speakers and English monolinguals. These were the only significant results found with respect to demographic factors outside of self-determined ethnicity.

4 Discussion

4.1 Low front vowel raising, ethnicity, and L1 phonology

This work attempts a large-scale sampling across the internal diversity of Californian English. Results suggest that ethnic subgroups of the population exhibit distinct patterns of CVS adoption. Raising and fronting of pre-nasal /æ/ (HAND-raising) is one such example: our results suggest that the degree of raising and the steepness of the F2 trajectory of the vowel vary by ethnicity. White and Black speakers exhibit higher initial F2 and lower initial F1 values for this vowel, characteristic of advancement in the direction of the CVS; most other groups lag behind them, notably the Latino and Korean groups. Outside of the nasal coda environment, speakers tended to back /æ/ (TRAP-backing), a common characteristic of CVS. Yet these changes were not consistent across ethnicities either. In fact, the Korean participants, who lagged in HAND-raising, demonstrated some of the highest rates of TRAP-backing. This supports previous accounts of minority communities in California participating in well-known sound changes of the majority (White) community (Fought, 1999; Hall-Lew, 2009).

While White and Black speakers showed more HAND-raising, they showed less TRAP-backing. Likewise, while Korean speakers lagged in HAND-raising, they led in TRAP-backing. Consequently, the location of /æ/ in acoustic space may differ between Korean and White or Black speakers, but all trajectories are broadly similar across groups. The sole exception to this generality was the

Latino speakers who lagged in both HAND-raising and TRAP-backing. For these speakers, it would appear that /æ/ is not undergoing an allophonic split to the extent of White, Black, or Korean speakers.

We must also factor in the linguistic environment of speakers in the Voices of Berkeley corpus, which may be correlated with ethnicity. For example, the patterning of /æ/ in Korean-identified Californian English speakers can be attributed partly to the role of Korean phonology (regardless of the speaker's linguistic status—recall that not all study participants were bilingual or heritage speakers). Many Californians of Korean descent may have been exposed to the language in childhood. Although they may or may not be bilingual as adults, phonetic categories are established from a young age (Werker and Tees, 1984; Kuhl, 1991) and have a lasting effect on acquisition, perception, and production in the L1 and subsequent L2s (Broersma, 2016).

The role of ambient caregiver language, even when not acquired by children, is well documented. The differences by ethnicity between Korean and White/Black participants that variables such as /æ/ demonstrate can be attributed to the linguistic experiences of many of the Voices of Berkeley participants. That White and Black speakers patterned similarly is not surprising. AAVE and varieties of White American English certainly differ, but still have more overlapping vowel phonemes than English and Korean (Thomas, 2007): for instance, the latter does not have phonemic /æ/. Though all participants were native English speakers, bilingual and heritage phonology research has demonstrated the effect that two languages have on one another in bilingual/heritage speakers' phonologies (Flege and Port, 1981; Flege, 1991; Kehoe et al., 2004; Chang, 2010).

Given their tendency to back /æ/, we could propose that Korean speakers produce an intermediary /æ/ value between English /æ/ and Korean /a/. (This is already a well-documented variant in Chicano English, though orthographic correspondence between English /æ/ and Spanish /a/ certainly plays a role in this; see below). The absence of an /æ/ category in Korean, even if the participant does not speak the language, could cause a distinctive shift in the acoustic mapping of English /æ/. Further perception studies would need to examine this proposition in more detail.

Unlike Korean participants, the Latino group showed an overall reduced acoustic /æ/ space. The F1 and F2 values lagged behind other speakers for nasal /æ/ raising, a finding that supports previous accounts of Chicano English in California. However, the Latino group also had higher F2 values for the non-nasal /æ/ than the most advanced ethnic groups (i.e. less TRAP-backing), which contradicts other accounts of Chicano English in California that found that these speakers exhibit *more* TRAP-backing than their White peers. This finding is often attributed to 'Spanish interference' (Eckert, 2008b, p. 34).

The source of this variation in Chicano English is clear: as in Korean, /æ/ is absent from the five-vowel Spanish system. Furthermore, orthographic English /æ/ corresponds to Spanish /a/. Yet the previous finding of increased TRAP-backing in Latinos was not supported in our analyses. Consequently, we propose that the TRAP-backing sound change no longer uniquely indexes Chicano speakers, a change that Eckert predicted. The Chicano pattern of TRAP-backing has become so ubiquitous, and indexes Chicano speakers so strongly, that it may now permit additional indexical fields, even those that are not exclusively Chicano (Mendoza-Denton, 2014). The Korean group, and to a lesser extent the Chinese, now exhibits the most TRAP-backing. Further sociolinguistic investigation is required to validate this preliminary finding, but our analyses do suggest that the distinctive Chicano TRAP-backing is not unique to this ethnic group, and, moreover, the Latino group does not even participate in the sound change as much as other groups.

4.2 Back vowel fronting, ethnicity, and heritage language

For back vowel fronting, once again, results varied by self-determined ethnicity. The dichotomy between Black and White participants and Korean and Latino was still present for /oʊ/: Black and White participants had higher F2 values than other groups, while Korean and Latino participants had the lowest. Much of this variation can again be explained in terms of heritage language phonologies. Like /æ/, /oʊ/ is absent in both Korean and Spanish, but /o/ is not. While White and Black participants, generally not exposed to the phonologies of other languages from a young age, front /oʊ/, Korean and Latino participants may assimilate their /oʊ/ vowel to /o/. This could result in an intermediary category between /oʊ/ and /o/: that is, a retracted /oʊ/.

While this explanation of heritage language phonologies may explain inter-group variation in /æ/ and /oʊ/ patterning, /u/ appears to compromise the reasoning. White speakers, with the highest F2 values, still lead in this vowel change, but Korean participants also lead. (Black participants lag only slightly behind this.) One possible explanation for Korean /u/ fronting is based in L1 phonology: Korean has two phonemic high central unrounded vowels, /u, uː/ (in addition to its high close vowels /u, uː/), and as argued in Section 4.1 above, the presence of this category in speakers of Korean or in people who were highly exposed to Korean as children, can affect the realization of several English vowels.

This logic may seem contradictory. After all, we find that Korean speakers exhibit more TRAP-backing precisely away from the large presence of mid front vowels. Now, it appears that they do exactly the opposite, exhibiting /u/ fronting as the possible result of the categorical pull of /u, uː/. This raises an interesting question: why do some Korean vowel categories appear to result in English vowel assimilation while others repel it?

The number of categories aside, the answer may rest in the social hierarchy of CVS. Korean-identified Californians participate widely in TRAP-backing and /u/-fronting, but not HAND-raising or /oʊ/-fronting. This pattern aligns most closely with that of another group: Latino and/or Hispanic-identified Californians, many of whom may speak Chicano English. Previous work has documented the prevalence of /u/-fronting (Fought, 1999) and TRAP-backing amongst Chicano English speakers (Eckert, 2008b; Mendoza-Denton, 2014). These changes are also common amongst White and Black ethnicities, but it would appear that Korean speakers only participate in those changes that are attributed to another ethnic minority. As discussed for the Latino group above, attribution does not entail usage: TRAP-backing is indicative of Chicano English speakers, but our Latino group did not participate in this change to the same extent as other groups.

Still, it could be that Korean Californians are participating only in changes that are associated with the largest ethnic minority in the state. Further research may even determine if the similarities between the two groups are correlated with geographic location: it is plausible that Koreans and Latinos who, for example, live in bordering communities in urban Southern California will influence each other's speech. This could explain the otherwise confounding distinction between Korean participation in /u/-fronting and TRAP-backing but their reduced /oʊ/-fronting and HAND-raising. All four are well-documented sound changes in CVS, but it is only through the lens of ethnolects in contact that we can propose explanations for the unique phonetic patterns of individual ethnic groups.

4.3 Language background and ethnicity

For the most part, it seemed that Chinese-identified participants in the Voices of Berkeley corpus appeared to be the most 'average' Californians in that their participation in the various characteristics of CVS neither led nor lagged behind the other ethnic groups. Without deep ethnographic

study we would only be able to list the many reasons why this may be the case.

However, it is important to note that ‘Chinese’ as one large ethnic group is neither accurate nor ideal. Despite the SDE groups coming from participants’ own decisions, we have seen that the differences among ethnic groups can be influenced largely by a non-English language that is associated with that ethnicity. Our one-way repeated measures ANOVA showed significant differences in /æN/ when comparing Chinese Californians who speak Mandarin and Chinese Californians who speak Cantonese. These two languages have very different phonologies, and the communities that speak them often live in different geographical environments and have different immigration histories. Although our study has focused on ethnicity as the primary predictor of varying participation in CVS, we necessarily conclude that ‘ethnicity’, for the purposes of sociolinguistic inquiry, is more complex than the traditional ethnic categorizations we are all accustomed to, which we may take for granted.

5 Conclusion

The California Vowel Shift represents several phonetic sound changes in progress. However, our results have demonstrated that not all Californians participate equally. Sociodemographic factors such as ethnicity and language background are significant predictors of how an individual’s vowel space will adhere to previously-identified CVS patterns. Our knowledge of CVS has developed beyond the original findings to include the reality of California’s diversity, which underscores the importance of including ethnicity as a sociolinguistic variable and avoiding the generalization, particularly in multietnic regions such as California, that White American English is the norm.

Future work in this field can build on these findings; this study is an excellent starting point for determining the meanings of sociolinguistic variables, such as whether the F2 values of non-raised /æN/ or highly-backed /æ/ are linked indexically to certain Californian Asian identities, and in particular how TRAP-backing has traveled as a sociolinguistic variable from Latino identity to other ethnic identities. In-depth ethnographic work would help elucidate the social meanings of these variables. Such a methodological tool is especially important as the relationship between ethnicity and language are complex, historically dependent, and particular to different communities.

A Production stimuli

The following sentences were used in the collection of corpus data. They are shown with corresponding ARPABET transcriptions of vowels used in acoustic analysis. The sentences are slightly modified from sentences taken from the TIMIT database.

1. Go Bears!
OW EH
2. Dawn found it odd that Judd did a handstand.
AO AW IH AA AH AEN-AEN
3. She had your dark suit in greasy wash water all year.
IY AE UH AA UW IH IY AA AO AO IY
4. Who said you should hold such an awkward pose?
UW EH UW UH OW AH AA OW
5. Don was awed by the hat rack.
AA AO AY AE AE
6. This wheel’s red spokes show why mud is no boon.
IH IY EH OW OW AY AH OW UW

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The influence of conjugation class on phonological patterns: Diphthongization and raising in Spanish verbs

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1 Summary

In the present paper, I explore the relationship between the morphophonemic alternations mid-vowel/diphthong and mid-vowel/high-vowel of Spanish verbs, and conjugation class; discussed using data extracted from a corpus of Spanish, and in a nonce-form experiment.

Differences in processing of conjugation classes during acquisition, and in the distribution of vowel alternations in each conjugation class, led us to predict that conjugation class would be relevant during processing. Furthermore, the observations, attested by our corpus search, that vowel alternation is correlated with frequency, raised the question of whether diphthongization and raising are productive at all. The results of a nonce word experiment showed that speakers produced both diphthongization and raising. Speakers did so with significant individual differences and with conjugation class mediating the production of raising but not of diphthongization.

2 Introduction

2.1 Conjugation classes

Conjugation classes in Romance are marked by a thematic vowel morpheme whose only apparent semantic content is class identity. They are a classic example of the morphomic level proposed by Aronoff (1994) that establishes a domain of morphology by itself.

The differences between conjugation classes in Spanish are given by the different inflectional suffixes they receive, which can be different for each class, or, in most instances, different for conjugation 1 (C1) versus conjugations 2 and 3 (C2 and C3).

(1) *Spanish conjugations*

	C1	C2	C3
Infinitive	/am- ar /	/tem- er /	/part- ir /
1 pl pres indicative	/am- a -mos/	/tem- e -mos/	/part- i -mos/
3 sg pres indicative	/am- a /	/tem- e /	/part- e /

Verb neologisms and borrowings are made into C1 verbs: *chatear*, *parquear*, *tuitear*, etc., which is a reason why C1 is called the unmarked class. The psychological reality of this is evidenced in child language acquisition. Clahsen et al. (2002) and Radford and Ploenning-Pacheco (1995), found that children acquiring Spanish overgeneralize the inflectional suffixes of C1 to verbs from C2 and C3, much more than the other way around. Children added the inflectional endings of C1 to verbs of C2 and C3. The authors argued that this is akin to the process of regularization that children apply to irregular plurals, or irregular tense markers. The inflection of C1 is applied to verbs from the other two because C1 is the regular and productive one.

Interestingly, while children apply the inflectional ending of C1 to C2 and C3 verbs, they keep the correct thematic vowel, yielding cases such as **quer-i-ba* and **ten-i-ba* (Clahsen et al., 2002, p. 15). Linares (2011) found a similar phenomenon in a task with adult speakers, involving the default overgeneralization of C1 participle endings. However, he also found that the C2-C3 participle ending

is also generalized but restricted to verbs identified as members of these classes. In the sections that follow, I present results of a study that sought to investigate whether adult speakers are sensitive to differences in the distribution of vowel alternations in the stem between the three conjugations.

2.2 Vowel alternations: Diphthongization and raising

Spanish verbs with a mid-vowel in the last syllable of the stem may appear in three possible ways. One is with the mid-vowel (/e/ or /o/) in *all* slots of the paradigm, another is with an alternation in which a diphthong takes the place of the mid-vowel in fixed positions of the paradigm (/ie/ or /ue/), and the third is with a corresponding high vowel (/i/).

(2) *Vowel alternations*

	No change	Change: diphthongization	Change: raising
Infinitive	/tem.'er/ (to fear)	/ker.'er/ (to want)	/pe.'dir/ (to request)
2 sg pres	/'tem.es/ (you fear)	/'kje.res/ (you want)	/'pi.des/ (you request)

It is difficult to account for the alternations in terms of rules, since the only consistent generalization that can be made for all verbs is that the alternations occur only when the target nucleus is stressed. Stress, on the other hand, is linked to the inflection and is constant for all verbs in the same paradigm slots. Notwithstanding that, the consistency of the alternations, and the large number of verbs that present them, has made researchers wonder whether there are any generalizations that speakers make, and whether these alternations are extended to new forms.

In contrast to previous rule-based accounts, Albright et al. (2001) modeled and tested the influence of segmental environment analogy on the ‘productivity’ of diphthongization in Spanish verbs. Their algorithm showed a high degree of success at predicting similar results with nonce verbs to those obtained from native speakers. Besides the important contribution to understanding the role of segmental analogy, their study also showed that vowel alternations (or diphthongization at least) may be productive, *contra* findings by Bybee and Pardo (1981).

2.3 Conjugation classes and vowel alternations

In their experiment, Albright et al. (2001) found that when only C1 verbs were in the training data, the correlation between the predictions made by their model and the experimental results was much better than when verbs from the other two conjugations were included. This led them to speculate about the possibility that diphthongization operates differently depending on the conjugation class of the verb.

Differences in the application of a phenomenon depending on a ‘word class’ have been seen in diphthongization of Spanish nouns. Eddington (1996, 1998) found that there are groups of derivational suffixes which tend to appear with a diphthongized stem more than others, as per the existing words in the lexicon – the author derived the correlations from a corpus of Spanish. When these suffixes were added to nonce forms and subjects were given the choice of either a diphthongized stem or not, their responses matched closely the distribution found in the language for the associated suffix. That is, subjects were aware and sensitive to the ‘class’ diphthongization likelihood of each suffix. Eddington (1998) refers to this phenomenon as a ‘gang effect’. Morphophonological patterns are (also) stored as relationships between word groups.

With the previous ideas in mind, we set out to answer the following question:

- Is there a relationship between the presence of diphthongization and conjugation class?

In the next section, we seek to answer this question in terms of what we observe in the language, and in the following, we compare the results of the corpus search with the results on a nonce form experiment with native speakers.

3 Methods

3.1 Corpus search

Corpus del Español del Siglo XXI (RAE, 2014) is a corpus of oral and written Spanish that contains texts from diverse sources (arts, news, science, etc.) and from all areas of the Spanish speaking world. It has 25 million forms per each of the years between 2001 and 2012. Currently, the corpus is accessible only online (<http://www.rae.es/recursos/banco-de-datos/corpes-xxi>) and all instructions are in Spanish. We used dictionaries to create an as exhaustive as possible list of Spanish verbs with a mid-vowel (/e/ or /o/) as the last vowel of the stem. Their type frequency was queried in CORPES XXI, and we included only those for which frequency was greater than zero, for a resulting list of 1114 verbs.

3.2 Nonce-form experiment

Forty-six subjects consented to be part of the experiment voluntarily, all native speakers of Spanish, who grew up in Cuba. The mean age is 31.55 years, the median 30.5, and the range 22 to 73 years. There were 23 females and 23 males, all college educated or above. The subjects of the present experiment range from monolingual speakers residing in Havana (Cuba), Madrid (Spain), or Veracruz (Mexico), to late bilinguals residing in different cities in the U.S. with varying degrees of proficiency in English. For those speakers who also speak English, all learned it after the age of 20. They all also resided in Cuba until at least their 20th birthday. The list of 33 nonce stems provided by Albright et al. (2001) was used.

- | | | | |
|-----|--------------|--------------|--------------|
| (3) | 1. /retolb-/ | 12. /lek-/ | 23. /nom-/ |
| | 2. /ent-/ | 13. /del-/ | 24. /fostr-/ |
| | 3. /pre-/ | 14. /solm-/ | 25. /tʃort-/ |
| | 4. /sendr-/ | 15. /kert-/ | 26. /mobr-/ |
| | 5. /nor-/ | 16. /tebr-/ | 27. /bekt-/ |
| | 6. /getʃ-/ | 17. /gembl-/ | 28. /ler-/ |
| | 7. /botr-/ | 18. /soltr-/ | 29. /solk-/ |
| | 8. /tʃostr-/ | 19. /tox-/ | 30. /debr-/ |
| | 9. /detʃ-/ | 20. /tʃej-/ | 31. /bold-/ |
| | 10. /fot-/ | 21. /lop-/ | 32. /lor-/ |
| | 11. /der-/ | 22. /remp-/ | 33. /kolb-/ |

Since it was the objective to test these forms in all three conjugations, three different versions of questionnaires were created with a third of the nonce-forms in a different conjugation for each version. Each nonce form appears in a different conjugation in each of the three versions. The order in which the nonce forms appear was generated randomly for each questionnaire.

Since subjects agreed to participate remotely, the interview protocol followed by Albright et al. (2001) was presented as a written questionnaire. This questionnaire was distributed as either a survey attached to email, or accessed on Google Forms. Subjects were asked to type in the forms

as they first came to their mind, without regard as to what they thought would be correct, and they were asked to do this by themselves, without consulting any resource or any other person.

The following is an example of the wording of the activity testing for the stem /ler-/ in the first conjugation.

(4) Ejemplo:

Cada verano mi familia y yo *lerramos* durante las vacaciones.
(Every summer my family and I *lerr* while on vacation.)

Actividad:

Hemos _____ cada verano por diez años. (Expected: *lerrado*)
(We have *lerred* every summer for ten years.)

Me fascina _____. (Expected: *lerrar*)
(I love *to lerr*.)

Hace seis meses que yo no _____. (Target form: 1person singular form of the verb).
(It's been six months since I've *lerred*.)

4 Results and discussion

4.1 Corpus search

As expected, the distributions of verbs along the factors of conjugations and vowel alternation are skewed to the right, with a handful of verbs at high frequencies, and most verbs largely unused. Along these dimensions, C2 and C3, as well as vowel alternations confirmed the behavior of typically irregular phenomena. C2 and C3 verbs, as well as diphthongizing and raising verbs, tend to have a higher concentration of high frequency forms than C1 or non-alternating verbs. The table in (5) below shows the results of a linear regression with the logarithm of the frequency for verbs of each group. Log was used in order to correct for the skewness of the distribution and achieve normality of residuals.

Coefficients

	Estimate	Std. Error	t value	Pr(> t)
C1(intercept)	0.92388	0.08677	10.647	<2e-16 ***
C2	0.77337	0.16577	4.665	3.46e-06 ***
C3	1.24849	0.25873	4.825	1.60e-06 ***

Coefficients

	Estimate	Std. Error	t value	Pr(> t)
No_alternation(intercept)	1.05053	0.07809	13.453	<2e-16 ***
diphthongization	0.88041	0.20631	4.267	2.15e-05 ***
raising	1.46123	0.38859	3.760	0.000179 ***

The differences from C2 and C3, as well as between diphthongization and raising groups, were marginal to non-significant $p=0.09$ and $p=0.13$ respectively. This pattern is consistent with findings in Italian and Portuguese (Say and Clahsen, 2002; Veríssimo and Clahsen, 2009).

When analyzing the proportion of vowel alternation to conjugation class, one finds that C2 then patterns with C1, and apart from C3. With respect to raising, it is only present in C3. With respect to diphthongization, it is present in all three conjugations, but it takes a greater proportion

of verbs of C3 than of C1 and C2.

(5) *Alternations by conjugation class*

	C1		C2		C3	
	raw number	ratio	raw number	ratio	raw number	ratio
No alternation	660	0.89	235	0.85	21	0.22
Diphthongization	82	0.11	43	0.15	34	0.36
Raising	–	–	–	–	39	0.42
Total	742	1	278	1	94	1

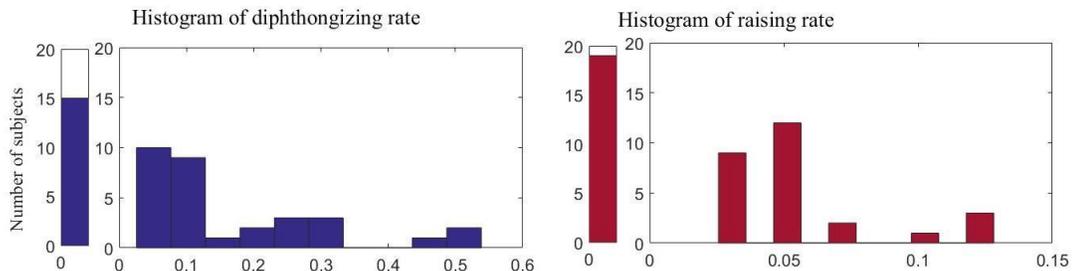
The relationship between conjugation class and vowel alternations, as it manifests in the verbs existing in the language, is not straightforward. On the one hand, C2 and C3 are more represented among high frequency verbs, just like diphthongization and raising are, which is indicative of an ‘irregular’ nature. On the other hand, C1 and C2 have similar relatively low proportions of diphthongizing verbs within their ranks, and no raising, which is the opposite of C3.

4.2 Nonce-forms experiment

In the nonce-form experiment, subjects produced both diphthongized and raised forms, which confirms that these phenomena must be derivable in some way by speakers, rather than simply stored in memory.

There were significant individual differences in the rate at which subjects produced the vowel alternations, ranging from none at all to a significant proportion of the answers, as can be seen in the figure in (6). This range of individual differences makes more questionable the use of strict rules to derive the alternations.

(6)



Of the 1,518 forms collected, 12% were not included as they consisted of other phenomena such as /e/ epenthesis, answers with wrong form (e.g. gave a participle instead of 1 person singular, etc.). A not small number of these consisted on the insertion of /m/, showing that subjects had not correctly parsed the stem from the stimuli in 1 person plural given (e.g. *chortemos* should have been *chorto* but was given as *chortemo*).

Subjects behaved differently in their production of diphthongization and raising between conjugation classes. When pooled together, the ratio of diphthongized forms for each conjugation is very similar, which is different from what we found in the corpus search. On the other hand, raising was markedly more present in C3 nonce forms, which finds correspondence in the fact that raising is present only in C3 forms in existing verbs.

(7) *Alternations as ratio of total included responses*

	C1 Ratio	C2 Ratio	C3 Ratio
No alternation	0.84	0.81	0.64
Diphthongization	0.13	0.17	0.21
Raising	0.02	0.02	0.10

The conjugation-specific behavior in raising is consistent with the findings of Linares (2011) in adults and Clahsen et al. (2002) for children. It suggests that class markers (without semantic content otherwise), are used to route the processing in different directions. This routing however reflects only clearly demarked, class-specific behavior, such as raising only in C3, and not differences in the behavior of a phenomenon that is present in all three, such as diphthongization.

5 Conclusions

The present study showed that the vowel alternations of raising and diphthongization can in fact be produced in nonce forms by native speakers, which points to mechanisms other than memorization of the existing alternating forms in Spanish. Interestingly, production of the alternations is not even among all speakers, which shows that the mechanism must allow for gradience in the representations. Another finding was that conjugation class does seem to play a role in the presence of the alternations, although it is restricted to phenomena that are clearly constrained to a group, rather than tendencies.

One further aim of the study, upon collection of more data, will be to attempt to corroborate the findings of Albright et al. (2001), on the role of segmental environments on diphthongization, extended to the three conjugations of the language.

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Parallel chain formation in Ibibio contrastive verb focus*

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1 Introduction: A polar puzzle

In Ibibio (Niger-Congo; Akwa Ibom State, Nigeria), contrastively focused verbs exhibit what appears to be polarity-conditioned allomorphy. Affirmative forms take a so-called ‘reduplicative prefix’ (Akinlabi and Urua, 2000, 2002) (1a), while a full copy of the verb surfaces when a contrastively focused verb is negated (1c).¹

- (1) a. **Ímá á-ké-bòó-*bòó*rò**
Ima 3SG-PST.FOC-respond-respond
‘Ima RESPONDED.’
- b. ***Ímá á-ké-bòó-*rò*-bòó-*rò***
Ima 3SG-PST.FOC-respond-respond
‘Ima RESPONDED.’
- c. **Ímá í-kí-bòó-*rò*-ké-bòó-*rò***
Ima I-PST.FOC.I-respond-NEG-respond
‘Ima didn’t RESPOND.’
- d. ***Ímá í-kí-bòó-*rò*-bòó-*rò*-ké**
Ima I-PST.FOC.I-respond-respond-NEG
Intended: ‘Ima didn’t RESPOND.’

Notably, these forms are in complementary distribution: full copies cannot surface in the simple affirmative (1b) and the reduced prefix cannot surface in the negative (1d). In addition to negation, full verb copies also surface in relative clauses and reciprocals with contrastively focused verbs. All cases where full verb copies appear share the common property that overt material intervenes between the two copies.

The current account for Ibibio contrastive verb focus (CVF) treats it as a primarily morphophonological phenomenon. Akinlabi and Urua (2000, 2002) take the reduplicative morpheme /RED-/ to be the input to CVF, which produces a CVV-Verb structure in simple affirmatives. Akinlabi and Urua (2002) acknowledge and provide a good descriptive account of verb forms under negation, but they do not offer any analysis of such that explains why the alternation between ‘prefixing reduplication’ and a full verb copy should or does occur in the first place.

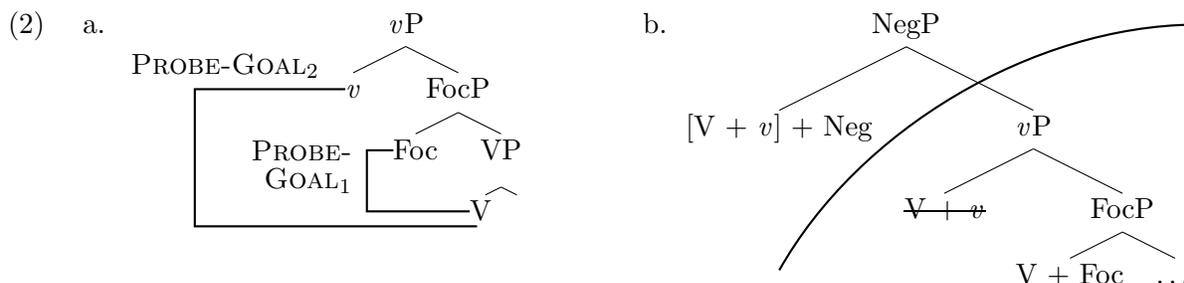
Moreover, Ibibio CVF is reminiscent of constructions in other languages that involve multiple verb copies, which carry implications for replicative processes in grammar (Nunes, 2003, 2004; Nunes

*I would like to thank Mfon Udoinyang and Edopeseabasi Udoinyang for graciously taking time to share their language. This project extends collaborative work done on constructions involving verb focus in Ibibio with Travis Major and Mfon Udoinyang, and I am grateful to them for their help. I also thank Jason Kandybowicz, Harold Torrence, Isaac Gould, Andrew McKenzie, Ibrahima Ba, Longcan Huang, Masashi Harada, Zhuo Chen, David Kummer, and audience members at the BLS 42 meeting for their many insights and suggestions. Unless otherwise noted, examples in this paper are from Mfon and Edopeseabasi and reflect their judgments. Remaining errors and faults are, of course, my own.

¹Examples are rendered in accordance with popular orthographic conventions, with the exception that tone is typically unmarked orthographically. Abbreviations are as follows: 1 = 1st person, 2 = 2nd person, 3 = 3rd person, ANTIC = anticausative, CON = contrastive, I = antiagreement marker, FOC = focus, N = nominalizer, NEG = negation, PL = plural, PST = past, RECP = reciprocal, REL = relativizer, SG = singular.

and Quadros, 2006; Kandybowicz, 2008; Aboh and Dyakonova, 2009, a.o.). The phenomenon of multiple verb copies being pronounced at spell-out occurs, for example, in Nupe (Kandybowicz, 2008), Kabiye (Collins and Essizewa, 2007), and Brazilian Sign Language (Nunes, 2004; Bošković and Nunes, 2007), and the primary mechanism generating more than one surface copy of the verb in these cases is syntactic. This paper develops a similar account for CVF in Ibibio, offering an alternative to morphophonological reduplication.

The main claim of this paper, then, is that Ibibio CVF is syntactically driven and always involves multiple verb copies generated by the narrow syntax. The analysis that I propose seeks to unify what seem like disparate forms at the surface level, building on previous attempts to syntacticize this phenomenon (Duncan et al., 2014, to appear). Here, I argue for a novel approach where all CVF forms underlyingly involve full copying whose mechanism is parallel chain formation (Kandybowicz, 2008; Aboh and Dyakonova, 2009), shown in the truncated trees below.



The schematic in (2a) represents the architecture and derivational apparatuses that I claim form the core of Ibibio CVF, which activates a low, vP -internal focus position. Both v^0 and Foc^0 form probe-goal relations with V^0 simultaneously, generating two independent verb movement chains. Standard chain resolution deletes the tails and preserves the heads, leaving verb copies associated with distinct catenae. Material at the vP phase edge escapes for further operations, such as raising to T^0 , or Neg^0 as in (2b). In the case of negation—as well as relativization and reciprocals—suffixal material intervenes between verb copies. To account for why and when the ‘reduplicative prefix’ appears, I propose a post-syntactic PF rule aimed at maintaining distinction between verb copies that surface next to each other. Thus, the CVF allomorphs are conditioned by linear adjacency (or not) of the verb copies.

This paper is organized as follows. Section 2 presents some of the basic properties of contrastive verb focus, presenting data for the various constructions that give rise to CVF allomorphy. In Section 3, I discuss the current account of Ibibio CVF advanced by Akinlabi and Urua (2000, 2002), and begin to sketch out the syntactic alternative that I advocate here. Following this, in Section 4, I discuss the ordering of relevant projections in the Ibibio clausal spine. This provides a foundation for understand the derivation of Ibibio CVF via parallel chain formation, detailed in Section 5. Section 6 concludes.

2 Properties of Ibibio contrastive verb focus

2.1 Affirmative (non-reciprocal, non-relativized)

In affirmative, non-reciprocal, non-relativized contexts, Ibibio CVF surfaces as what appears to be simple ‘prefixing reduplication’ (Akinlabi and Urua, 2000, p. 79; 2002, p. 123). Examples of this are shown in (3), where the verbs *má* ‘love’, *kít* ‘see’, and *nyímmé* ‘agree’ all take a CVV prefix, whose phonological content is determined by the verb root, when contrastively focused.

- (3) a. *Ákùn á-màá-má àkàrà*
 Akun 3SG-love-love beancake
 ‘Akun LOVES beancake.’ *má-má
- b. *Í-ké-kèé-kít Ékpê*
 1SG-PST.FOC-see-see Ekpe
 ‘I SAW Ekpe.’ *kít-kít
- c. *Ímá á-ké-nyèé-nyímmé*
 Ima 3SG-PST.FOC-agree-agree
 ‘Ima AGREED.’ *nyímmé-nyímmé

Importantly, the phenomenon of CVV- prefixation occurs regardless of the shape of the verb root (CV, CVC, CVCCV). Moreover, certain phonological constraints affect the surface form of the so-called prefix. The shape of the prefix is always a heavy bimoraic syllable (Akinlabi and Urua, 2002), with a contour tone on a long vowel (Akinlabi and Urua, 2000; Duncan et al., to appear).

2.2 Negation

Negation in Ibibio is expressed either as an independent preverbal particle or (more typically) through verbal suffixation. The suffixing strategy is obligatory in verbal negation in standard declarative matrix clauses, and the form of the suffix—underlyingly /-ké/-is sensitive to the verb root (Kaufman, 1968; Essien, 1985, 1990; Akinlabi and Urua, 2002; Baker and Willie, 2010).²

- (4) a. *Í-kí-bó-ghó*
 I-PST.FOC.I-say-NEG
 ‘She didn’t say it.’
- b. *Í-kí-dép-pé*
 I-PST.FOC.I-buy-NEG
 ‘She didn’t buy it.’
- c. *Í-kí-sàñá-ké*
 I-PST.FOC.I-walk-NEG
 ‘She didn’t walk.’

Allomorphs of negation are thus predictable based on the verb root or stem. When the root is CV or CVC, the vowel harmonizes with that of the root. For CV verbs, the suffix is [-yV] (4a), while the consonant undergoes assimilation when attaching to CVC verbs (4b). If the verb or stem is bisyllabic, then the suffix is *-ké* (4c). Following Baker and Willie (2010) and Duncan et al. (to appear), I take it that negative suffixation is a reflex of raising-to-Neg, and that NegP dominates *v*P.

Contexts in which the independent negative particle *ké* appears include imperatives and the effect clauses of causatives.

- (5) a. **Kú-sàñá(*-ké)**
 NEG.2SG-walk
 ‘Don’t walk!’

²In closely-related Efik (Niger-Congo), the assimilative form never surfaces, and /ke/ is always realized as *ke* or *ke*.

- b. Ímá á-nám [Ékpê **ké** à-dép(*-pé)]
 Ima 3SG-make Ekpe NEG 3SG-buy
 ‘Ima made Ekpe not buy it.’
- c. Í-mà á-nám [(***ké**) í-kwó-**ghó**]
 1SG-PST 3SG-make NEG I-sing-NEG
 ‘I made him not sing.’

In imperatives, negation must surface before the verb (5a), whereas, in the effect clauses of causatives, negation can either appear preverbally (5b) or postverbally (5c). However, the alternation in the embedded clauses is an either-or choice: negation cannot surface both preverbally and postverbally. I take it that the verb stays low and does not raise to Neg⁰ when the preverbal particle appears. This could suggest that Neg⁰ acts as a probe in its own right, independent of T⁰, especially if small clause complements of *nám* ‘make’ are either impoverished, lacking a TP layer, or ‘possess a weak T with no morphological exponent’ (Baker, 2008, p. 624).

Unlike simple affirmative CVF, ‘prefixing reduplication’ is impossible with standard (suffixal) negation. Instead, full copies of the verb must appear on either side of the negative suffix.

- (6) a. Í-kí-**bó**-ghó-**bó**
 I-PST.FOC.I-say-NEG-say
 ‘She didn’t SAY it.’ *bòó-bó-ghó
- b. Í-kí-**dép**-pé-**dép**
 I-PST.FOC.I-buy-NEG-buy
 ‘She didn’t BUY it.’ *dèé-dép-pé
- c. Í-kí-**sàñá**-ké-**sàñá**
 I-PST.FOC.I-walk-NEG-walk
 ‘She didn’t WALK.’ *sàá-sañá-ké

The prefixal ‘reduplicant’ is, however, compatible with the preverbal negative particle.

- (7) Ímá á-nám [Ékpê **ké** à-dèé-dép]
 Ima 3SG-ake Ekpe NEG 3SG-buy-buy
 ‘Ima made Ekpe buy it.’

Below I provide a detailed account for the derivation of CVF in affirmative and negative contexts à la parallel chains. At present though, it will be sufficient to note that standard verbs and contrastively focused verbs participate in similar alternations that appear to be based on the presence or absence of verb raising to Neg⁰.

2.3 Reciprocals

Another context where CVV- ‘reduplication’ is blocked in CVF is reciprocals. In Ibibio, reciprocals are bipartite, with morphological components flanking the verb (Essien, 1990, p. 112; Brooks, 2014).

- (8) a. Ékpê á-mà á-ú-kòm (mìèn)
 Ekpe 3SG-PST 3SG-1SG-greet me
 ‘Ekpe greeted me.’
- b. Ì-mà í-**dú**-kòm-**mò**
 1PL-PST 1PL-RECP-greet-RECP
 ‘We greeted each other.’

I assume that reciprocal morphology, like that of postverbal negation, appears on the verb as a consequence of raising. Following Buell (2005, p. 40) for Zulu, I take it that reciprocals head their own projection, which I here label RecP. For reasons that will become apparent below, I situate this projection inside the verbal domain; accordingly, the verb picks up reciprocal markers as it transits cyclically through heads en route to v^0 .

Like the negative suffix, reciprocals also disrupt the pattern of ‘prefixing reduplication’.

- (9) a. **É-dú-má-ghà**
 3PL-RECP-love-RECP
 ‘They love each other.’
- b. **É-dú-má-ghà-dú-má-ghà**
 3SG-RECP-love-RECP-RECP-love-RECP
 ‘They LOVE each other. *dú-màá-má-ghà
 (they don’t hate {each other/*someone else})’

As seen in (9b), when a reciprocal is contrastively focused, two full verb copies must appear. Unlike negation, though, the reciprocal morphology is crucially doubled along with the verb root. I propose that the availability for reciprocal morphology copying and the unavailability for negative morphology doubling is a direct outcome of where RecP and NegP attach on the clausal spine with respect to the low FocP and vP . Specifically, the reciprocal forms the input to contrastive focus, as opposed to the other way around, whereas contrastive focus forms the input to negation. Importantly, too, the fact that reciprocal morphology is copied under contrastive verb focus strongly suggests that the morphological exponent of Foc^0 cannot simply be a copy of the bare verb. Instead, it copies all available material underneath it.

2.4 Relative clauses

The third context in which full verb copies appear in CVF is in relative clauses. Formally, relativized verbs and negated verbs are essentially identical (Essien, 1985, p. 75, 81). The following examples showcase a variety of verbs based on differing syllable structure (monosyllabic (open and closed), bisyllabic), illustrating the formal affinity between relativized and negated verbs.

- (10) a. $\sqrt{Dì\acute{o}\tilde{N}\acute{o}+Neg}$
ń-kí-dì\acute{o}\tilde{N}\acute{o}-ké
 1SG-PST.FOC.I-know-NEG
 ‘I didn’t know it.’
- b. $\sqrt{Dì\acute{o}\tilde{N}\acute{o}+C[+Rel]}$
Íkpó á-ń-ké-dì\acute{o}\tilde{N}\acute{o}-ké á-dò àmì
 thing 3SG-1SG-PST.FOC-know-REL 3SG-be DEM
 ‘This is the thing that I knew.’
- c. $\sqrt{Bót+Neg}$
ń-kí-bót-tó
 1SG-PST.FOC.I-mold-NEG
 ‘I didn’t mold the pot.’

- d. $\sqrt{\text{BÓT}+\text{C}[\text{+Rel}]}$
 Ábáñ á-ń-ké-**bót-tó** á-dò àmì
 pot 3SG-1SG-PST.FOC-mold-REL 3SG-be DEM
 ‘This is the pot that I molded.’
- e. $\sqrt{\text{BÒ}+\text{Neg}}$
 ń-kí-**bò-ghó**
 1SG-PST.FOC.I-say-NEG
 ‘I didn’t say it.’
- f. $\sqrt{\text{BÒ}+\text{C}[\text{+Rel}]}$
 Mkpó á-ń-ké-**bò-ghó** á-dò àmì
 thing 3SG-1SG-PST.FOC-say-REL 3SG-be DEM
 ‘This is the thing that I said.’
- g. $\sqrt{\text{BÙM-Ó}+\text{Neg}}$
 Ábáñ í-kí-**bùm-ó-ké**
 pot 3SG-PST.FOC.I-break-ANTIC-NEG
 ‘The pot was not broken.’
- h. $\sqrt{\text{BÙM-Ó}+\text{C}[\text{+Rel}]}$
 Ábáñ á-ké-**bùm-ó-ké** á-dò àmì
 pot 3SG-PST.FOC-break-ANTIC-REL 3SG-be DEM
 ‘This is the pot that was not broken.’

As with negation, relativized verbs bear one of three suffixes, depending on the shape of the root or stem to which they attach: $[-\gamma V]$, $-\text{CV}$, or $-\text{ké}$.

Also akin to verbal negation, Ibibio has two general strategies for relativization. In addition to the suffixation illustrated in (10), an alternative construction is characterized by a relativizer appearing preverbally, high in the complementizer domain. The examples below demonstrate these two strategies in an object relative clause, with (11a) as the input to relativization.

- (11) a. M-mà á-dép(*-pé) ñwèt
 1SG-PST 3SG-buy book
 ‘I bought a book.’
- b. Ímá á-kót ñwèt **sé** àmì ń-ké-dép(*-pé)
 Ima 3SG-read book REL I 1SG-PST.FOC-buy
 ‘Ima is reading the book that I bought.’
- c. Ímá á-kót ñwèt (***sé**) àmì ń-ké-dép-**pé**
 Ima 3SG-read book I 1SG-PST.FOC-buy-REL
 ‘Ima is reading the book that I bought.’

In (11b), when the relativizer surfaces preverbally and the suffix is blocked, the verb stays low (not raising any higher than T^0). In contrast, in (11c) the verb complex undergoes raising-to-C (Duncan, 2014), allowing the relativizer to appear postverbally.³

Moreover, relative clauses pattern like negation and reciprocals with respect to contrastive verb focus, in that ‘prefixing reduplication’ is again incompatible when raising produces suffixal material.

³Agreement patterns provide supporting evidence for the raising-to-C analysis of this type of relative clause in Ibibio. Ibibio exhibits subject agreement all the way down the clausal spine, across an array of functional heads (Baker and Willie, 2010). Object agreement is possible on the verb, but not on higher heads. When overt, object

- (12) a. ñwèt (***sé**) ñ-ké-**dép-pé-dép**
 book 1SG-PST.FOC-buy-REL-buy
 ‘book that I BOUGHT.’ *dèé-dép-pé
- b. ñwèt **sé** ñ-ké-**dèé-dép**
 book that 1SG-PST.FOC-buy-buy
 ‘book that I BOUGHT.’ *dép-pé-dép

As seen in (12a), when raising-to-C occurs in a relative clause with CVF, two full copies of the verb must appear on either side of the relative suffix. As with negation, it is possible to have the prefixal variant in a relative clause, but only when the relativizer surfaces preverbally, forcing the verb to stay downstairs.

3 Previous work on Ibibio contrastive verb focus, and the status of the ‘reduplicant’

Descriptions of contrastive verb focus have been given with varying degrees of depth and accuracy in the Ibibio literature (Essien, 1985, p. 88; 1990, p. 103-106; Akinlabi and Urua, 2000; Akinlabi and Urua, 2002; Kaufman, 1968, p. 305-308; Simmons, 1957, p. 8-9), and an extensive phonological analysis has been proposed for this construction in related Efik (Cook, 1985, 2002). Overall, the general consensus is that this phenomenon is morphophonological in nature. That is, the element that encodes contrast is treated as a prefix whose phonological form is sensitive to the verb root or stem. Essien offers an insightful departure from other discussions of contrastively focused verb forms by claiming that ‘all reduplications are full [reduplication]’ (1990, p. 104) at an underlying level, though he does not offer any detailed treatment of such. Moreover, according to Essien (1985, p. 88) morphological verb doubling precedes phonological modifications. The proposed analysis in this paper thus interestingly upholds the spirit of his original insights in terms of full copies feeding into the phonology, though I maintain that verb copying is itself a strictly syntactic operation and not a morphological one.

Akinlabi and Urua (2000, 2002) offer the most comprehensive theoretical treatment of Ibibio contrastive verb focus. Adopting Correspondence Theory (McCarthy and Prince, 1995), the main concern in Akinlabi and Urua (2000) is tonal patterns on the (so-called) reduplicant that surfaces in contrastive verbs. Under the umbrella of Optimality Theory (Prince and Smolensky, 1993), Correspondence Theory advances a view of reduplication as ‘[b]ase-copy parallelism’ (McCarthy and Prince, 1995, p. 249), where the reduplicant is itself a copy of some portion of the base. For Akinlabi and Urua (2000), then, tonal patterns in contrastively focused verbs can be accounted for by mapping out and ranking constraints that take priority over input-output faithfulness. However, what is most significant at present is that their input to contrastive verb focus is /RED + BASE/. Thus, while their account is more rigorous than previous descriptions, they do not depart from the general tendency to explain contrastive verb focus through morphophonological processes.

Akinlabi and Urua (2002) also operate within the framework of Optimality Theory to provide a general account of foot structure of Ibibio verbs. For contrastive verb focus in particular, they again posit a reduplicative prefix, but additionally note that it ‘takes the shape of a heavy (bimoraic) syllable’ (2002, p. 156). Additionally, they claim that the reduplicant prefix is guaranteed to be

agreement appears lower than T⁰ and closer to the verb than the subject agreement marker (see, for example, the verb in (8a)). Note, though, that in (10f) above, the verb complex shows agreement with a relativized object, and this agreement marker precedes the subject marker on T⁰. I take it that this is only possible after the verb has raised high enough (i.e. in the C domain) to trigger agreement with the relativized object.

open because of a NO-CODA markedness constraint. Crucially, though, they again consider CVF ‘reduplication’ to be a morphological process that becomes subject to phonological constraints. Again, the role of syntax proper is diminished, if not left out entirely.

Though Akinlabi and Urua (2002) discuss negative and relativized verbs, they do not do so in the context of their prior analysis for CVF. What is interesting about negative and relativized verbs is that, as shown above, if they are also contrastively focused, the bimoraic ‘reduplicant’ prefix fails to surface. Instead, two full copies of the verb (with codas, if relevant) flank the negative or relativizing suffix, which are homophonous. Importantly, the grammatical output is not necessarily straightforwardly predicted if the underlying representation that feeds into CVF with negation/relativization is the complex morphological unit /RED + BASE/. Indeed, if this were the case, we might instead (wrongly) predict the ungrammatical forms where the reduplicative affix is sensitive to the verb root, namely, *CVV_{RED}-√Verb-NEG/REL.

Building on work from Duncan et al. (to appear), I contend that the formal differences between affirmative and negative/relativized/reciprocal forms cannot be fully and satisfactorily explained without appealing to syntactic operations that must precede morphological and phonological ones. In other words, before understanding what morphophonological processes affect contrastive verb focus (and how), we must first attend to the syntactic configurations that provide the relevant input to such. Doing so, as I show here, has the advantage of providing a unified account for all contrastive verb forms, regardless of polarity, relativization, etc.

If the analysis presented here is on track, then the reduced form in the affirmative (i.e. with ‘prefixing reduplication’) derives from a post-syntactic rule that targets adjacent copies whose configuration is provided by the narrow syntax. I take it that this reduction is a post-Vocabulary-Insertion readjustment rule (Harris and Halle, 2005; Halle, 2008) triggered by merger (Kandybowicz, 2008, p. 112), which results in a haplology-style effect. Such a rule does not apply when phonological material intervenes (as in the case of negation and relativization) between components of a word. Thus, instead of positing an underlying reduplicative morpheme for non-negative, non-relativized forms and (possibly) a distinct morpheme for negative and relativized ones (or some other strategy), parallel chains within Copy Theory (supplemented by PF rules) offers an explanatory model that highlights underlying similarity. Multiple copies are pronounced because v^0 and Foc^0 both probe the verb root; as heads of independent chains, these two verb copies survive the LCA while lower copies are deleted. Further PF repair strategies apply whenever verb copies are linearly adjacent.

4 Toward an analysis: The Ibibio clausal spine

Before transitioning to my proposal for the derivation of Ibibio CVF, this section makes explicit some aspects of Ibibio syntax that are assumed in my analysis. First, following Baker (2008) and Baker and Willie (2010), the core clausal spine in Ibibio is as follows.

$$(13) \quad \text{CP} \gg \text{TP} \gg \text{NegP} \gg v\text{P} \gg \text{VP}$$

As noted previously, verbs raise in a variety of contexts in Ibibio. This includes raising to: T^0 in matrix clauses, Neg^0 when the negative suffix appears (possibly en route to T^0), and C^0 in relative clauses when the relativizing suffix appears.

In addition to this, the analysis below builds on prior work motivating the existence of a low FocP near the verbal domain. Duncan et al. (to appear) show that focus constructions in Ibibio are not unified, and that CVF uniquely activates the lower FocP . This low focus projection is structurally lower than TP and higher than VP. Additional support for this hierarchy comes from CVF in nonfinite clauses.

- (14) a. Òkôn á-yém àdí-màná ò-nám
 Okon 3SG-want to-do.again N-do
 ‘Okon wants to do it again.’ (Baker and Willie, 2010, p. 108)
- b. Òkôn á-yém [TP **àdí-màá-màná** ò-nám]
 Okon 3SG-want to-do.again-do.again N-do
 ‘Okon wants to DO IT AGAIN.’
- c. Òkôn á-yém [TP **àdí-màná ò-nàá-nám**]
 Okon 3SG-want to-do.again N-do-do
 ‘Okon wants to DO it again.’

Accordingly, verbs that are contrastively focused in nonfinite clauses surface below T^0 , which in (14) is *àdí*.

One final pertinent observation returns to the claim above that reciprocals raise *vP*-internally and form the input to contrastive focus. Since RecP is inside *vP*, contrastively focused reciprocals in turn provide the input to both negation and relativization.

- (15) Ì-kí-**dú-kòm-mò**-ké-**dú-kòm-mò**(*-ké)
 1PL-PST.FOC.1PL-RECP-greet-RECP-NEG-RECP-greet-RECP
 ‘We didn’t GREET each other.’

Accordingly, as shown in (15), reciprocal morphology is doubled, but negation (as well as relativization) never is. Taken together, these facts lead to the following revised Ibibio clausal spine.

- (16) CP >> TP >> NegP >> *vP* >> FocP >> RecP >> VP

5 Parallel chain formation

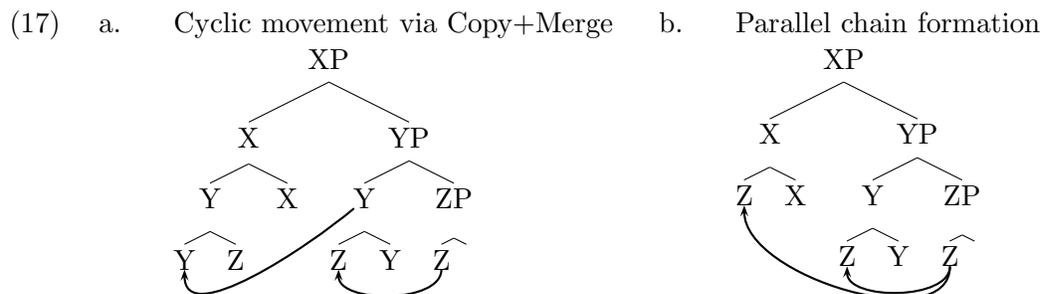
This section provides a derivational account of multiple verb copies in Ibibio contrastive verb focus that is consistent with Minimalism and Distributed Morphology. I start by providing a base proposal for non-negative, non-relativized cases, and then extend this to the polarity-, relativized-, and reciprocal-conditioned allomorphs. Additionally, I present a puzzle from contrastive verb focus patterns in serial verb constructions (SVCs) that a parallel chains analysis solves rather elegantly.

5.1 Mechanisms for verb copying

Focus and/or topic constructions involving the realization of multiple verb copies have been attested in a variety of languages (see, e.g. Landau, 2006 for Hebrew; Vicente, 2005, 2006 for Spanish; Hiraiwa, 2005 for Buli; Cable, 2004 for Yiddish and Brazilian Portuguese; DeGraff, 1995 for Haitian Creole; Quadros, 1999, Nunes, 2003, 2004, and Nunes and Quadros, 2006 for Brazilian Sign Language; Kandybowicz, 2007, 2008 for Nupe; Abels, 2001 for Russian; Aboh and Dyakonova, 2009 for Gungbe and Russian). Explanations for why multiple verb copies get pronounced vary considerably in the literature. What is consistent, though, is the recognition that the existence of multiple verb copies at spell-out is exceptional from the perspective of typical movement operations.

Broadly speaking, two syntactic approaches to multiple copy spell-out from within the Copy Theory of Movement (Chomsky, 1995) have emerged in relatively recent literature that provide principled explanations for why more than one verb copy gets pronounced. One is more conservative in terms of the apparatuses necessary for generating multiple copies, relying on processes like cyclic

head movement, which is often decomposed into series of Copy+Merge operations. This approach is schematized in (17a) below. The second approach, developed independently by Kandybowicz (2008) and Aboh and Dyakonova (2009) also relies on these processes, but differs in that it appeals to the ability for two independent chains to be formed simultaneously. This approach is known as parallel chain formation, which is shown schematically in (17b).



In (17b), the head Z^0 is simultaneously targeted by two probes, in this case Y^0 and X^0 . Parallel chains ensue when two heads act as probes for the same goal, resulting in two independent chains that are anchored at the same foot.

One major problem regarding the pronunciation of more than one copy pertains to linearization at PF (Bošković and Nunes, 2007, Section 3). According to Kayne's (1994) Linear Correspondence Axiom (LCA), asymmetric c-command determines linear order. If, as suggested by Chomsky (1995), movement effectively involves Copy+Merge then nontrivial chains should yield unlinearizable structures. This is because multiple copies would instantiate multiple c-command relationships, and the output would be uninterpretable. To resolve this issue, Nunes (1995) proposes Chain Reduction, whereby copy deletion helps facilitate optimal linearization. Economy dictates that deletion should apply as little as possible, and chain links can be preserved in exceptional cases (Nunes, 1995, 1999, 2004). In line with Distributed Morphology (Halle and Marantz, 1993, 1994), proposals for deriving verbal repetition in Brazilian Sign Language (Nunes, 2004; Nunes and Quadros, 2006) and Nupe (Kandybowicz, 2007) appeal to post-syntactic Morphological Reanalysis (specifically, Fusion) to facilitate linearization, thereby guaranteeing that a second copy survives deletion. Yet, as Kandybowicz (2008) has called attention to, Fusion in these cases seems merely to be 'asserted' as an ad hoc solution, and thus falls short of offering a meaningful explanation for the existence of multiple copies.

Recently, Kandybowicz (2008) and Aboh and Dyakonova (2009) investigate what the latter call 'predicate fronting with doubling', independently providing novel analyses that invoke parallel chain formation in the narrow syntax. Below are examples of predicate fronting with doubling in Nupe (18a), Gungbe (19a), and Russian (20a), followed by simplified schemata representing parallel chain formation in each language. (Superscript numbers note independent verb/root movement chains.)

- (18) a. Nupe (Kandybowicz, 2008, p. 109)
- Bi-**ba** Musa **ba** nakàn o
 RED-cut Musa cut meat FOC
 'It was CUTTING that Musa did to the meat.'
- b. $[_{FOcP} \sqrt{2} [_{TP} [_{vP} v + \text{Agro} + V + \sqrt{1} [_{AgroP} \text{Agro} + V + \sqrt{1} [_{VP} V + \sqrt{1} [_{VP} \sqrt{1,2}]]]]]]]]$

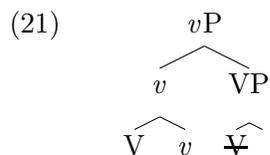
- (19) a. Gungbe (Aboh and Dyakonova, 2009, p. 1044)
d̥ù (%wè) Séná **d̥ù** blédì l̥ò
 eat FOC Sena eat bread DET
 ‘Sena ate the bread.’
 b. [_{FocP} V² Foc [_{TP} [_{AspP} V¹+Asp [_{VP} ~~V~~^{1,2}]]]]
- (20) a. Russian (Aboh and Dyakonova, 2009, p. 1039)
Videt’(-to) ja ee davno ne **videla**, ...
 see.INF(-PTCL) I.NOM her.ACC long NEG see.PST.FEM.S ...
 ‘As for seeing her, it’s been a long time since I saw her, ...’
 b. [_{TopP} vP² [_{FinP} [_{TP} [_{AspP} v¹+Asp [_{VP} ~~v~~¹]]]]]]

In each case, predicate fronting with doubling (whether for focus or topicalization) instantiates parallel chains because two functional heads probe the verb root, and the heads of each chain are pronounced in disjoint locations. One upshot of the parallel chains approach is that the presence of two separate chains allows for ‘unremarkable’ (Kandybowicz, 2008, p. 17) chain resolution to take place; each chain head bears a copy of the verb, which ensures that two copies will be pronounced, and the tails are deleted (Nunes, 2004). Parallel chains thus avoids a need for ‘asserting’ processes like Morphological Fusion to account for multiple verb copies (Kandybowicz, 2008) because it sees the two copies as only ‘superficially’ belonging to the same chain (Aboh and Dyakonova, 2009, p. 1036).

5.2 Parallel chains as the mechanism for Ibibio contrastive verb focus

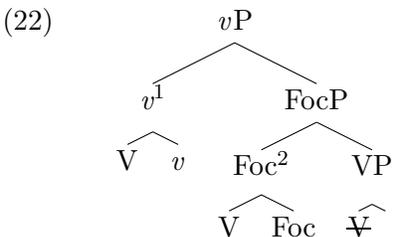
Initially, Ibibio contrastive verb focus might seem an unrelated case compared to predicate fronting with doubling in Nupe, Gungbe, and Russian. These constructions all involve two full copies of the verb that are displaced, seemingly unlike the case of Ibibio CVF which does not appear on the surface to always involve full copies. Accordingly, in simple affirmative CVF, only one full copy is pronounced, and the contrastive component looks to be encoded by partial reduplication, thus, not necessarily driven syntactically. Nevertheless, I argue that this difference is by and large superficial, and that Ibibio CVF actually bears a derivational affinity to constructions in other languages where full verb copies are repeated.

Following standard Minimalist assumptions, the merger of v^0 in basic Ibibio clauses triggers root raising in the following fashion.



In line with DM principles, the bare root transits through a verbalizing morpheme en route to v^0 . Given the Phase Impenetrability Condition (Chomsky, 2000), the complex head in v^0 is available for further Copy+Merge operations. Standard chain resolution at PF ensures that lower copies get deleted according to principles of economy (Nunes, 2004).

This core template also underlies CVF. However, in such constructions the verb complex additionally raises through a low focus projection that houses a null Foc^0 . Both v^0 and Foc^0 probe V, triggering two parallel movement chains anchored at the same foot. The resulting configuration is shown in (22), with independent verb movement chains again noted by superscript numerals.



In this derivation, verb copies are retained at both v^0 and Foc^0 . Moreover, as noted previously, the higher copy at the phase edge may undergo subsequent raising (e.g. to Neg^0 or T^0) while the rest of the material in $v\text{P}$ gets spelled out.

There are (at least) two viable motivations for generating parallel chains in Ibibio. One option is that, when v^0 merges and forms the phase edge, the head of the phrase immediately dominated by $v\text{P}$ (i.e. FocP) inherits some of v 's features through a mechanism of Feature Inheritance (Chomsky, 2008). Alternatively, the head of this lower FocP may operate much like a FocP in the left-periphery, and is fully capable of forming a probe-goal relation in its own right. In this scenario, Foc^0 could bear a $[\text{+F}]$ feature triggering head movement within its c-command domain and/or needing to be checked. Either way, various approaches to head movement in current Minimalist literature could explain why two chains would be instantiated rather than one.

Just like Nupe predicate cleft constructions and Gungbe and Russian predicate fronting, then, Ibibio contrastive verb focus is ‘bi-locational’ (Kandybowicz, 2008, p. 106). The question arises, though, as to whether parallel chains are necessary, given that positing a single chain seems simpler. In other words, can parallel chains provide the most parsimonious and explanatory account of CVF in Ibibio? Importantly, a parallel chains analysis does not require invoking post-syntactic operations like Fusion to render the verb copy in Foc^0 invisible to the LCA, allowing it to ‘circumvent LCA effects and therefore make realization of multiple copies possible’ (Bilola, 2013, p. 521). The parallel chains account is therefore advantageous in that it allows for ‘unremarkable’ chain resolution to take place: each chain head survives deletion and is pronounced while all lower copies are erased. Thus, the parallel chains account relies solely on existing and well-founded syntactic operations without having to appeal to additional mechanisms.

5.3 Further evidence: Serial verb constructions and iterated FocPs in the low middle field

Additional evidence in support of parallel chains and the placing of FocP within as opposed to above $v\text{P}$ comes from serial verb constructions (SVCs). In particular, either V_1 or V_2 in a $V_1 V_2$ sequence can undergo contrastive focus in Ibibio, but the relative ordering of the verbs nevertheless remains constant. I propose that this is made possible by iterated FocPs housed within iterated $v\text{Ps}$.

Major (2015) provides the most in-depth description of Ibibio SVCs to date. Applying syntactic diagnostics drawn from SVC literature, he concludes that genuine SVCs in Ibibio have the following properties: (a) the verbs share at least one argument, (b) SVCs are singular with respect to tense/aspect and polarity, (c) they contain neither overt nor covert coordination, and (d) they are monoclausal. Interestingly, it is permissible in Ibibio to contrastively focus either V_1 or V_2 in an SVC. The example in (23a)-(23c) shows an SVC with transitive verbs, and (23d)-(23f) with intransitive ones.

- (25) a. Òkôn á-mà á-tèé-têm ñdídíyá á-nyàá-nyâm
 Okon 3SG-PST 3SG-cook-cook food 3SG-sell-sell
 ‘Okon COOKED food and SOLD it.’
- b. Ènò á-mà á-dàá-dàká a-dàá-dá
 Eno 3SG-PST 3SG-rise-rise 3SG-stand-stand
 ‘Eno AROSE.’

The ability for both verbs to undergo contrastive focusing in a single clause strongly suggests the availability of more than one FocP. If, as suggested in the present analysis, the low focus phrase intervenes between *v*P and VP, we can straightforwardly account for double contrastive focus in an SVC by again locating distinct FocPs within each *v*P, as in (24) above. The focus layers can thus be activated independently (targeting either the higher or the lower verb) or simultaneously. Each head probes a goal within its local c-command domain according to Minimal Search. Consequently, in cases where only one verb is focused, or in cases where both verbs are focused, the $V_1 V_2$ order is never compromised.

The ability for both verbs to be contrastively focused in a monoclausal architecture thus follows rather neatly if FocP is indeed a *v*P-internal projection (rather than being above *v*P). Since SVCs contain more than one *v*P, the prediction is that either one or both verbs in an SVC can be focused. As demonstrated above, this prediction is borne out.

There are two further significant upshots for the order *v*P >> FocP >> VP. First, as mentioned above, if *v*P is the higher projection then the verb can escape for further raising (e.g. to Neg⁰/T⁰/C⁰) under the assumption that *v*P is a phase. Second, this offers a satisfactory explanation for why either V or both Vs in a $V_1 V_2$ complex can undergo focusing without disrupting the $V_1 V_2$ order. Putting these two points together reveals that iterated FocPs are absolutely necessary: if only one focus projection were available then we would predict orderings in SVCs that are neither attested nor possible in Ibibio.

5.4 Toward a unified account: ‘Prefixing reduplication’ as a repair strategy

The above analysis argued for a syntacticized approach to contrastive verb focus in Ibibio by treating such constructions as instances of parallel chains driven by narrow syntactic operations. Although the current analysis by Akinlabi and Urua (2000, 2002) appeals to reduplicative prefixes to account for CVF verb forms, this approach actually preserves the insight originally from Essien (1985) about the precedence of full verb copies feeding into the derivation. The proposal is, though, thus far incomplete in that it does not explain the ‘reduplicative’ nature of affirmative (non-relative, non-reciprocal) contrastively focused verbs. It remains to be seen, exactly how and why allomorphic variation should exist in contrastive verb focus at all. I now address this question specifically to work toward providing a principled explanation for the observed allomorphy of Ibibio contrastively focused verbs.

The basic problem at hand is that, given the proposal outlined above, full verb copies in affirmative (non-relative, non-reciprocal) CVF should obtain. However, this results in ungrammaticality, as (26b) demonstrates.

- (26) a. Ènò á-ké-tíí-tíyó
 Eno 3SG-PST.FOC-remember-remember
 ‘Eno REMEMBERED.’
- b. *Ènò á-ké-tíyó-tíyó

To account for this, I claim that Ibibio makes recourse to a PF rule that occurs after the LCA has been applied. After spell-out, this rule targets identical verb copies that are linearly adjacent. This rule is formally proposed as MAINTAIN DISTINCTION below.

(27) Maintain Distinction

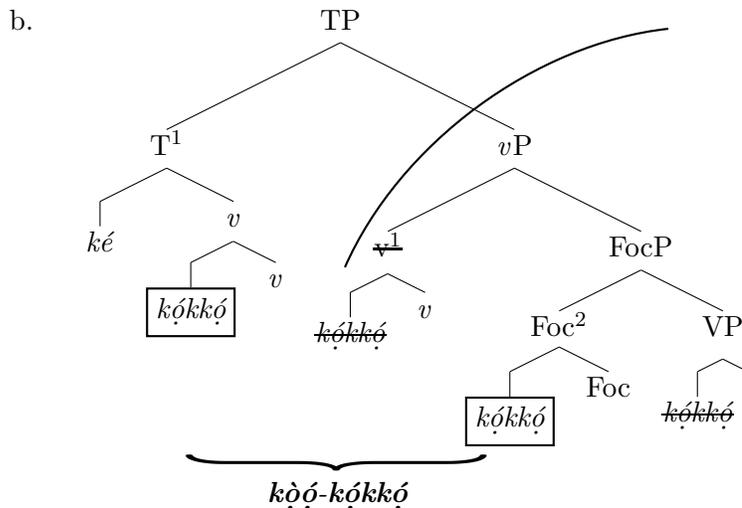
- a. Let α and β be two copies of the same root, γ .
- b. If α and β are linearized as $\langle \alpha, \beta \rangle$ such that no phonological content intervenes between them, alter α 's phonological form to CVV.
- c. Else if phonological content intervenes between α and β , allow both copies to be spelled out in full.

Essentially, then, the phenomenon of ‘prefixing reduplication’ is really the result of a PF repair strategy that reduces adjacent verb copies because they generate undesirable phonological output. Accordingly, being rendered distinct for morphosyntactic purposes (i.e. being at the head of a distinct movement chain, escaping deletion) does not guarantee phonological distinction in the language. One of the reasons I argue that the above account for affirmatively contrastive verbs is preferred is that it can easily be extended to account for negative, relativized, and reciprocal verb forms. The particular blend of morphosyntactic and morphophonological operations predicts that post-LCA phonological reduction will fail to apply whenever overt phonological material intervenes between verb copies (statement (c) in Maintain Distinction).

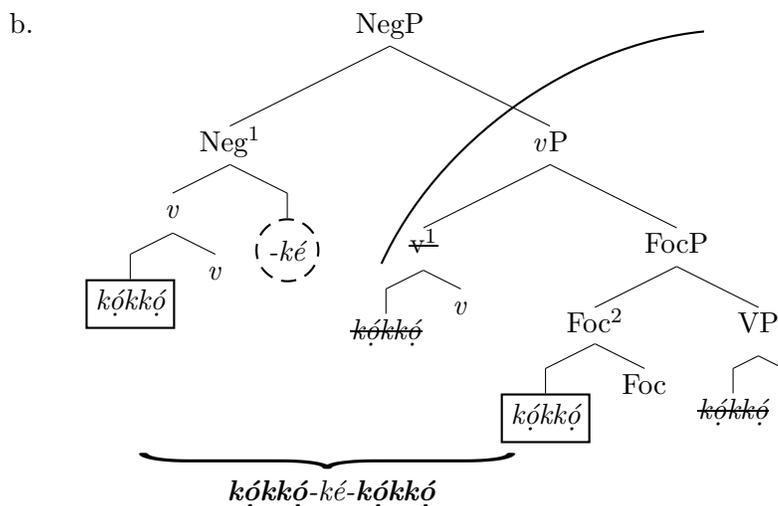
What, though, accounts for the constraint, that only the higher verb copy is susceptible to phonetic change? One possible explanation follows rather straightforwardly from phase-based syntax. Chomsky (1999, 2000) proposes that syntactic derivations are fed to the PF wing of grammar in chunks known as phases rather than in one complete piece. Generally, *v*P and CP are acknowledged as phase boundaries, which means that *v*P-internal content is spelled out while the inflectional domain is being built. In Ibibio, if *v*P-internal material (minus edge features) gets sent to PF first, this has two significant consequences for contrastive verb focus. First, the copy of the verb located in Foc^0 gets spelled out as material in v^0 undergoes further raising to the inflectional domain. The higher copy, though, will not get spelled out until C merges, thus subjecting it to further PF operations. In other words, once PF recognizes the problem of linear adjacency, triggering the PF repair strategy of Maintain Distinction, only the higher verb copy is available for phonetic reanalysis.

In (28b) and (29b) I present simplified snapshots of the derivations of simple affirmative CVF and negative CVF after head movement (in the narrow syntax) and Vocabulary Insertion (in the morphology). Below each tree I also include the ultimate output for the verb form.

- (28) a. **Á-ké-kòḡ-kókókó**
 3SG-PST.FOC-step.aside-step.aside
 ‘He STEPPED ASIDE.’



- (29) a. Í-kí-[*NegP* kókókó-ké-kókókó]
 I-PST.FOC.I-step.aside-NEG-step.aside
 ‘He didn’t STEP ASIDE.’



Notably, the derivation of negative contrastive verb focus is identical to that of affirmative contrastive verb focus *vP*-internally. That is, the verb root transits to v^0 and to Foc^0 via distinct chains, and these chain heads each survive linearization algorithms. CVF instantiates parallel chains because both v^0 and Foc^0 probe V^0 , generating independent chains anchored at the same foot. The critical difference between the affirmative form in (28) and the negative form in (29), pertains to whether or not phonological material intervenes following linearization. As seen in (28b), v^0 raises to T^0 , but the material in T^0 surfaces preverbally; thus, when the tails of this movement chain are deleted there is no overt content that intervenes. This provides the relevant context for Maintain Distinction to apply, targeting/altering the higher copy since the (still) *vP*-internal copy at Foc^0 is no longer susceptible to PF operations of this type. In contrast, in (29b) the morphological exponent of Neg^0 surfaces suffixally on the highest copy, which raises from the *vP* phase edge while *vP*-internal content gets spelled out. Subsequent to the LCA, the configuration in (29b) results in phonologically overt material surfacing between verb copies at spell-out. A similar effect obtains for the raising-to-C type of relative clause formation, as well as in reciprocals, both of which again produce intervening affixal material. Thus, the secondary PF rule of Maintain Distinction (i.e.

phonological reduction resulting in ‘prefixing reduplication’) to generate phonological distinction need not apply in negative, relativized, or reciprocal contexts.

A significant positive outcome therefore arises when adopting a parallel chains approach to Ibibio contrastive verb focus: the various allomorphs are treated as underlyingly similar. Narrow syntax provides the relevant structural input for triggering ‘reduplication’ just as it provides the input that generates polarity-, relativization-, and reciprocal-conditioned differences. More specifically, the account I propose here treats the formation of all contrastive verb forms as virtually identical inside the *vP* phase. The upshot of this is that we can offer a unified derivational account for the various allomorphs of contrastive verb focus while appealing to PF operations to understand the differences in how verb copies are pronounced, and why.

6 Conclusion

In this paper I have endeavored to show that morphophonologically conditioned allomorphy in Ibibio CVF is not what it appears on the surface. I argued that Ibibio CVF is syntactically driven, and not primarily a morphophonological phenomenon. In the account proposed here, the input to CVF is always two full verb copies (Essien, 1985, p. 88), and the syntactic vehicle for verbal repetition is parallel chains in the narrow syntax. If the proposal outlined here is on the right track, Ibibio furnishes further support for parallel chains as a driving mechanism for replicative processes (Chomsky, 2008; Kandybowicz, 2008; Aboh and Dyakonova, 2009).

Syntacticizing Ibibio CVF leads to a unified analysis, meaning that ‘prefixing reduplication’ in addition to polarity-, relativization-, and reciprocal-conditioned allomorphs can be seen as structurally similar, underlyingly. All CVF forms derive from a common core where /RED-/ does not need to feature into the analysis. Accordingly, the so-called ‘prefixing reduplicant’ doesn’t ‘get’ its phonological content from the verb, it already has it by virtue of being a copy of the verb. The presence or absence of intervening morphophonological material surfacing between verb copies serves as the trigger for allomorphy in Ibibio CVF, which is computed at PF after Vocabulary-Insertion and linearization. Ibibio CVF thus provides compelling evidence that syntactic configurations feed into morphophonological ones and not the other way around. Post-syntactic morphophonological operations are still relevant—and necessary to account for why the phonological forms of affirmative and negative contrastive verbs differ—but they must crucially rely on specific architectures provided by the syntax.

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Jespersen’s Cycle and the scope of negation in American Sign Language

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1 Introduction

Negation is one of the more widely studied areas in the field of semantics. Patterns of negation vary widely from language to language, leading authors to attempt to come up with larger generalizations on the behavior of negation that occasionally overlook information from other languages. Throughout the semantic literature, there has been a longstanding debate over the distinction between external (sentential) and internal (constituent) negation, with a number of contemporary logicians making the claim that there are no known languages that lexicalize the distinction between the two (Gazdar, 1979; Levinson, 1983; Horn, 1985, a.o.). External negation is illustrated in English in (1a), where the overall polarity of the proposition is negative and the predicate is denied. Example (1b), on the other hand, shows what would be considered internal negation. In this proposition, the overall polarity remains positive, with a negative predicate being affirmed by the subject.

- (1) a. John does **not** regret having read the book.
- b. John regrets **not** having read the book.

For languages like English, this generalization that languages mark external and internal negation using the same lexical item seems to hold; both external and internal negation are usually marked through the lexical item *not*. English’s negative prefix comes as an exception to this generalization, as it is often treated as internal negation (Horn, 1985). The interpretation of the scope of negation instead depends on other factors such as prosodic stress (2) and syntactic movement of the negation marker. However, there is a growing body of literature that indicates that languages like Korean (Yoon, 2008) and Malay (Kroeger, 2014) use a different marker for each type of negation. The distinct scope of negation is explicitly marked through the negative lexical item that a proposition takes.

- (2) a. We could **not** go to school (because it was a snow day).
- b. We could **NOT** go to school (but we could go to the movies instead).

In the present paper, we add to that list by contributing novel evidence, on the basis of a number of semantic scope diagnostics, that American Sign Language (ASL) exhibits two distinct patterns of negation. Further, we argue that these distinct patterns arise as a result of the language following Jespersen’s Cycle in a unique way.

2 Negation in ASL

ASL and other sign languages, unlike spoken languages, make use of non-manual markers to impart real linguistic information. For ASL, these markers can take the form of eyebrow furrowing for *wh*-questions, eyebrow raising for polar questions and topic marking, and a headshake to signal negation, to name a few. Past studies on negation (Veinberg and Wilbur, 1990; Anderson and Reilly, 1997) have revealed that ASL has several different options available to it in terms of external

negation. Stokoe (1960) first noted that a side-to-side headshake can be used to signal negation on a syntactic level, regardless of the presence or absence of the sign commonly glossed as ‘NOT’. This general pattern is shown in (3), below, where the scope and duration of the negative headshake is marked by the line over the gloss. In this construction, the sign ‘NOT’ is optional, and its inclusion or exclusion does not alter or contribute to the interpretation of negation in the proposition. The negative headshake alone is capable of negating the entire proposition.

- (3) WOMAN (NOT) GIVE-ME RED BOOK^{neg.}
 ‘The woman didn’t give me the red book.’

External negation in ASL allows for what appears to be an optional negative concord (NC) construction involving both a negative headshake and a manual negation marker. In constructions like (3), where there appears to be two instances of negation in a single clause, the polarity of the proposition remains negative. Two negatives, in this case, do not make a positive. But, unlike true NC languages, it is not the case that both negative markers are capable of conveying logical negation. The manual negation marker, analogous to *n*-words in spoken languages, does not convey logical negation; the facts outlined in (4a) and (4b) illustrate that the pattern of NC in ASL is more similar to the pattern of negative spread seen in French than it is to true NC languages. In French, *ne* does not contribute to logical negation. Instead, *pas* is the propositional operator that negates the proposition, and, as a result, the *ne...pas* construction is interpreted as being only a single instance of negation (Giannakidou, 2005). In ASL, logical negation is expressed through a negative headshake, which explains the language’s previously discussed ability to drop the manual negation marker in instances of external negation without affecting meaning.

- (4) a. *MARY NOT SEE PAUL
 Intended meaning: ‘Mary didn’t see Paul.’
 b. MARY (NOT) SEE PAUL^{neg.}
 ‘Mary didn’t see Paul.’
 c. MARY SEE PAUL^{neg.}
 ‘Mary didn’t see Paul.’

The scope and duration of the negative headshake can vary according to a few set patterns. When the headshake co-occurs with the pre-verbal sign ‘NOT’, the headshake either accompanies only ‘NOT’ or may optionally spread to cover the entire verb phrase (5a). This optionality of spreading is illustrated by the brackets in the non-manual line of the gloss. In contrast, when ‘NOT’ is absent, the headshake must obligatorily spread, as seen in (5b)-(5c) (Neidle et al., 2000). The final pattern of non-manual negation that ASL exhibits involves the headshake beginning with the first sign of the proposition and obligatorily spreading over the entire tense phrase (5d). The optionality of the manual negation marker in this type of construction does not affect either the spread of the headshake or the grammaticality of the proposition itself; crucially, if the headshake extends over the entire TP, the negation is not generally interpreted as negating the subject noun. Instead, it is still the case that the predicate is negated.

- (5) a. JOHN NOT (BUY HOUSE)^{neg.}
 ‘John is not buying a house.’
 b. JOHN BUY HOUSE^{neg.}
 ‘John is not buying a house.’
 c. *JOHN BUY^{neg.} HOUSE
 Intended meaning: ‘John is not buying a house.’

- d. $\overline{\text{JOHN (NOT) BUY HOUSE}}^{\text{neg.}}$
 'John is not buying a house.'

Headshakes are also frequently used in spoken languages, but they do not hold the same grammatical functions as they do in signed languages. This is due in part to the idea that the primary function of a headshake for speakers of spoken languages is to provide emphasis or a non-verbal *no*. However, they cannot be used alone to produce negation the way they can in sign languages, as shown in (5b) for ASL, and they lack the sharp onset and offset that headshakes in sign languages have been identified as possessing (Veinberg and Wilbur, 1990). Language contact between spoken and signed languages has been claimed to be responsible for the adoption of negative headshakes into sign languages, where they eventually grammaticalized and became a lexical part of negation (Pfau, 2015).

Because sign languages have been historically understudied, there have only been a few studies on ASL negation that have looked at the possibility of internal negation as being separate from external. Even though it is the most-studied and longest-studied sign language to date, much of the research on negation in ASL has focused on descriptive aspects of the language rather than on examining the theoretical implications for the facts from the language. There are, of course, exceptions to this generalization. In 2004, Zeshan conducted a crosslinguistic typological study of negation in signed languages with the idea, in part, that a negative headshake could potentially be used to mark internal negation. If a negative headshake could cover only a single word in a proposition, it would be possible to argue that the scope of negation was limited to a constituent rather than an entire proposition, though the results from the study showed that this is not the case; the scope of the negative headshake cannot be limited to express internal negation for any of the languages included in the study. Crucially, her study included Quebec Sign Language (*Langue des Signes Quebec*, LSQ), which is in the same language family as ASL, but did not include ASL itself.

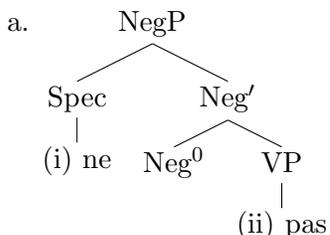
Fischer (2006) analyzed negative incorporation, a type of negation limited to a small set of verbs where negation is marked through an outward twisting motion incorporated into the sign itself, as a type of internal negation. According to her analysis, the negative forms of stative predicates like 'GOOD', 'WANT', 'LIKE', and 'HAVE' are derived through compounding the predicate with 'DON'T'; because by definition the negation is attached to a specific predicate form, she argues that it is not truly acting on the entire proposition. She also notes the possibility that ASL may use the manual negation marker 'NOT' or the negative headshake for internal negation, though she does not provide an argument either for or against such a claim.

3 Jespersen's Cycle in ASL

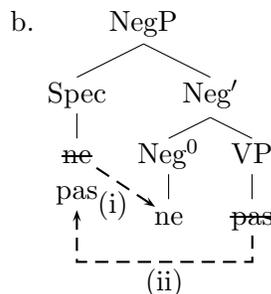
The studies that have examined the theoretical function of manual negation in ASL indicate that the apparent connection between negation in French and in ASL goes beyond the two languages' use of negative spread. Recent research (Pfau, 2015) claims that signed languages as a typological class underwent a process akin to Jespersen's Cycle, for which French is the classic and best known example. In Stage I of Jespersen's Cycle, the sole obligatory negation marker occupies the syntactic location of Spec, NegP. Over time, but still in Stage I, a secondary form of negation is adopted into the language to act to reinforce or emphasize negation. Eventually as the language develops, negation is reanalyzed and the initial negation marker, *ne* in the case of French, moves to occupy Neg⁰ instead of Spec, NegP. The reinforcer *pas* for French, then becomes the main marker of negation and renews Spec, NegP rather than being part of the VP. In modern colloquial French, negation has developed to the point that *ne* is optional and is frequently omitted without affecting

meaning. It is expected to eventually disappear altogether. As a result, *ne* can no longer be said to be the head of the NegP. The figure in (6) shows the development of negation in French.

(6) *Jespersen's Cycle in French (Pfau, 2015)*



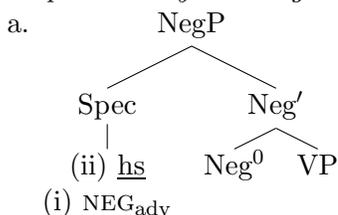
STAGE I(i): adverb *ne* in SpecNegP
 STAGE I(ii): reinforcer *pas* in VP



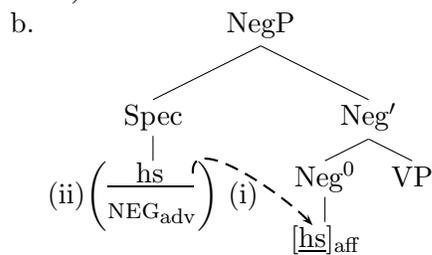
STAGE II(i): reanalysis of *ne* as Neg⁰
 STAGE II(ii) renewal of Spec by *pas*

The mechanism that Pfau describes for Jespersen's Cycle in signed languages is similar; based on the different ways that negation is expressed across sign languages as a larger typological class, he argues that negation was originally carried by manual negation. Headshakes were introduced into sign languages later due to influence from co-speech gestures from other languages. As negative headshakes were picked up through language contact with spoken language communities, they first exhibited behavior similar to the function of *pas* and signaled emphatic negation. In the first step of Jespersen's Cycle, the manual negation marker was analyzed as a negative adverb that occupied Spec, NegP. The reinforcing headshake acted as a lexical part of the negative adverb rather than occupying its own syntactic location. In Stage II, the headshake was reanalyzed as Neg⁰ while the manual negation marker remained in Spec, NegP. This change differs from the pattern that we see in French because the lexical item that originally carried logical negation never became the head of the NegP. Instead, it remained a specifier where Pfau (2015) notes that it is already only optionally expressed and predicts that it will eventually disappear.

(7) *Jespersen's Cycle in signed languages (Pfau, 2015)*

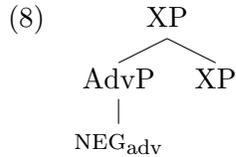


STAGE I(i): NEG_{adv} in SpecNegP
 STAGE I(ii): reinforcer *hs* as lexical part of NEG_{adv}



STAGE II(i): reanalysis of *hs* as Neg⁰
 STAGE II(ii) / STAGE III: NEG_{adv} becomes optional (and disappears)

We argue, however, that this is not the case in ASL. Instead, the manual negation marker has undergone a semantic and syntactic restructuring and found a new job as a marker of internal negation. As the marker of internal negation, we propose that the manual negation is no longer part of the NegP. Instead, it has become a negative adverb that modifies a generic XP, as shown in (8).



4 Current proposal

Our current proposal has two main points. First, our data confirms that the headshake has been reanalyzed and grammaticalized as the first step of a semantic restructuring, as defined by Eckardt (2006). As a result, it is only capable of marking external negation, and has acquired the grammatical status of a propositional operator with the semantic type $\langle t, t \rangle$. Second, we propose that the job of the manual negation marker, contrary to common assumption, was not merely weakened or nullified in this process of grammaticalization, but has become the marker of internal negation. It has undergone a change from propositional operator to predicate modifier in a process of reanalysis in the sense of Hopper and Traugott (1993). It was reanalyzed as a negative adverb with a concomitant shift in meaning from a propositional operator of type $\langle t, t \rangle$ to a predicate modifier of type $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ for intransitive verbs, $\langle \langle e, \langle e, t \rangle \rangle, \langle e, \langle e, t \rangle \rangle \rangle$ for transitive verbs, etc.

4.1 Internal vs. external negation

ASL appears to exhibit two distinct patterns of negation. External negation, as shown in (9a), requires the presence of a non-manual marker in the form of headshake negation. Internal negation, shown in (9b), only requires the presence of the manual negation marker ‘NOT’.

- (9) a. MOTHER FUTURE NOT BUY HOUSE^{neg.}
 ‘Mother will not buy a house.’
- b. MOTHER FUTURE NOT BUY HOUSE
 *‘Mother will not buy a house.’
 ‘It is the case that mother will not buy a house.’

Though it is easy to confuse the precise scope of negation, the results of the following tests collectively support our proposal that the negative headshake and manual negation marker ‘NOT’ have clearly divided the labor as external and internal negation respectively. Among the properties used to distinguish external from internal negation were: tag questions, the *again*-test, the *deliberately*-test, metalinguistic negation, expletive negation, and *try-to-V* constructions.

4.2 Tag questions

Tag questions were originally proposed as a method of determining wide scope from narrow scope negation by Klima (1964). Positive or negative tag questions must be opposite in polarity the sentence they attach to; because external negation, which has wide scope, results in a negative proposition, the tag questions that attach to it must be positive, as in (10a). Internal negation, which has a narrow scope, does not change the overall polarity of a sentence, so the polarity remains positive. As a result, the tag questions that attach to instances of internal negation must be negative like in (10b).

- (10) a. It’s **not** late, is it?
 b. John regrets **not** having read the book, doesn’t he?

In ASL, judgments from consultants show this same pattern of tag question use. In (11a), where the presence of the negative headshake creates external negation, the positive tag question ‘TRUE BUSINESS’, which is roughly equivalent to *is it*, is grammatical. When negation is also extended to the tag question, as in example (11b), the resulting sentence was judged ungrammatical. These results follow Klima’s pattern of tag question use because the tag question in (11b) is not opposite in polarity the matrix clause that it attaches to.

- (11) a. $\overline{\text{TIME LATE}}^{\text{neg.}} \overline{\text{TRUE BUSINESS}}^{\text{y/n}}$
 ‘It’s not late, is it?’
 b. * $\overline{\text{TIME LATE}}^{\text{neg.}} \overline{\text{NOT}}^{\text{neg.}} \overline{\text{TRUE BUSINESS}}^{\text{y/n}}$
 ‘It’s not late, isn’t it?’

In (12a) we show the manual negation marker expressing internal negation and resulting in an affirmative proposition. The tag question that attaches to the proposition must be negative in order to be grammatical, which is illustrated by the ungrammaticality of (12b), where both the question and its tag are positive. Example (12a) also shows that the ungrammaticality of (11b) does not arise from the combination of multiple non-manual markers on the tag ‘TRUE BUSINESS’.

- (12) a. $\text{JOHN SORRY NOT READ BOOK, } \overline{\text{NOT}}^{\text{neg.}} \overline{\text{TRUE BUSINESS}}^{\text{y/n}}$
 ‘John regrets not having read the book, doesn’t he?’
 b. * $\text{JOHN SORRY NOT READ BOOK, } \overline{\text{TRUE BUSINESS}}^{\text{y/n}}$
 ‘John regrets not having read the book, does he?’

4.3 *Again*-test

The *again*-test was originally proposed as a diagnostic for object position, but as per Beck and Snyder (2001), it has also been suggested to indicate the syntactic domain of negation. When *again* is added to an affirmative sentence, the resulting interpretation is repetitive. Internal negation shows identical behavior to affirmative statements and only allows for a repetitive interpretation. External negation allows for both a repetitive and restitutive interpretation. In example (14), the presence of external negation combined with the sign glossed as ‘AGAIN’ results in a repetitive meaning. But according to consultants, it also results in the additional restitutive meaning shown below. This contrasts with the manual negation marker in (15), where only the repetitive meaning is available. These results suggest that (15) is an example of internal negation because it follows the pattern for affirmative sentences and the expected pattern for internal negation.

- (13) SALLY PAINT DOOR BLUE AGAIN
 ‘Sally painted the door blue, and she had painted the door blue before.’
 (14) SALLY $\overline{\text{(NOT) PAINT DOOR BLUE AGAIN}}^{\text{neg.}}$
 ‘Sally didn’t paint the door blue again, but she had painted it blue before.’
 ‘Sally didn’t paint the door blue again, but it had been blue before.’
 (15) SALLY NOT PAINT DOOR BLUE AGAIN
 ‘Sally didn’t paint the door blue again, but she had painted it blue before.’

4.4 *Deliberately*-test

Several different authors have proposed the *deliberately*-test as a diagnostic for the scope of negation (Klima, 1964; Payne, 1985; McCawley, 1988). The introduction of *deliberately* to instances of

external negation necessarily results in ambiguity. Under one interpretation of (16), the deliberateness of the act is outside of the scope of negation; John intentionally avoided Mary. In another interpretation, the deliberateness falls under the scope of negation, meaning that John did see Mary but that it was not on purpose. In (17), however, where internal negation is expressed through manual negation, 'ON-PURPOSE' is not negated and only the interpretation that John avoided Mary on purpose is allowed.

- (16) $\overline{\text{JOHN (NOT) SEE MARY ON-PURPOSE}}^{\text{neg.}}$
 'John avoided (did not see) Mary on purpose.'
 'John saw Mary, but not on purpose.'
- (17) **JOHN NOT SEE MARY ON-PURPOSE**
 'John avoided (did not see) Mary on purpose.'

4.5 Metalinguistic negation

The term metalinguistic negation was first used by Horn (1985) to describe instances of negation where what is negated is not the truth of the proposition, but what he called its assertability. Examples in English include things like (18a)-(18c).

- (18) a. I'm not cold, I'm freezing.
 b. It's not Mrs., it's Dr.
 c. Joe didn't cause some of the problems, he caused all of them.

Metalinguistic negation has also been identified as requiring a syntactic wide scope (Yoon, 2008) and is only available to external negation. Because internal negation acts on predicates rather than propositions, attempting to express metalinguistic negation through a marker of internal negation would result in a semantically anomalous interpretation where what is intended to be negated is instead affirmed. Though the syntactic structure of metalinguistic negation in ASL is quite different from the structure in English, it is still the case that only external negation can be used to express it. In example (19), we see the original proposition set up as a yes/no question where the signer asks if they are happy. This is followed by negation in the form of a negative headshake, and, finally, a corrected statement asserting the degree of the signer's happiness. (20), on the other hand, illustrates that the same idea cannot grammatically be expressed with manual negation.

- (19) $\overline{\text{IX:1P HAPPY}}^{\text{y/n}} \overline{\text{(NOT)}}^{\text{neg.}} \text{IX:1P THRILLED}$
 'I'm not happy, I'm ecstatic.'
- (20) a. * $\overline{\text{IX:1P HAPPY}}^{\text{y/n}} \text{NOT IX:1P THRILLED}$
 'I'm unhappy, I'm ecstatic.'
- b. * $\overline{\text{IX:1P NOT HAPPY}}^{\text{y/n}} \text{IX:1P THRILLED}$
 'I'm unhappy, I'm ecstatic.'

4.6 Expletive negation

Zanuttni and Portner (2003) documented (21) from the Paduan dialect of Italian, where the sentence-initial negative marker is not apparently realized in the meaning. They propose that these types of constructions create a comparative, where the likelihood of a true proposition is judged against its negative alternative. If the likelihood of the true proposition is rated as being less likely, negation is licensed to trigger an emphatic effect in expressing how unlikely or unexpected the true proposition was.

- (21) **No** ga-lo magná tuto!
neg. has-S.CL eaten everything
 ‘He ate everything!’ [Paduan Italian]

In ASL, expletive negation has never specifically been studied or documented, though the use of headshake negation has been said to express uncertainty (McClave, 2001). McClave (2001) also analyzed the use of headshake negation in (22) as being the result of behaviors picked up from spoken English. Under this analysis, the negative headshake is not serving a linguistic or grammatical function, and is, instead, more along the lines of a co-speech gesture. Given Pfau’s (2015) analysis that headshakes have grammaticalized into signed languages and the relative infrequency of non-meaningful co-speech gestures used by native signers, (22) could also be analyzed as a type of expletive negation rather than a lateral headshake.

- (22) $\overline{\text{WOW SHOW-UP MANY}}^{\text{hs}}$
 ‘Wow! Many (non-handed signs) showed up.’ (McClave, 2001, p. 55)

Like metalinguistic negation, expletive negation is only available to external negation. McClave (2001) reports that (22) with a headshake that we analyze as external negation, is grammatical with the stated meaning. In this interpretation, the negative headshake does not impart any negative meaning on the sentence. For (23a) and (23b), consultants reported that regardless of where the manual negation marker is placed, they were unable to construct a proposition with the same meaning as (22). Instead, the sentences in (23) are semantically nonsensical because consultants felt strongly that the negation should be expressed somewhere in the meaning.

- (23) a. # **WOW NOT SHOW-UP MANY**
 ‘Wow! Many (non-handed signs) showed up.’
 b. # **WOW SHOW-UP NOT MANY**
 ‘Wow! Many (non-handed signs) showed up.’

4.7 *Try-to-V* constructions

The final diagnostic test for the scope of negation that we present for ASL is the *try-to-V* construction. In these types of constructions, narrow scope is only available to internal negation. Because external negation results in a reversal of polarity for an entire proposition, negation with a narrow scope cannot be expressed through external negation. Internal negation, conversely, cannot be used to express wide scope negation because it is not capable of acting on a sentence to reverse its polarity. This same pattern is seen in ASL, where a negative headshake is required to express wide scope negation. (24a) and (24b) together show that the wide scope interpretation is obligatorily expressed through non-manual headshake negation. (25a) and (25b), on the other hand, show the opposite pattern. The narrow scope meaning can only be expressed through the use of a manual negation marker. In (25b), even when the negative headshake only scopes over ‘LAUGH’, the resulting sentence is judged ungrammatical.

- (24) a. **BILL** $\overline{\text{(NOT) TRY LAUGH}}^{\text{neg}}$
 ‘Bill didn’t try to laugh.’
 b. ***BILL NOT TRY LAUGH**
 ‘Bill didn’t try to laugh.’
 (25) a. **BILL TRY NOT LAUGH**
 ‘Bill tried not to laugh.’

- b. *BILL TRY $\overline{\text{(NOT) LAUGH}}^{\text{neg.}}$
 'Bill tried not to laugh.'

From the above scope diagnostics, it is clear that ASL systematically differentiates between manual and non-manual negation. Additionally, ASL follows the expected patterns for external and internal negation with respect to the manual and non-manual markers respectively. The negative headshake behaves the way we would expect external negation to in only licensing positive tag questions, allowing for both a repetitive and restitutive interpretation when combined with 'AGAIN', creating ambiguity when used with 'ON-PURPOSE', licensing expletive and metalinguistic negation, and only licensing a wide scope negation. Manual negation, contrary to Pfau's (2015) prediction, behaves the way we would expect internal negation to. Manual negation licenses the use of negative tag questions, only allows for a repetitive reading when combined with 'AGAIN', does not result in ambiguity when used with 'ON-PURPOSE', does not license either metalinguistic or expletive negation, and allows for a narrow scope.

5 Semantic restructuring of manual negation

Historical evidence from sign languages is rare because prior to the 1960s, they were not considered true languages and thus little effort was made to document or preserve data. The development of video technology made preservation of sign language data more possible, but it was not until the publication of Stokoe's (1960) research that steps were taken to document and investigate ASL on linguistic terms. In response to this fact, Pfau (2015) proposes that sign languages as a typological class represent different points along Jespersen's Cycle. For all sign languages that have had their systems of negation analyzed, there exists a combination of both manual and non-manual signs. The degree to which they rely on one over the other in expressing external negation varies from language to language; signed languages that mainly rely on manual negation, like Italian Sign Language (*Lingua Italiana dei Segni*, LIS) or Hong Kong Sign Language (HKSL), represent the early stages of the cycle.

- (26) PAOLO CONTRACT SIGN $\overline{\text{NON}}^{\text{neg.}}$ [LIS] (Pfau, 2015, p. 25)
 'Paolo didn't sign the contract.'

Languages that are commonly negated through the use of a headshake alone, like Flemish Sign Language (*Vlaamse Gebarentaal*, VGT) or Indopakistani Sign Language (IPSL), are said to represent a point further along in Jespersen's Cycle. For these languages, just like for ASL, the use of a manual negation marker is optional in expressing external negation because, according to Pfau's analysis, they have reached a point in Jespersen's Cycle where the negative headshake has been reanalyzed and become the main marker of negation.

- (27) $\overline{\text{NOW GAME START}}^{\text{neg.}}$ [VGT] (Pfau, 2015, p. 29)
 'The game doesn't start now.'

If we assume this to be correct, we can show that both the negative headshake and the manual negation marker have undergone semantic restructuring since their initial roles. Semantic restructuring is marked by an increase in cohesion and a decrease in weight and variability, as characterized by Lehmann (1982). We propose that there have been three stages of semantic restructuring in the scope of negation in ASL: an initial semantic generalization (bleaching) of the manual negation marker to remove the external negation meaning, the negative headshake lost emphatic pragmatic meaning and picked up semantic meaning, and the manual negation marker picked up new semantic meaning and became a predicate modifier.

In order for a morpheme to undergo semantic reduction or bleaching, it first has to lose its intention. Rather than describing a specific idea, or even a limited set of ideas, it evolves and begins to describe a larger range of things, eventually losing its meaning altogether (Haiman, 1991). It could be argued that manual negation in ASL undergoes a type of semantic bleaching where it changes from serving a very specific purpose of negating entire propositions as a propositional operator. As shown in (24) and (25) above, propositional operators cannot operate on the level of individual constituents. They can only function with a wide scope on the level of a larger clause. Predicate modifiers serve a much more general purpose and have the ability to modify any potential XP.

The manual negation marker must also demonstrate a reduced syntagmatic variability; rather than being able to move about freely in terms of its syntactic location, it should occupy a fixed location relative to its function within the proposition. In ASL it is true that manual negation cannot freely move around syntactically without affecting either meaning or grammaticality. Instead, it occupies a fixed, pre-verbal position. Manual negation is only permitted to appear immediately before the constituent that it negates. The following examples show that moving ‘NOT’ to different syntactic locations changes the intended meaning of the proposition.

- (28) a. JOHN SORRY **NOT** READ BOOK
‘John regrets not having read the book.’
- b. **NOT** JOHN SORRY READ BOOK
‘It is not John that regrets having read the book.’
- c. JOHN **NOT** SORRY READ BOOK
‘It is the case that John is not sorry he read the book.’
- d. *JOHN SORRY READ BOOK **NOT**
Intended meaning: ‘John regrets not having read the book.’

In comparison, the negative headshake exhibits more freedom with respect to syntagmatic variability. Its scope can cover either a VP or an entire TP with no difference in meaning or grammaticality. Where the examples in (28a)-(28d) show a discrepancy between their intended meanings and their attested meanings, the examples in (29) show no such distinction. When the onset of the headshake coincides with the beginning of the subject NP it is interpreted as being external negation just as it would be if the onset came with the VP instead.

- (29) a. $\overline{\text{DOG (NOT) CHASE CAT}}^{\text{neg.}}$
‘The dog didn’t chase the cat.’
- b. DOG $\overline{\text{(NOT) CHASE CAT}}^{\text{neg.}}$
‘The dog didn’t chase the cat.’

6 Conclusion

We have shown that ASL follows Jespersen’s Cycle in a unique way. Just like *pas* in Jespersen’s Cycle in French, a non-manual marker in the form of a negative headshake has been reanalyzed to become the main carrier of external negation (Pfau, 2015), which was confirmed by our scope diagnostics. Manual negation has also undergone a semantic and syntactic change, making it distinct from *ne* in French. Rather than becoming optional and simply disappearing as the traditional pattern for Jespersen’s Cycle predicts, the results of our scope diagnostics show that systematic asymmetries currently exist between the two negative markers in ASL; the manual negation marker

has reanalyzed (Hopper and Traugott, 1993) as internal negation. Further, negation in ASL patterns with other paths of meaning change involving semantic restructuring that can provide insight into the relationship between diachronic change and synchronic meaning.

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Internally headed relatives and event nominalizations in Washo*

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1 Introduction

Washo is a highly endangered Hokan/isolate language spoken in the Lake Tahoe region of California and Nevada.¹ The aim of this paper is to examine the syntax and interpretation of a certain type of clausal nominalization in Washo formed through the final suffixation of a third person pronoun (1). The nominalized structures to be examined below exhibit an apparent mismatch at the syntax-semantics interface in that they are systematically ambiguous between individual (relative clause, (1)) and eventive interpretations (2).

- (1) t'él:liwhu ʔ-íšm-i-š-ge l-í:gi-yi
man 3-sing-IND-SR-REL 1-see-IND
'I saw the man *who was singing*.' (Washo Archive)

- (2) t'él:liwhu ʔ-íšm-i-š-ge di-dámal-i
man 3-sing-IND-SR-REL 1-hear-IND
'I heard *the man's singing*.' (Washo Archive)

In (1), reference to an individual who is the agent of a singing event is made, while in (2), the reference made is to the singing event itself, of which the man is the agent. The suffixes on these nominalizations come in either the subject form of the independent third-person pronoun (3a) or the non-subject form (b). It is important to note that because Washo is massively pro-drop, the use of the pronoun in this construction is exceptional in the language.

- (3) a. **gi**: 3rd person independent subject pronoun
b. **ge**: 3rd person independent non-subject pronoun

As Comrie and Thompson (1985) note in their cross-linguistic survey, relativization is often indistinguishable from nominalization – just as we see in Washo. It follows from this that the strategy employed to form internally headed relatives does not manifest a syntax dedicated to relativization structures; rather, it can also extend to other constructions like event readings such as in (2). Despite their shared syntax, the two readings may be disambiguated by the matrix verb (4) or wider context (5).

- (4) máʔak t'í:yeli-lu ge-yúli-hay-i-š-**gi** gílgay-i
stick large-INST 3OBJ-die-CAUS-IND-SR-REL break-IND
'The big stick he killed it with broke.' (Washo Archive)

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¹All unpublished data come either from my own fieldwork or from the Washo Archive (washo.uchicago.edu). Glosses: 1/2/3 = 1st/2nd/3rd person; AORist; CAUSative; Distant FUTURE; DURative; INDEpendent mood (following Bochnak's (2015) treatment); INSTRumental; MIRative; MODal; NEGation; NC: negative concord; NEGation; SR: switch reference; RELative marker. The orthography adopted is from Jacobsen (1964); symbols deviating from the IPA are: L: [l]; š: [ʃ]; y: [j].

- (6) béverli wát l'i:gi-**gab**-i-š-gi k'-'éʔ-i
 Beverly tomorrow 1-see-**dis.fut**-IND-SR-REL 3-BE-IMP
 'I'm going to see Beverly tomorrow.'
 Literally: 'My seeing Beverly tomorrow exists.' (Washo Archive)

Second, nominalizations must house switch reference markers where applicable, which indicate that the subject of an embedded verb is different from that of the matrix verb. Switch reference markers are argued to occupy a high position in the clause (e.g. C under Finer's (1985) treatment). In (7), the switch reference marker on the verb *sing* indicates that its subject is different from that of *see*, which occupies the matrix clause.

- (7) t'él:liwhu ʔ-íšm-i-š-ge l-í:gi-yi
 man 3-sing-IND-**SR**-REL 1-see-IND
 'I saw the man who was singing.' (Washo Archive)

Both of these pieces of evidence indicate that the nominalized constituent is a fully-specified CP, which has no restrictions about what kinds of TAM suffixes can be encoded in the left periphery (cf. Northern Paiute, where nominalizations are *v*Ps (Toosarvandani, 2014)).⁴

Note that the appearance of the switch reference marker inside the relative clause indicates that the verb it contains belongs to a subordinate clause. As Jacobsen (1964) points out, relative clauses are obligatorily fronted in the language; we see the same behavior in the analogous event nominalizations. Thus, while Washo is a strict SOV language, we observe apparent word order violations in examples like (8), where the subject of the matrix verb, *woman*, must appear after its object, *heron*, resulting in an exceptional OSV word order.

- (8) (*daʔmóʔmoʔ) k'ák'aʔ dá: gé:gel-i-š-ge (daʔmóʔmoʔ) yá:m-aʔ
 woman heron there 3.sit-IND-SR-REL woman 3.speak-AOR
 'The woman spoke to a heron who was sitting there.' (Jacobsen, 1981)

Such movement of CPs is common cross-linguistically, and can be treated simply as clause-fronting, though more work is needed on word order in Washo in order to determine the conditions under which constituents may front.

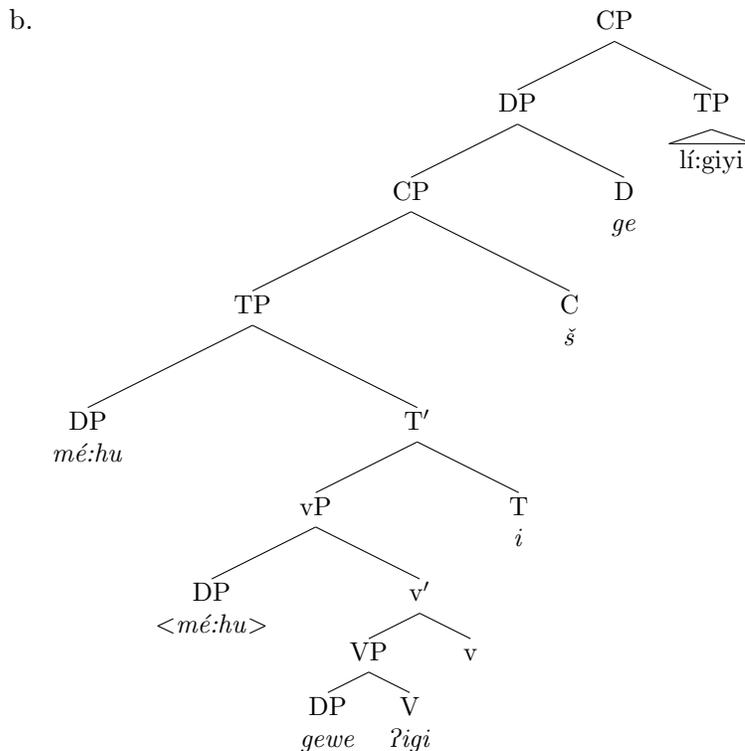
Below I give the structure in (9b) that I propose for a nominalization like (9a), building on Peachey (2006). In this structure, the nominalizer is a head D, occupied by the suffixal pronoun *ge*, which selects for the embedded clause. The matrix verb *see* then selects for this DP as its nominal complement.

⁴Toosarvandani's (2014) analysis is concerned with the following contrast between (i) and (ii), in which the nominalization in (i) refers to an individual, while the one in (ii) refers to an event. Both involve the nominalizer *-na*, which assigns genitive case and selects for a *v*P under Toosarvandani's analysis (in contrast to the nominalization of full clauses in Washo, where no such case effects are observed).

- (i) Nii ka=i=na'a saa-**na** tika.
 1.SG.NOM DEF.ACC=1.SG.GEN=father cook-NMZLR eat
 'I ate the thing that my father cooked.' (Toosarvandani, 2014, p. 803)
- (ii) Nii ka=i=bia hubia-du-**na** naka.
 1.SG.NOM DEF.ACC=1.SG.GEN=mother song-make-NMZLR hear
 'I hear my mother singing.' (Toosarvandani, 2014, p. 802)

- (9) a. mé:hu gewe ʔ-igi-yi-š-ge lé-saʔ l-í:gi-yi
 boy coyote 3-see-IND-SR-REL 1-still 1-see-IND
 ‘I saw the same coyote as the boy.’

(field notes)



In order to account for the suffixation of this D head (i.e. the fact that it appears as part of the morphology on the subordinate verb), I propose that the morpheme *ge* occupying D *lowers* to the C head for which it selects. *Lowering* is the process by which heads in a complement sequence are rebracketed to form a complex head (Embick and Noyer, 2001) in the framework of Distributed Morphology (Halle and Marantz, 1993), as schematized in (10).

- (10) *Lowering of X⁰ to Y⁰*
 $[XP X^0 \dots [YP \dots Y^0 \dots]] \rightarrow [XP \dots [YP \dots Y^0 + X^0 \dots]]$

Once *-gi/-ge* has lowered, it can undergo fusion with the morpheme to its left to spell out as a single morphological word. The case alternation observed on the suffixes *-gi/-ge* moreover indicate whether the individual/event denoted by the nominalized relative clause is the subject or non-subject of the matrix verb. The presence of *gi* indicates that the DP has been assigned nominative case (11); the presence of *ge* indicates that the DP has been assigned non-nominative case, as in (12).

- (11) máʔak t'í:yeli-lu ge-yúli-hay-i-š-**gi** gílgay-i
 stick large-INST 3OBJ-die-CAUS-IND-SR-REL break-IND
 ‘The big stick he killed it with broke.’

The use of the non-nominative suffix *ge* includes not only accusative objects (12a; repeated from 9a), but also extends to its use with postpositions, which may themselves select for the matrix DP containing the relative clause (b).

- (12) a. mé:hu gewe ʔ-igi-yi-š-ge lé-saʔ l-í:gi-yi
 boy coyote 3-see-IND-SR-REL 1-still 1-see-IND
 ‘I saw the same coyote as the boy.’
- b. séwit ge-séʔš-uweʔ-i-ge-lu ga-Lók’aš-ha
 porcupine IMP-take-hence-IND-REL-INST IMP-scare-CAUS
 ‘Take a porcupine and scare him with it.’ (Jacobsen, 1981)

In the next section I move on to derive the ambiguity in the interpretation of nominalized clauses.

3 The interpretation of clausal nominalizations

The core of the semantic analysis is that the suffixes *ge/ge* that nominalize a CP have essentially the semantics of a Strawsonian definite article, as below.

- (13) $[[gi/ge]]: \lambda P_{\langle e,t \rangle} \iota x_e [P(x)]$

As the semantics of this nominalizer involves binding by an ι -operator, we can capture the systematic ambiguity between individual and event readings through the proposal that the type of variable bound by this operator can vary. Following Toosarvandani (2014), I propose that the individual reading in relative clauses arises when an *individual* variable is bound by this ι -operator, while the event reading arises when an *event* variable is bound.

While this is all that is needed to derive the event analysis, the individual reading requires additional explanation. In the semantic analysis below, I propose that there are two other pieces required to achieve this reading: i) internally headed relatives, but not event readings, involve a relative operator high in the CP which binds the ‘semantic head’ of the relative clause; and ii) the semantic head of the relative clause is a Heimian indefinite, which contributes a restricted variable that becomes available for binding by the ι -operator (Basilico, 1996).

Further, following Toosarvandani’s (2014) semantic treatment of Northern Paiute, I adopt Kratzer’s (1996) Neo-Davidsonian event semantics and assume *Event Identification*, a compositional rule that combines two predicates of events by abstracting over both of their event arguments.

- (14) **Event Identification:** $\lambda x \lambda e (\alpha(x)(e) \ \& \ \beta(e)): \langle e, \langle s, t \rangle \rangle$
- $$\begin{array}{c} \alpha \qquad \beta \\ \diagdown \quad \diagup \\ \langle e, \langle s, t \rangle \rangle \quad \langle s, t \rangle \end{array}$$

In the following sections I explain the analysis for both readings in greater detail.

3.1 The individual reading

The individual reading arises when the semantics of the nominalized clause is interpreted as that of an internally-headed relative. Note that Washo relative clauses are analyzed as internally-headed because a clause-internal argument can become the semantic head of a relative clause (Jacobsen, 1964, 1981). Thus, the following relative clause is ambiguous between two meanings.

- (15) mé:hu gewe ʔ-igi-yi-š-ge lé-saʔ l-í:gi-yi
 boy coyote 3-see-IND-SR-REL 1-still 1-see-IND
 Interpretation 1: ‘I saw the same coyote as the boy.’
 Interpretation 2: ‘I saw the same boy that saw the coyote.’

The so-called *semantic head* of the relative clause refers to the argument that acts like the selected argument of the matrix verb. On interpretation 1, the *coyote* is both the object of the matrix clause and subordinate clause, while on interpretation 2, the *boy* is both the object of the matrix clause and the subject of the subordinate clause.

I show below that we arrive at the correct semantics for Washo relative clauses by treating the semantic head of the relative clause as a restricted variable (along the lines of Williamson (1987); Basilico (1996)) that becomes bound by the ι -operator denoted by *gi/ge*. I repeat this function in (16), which takes a property as its argument and returns the unique individual of whom that property holds.

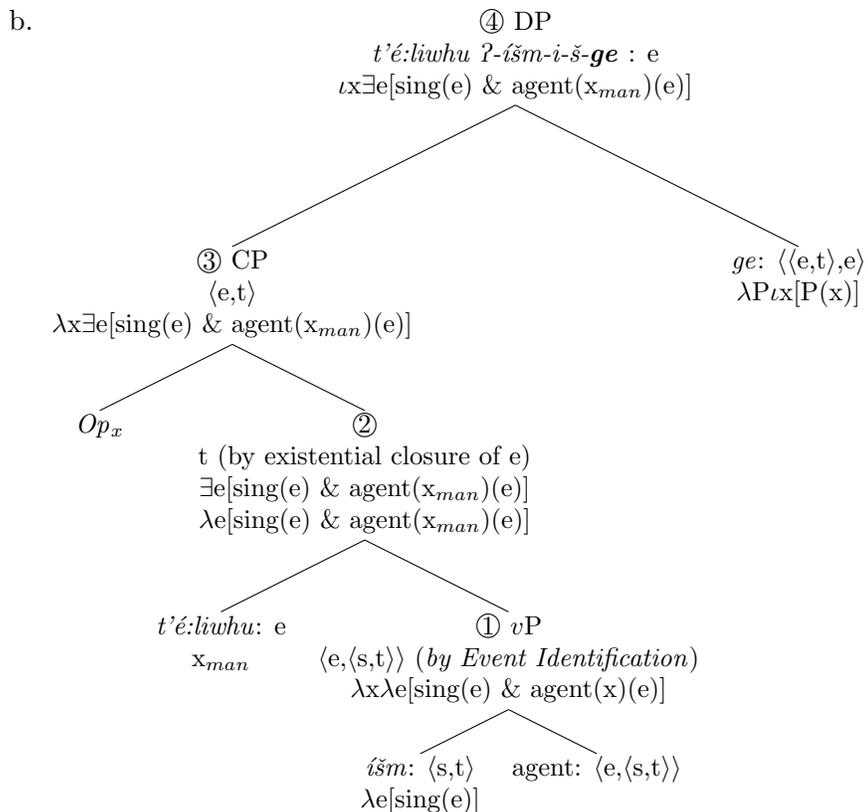
$$(16) \quad \llbracket gi/ge \rrbracket: \lambda P_{\langle e,t \rangle} \iota x_e [P(x)]$$

The ι -operator in this function will ultimately bind the semantic head of the relative clause, which means that this head needs to have the meaning of a variable in order to be bound. While Williamson (1987) and Basilico (1996) first imposed this necessity, their analyses do not make precise how a restricted variable should be represented. I give in (17) the denotation I assume for an indefinite like *man*, which represents a restricted variable in that it can only be assigned a value by the assignment function if the variable is a subset of the property *man*.

$$(17) \quad \llbracket x_{man} \rrbracket^g = g(x) \text{ iff } g(x) \in \llbracket man \rrbracket$$

With this in mind, I walk through the derivation for a relative clause like (18a) in (b).

- (18) a. t'él:liwhu ʔ-íšm-i-š-ge l-í:gi-yi
 man 3-sing-IND-SR-REL 1-see-IND
 'I saw *the man who was singing*.'⁵



⁵Here I do not include the step of movement of the subject out of the *vP*.

In ①, the subordinate verb *sing* composes with the agent through Event Identification, returning a function of type $\langle e, \langle s, t \rangle \rangle$. The external argument of the verb, here the restricted variable x_{man} , saturates the individual argument of this function. In ②, the resulting $\langle s, t \rangle$ function undergoes Existential Closure of the event variable, returning a proposition of type t . In ③, the relative operator in CP λ -abstracts over the restricted variable, returning the property meaning canonically assumed for relative clauses. Note that this operator acts essentially as an unselective binder, binding any free variable available within its scope. Now that the CP is property-denoting, the function denoted by the suffix *-ge* takes this property and returns the unique individual for whom this property holds. This gives us precisely the desired semantics: the matrix verb now selects for a nominal argument, whose meaning is that of an individual who is the agent of a singing event (i.e. *the man who sang* in (18b)).

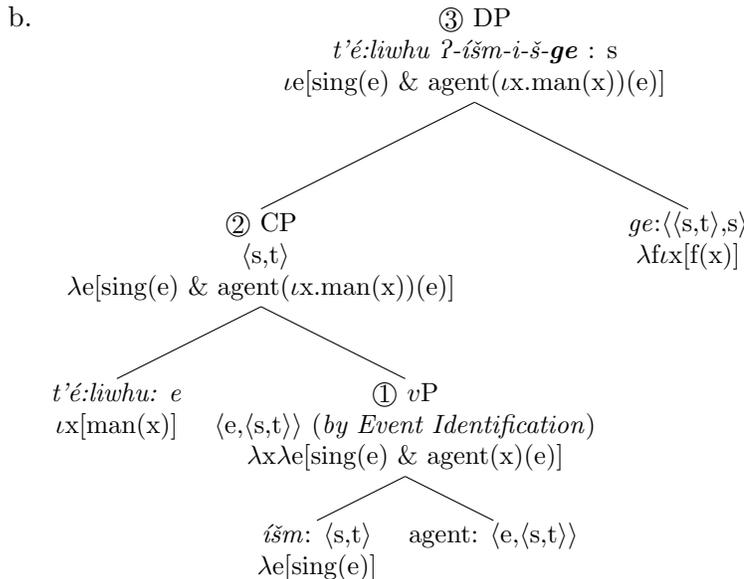
3.2 The event reading

The first difference in the event reading is that \exists -closure of the event variable does not apply, leaving the event variable unsaturated. Second, there is no relative operator required to bind a restricted variable. Third, the function denoted by D now ranges over sets of events, not properties (Toosarvandani, 2014), with the effect that the ι -operator can now bind an event variable, rather than an individual variable.

$$(19) \quad \llbracket \text{gi/ge} \rrbracket: \lambda f_{\langle s, t \rangle} \iota x_s [f(x)]$$

Composition of an event interpretation like (20a) then proceeds as in (20b).

- (20) a. t'é:liwɰu ʔ-íʂm-i-š-ge di-dámal-i
 man 3-sing-IND-SR-REL 1-hear-IND
 'I heard *the man's singing*.'



In ①, the subordinate verb *sing* again composes with the agent through Event Identification, just as in the individual reading. In ② however, there is no existential closure of the event variable, resulting in a CP whose denotation is a function from events to truth values. Finally, in ③, the event variable is ι -bound, returning an individual event. This is again precisely the meaning we want for the DP, which now denotes a unique singing event whose agent is some salient *man*. The

object of the matrix verb *hear* is now correctly the event of singing, rather than the individual who sang.

4 Washo and the indefiniteness restriction

The discussion of internally headed relatives above leads to a question about the interpretation of strong determiners in this construction. It has been widely demonstrated that internally-headed relative clauses in many languages are subject to an indefiniteness restriction. This restriction requires that the semantic head of the relative be *indefinite*, to the exclusion of *strong* determiners such as definite determiners or quantifiers (Williamson (1987) for Lakhota; Basilico (1996) for Digueño, Mojave, Mooré, and Northern Athabaskan). Basilico (1996) proposes that this restriction is explained if the relative operator needs a free variable to bind: following Heim (1982), indefinites introduce restricted variables which can serve precisely this function. In this section I show that Washo violates this restriction, and propose an analysis that can account for this fact. In a nutshell, the proposal is that demonstrative determiners in Washo, like indefinites, house a restricted variable that can be bound by the relative operator.

In the analysis presented above, the variable bound in a relative clause is contributed by a Heimian indefinite. However, we do see strong determiners in internally headed relatives in Washo, namely demonstratives.

- (21) **wí:diʔ/hádigí** t'ánu ʔ-í:biʔ-i-š-ge l-í:gi-yi
 this/that person 3-come-IND-SR-REL 1-see-IND
 'I saw this/that person that came.' (field notes)

Examples such as (21) demonstrate that Washo violates the indefiniteness restriction observed across many other languages with internally-headed relatives.⁶ The problem such examples pose to the current treatment of relative clauses is as follows. The individual reading as derived in Section 3.1 requires an indefinite to be the semantic head of the relative clause, so that a restricted variable can be bound by the ι -operator in the nominalizing head *gi/ge*. The demonstrative above should have a definite interpretation, involving no such variable. The question that arises is then how a semantic head containing a demonstrative can give rise to an individual interpretation. Below I propose an analysis according to which demonstratives likewise contain an unbound variable, making them suitable as semantic heads in Washo relative clauses.

4.1 The interpretation of demonstratives

In order to explain why demonstratives should make suitable semantic heads in Washo relative clauses, I follow Elbourne's (2005) proposal that D heads in English select not only for an NP, but also for a bindable index (see also Elbourne (2008); Schwarz (2009)). The denotation of a DP then involves identity to an unbound variable (i.e. is equivalent to the result of *trace conversion* (Fox, 2002)), according to which a variable is inserted into definite descriptions for purposes of binding. In Elbourne's system, this is not an extra step required for binding; the index starts out as an argument of D from the beginning. Hanink (to appear) builds on Elbourne (2005, 2008) as well as Schwarz's (2009) proposal that an index is encoded in the structure of certain definite descriptions and argues for the following syntax, which I will assume for the remainder of the analysis.⁷

⁶This is also the case in Navajo, according to Grosu (2009). It is worth noting that relative clauses in Navajo are also formed through the suffixation of a 3rd-person pronoun to an entire clause.

⁷For arguments in favor of this syntax, see Hanink (to appear).

- (22) a.
$$\begin{array}{c} \text{DP} \\ \swarrow \quad \searrow \\ \text{D} \quad \text{idxP} \\ \quad \swarrow \quad \searrow \\ \quad \text{idx} \quad \text{NP} \end{array}$$
- b. For any i and assignment g , $\llbracket \text{the } idx_i \text{ NP} \rrbracket^g =$
 $\iota x: x \in D_e \text{ such that } P(x) = 1 \ \& \ x = g(i).$

This meaning is achieved through the following denotation for *idx*, which denotes the property of being identical to some restricted variable.

- (23) $\lambda x[x = g(i)]$

Given this property denotation, the meaning of *idx* composes with a noun phrase through Predicate Modification (Heim and Kratzer, 1998) before composing with D. Crucially, the variable denoted by the index remains free and is available for binding at the DP level. The index associated with this variable can then be assigned a value by some assignment function g .

Elbourne (2008) expands on the proposal that definite descriptions involving *the* by proposing that demonstratives likewise contain an index, differing only in that a deictic component (i.e. proximal *this* or distal *that*) is always present.⁸ To model this feature here, I treat proximal/distal specifications as properties encoded by D, though I abstain from giving any proposal as how to these features enter the derivation.

- (24) a. $\llbracket \text{that} \rrbracket: \lambda P \iota x[P(x) \ \& \ \text{distal}(x)]$
 b. $\llbracket \text{this} \rrbracket: \lambda P \iota x[P(x) \ \& \ \text{proximal}(x)]$

Assuming (24) for Washo demonstratives like those in (21), the structure and interpretation of *hádigí t'ánu* ‘that person’ will be as in (25).

- (25)
$$\begin{array}{c} \text{DP} \\ \text{hádigí t'ánu} \\ \iota z[\text{person}(z) \ \& \ \text{distal}(z) \ \& \ z = g(i)] \\ \swarrow \quad \searrow \\ \text{D} \quad \text{idxP} \\ \text{hádigí} \quad \lambda x[\text{person}(x) \ \& \ x = g(i)] \\ \lambda P \iota z[P(z) \ \& \ \text{distal}(z) \ \& \ z = g(i)] \quad \swarrow \quad \searrow \\ \quad \text{idx} \quad \text{NP} \\ \lambda x[x = g(i)] \quad \text{t'ánu} \\ \quad \quad \lambda y[\text{person}(y)] \end{array}$$

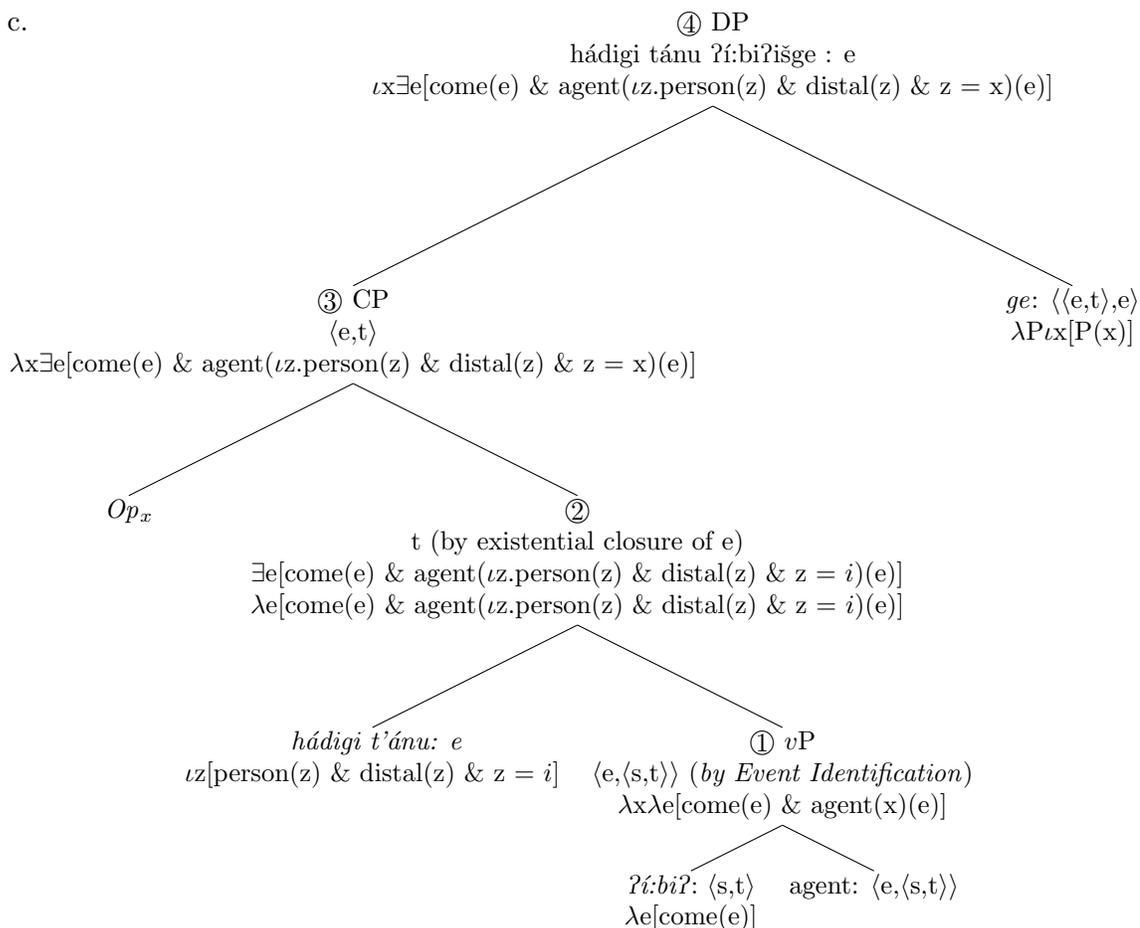
I propose that this analysis provides us with just the unbound variable we need to allow for binding by the relative operator in CP. In (26) I walk through the derivation for an internally-headed relative whose semantic head contains the demonstrative *hádigí* ‘that’.

- (26) a. *hádigí t'ánu* ?-í:bi?-i-š-ge l-í:gi-yi
 that person 3-come-IND-SR-REL 1-see-IND
 ‘I saw that person that came.’

⁸Elbourne (2008) also makes use of an R variable that serves as a relational component between the property meaning of the noun and the index, though this more articulated structure is not necessary for the composition here.

b. $[[\text{hádigí t'ánu}]]: \iota z[\text{person}(z) \ \& \ \text{distal}(z) \ \& \ z = i]$

c.



Above in ①, we see again that the verb composes with the agent via Event Identification. The external argument, *hádigí t'ánu*, which houses an unbound variable, saturates the individual argument denoted by *vP*. In ②, the property from events to truth values undergoes existential closure of the event variable to return a proposition. In ③, the relative operator λ -abstracts over the only free variable in this function to return a property of individuals. Finally in ④, the ι -operator binds this variable to return the unique individual whose distance is distal, and who is the agent of the coming event. We therefore arrive at the desired individual meaning which can then compose with the matrix verb (*see*) to form a proposition.

4.2 Structurally-encoded indices and cross-linguistic variation

Elbourne's analysis of demonstratives allows us to explain why demonstratives are viable semantic heads in Washo relative clauses, explaining their ability to be interpreted relative-clause internally. This of course raises an obvious question, however: if demonstratives house a variable that can be bound by a relative operator, then it is unclear why we should observe such a robust cross-linguistic restriction on strong determiners in internally-headed relatives. While I cannot offer a concrete solution to this puzzle, I propose that the presence of the index in demonstratives is a point of variation across languages. Essentially, if there is evidence that definite descriptions in a given language house an index, then I predict that that language should allow for definite determiners inside internally-headed relatives.

While evidence for the presence of indices varies across languages (see e.g. Schwarz (2009), who gives evidence for the presence of an index in German anaphoric definites), there is a clue shown by the morphology of Washo demonstratives that suggests that this analysis is on the right track. Remember that Elbourne’s (and Hanink’s (to appear)) claim about definite descriptions is that definite determiners select for two arguments: an index and a noun phrase. I argue that the morphology of the Washo demonstrative *hádigí* transparently reveals this structure. I argue that this determiner is in fact comprised of both a demonstrative head as well as a pronoun. First, there is evidence from earlier speakers of the language that the demonstrative used to be simply *hádi?*.⁹

- (27) **hádi?** wí:di? bedlí? ?-íšl-i
 that this matches 3-give-IND
 ‘That one is giving this one matches.’ (Jacobsen, 1964)

Second, the third-person nominative pronoun is the form *gi*.

- (28) **gí**-k’ej pú:lul rí:no-ya de-yé?e-š-ha k’-é?-i
 he-REST car Reno-toward NMZLR-go-SR-CAUS 3-be-IND
 ‘He always drives to Reno.’ (Washo Archive)

Putting both of these elements together, we arrive at precisely the syntax of demonstratives shown in (25), schematized below in a more articulated structure. In (29), the demonstrative *hádi?* serves as the D head, while the pronoun *gi* occupies *idx* – consistent with the fact that pronouns have the same interpretation as *idx* in a definite description.¹⁰

- (29)
-
- ```

 graph TD
 DP --> D[hádi?]
 DP --> idxP[idxP]
 idxP --> idx[gi]
 idxP --> NP[NP]
 NP --> N[t'ánu]

```

I therefore argue that the morphology of *hádigí* provides transparent evidence that an index is available for binding in Washo demonstratives. The status of demonstratives in languages respecting the indefiniteness restriction however remains to be explored. In the next section I show that in addition to explaining the interpretation facts, the ability of definite determiners to house a bindable index in Washo extends a puzzling fact about the restrictive semantics of these relative clauses when they are stacked.

### 4.3 Relative clause stacking

In this section I show that the analysis of Washo demonstratives presented in Section 4.1 immediately extends to a puzzle about Washo relative clauses: they can stack. In a nutshell, I argue that, because the suffix *gi/ge* essentially has the semantics of the definite article, the denotation of this nominalizer likewise houses a restricted variable which makes stackability possible.

According to Grosu’s (2009) typology (inter al.), restrictive relative clauses – as opposed to *maximalizing* relative clauses found in Japanese or Korean (Hoshi, 1995; Shimoyama, 1999) –

<sup>9</sup>In fact, some speakers still use this form.

<sup>10</sup>The case on *gi*, however, is invariant in that the demonstrative cannot not surface as *hádigí* even in non-nominative contexts. This implies that the nominative *hádigí* has become the fixed, default form of the demonstrative.

should be stackable with a restrictive semantics. This prediction is borne out by Washo relative clauses.

- (30) mé:hu baŋaya eʔ-i-š-ge Alan boŋiy-iš-gi bašug-e:s-i  
 boy outside be-SR-REL Alan call-IND-SR-REL come.in-NEG-IND  
 ‘The boy that was outside that Alan called didn’t come in.’ (field notes)

In (30), the most deeply embedded DP is *the boy that was outside*, which is the object of the verb in the intermediate relative clause, *call*. The resulting intersective DP *the boy that was outside that Alan called* then becomes the subject of the higher matrix verb, *come in*.

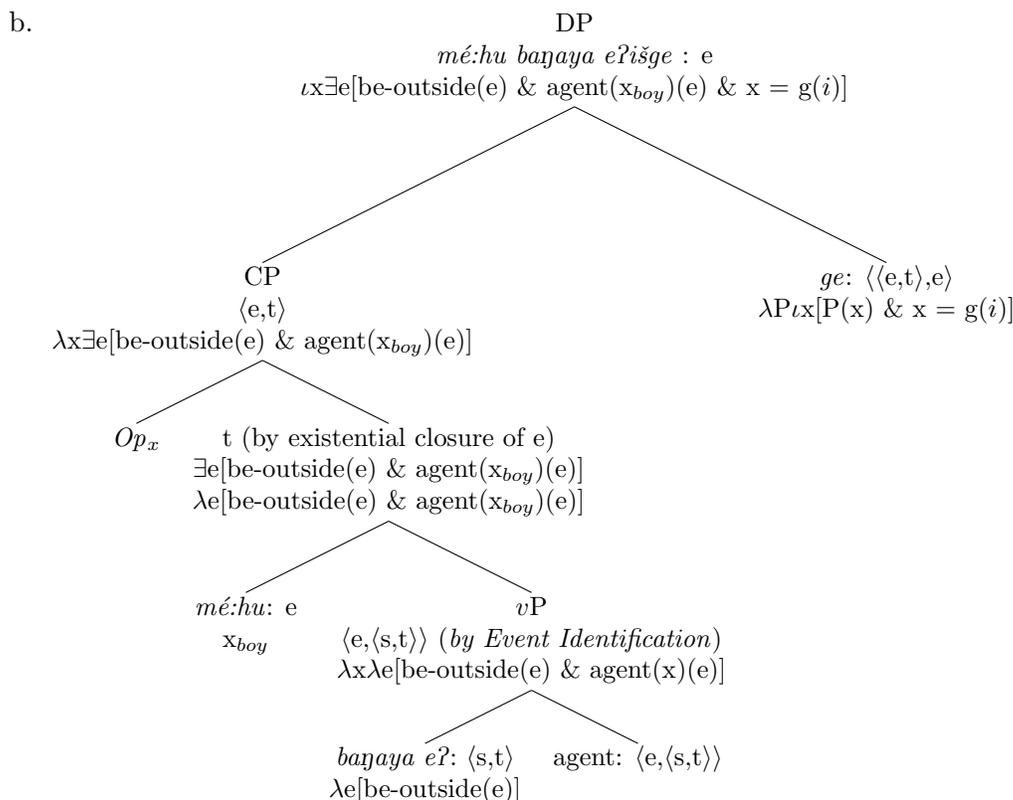
Such cases pose a problem for a semantic analysis that does not allow for unbound variables in definite descriptions in Washo. The problem is this: once the meaning of the relative clause is derived to form an individual, there is no longer any unbound variable contributed by an indefinite or otherwise that can be bound by the relative operator in the higher relative clause.

However, Elbourne’s proposal that definites house a restricted variable immediately explains the stackability of relative clauses in Washo. Under this account, the bindable variable made available to the higher relative clause is provided by the nominalizer of the lowest relative clause itself. We can therefore revise the function denoted by the nominalizer *gi/ge* to the following.

- (31)  $[[gi/ge]]^g: \lambda P_{\langle e,t \rangle} \iota x_e [P(x) \ \& \ x = g(i)]$

After this suffix selects for CP, it returns an individual that still has an unbound variable, which in turn can become bound by the higher relative operator. I walk through this in more detail below. I give in (32b) the denotation for the most embedded relative clause in (32a).

- (32) a. mé:hu baŋaya eʔ-i-š-ge Alan boŋiy-iš-gi bašug-e:s-i  
 boy outside be-SR-REL Alan call-IND-SR-REL come.in-NEG-IND  
 ‘The boy that was outside that Alan called didn’t come in.’



This gives us the correct denotation for stacking purposes: the resulting DP has an unbound variable that can become bound by the next-highest relative operator.

It is important to note here that bare nouns in Washo are ambiguous between an indefinite and a definite reading; there is no overt form of the definite or indefinite form, as (33) illustrates.

- (33) a. **géwe** ʔwáʔ ʔ-iyéʔ-áʔyiʔ-i  
 coyote here 3-go-MIR-IND  
 ‘A coyote was walking here.’ (Washo Archive)
- b. **géwe** t’ánu-ŋa ʔ-iʔw-é:sʔ-i  
 coyote person-NC 3-eat-NEG-IND  
 ‘The coyote didn’t eat anyone.’ (Washo Archive)

However, while the definite article has no overt form in cases where a nominal restriction is present, the semantics I have assigned to the suffix *gi/ge* is essentially that of the definite article. This makes the suffix *gi/ge* the only *overt* realization of the definite article in Washo, which is however only observable in the context of CP-selection. This suggests that we can write a contextual rule for the definite article, whose vocabulary entry is generally null, but overt in the context of a CP. In the general case, the elsewhere form (34a) will override the more contextually specified insertion rules (34b)-(34c), unless their contextual specifications are met.

- (34) a. [D] ↔ ∅  
 b. [D] ↔ ge/CP\_\_  
 c. [D +nom] ↔ gi/CP\_\_

The elsewhere form is null and surfaces in most environments (34a). The non-nominative form, *ge*, surfaces only in the context of a CP, as specified in the contextually-determined environment in (b). The most specified rule in (c) will only apply in case a nominative feature is present on the D head. The morphological connection between the definite article and third person pronoun in Washo warrants further investigation.

Before moving on, I note here for the sake of completeness that stacking is likewise available for the event interpretation of nominalized clauses, as in (35).

- (35) Alan ʔ-íšm-i-š-ge di-dámal-galám-i-ge di-hámuguyú:k-iwaé:s-i  
 Alan 3-sing-IND-SR-REL 1-hear-want-IND-REL 1-think-DUR-IND  
 ‘I keep thinking that I want to hear Alan’s singing.’  
 Literally: ‘I keep thinking about my wanting to hear Alan’s singing.’ (field notes)

Such examples however do not pose any challenge for the semantic analysis presented above; the entire event-denoting DP is simply selected for as the object of the next-highest verb, whose own event variable is free to become bound by the *ι*-operator in D.

#### 4.4 An open question: The interpretation of quantifiers

While I have shown that demonstratives can be interpreted inside of relative clauses due to the fact that they host a restricted variable, I have not discussed other types of determiners. According to the indefiniteness restriction, all so-called strong determiners are banned in relative clauses. While my fieldwork is still ongoing, there is preliminary evidence that certain quantifiers are allowed inside relative clauses, particularly coming from the universal quantifier *mi?le?*.

The quantifier *miʔleʔ* is akin to an ‘all’-type quantifier (as opposed to an ‘every’-type quantifier). It takes a plural restriction, which can be observed in a fixed set of human nouns (non-human nouns show no plural morphology). The plural morphology in this noun set is seen for example in the reduplication of the final syllable in *mé:hu* and stress shift below (Yu, 2005).

- (36) tánu **mehú:hu** miʔle-w gaʔlá:mi  
 person boys.REDUP all-human 3-like-IND  
 ‘Someone likes all the boys.’ (Washo Archive)

On the surface, it appears that the universal quantifier *all* does in fact appear relative-clause internally.

- (37) **miʔle-w** t’ánu ʔ-í:biʔ-i-š-ge l-í:gi-yi  
 all-human person 3-come-IND-SR-REL 1-see-IND  
 ‘I saw all the people that came.’ (field notes)

The ability of the quantifier to appear inside the relative clause results in a syntax-semantics mismatch. As Grosu (2009) points out in his discussion of Navajo, the scope of the universal quantifier must be in the matrix clause, and not in the embedded clause in examples like (38), taken from Faltz (1995).

- (38) Leechaa’i **t’aa-altso** ash-kii deishzashi-gii nidahal’in  
 dog all boy bite-REL bark  
 ‘All the dogs that bit the boy are barking.’ (Faltz, 1995)

As Grosu notes, Faltz explains that this example cannot be interpreted with the paraphrased meaning in (39a), rather it must have the meaning in (b).

- (39) a. *all the contextually relevant dogs bit the boy.*  
 b. *a subset of the relevant plurality of dogs bit the boy, and those dogs are barking.*

Likewise in the Washo example in (37), *miʔleʔ* quantifies over the set of *people who came*, not just *people*. In addition to the clause-internal position, another strategy for quantification in such contexts is for the quantifier to occur overtly in the matrix clause (40), or to appear in both the matrix and embedded clause (41).

- (40) mehú:-hu bó:njy-i-š-gi **miʔle-w** p’ímeweʔ-i  
 child-PL 3.call-IND-SR-REL all-human 3.come.out  
 ‘All the children whom she called came out.’ (field notes)

- (41) **miʔle-w** hádigi ibi-ʔi-gi **miʔle-w** Ø-ʔemlu-i.  
 all-human those 3.come-IND-SR-REL all-human 3-eat-IND  
 ‘All those people (pointing) that came ate.’ (field notes)

It remains an open question as how to such quantifiers fit into the analysis presented here, as it is unclear how the semantic head of the internally-headed relative clause can be interpreted in their presence (which does away with the presence of any unbound variable). Relatedly, more work is needed to investigate other types of quantifiers in relative-clause internal positions.

## 5 Conclusion

The Washo clausal nominalizations investigated in this paper are formed through the suffixation of a third-person pronoun in either its nominative form (*gi*) or non-nominative form (*ge*). One and the same syntax gives rise to an ambiguous semantics: either the nominalization is interpreted as an individual in an internally-headed relative, or it can be interpreted as an event. I have argued here that this ambiguity arises through the ability of the suffix *gi/ge* to bind an individual variable in the former case as well as an event variable in the latter.

The work presented here on relative clauses situates Washo moreover with respect to the well-known indefiniteness restriction, which holds for many languages with internally-headed relatives. In the general case, the semantic head of the relative clause in Washo is contributed by a Heimian indefinite, which contributes a restricted variable available for binding. However, Washo also allows definites to be interpreted inside the relative clause in the form of demonstratives. I have shown that this fact follows if definite descriptions may house an unbound variable which becomes available for binding by the  $\iota$ -operator. I have also shown that this analysis immediately and neatly accounts for the ability of relative clauses to stack: the suffix *gi/ge*, which has the semantics of a definite article, can itself contribute a restricted variable to be bound by higher relative operators. Remaining work is needed to investigate the interpretation of quantifiers inside the relative clause, though preliminary data show that at least universal quantification is allowed.

Broadly speaking, the work presented here contributes to the understanding of syntax-semantics mismatches in clausal nominalization structures. In Washo, we observe one syntactic construction that can give rise to two different interpretations, analyzed here as a flexibility in terms of binding. Further, this work contributes to our understanding of the encoding of indices inside definite descriptions cross-linguistically, providing support for claims along the lines of those in Elbourne (2005), Schwarz (2009), and Hanink (to appear) from Washo, an understudied isolate language.

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# The Structured Individual Hypothesis for processing aspectual verbs\*

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## 1 Introduction

Aspectual verbs (AspVs) are verbs such as *begin*, *finish*, *end*, and *continue*. Sentences with aspectual verbs like (1a), in which an aspectual verb is composed with an entity-denoting complement, often receive an interpretation as in (1b). The subject denotation *Jane* is conceived of as an agent that began doing some activity involving the complement denotation, *the book*. This kind of reading will be called the ‘agentive reading’ of AspV sentences.

- (1) a. Jane **began** the book.
- b.  $\rightsquigarrow$  Jane began reading/writing/... the book.

On the other hand, sentences like (2a) are interpreted as (2b), in which the subject denotation is conceived of as a subpart of the entity denoted by the complement. This kind of reading will be called the ‘constitutive reading’ of AspV sentences.

- (2) a. The chapter on global warming **began** the book.
- b.  $\rightsquigarrow$  The chapter on global warming was the initial subpart of the book.

Examples (1) and (2) demonstrate that sentences with aspectual verbs can give rise to both an agentive reading and a constitutive reading.

In terms of real-time comprehension, it has been shown that sentences with aspectual verbs like (1a) engender additional processing cost and localizable brain activity, as compared to (3), in which an activity is morpho-syntactically present.

- (3) Jane **read/wrote** the book.

The processing cost associated with aspectual verbs and its potential brain correlates have been shown in a variety of measurements in previous studies, including eye-movements (Traxler et al., 2002, 2005; Pickering et al., 2005; Frisson and McElree, 2008; Katsika et al., 2012), self-paced reading (McElree et al., 2001; Traxler et al., 2002), multi-response speed-accuracy trade off paradigm (MR-SAT) (McElree et al., 2006), focal lesion (Piñango and Zurif, 2001), MEG (Pykkänen and McElree, 2007), ERP (Kuperberg et al., 2010; Baggio et al., 2010), and fMRI (Husband et al., 2011; Lai et al., 2014). However, this cost has only been measured on the basis of the agentive reading.

Two questions emerge from these observations: First, is there a unified way to capture both the agentive and constitutive readings in sentences with aspectual verbs? Second, can such an analysis account for the processing cost associated with these sentences?

The first question has been addressed by Piñango and Deo (2012, 2015), whose structured individual analysis will be introduced below. Based on their analysis, we propose the Structured Individual Hypothesis to address the second question regarding the source of processing cost associated with AspV sentences. This study reports two experiments that test this hypothesis, along with a pretest questionnaire. We show that the results are consistent with the Structured Individual Hypothesis for processing aspectual verbs in both agentive and constitutive readings.

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\*We would like to take this chance to thank the audience of the BLS42 workshop for useful comments.

## 1.1 The Structured Individual analysis

This section introduces the Structured Individual analysis proposed by Piñango and Deo (2012, 2015). Intuitively, aspectual verbs such as *begin* and *finish* map the subject denotation to a specific subpart of a structured entity denoted by the complement. For example, in (4), the aspectual verb *begin* maps the denotation of *Boston Common* to an initial subpart of a structured entity denoted by *the Freedom Trail*.

- (4) Boston Common begins the Freedom Trail.

Piñango & Deo propose that aspectual verbs select for structured individuals as their complements. Structured individuals are defined as entities that can be conceptualized as a directed path structure—an *axis*—in some ontological dimension.

- (5) *Directed path structure*



The notion of dimension can be illustrated by the following examples. Consider this sentence: (6) ‘*This famous perch begins the Appalachian Trail.*’ The complement denotation (*the Appalachian Trail*) is conceptualized as a structured individual, which is construed as an axis along the **spatial dimension**. The verb *begin* maps the subject denotation *this famous perch* onto the initial subpart of the axis construed by the complement: that is, the spatial extent of the famous perch is the initial subpart of the spatial extent of the Appalachian Trail, as visualized in (6) below. This sentence exemplifies the constitutive reading along the spatial dimension.

- (6) SPATIAL: *This famous perch begins the Appalachian Trail.*



Sentence (7) ‘*A short postscript ends the novel.*’ exemplifies the constitutive reading along the **informational dimension**. In this case, the complement *the novel* is conceptualized as a structured individual, constructed as an axis along the informational dimension. The aspectual verb *ends* maps the subject denotation, *a short postscript*, onto the final subpart of this axis: that is, the informational content denoted by *a postscript* is the final subpart of the content denoted by *the novel*.

- (7) INFORMATIONAL: *A short postscript ends the novel.*



The dimension can also be **eventive**. For instance, the complement in the following sentence is conceptualized as a structured individual, construed as an axis along the eventive dimension.

Here, the aspectual verb maps *a prayer* onto the initial subpart of the axis denoted by *the banquet*. Sentence (8) exemplifies a constitutive reading along the eventive dimension, such that the praying event is the initial event of a (macro-)event denoted by *the banquet*.

- (8) EVENTIVE: *A prayer started the banquet.*



Examples (6) through (8) demonstrate that a structured individual denoted by the complement following an aspectual verb can be realized along various dimensions. The sentence is interpreted in accordance with the dimension onto which the structured individual is construed as an axis.

In addition, Piñango and Deo (2015) argue that the functions that map the complement denotation to an axis along a specific dimension are lexically encoded as part of the meaning of aspectual verbs. Each lexical function is associated with a specific dimension (e.g.  $f_{space}$ ,  $f_{time}$ ,  $f_{info}$ ). That is,  $f_{space}$  maps the structured individual denoted by the complement onto the spatial dimension, and  $f_{info}$  maps the structured individual denoted by the complement onto the informational dimension.

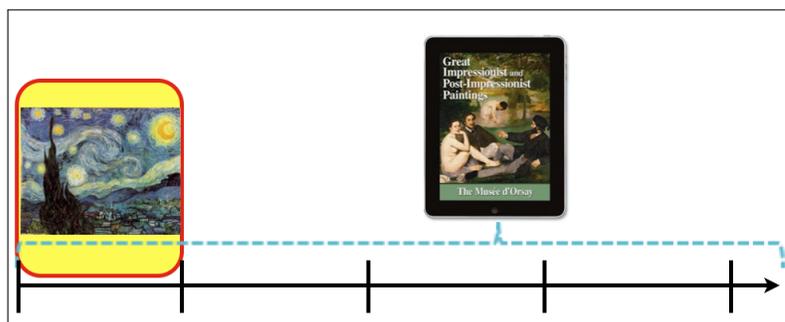
This means that the interpretation of an AspV sentence depends in large part on the dimension along which the structured individual is construed. Crucially, the choice of dimension is contextually determined; this will be explained in more detail below.

### 1.1.1 Two configurations in which aspectual verbs appear

Upon closer examination, AspVs can be composed with an animate subject (e.g. (1a)) or with an inanimate subject (e.g. (2a)).

In the case in which an aspectual verb combines with a subject that denotes an *inanimate* entity, such as “‘*Starry Night*’ began the collection of oil paintings”, the sentence gives rise to a constitutive reading which can be schematized as below. Such configurations (inanimate subject + AspV) will be termed the ‘AspVinanimate’ configuration henceforth.

- (9) ‘**Starry Night**’ began the collection of oil paintings.



Notice that this constitutive reading is itself underspecified with respect to the dimension along which the complement denotation might be construed as a structured individual. If the complement is construed as an axis along the *spatial* dimension, *the collection of oil paintings* is conceived as a physical entity, such as a book consisting of  $X$  pages. Along this spatial dimension, the subject denotation ‘*Starry Night*’ is printed on the first page of this collection. If the complement is

construed along the *informational* dimension, it will be conceived as a structured body of informational content, consisting of  $X$  paintings, where each painting is a piece of informational content. Accordingly, the sentence is understood to convey that the painting titled ‘Starry Night’ was the first painting of this collection. In other words, a constitutive reading of an AspV sentence can be realized along multiple dimensions, yielding different interpretations.

On the other hand, when an aspectual verb combines with a subject that denotes an *animate* entity, such as (10), the sentence gives rise to a semantic ambiguity between an agentive and a constitutive reading along various dimensions. Such configurations will be termed the ‘AspVanimate’ configuration henceforth.

- (10) **Van Gogh** began the collection of oil paintings.

Sentence (10) can give rise to an agentive reading, such as ‘*Van Gogh began browsing/editing/etc. the collection of oil paintings*’. In this case, the complement is conceptualized as a structured individual, construed as an axis along the eventive dimension, and the subject is conceived as an Agent<sup>1</sup>. The sentence can also give rise to a constitutive reading, such as ‘*Van Gogh’s painting was the initial subpart of the collection*’. Just as the constitutive reading in the inanimate configuration, here the complement can be realized along different dimensions. It can be conceived as a physical entity along the spatial dimension (e.g. a book consisting of  $X$  pages), or as a structured body of informational content along the informational dimension (e.g. a collection of  $X$  paintings). In this sense, the composition of an aspectual verb and an animate subject engenders a semantic ambiguity between an agentive reading and a constitutive reading. The exact interpretation of the sentence depends on the dimension along which the structured individual (denoted by the complement) is construed.

Importantly, on the current analysis, both AspVanimate and AspVinanimate configurations involve dimension ambiguity. The complement, and the sentence accordingly, can be interpreted along more than one dimension (e.g. spatial, information, eventive, temporal).

### 1.1.2 Factors that determine the interpretations of AspV sentences

The Structured Individual analysis identifies two factors that influence the reading of sentences with aspectual verbs: (a) the composition with the subject, and (b) the choice of dimension.

- (11) *Two factors affecting the interpretations of AspV sentences*

| (a) Composition with Subject | (b) Choice of Dimension   | ⇒ Reading            |
|------------------------------|---------------------------|----------------------|
| Animate entity               | Eventive<br>Spatial       | Agentive reading     |
| Inanimate entity             | Informational<br>Temporal | Constitutive reading |

The composition of an aspectual verb with an animate subject does not necessarily give rise to an agentive reading along the eventive dimension. For instance, the sentence ‘*The little boy began the line*’, which contains a subject that is typically conceived as an animate entity, engenders a constitutive reading along the spatial dimension.

In addition, the eventive dimension by itself does not predict an agentive reading, in which the subject is conceived of as an agent. For instance, the sentence ‘*The prayer finished the banquet*’ is interpreted along the eventive dimension, yet it gives rise to a constitutive reading. Here the

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<sup>1</sup>Please see Piñango and Deo (2015) for details.

subject (*the prayer*) denotes an event, and the complement denotes an ordered set of subevents of the banquet event. The sentence is understood to convey that the praying event was the final subevent of the larger event denoted by *the banquet*. More examples are given below.

(12) *The interaction between Subject animacy X Dimension*

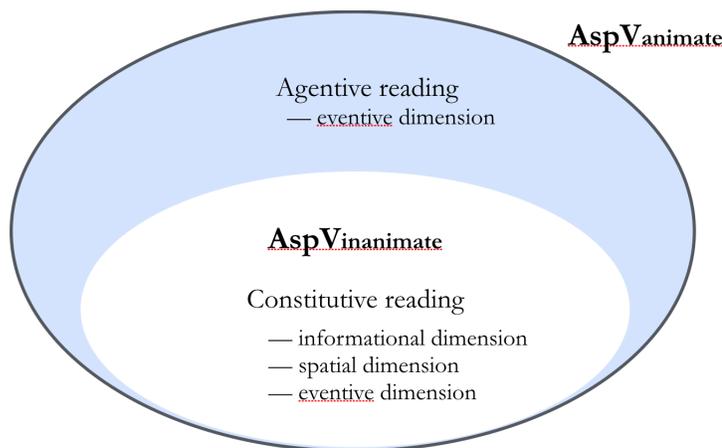
| Composition with Subject | Dimension     | Reading                                         | Example                                                    |
|--------------------------|---------------|-------------------------------------------------|------------------------------------------------------------|
| Animate Subj + AspV      | eventive      | agentive                                        | <i>Van Gogh<sub>(agent)</sub> began the collection.</i>    |
|                          | informational | constitutive                                    | <i>Van Gogh<sub>(content)</sub> begins the collection.</i> |
|                          | spatial       |                                                 | <i>The little boy began the queue.</i>                     |
| Inanimate Subj + AspV    | eventive      | agentive                                        | <i>The printer started my paper.</i>                       |
|                          | informational | constitutive                                    | <i>The prayer finished the banquet.</i>                    |
|                          | spatial       |                                                 | <i>A short postscript ends the novel.</i>                  |
|                          | temporal      |                                                 | <i>The famous perch begins the trail.</i>                  |
|                          |               | <i>The December solstice begins the winter.</i> |                                                            |

These indicate that subject animacy or dimension alone cannot determine the type of reading. Rather, the interpretation of an AspV sentence is determined by both factors, (a) and (b) listed above, in combination.

**1.1.3 The superset relationship between the two configurations of AspV sentences**

Recall the two configurations of AspV sentences mentioned in Section 1.1.1. The composition of an aspectual verb and an inanimate subject (AspVinanimate) gives rise to a constitutive reading along various dimensions. With an animate subject, an AspV sentence (AspVanimate) also gives rise to a constitutive reading along multiple dimensions. In addition, it can yield an agentive reading along the eventive dimension. That is, the set of dimensional readings available in the AspVanimate configuration is a superset of those available in the AspVinanimate configuration:  $AspVanimate \supseteq AspVinanimate$ , in terms of available dimensional interpretations.

(13) *Superset relationship: AspVanimate  $\supseteq$  AspVinanimate*



The Structured Individual analysis suggests that sentences with aspectual verbs are semantically ambiguous along various dimensions. Comprehenders must determine the specific dimension in context to get the exact interpretation. This analysis provides a unified way to capture both the

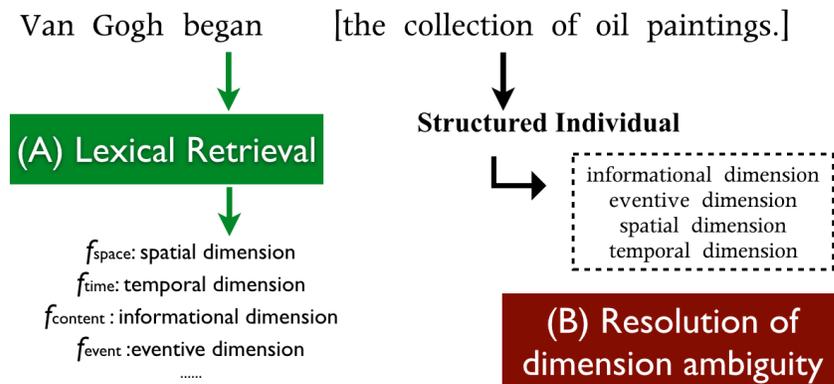
agentive and constitutive readings of sentences with aspectual verbs. With this analysis in place, we address the question of the real-time comprehension predictions that follow from the analysis.

## 1.2 The Structured Individual Hypothesis

The question we ask here is: Can the above semantic analysis account for the processing cost associated with sentences with aspectual verbs? We answer this question by the processing implication of the Structured Individual analysis. The analysis and its processing implications are what constitute the Structured Individual Hypothesis. Specifically, we propose that the real-time comprehension of an AspV sentence proceeds as below: When comprehenders encounter an aspectual verb, they retrieve all lexical functions encoded in the verb; each function is associated with a specific dimension (e.g. spatial, informational, temporal, eventive). Recall that aspectual verbs require their complement to be conceptualized as a structured individual. When comprehenders encounter the complement, the structured individual denoted by the complement is construed as an axis along a variety of dimensions. Hence, comprehenders have to determine—in context—the relevant dimension along which the structured individual is construed, in order to obtain an appropriate interpretation for the sentence.

According to this Structured Individual Hypothesis, processing sentences with aspectual verbs requires more effort because it involves (A) retrieval of dimension-functions in aspectual verbs, and (B) resolution of dimension ambiguity (i.e. choosing the contextually-relevant dimension) during the composition with the complement.

### (14) *The Structured Individual Hypothesis*



It should be noted that, in addition to the generalized semantic representation for both agentive and constitutive readings, there is experimental evidence that supports treating aspectual verbs as a unified group distinct from other verb types. Katsika et al.'s (2012) eye-tracking study reveals that the set of verbs used in previous studies that investigate the cost associated with sentences like (1a) in fact collapses aspectual verbs (e.g. *begin*, *finish*) with psychological verbs (e.g. *enjoy*, *endure*). Their results show that aspectual verbs engendered longer reading times than psychological verbs. The dissociation between these two verb types is further suggested by Utt et al. (2013). Recently, Lai et al. (2014) explicitly test the Structured Individual Hypothesis. Their results show that processing aspectual verbs not only requires more effort in real-time comprehension, as found in Katsika et al. (2012), but also involves localizable brain regions.

The present study extends Lai et al.'s study by introducing a condition in which an aspectual verb is composed with an inanimate subject, namely, the AspVinanimate configuration in Section

1.1.1. If the Structured Individual Hypothesis is on the right track—that is, all AspV sentences involve retrieval of lexical functions and dimension ambiguity—then both the AspVanimate and AspVinanimate configurations should pattern alike regardless of subject animacy. Both are predicted to be costly. The condition with an inanimate subject also allows investigation of the factors that determine the reading of AspV sentences according to the hypothesis; namely, subject animacy and the choice of dimension in combination (not just animacy alone).

To test this hypothesis, we conducted a self-paced reading experiment (Experiment 1) and an fMRI experiment (Experiment 2) to investigate the behavioral patterns and neurological correlates associated with processing aspectual verbs, along with a questionnaire pretest.

## 2 Pretest: Rating questionnaire

We first employed a rating questionnaire to make sure that the stimuli which would be used in the following experiments were acceptable to native speakers.

### 2.1 Methods

#### 2.1.1 Conditions and materials

We created four conditions. The first two conditions contained sentences with aspectual verbs and entity-denoting complements. The subject in the first condition typically refers to an animate entity (AspVanimate), while the subject in the second condition typically refers to an inanimate entity (AspVinanimate). These two AspV conditions were contrasted with two control conditions with psychological verbs, such as *enjoy*, *endure* (Control<sub>PsychV1</sub>) and *love*, *hate* (Control<sub>PsychV2</sub>). The first set of control-psychVs have been investigated in previous studies while the second set of control-psychVs have not. We do not distinguish these two conditions; both serve as controls.

(15) *Conditions and sample sentences*

| Condition                  | Verb           | Comp.-head            | Comp.+1   | Comp.+2              |                       |
|----------------------------|----------------|-----------------------|-----------|----------------------|-----------------------|
| AspVinanimate              | <i>starts</i>  | <i>the collection</i> | <i>of</i> | <i>impressionist</i> | <i>oil paintings.</i> |
| AspVanimate                | <i>started</i> | ...                   | ...       | ...                  | ...                   |
| Control <sub>PsychV1</sub> | <i>enjoyed</i> | ...                   | ...       | ...                  | ...                   |
| Control <sub>PsychV2</sub> | <i>loved</i>   | ...                   | ...       | ...                  | ...                   |

Fifty quadruples of the four conditions were created and one hundred fillers were introduced, yielding a total of three hundred sentences.

#### 2.1.2 Participants and procedures

Forty participants were recruited, all were native speakers of American English, between the ages of 18-30 and without reading disabilities. Their tasks were to rate the acceptability of each sentence from a scale of 1 to 5 and answer a comprehension question afterwards on a computer screen (5=makes sense; 1=does NOT make sense).

## 2.2 Results

We performed the Analysis of Variance (ANOVA), using subject as a random factor and rating score as a fixed factor. The data of three participants were discarded because their responses were either undifferentiated or inconsistent. Results showed that all sentences in the four conditions are within the acceptable range (>3.7).

(16) *Results of sensicality rating (N=37)*

| Condition                  | Mean | SD (Standard Deviation) | SE (Standard Error) |
|----------------------------|------|-------------------------|---------------------|
| AspVanimate                | 4.13 | 0.75                    | 0.04                |
| AspVinanimate              | 3.73 | 0.84                    | 0.05                |
| Control <sub>PsychV1</sub> | 4.31 | 0.52                    | 0.04                |
| Control <sub>PsychV2</sub> | 4.80 | 0.23                    | 0.02                |

### 3 Experiment 1: Self-Paced reading

To investigate the time-course of the cost associated with processing AspV sentences, we conducted a self-paced reading experiment with the moving-window paradigm.

#### 3.1 Method

##### 3.1.1 Materials

The quadruples of the four manipulating conditions were adopted from the pretest rating questionnaire. A set of unacceptable sentences was introduced as fillers. Each sentence was segmented into several windows, shown as the cells of Table 15. Our windows of interest were the verb, the complement head, and the two segments following the complement head (Complement+1, Complement+2).

##### 3.1.2 Participants

Twenty-eight native speakers of American English were recruited, all between the ages of 18-30, with normal vision and without history of reading disabilities.

##### 3.1.3 Procedures

Sentences were visually presented segment-by-segment on a computer screen. The participants were instructed to read the sentences at their own pace. Every trial began with a series of dashed lines corresponding to the words of the sentences on the screen, with a plus sign appearing on the left of the first segment, signaling the beginning of the sentence. The participants began by pressing the spacebar, causing the first segment to show up. With the subsequent pressing, the next segment appeared, and the previous segment was replaced by a set of dashes. At the end of the sentence, the participants were queried a comprehension question. A practice session was given beforehand, in which the participants had to reach 80% accuracy before proceeding to real trials.

### 3.2 Data analysis

We performed a mixed model analysis, incorporating a fixed effect of condition (four levels for the four conditions), and random intercepts for both subject and item. The data of all 28 participants were taken into account in data analysis. The reading times (RTs) measurements of the four windows of interest were analyzed: verb, complement head, and the two segments following the complement head (Complement+1, Complement+2). Analyses were carried out in the R statistical environment, using the *lmer* function in the *lme4* packages (Baayen et al., 2008; R Core Team, 2014). For the condition effect of RTs, we contrasted a model with condition as the

predictor against a null model without it. Pair-wise comparisons were corrected by Tukey tests for  $p$ -values. All significant contrasts are reported.

### 3.3 Results

The accuracy of the comprehension task was 95.03%, indicating that the participants fully comprehended the sentences and paid attention during the reading task.

No significant effect was found at the Verb or the Complement head position. The Verb segment showed a marginal effect of condition, yet it did not reach significance ( $\chi^2(3)=7.20$ ,  $p<0.066$ ) and disappeared at the following complement head position.

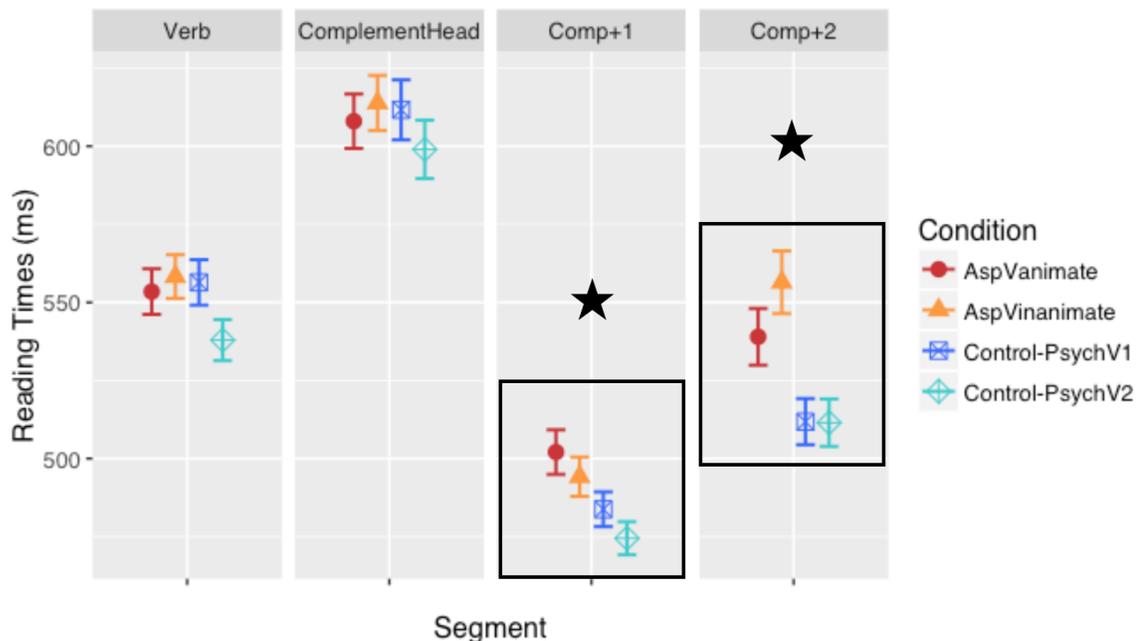
A significant effect of condition appeared at Complement+1 position ( $\chi^2(3)=15.37$ ,  $p=0.0015$ ). At this segment, both the AspVanimate and AspVinanimate conditions showed significantly longer RTs than the control condition: AspVanimate > Control<sub>PsychV2</sub> ( $b=27.58$ ,  $p=0.0015$ ), AspVinanimate > Control<sub>PsychV2</sub> ( $b=19.70$ ,  $p=0.0438$ ).

The Complement+2 segment revealed a similar pattern. A significant effect was found ( $\chi^2(3)=29.04$ ,  $p<0.001$ ). At this segment, pair-wise comparisons showed that the two conditions with aspectual verbs engendered significantly longer RTs than the two control conditions. Specifically, AspVanimate > Control<sub>PsychV1</sub> ( $b=27.17$ ,  $p=0.03$ ); AspVanimate > Control<sub>PsychV2</sub> ( $b=27.50$ ,  $p=0.03$ ); AspVinanimate > Control<sub>PsychV1</sub> ( $b=44.63$ ,  $p<0.001$ ); AspVinanimate > Control<sub>PsychV2</sub> ( $b=44.97$ ,  $p<0.001$ ). The two AspV conditions did not differ from each other, and neither did the two control PsychV conditions.

(17) *Results of reading times (in milliseconds), standard errors in parentheses*

| Condition                  | Verb          | Complement Head | Complement+1  | Complement+2   |
|----------------------------|---------------|-----------------|---------------|----------------|
| AspVanimate                | 553.45 (7.30) | 608.01 (8.70)   | 502.08 (7.13) | 538.99 (9.07)  |
| AspVinanimate              | 558.28 (6.98) | 613.86 (8.81)   | 494.20 (6.29) | 556.45 (10.01) |
| Control <sub>PsychV1</sub> | 556.42 (7.26) | 611.64 (9.61)   | 438.78 (5.55) | 511.82 (7.38)  |
| Control <sub>PsychV2</sub> | 537.93 (6.58) | 598.98 (9.34)   | 474.50 (5.28) | 511.49 (7.59)  |

(18) *Results of reading times (in milliseconds)*



Overall, results of RTs show that all sentences with aspectual verbs engendered longer RTs than the control sentences with psychological verbs, at the two segments following the complement head noun. Importantly, the two AspV conditions patterned alike, regardless of the difference in subject animacy. This is consistent with the Structured Individual Hypothesis, which claims that all sentences with aspectual verbs involve semantic ambiguity along multiple dimensions. Processing AspV sentences is more costly because comprehenders have to resolve dimension ambiguity, presumably by searching contextual information, in order to obtain a specific interpretation for the sentence.

## 4 Experiment 2: fMRI

Next, we conducted an fMRI experiment to investigate the neural correlates associated with processing sentences containing aspectual verbs.

### 4.1 Method

#### 4.1.1 Materials

The fifty quadruples (200 sentences) remained the same as the self-paced reading experiment, with a different set of 100 filler sentences introduced. The whole set of stimuli consisted of 300 sentences in total. Each participant saw all 300 sentences.

#### 4.1.2 Participants

Sixteen native speakers of American English were recruited for this study, all between the ages of 18-30, right-handed, without any reading disability or history of neurological disorders.

### 4.1.3 Paradigm

The set of 300 sentences were divided into 10 runs; each run contained 30 sentences, lasting 5 minutes 33 seconds with the inclusion of device connection delay. Within each run, the sentences were pseudo-randomized such that no successive sentences were of the same condition.

Each sentence was visually presented segment-by-segment by E-Prime software, as in the self-paced reading experiment; each segment lasted for 500 ms. The participants received a comprehension question after the sentence; each question remained on the screen for 4000 ms. There was a 500 ms interval between the sentence-final word and the question.

### 4.1.4 Imaging acquisition

*Anatomical Measurements:* The fMRI experiment was carried out on a Siemens Sonata; 3T whole body MRI scanner. Each session began with a 3-plane localizer followed by a sagittal localizer, and an inversion recovery T1 weighted scan (TE/TR=2.61/285 ms, matrix 192x192, FOV=220 mm, flip angle=70 degrees, bandwidth=501 Hz/pix, 51 slices with 2.5mm thickness). The AC-PC (anterior and posterior commissure) line was defined by this acquisition for prescription of the anatomic T1 images and functional images in the following series.

*Functional Measurements:* During the task, we conducted event-related functional MRI using gradient echo echo-planar imaging (EPI) blood oxygenation level dependent (BOLD) contrast, with TE=30 ms, TR=956 ms, matrix 84 x 84, FOV=210mm, flip angle=62 degrees, bandwidth=2289 Hz/pixel, slice thickness=2.5 mm, with 321 measurements (images per slice). The scanner was set to trigger the stimulus presentation program, which enabled the image acquisition to be synchronized with the stimulus presentation.

At the end of the functional imaging, a high-resolution 3D Magnetization Prepared Rapid Gradient Echo (MPRAGE) was used to acquire sagittal images for multi-subject registration, with TE=2.77 ms, TR=2530 ms, acquisition matrix 256x256, FOV=256mm, bandwidth=179 Hz/pix, flip angle=7 degrees, 176 slices with slice thickness=1mm. The fMRI data within subjects was registered to this brain volume, which was then registered across subjects into a common 3D brain space by the Yale BioImage Suite software package (Papademetris et al., 2006).

## 4.2 fMRI data analysis (event-related)

All data were converted from Digital Imaging and Communication in Medicine (DICOM) format to analyze format using XMedCon (Nolfe et al., 2003). During the conversion process, the first 6 images at the beginning of each of the 10 functional runs were discarded to enable the signal to achieve steady-state equilibrium between radio frequency pulsing and relaxation, leaving 315 images per slice per run for analysis. Functional images were motion-corrected with the Statistical Parametric Mapping (SPM) 5 algorithm ([www.fil.ion.ucl.ac.uk/spm/software/spm5](http://www.fil.ion.ucl.ac.uk/spm/software/spm5)) for three translational directions (x, y, z) and three possible rotations (pitch, yaw, roll). Trials with linear motion that had a displacement exceeding 1.5 mm or rotation exceeding 2 degrees were rejected. The data from one participant were excluded because of severe head movement. All further analyses were performed using BioImage Suite (Papademetris et al., 2006).

Individual subject data was analyzed using a General Linear Model (GLM) on each voxel in the entire brain volume with regressors specific for each task. In data analysis, each sentence was segmented into two events (i.e. two regressors), which correspond to the two hypothesized processes involved in the real-time comprehension of AspV sentences. **Event 1** included the onset of the subject noun phrase until the offset of the main verb. During this time window, readers were hypothesized to exhaustively activate the dimension-associated functions lexically encoded in

aspectual verbs. **Event 2** included the onset of the complement noun phrase until the offset of the sentence-final word. During this time window (i.e. after encountering the complement), readers were hypothesized to resolve dimension ambiguity so as to determine the dimension along which the complement is construed as an axis.

(19) *Event segmentation in fMRI data analysis (cells representing the stimuli presentation)*

| Condition                  | Event 1 (Subject + Verb) |                | Event 2 (Complement ~ Sentence-final) |           |                      |                       |
|----------------------------|--------------------------|----------------|---------------------------------------|-----------|----------------------|-----------------------|
| AspVinanimate              | ‘Starry Night’           | <i>starts</i>  | <i>the collection</i>                 | <i>of</i> | <i>impressionist</i> | <i>oil paintings.</i> |
| AspVanimate                | <i>Van Gogh</i>          | <i>started</i> | ...                                   | ...       | ...                  | ...                   |
| Control <sub>PsychV1</sub> | <i>Van Gogh</i>          | <i>enjoyed</i> | ...                                   | ...       | ...                  | ...                   |
| Control <sub>PsychV2</sub> | <i>Van Gogh</i>          | <i>loved</i>   | ...                                   | ...       | ...                  | ...                   |

The resulting beta images for each task were spatially smoothed with a 6 mm Gaussian kernel to account for variations in the location of activation across subjects. The output maps were normalized beta-maps, which were in the acquired space (2.5mm x 2.5mm x 2.5mm).

To take these data into a common reference space, three registrations were calculated within the Yale BioImage Suite software package. The first registration performed a linear registration between the individual subject raw functional image and that subject’s 2D anatomical image. The 2D anatomical image was then linearly registered to the individual’s 3D anatomical image. The 3D differs from the 2D in that it has a 1 x 1 x 1 mm resolution whereas the 2D z-dimension is set by slice-thickness and its x-y dimensions are set by voxel size. Finally, a non-linear registration was computed between the individual 3D anatomical image and a reference 3D image. The reference brain used was the Colin27 Brain (Holmes et al., 1998) in Montreal Neurological Institute (MNI) space (Evans et al., 1993). All three registrations were applied sequentially to the individual normalized beta-maps to bring all data into the common reference space.

Data were corrected for multiple comparisons by spatial extent of contiguous suprathresholded individual voxels at an experiment-wise  $p < .05$ . In a Monte Carlo simulation within the AFNI software package and using a smoothing kernel of 6mm and a connection radius of 4.33mm on 2.5mm x 2.5mm x 2.5mm voxels, it was determined that an activation volume of 183 original voxels (4953 microliters) satisfied the  $p < .05$  threshold. Clusters were created for each of the subtractions. Each cluster was identified with a region label, and then associated with additional numeral labels corresponding to Brodmann areas.

### 4.3 Results

#### 4.3.1 Behavioral results

The comprehension task showed 88.6% accuracy. With respect to the response times, we performed a repeated measures ANOVA and found no significant effect of condition. Results of behavioral results are presented below.

(20) *Response times (ms) to the questions in Experiment 2*

| Conditions                 | Mean    | SD     | se    |
|----------------------------|---------|--------|-------|
| AspVanimate                | 1684.18 | 590.90 | 25.06 |
| AspVinanimate              | 1685.85 | 595.22 | 25.57 |
| Control <sub>PsychV1</sub> | 1722.11 | 582.23 | 25.08 |
| Control <sub>PsychV2</sub> | 1651.49 | 547.17 | 24.09 |

### 4.3.2 Imaging results

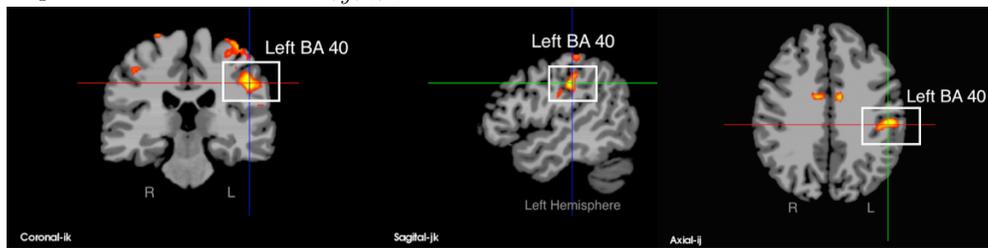
In *Event 1 (Subject+Verb)*, results showed that the *AspVanimate* condition preferentially recruited the left Brodmann Area (BA) 40, which is part of Wernicke’s area, over the *Control<sub>PsychV1</sub>* condition. Other regions activated by *AspVanimate* in this comparison included bilateral BA 6, 24, 7, and primary sensory area.

In *Event 2 (Complement~Sentence-final)*, the *AspVanimate* condition preferentially recruited the left inferior frontal gyrus (LIFG), including BA 44, 45, 47, and left insula, as compared to the *Control<sub>PsychV2</sub>* condition. Other activated regions for the *AspVanimate* condition over *Control<sub>PsychV2</sub>* included bilateral BA 6, right BA 8, right IFG, and primary visual cortex. The *AspVinanimate* condition showed a similar pattern, recruiting LIFG (BA 44, 45, 47) and left insula in *Event 2*, as compared to the *Control<sub>PsychV2</sub>* condition.

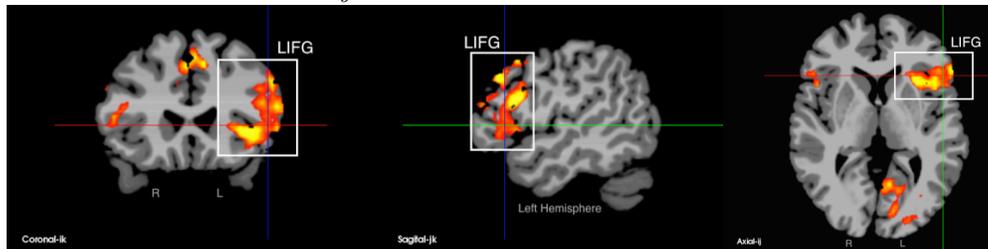
In addition, results from *Event 2* revealed that, compared to the *AspVinanimate* condition, the *AspVanimate* condition preferentially recruited more activity in bilateral posterior areas (BA 17, 18, 19), bilateral BA 7, left BA 39, 31, and left BA 6, 24.

In sum, the *AspVanimate* condition engendered more Wernicke’s activation than the *Control<sub>PsychV1</sub>* in *Event 1*, while both *AspVanimate* and *AspVinanimate* involved LIFG and left insula in *Event 2*. Besides the shared activation pattern, the brain regions recruited for the *AspVanimate* condition formed a superset of those recruited for the *AspVinanimate* condition.

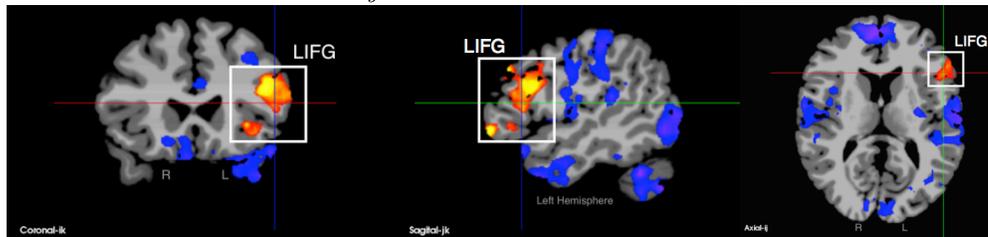
(21) *AspVanimate* > *Control<sub>PsychV1</sub>* in *Event 1*

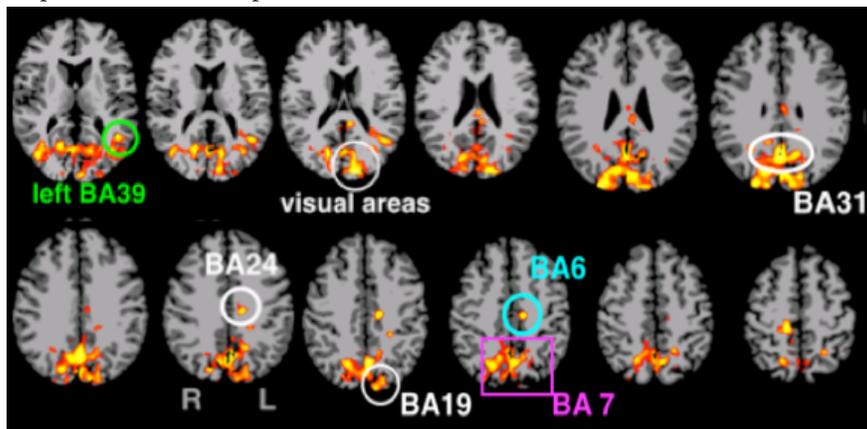


(22) *AspVanimate* > *Control<sub>PsychV2</sub>* in *Event 2*



(23) *AspVinanimate* > *Control<sub>PsychV2</sub>* in *Event 2*



(24) *AspVanimate* > *AspVinanimate* in Event 2

## 5 Discussion

First, Experiment 1 (Self-paced reading) showed that sentences with aspectual verbs, including both the *AspVanimate* and *AspVinanimate* conditions, induced longer RTs than the control psychological verbs. Experiment 2 (fMRI) revealed that both *AspV* conditions preferentially recruited LIFG and left insula after the complement was encountered. We take these to reflect the process of resolving dimension ambiguity induced by aspectual verbs. Both behavioral and neurological patterns suggest that all sentences with aspectual verbs, regardless of subject animacy, are processed in a similar way.

These findings are captured by the Structured Individual Hypothesis. It indicates that aspectual verbs require their complement to be a structured individual, which can be construed as an axis along multiple dimensions (e.g. spatial, informational, eventive, temporal). Processing *AspV* sentences involves (a) retrieval of dimension-function, which maps the complement denotation to a specific axis, encoded in these verbs, and (b) resolution of dimension ambiguity after encountering the complement.

Second, the imaging data suggest that processing sentences with aspectual verbs involved left BA40 (part of Wernicke’s area) for exhaustive retrieval of lexical functions, and LIFG for resolution of dimension ambiguity.

Third, the fMRI results revealed a superset relation in terms of brain activity between the two *AspV* configurations. The regions recruited by the *AspVanimate* configuration form a superset of those recruited by the *AspVinanimate* configuration ( $\text{AspVanimate} \supseteq \text{AspVinanimate}$ ). While the *AspVinanimate* configuration yields a constitutive reading along the spatial, informational, temporal, or eventive dimension, the *AspVanimate* configuration can yield an agentive reading along the eventive dimension in addition.

The finding that both *AspV* conditions patterned alike suggests that subject animacy alone does not determine the reading for sentences with aspectual verbs, as mentioned in the introduction. Animacy is not an ideal indicator for associating semantic arguments, as it cuts across several thematic roles in the semantic representations of predicates. Levin and Hovav (2005, p. 173) note that animacy ‘imposes a rather course-grained ranking, since NPs bearing the agent, experiencer, benefactive, and recipient roles, for instance, are all typically animate.’

In our case, an animate subject plays different roles in the agentive versus constitutive reading of *AspV* sentences; it serves as an Agent in the former and a Theme in the latter. Subject animacy is not associated with a specific reading for *AspVanimate* sentences; these sentences can give rise

to a constitutive reading just like the AspVinanimate configuration. In other words, with respect to the constitutive reading, the subjects in AspVanimate and AspVinanimate function the same. Besides, the subjects in the AspVanimate and PsychV conditions are dissimilar in other semantic features, indicating that animacy alone does not determine sentence interpretation.

(25) *The role of the animate subject & associated readings*

|                                         | Subject Animacy | Thematic Role of subject      |
|-----------------------------------------|-----------------|-------------------------------|
| AspVanimate– <i>AgentiveReading</i>     | animate         | Agent                         |
| AspVanimate– <i>ConstitutiveReading</i> | animate         | Theme? (–Agent, –Experiencer) |
| PsychV                                  | animate         | Experiencer                   |

Instead of animacy, we suggest that the notion of ‘control’ is a more reliable feature that captures the pattern of the readings in question. A subject bearing the [+control] feature has full control over his/her behavior and the resulting situation denoted by the predicate (Rozwadowska, 1989)<sup>2</sup>. An AspV sentence yields an agentive reading with a [+control] subject, and a constitutive reading with a [–control] subject. As shown in the following table, the control feature of the subject lines up with the two readings of AspV sentences.

(26) *Subject control and sentence interpretation*

|                              | Subject Control | Reading      |
|------------------------------|-----------------|--------------|
| AspVanimate                  | [+control]      | Agentive     |
| AspVanimate<br>AspVinanimate | [–control]      | Constitutive |

The control feature not only distinguishes the two readings of AspV sentences but also differentiates between AspV and PsychV sentences. The subject of sentences with the agentive reading seems to have more control ability than the subject of PsychV sentences. We may employ the ‘*What X did is...*’ test to diagnose volitional involvement in some action (Dowty, 1991; Culicover and Jackendoff, 2005), which is associated with control .

- (27) a. AspVanimate-Agentive reading :  
 ✓ What John (*as an actor*) did was begin the book.
- b. AspVanimate-Constitutive reading :  
 \* What John (*as a story character*) did was begin the book.
- c. AspVinanimate-Constitutive reading :  
 \* What the short prologue did was begin the book.
- d. PsychV :  
 What John did was {?enjoy/\*love} the book.

As the above test reveals, only the subject of AspV sentences in the agentive reading bears the [+control] feature unequivocally.

Control is often connected with volitionality. For instance, the force-dynamic approach (Talmy, 1988; Croft, 2012) argues that the notion of Agent can be defined as an antagonist that has volitional intrinsic force tendency. Dowty (1991) lists the involvement of volition as a contributing property of her Agent Proto-Role. Jackendoff (1992, p. 129) suggests the feature [±volitional] as

<sup>2</sup>Rozwadowska (1989) indicates that an ‘Agent is in full control of what he is doing.’

one characteristic of Agent as ‘volitional Actor’<sup>3</sup>. Here we do not postulate a fundamental difference between the two, as an entity that has control over his/her behavior is typically volitional in performing the action. Using Jackendoff’s test for volitionality—compatibility with *deliberately* (volitional) and *accidentally* (non-volitional)—we observe that [+volition] is most compatible with the agentive reading of AspV sentences, a pattern similar to [+control].

- (28) a. AspVanimate-Agentive reading :  
      ✓ The man (*as an actor*) began the book *deliberately*.  
b. AspVanimate-Constitutive reading :  
      ? The man (*as a character*) began the book *accidentally*.  
c. AspVinanimate-Constitutive reading :  
      \* The long prologue begins the book *deliberately/accidentally*.  
d. PsychV :  
      ? The man enjoyed the book {*deliberately/accidentally*}.

The case of aspectual verbs suggests that this notion of control factors in how comprehenders interpret the sentences.

## 6 Conclusion

This study examines the Structured Individual Hypothesis for the processing of sentences with aspectual verbs, by specifically contrasting the two configurations of the AspV sentences: those containing an animate-denoting subject and those with an inanimate-denoting subject. Results show that all sentences with aspectual verbs, regardless of subject animacy, engendered similar patterns in terms of reading times (self-paced reading) and cortical recruitment (fMRI). Furthermore, we suggest that the feature of control, not animacy, better captures the agentive versus constitutive reading of AspV sentences.

These findings are consistent with the Structured Individual Hypothesis. During real-time comprehension, readers retrieve the lexical functions encoded in aspectual verbs and determine the relevant dimension along which the sentence is to be interpreted. The fact that AspV sentences in the agentive and constitutive readings are processed in a similar way supports a unified analysis for aspectual verbs.

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<sup>3</sup>For Jackendoff, Agent could be a doer of action, a volitional actor, or an extrinsic instigator.

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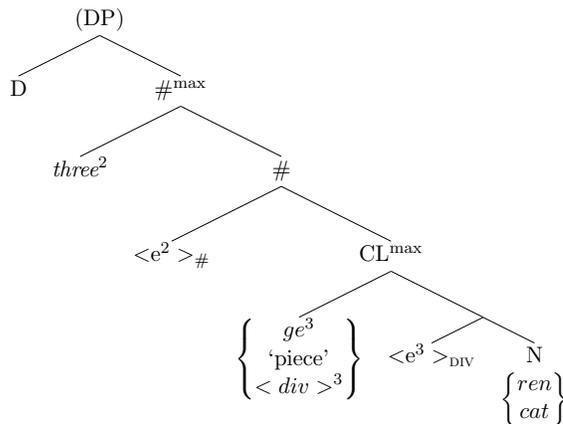
# Plurality in classifier languages: A view from Vietnamese pluralizers

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*Michigan State University*

## 1 Introduction

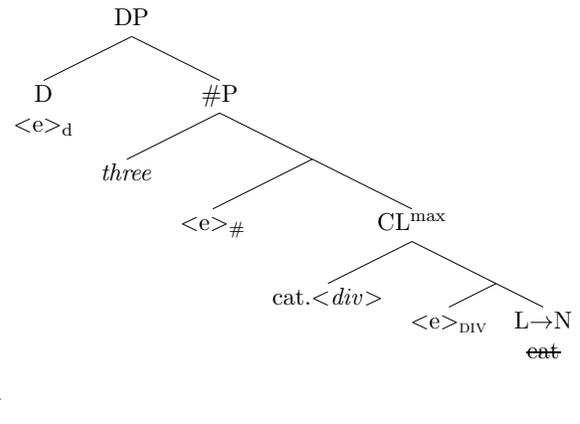
There is a well-known complementarity between grammaticalized number and classifiers (Cl) (e.g. Greenberg, 1990; Doetjes, 1996, 1997; Chierchia, 1998; Borer, 2005, among others). The consensus is that they perform a somewhat similar function. As a matter of fact, languages with plural inflection on noun phrases such as English, French, or Italian do not have Cls while, in contrast, classifier languages tend not to have obligatory/grammaticalized number marking. In Borer (2005), for example, both classifier marking and plural inflection perform a unique function on the count structure: they both divide ‘stuff’ into units,<sup>1</sup> as in (1).

(1) a. Count structure in Chinese



(Borer, 2005, Chapter 4, p. 11)

b. Count structure in English



(Borer, 2005, Chapter 4, p. 25)

Since they compete for the same position in the DP structure, Cls and number markers are different strategies different languages use to form grammatically countable units. If a language has both, Cls and number markers should not co-occur in the same noun phrase (Borer, 2005, Chapter 4, p. 8-10).

Even though recent work has shown that many classifier languages also have plural morphemes, in general their optionality and their behavior still confirm the above typological claim: they do not co-occur with Cls at all (in the case of *-men* in Mandarin or *-ner* in Armenian) and they cannot appear with Cls modifying the same noun phrase (in the case of *-tachi* in Japanese or *-tul* in Korean) (Kang, 1994; Cheng and Sybesma, 1999; Fassi Fehri and Vinet, 2004; Nakanishi and Tomioka, 2004; Borer, 2005; Bale and Khanjian, 2008; Kim, 2008; Park, 2008; Li, 2009; Gebhardt, 2009; Nomoto, 2013). Furthermore, many pluralizers (Pl) are portmanteau morphemes which carry more than just a plural feature.

Classifier languages that have pluralizers do not behave all alike as shown in Table 1. Importantly, none of the pluralizers in the languages listed in the table, except for Vietnamese, need to be licensed by Cls: the N-Pl phrases are completely grammatical in those languages, as seen in (3).

<sup>1</sup>In Borer’s words, they are operators that assign range to  $\langle e \rangle_{\text{DIV}}$ , the feature that heads CIP in a count structure (Chapter 4, p. 10).

(2) Table 1: *Pluralizers, numerals, and classifiers co-occurrence across languages*

| Combination <sup>2</sup> | Pl+N | Pl+Cl+N | Num+N          | Num+Cl+N       | Num+N+Pl | Cl+N      |
|--------------------------|------|---------|----------------|----------------|----------|-----------|
| <b>Armenian</b>          | ✓    | *       | ✓              | ✓              | ✓        | *         |
| <b>Japanese/</b>         | ✓    | *       | *              | ✓              | *        | *         |
| <b>Korean</b>            |      |         |                |                |          |           |
| <b>Mandarin</b>          | ✓    | *       | *              | ✓              | *        | ✓ (indef) |
| <b>Persian</b>           | ✓    | *       | ✓ <sup>3</sup> | ✓ <sup>4</sup> | ✓        | *         |
| <b>Vietnamese</b>        | *    | ✓       | *              | ✓              | *        | ✓ (def)   |

- (3) a. hovanoc-**ner** (Armenian)  
 umbrella-Pl  
 ‘(the) umbrellas’
- b. kodomo-**tachi** (Japanese)  
 child-Pl  
 ‘(the) children’
- c. cha-**tul** (Korean)  
 car-Pl  
 ‘(the) cars’
- d. haizi-**men** (Mandarin)  
 child-Pl  
 ‘(the) children’
- e. ordæk-**ha** (Persian)  
 duck-Pl  
 ‘(the) ducks’

This is not the only difference between Vietnamese and these other languages. Noun phrases with just a Cl must be interpreted as definite and singular. A plural interpretation can be obtained by the addition of one of the pluralizers *các* or *những*. The pluralizer *những* requires the noun phrase to be modified. Noun phrases with *những* can have generic, indefinite, or definite readings. The pluralizer *các*, on the other hand, does not need modification and never has indefinite readings, but allows generic interpretation only if there is some sort of modification.

The existence of two pluralizers *những* and *các*, which are obligatory in certain contexts, and the requirement that they must appear together with Cls in Vietnamese noun phrases, as shown in Table 1, show that in Vietnamese the pluralizers should not be treated as adjuncts as suggested by Wiltschko (2008) but rather as part of the extended projection of the noun. In this paper we aim to address the following two questions.

- (4) Questions:
- What are the similarities and differences between the two pluralizers in Vietnamese?
  - What is the structure and interpretation of noun phrases with pluralizers?

In answering those questions, the paper is going to make three claims. The first claim is that much like pluralizers in other classifier languages, *những/các* are also portmanteau morphemes and carry a [Pl] and a [D] feature of some sort. However they do not have an inherent Cl feature but rather

<sup>3</sup>Word order is ignored here.

<sup>4</sup>Although Persian has a Cl system, it is arguable that it is a typical classifier language: the appearance of the Cl is not obligatory in most numeral constructions (Gebhardt, 2009, p. 210).

<sup>5</sup>Except for *-yek* ‘one’.

must combine with a ClP. Second, they are quantifier-like and compete with numerals (Num) and most quantifiers (Q) in the structure. The third claim is that *những* requires restriction on the noun phrase in order to establish a partitive relation between a proper subset and a set established in the discourse, and this is reflected in its syntactic requirement of a predicate phrase as its complement.

The paper is organized as follows. Section 2 describes some basic and relevant characteristics of Vietnamese noun phrases. Section 3 presents the syntactic behavior and semantic properties of the two lexical pluralizers *những* and *các* from a descriptive perspective. In Section 4, we develop an analysis that may account for the syntactic and (begin to account) for the semantic properties of these pluralizers, and compare it to current proposals for plurals in other languages. Section 5 offers our preliminary conclusions and discusses some remaining issues.

## 2 Vietnamese noun phrases

As Vietnamese is not a commonly studied language, this section presents a brief overview of Vietnamese noun phrases as a premise for a detailed description of the two pluralizers later. The phrase in (5) shows the linear order of a Vietnamese noun phrase with full compositional units, which is *All/most-Pl/Num/Q-Foc(us)-Cl-N(oun)-Adj(ective)-Dem(onstrative)-P(repositional) P(hrase)-R(elative) C(lause)*.

- (5) tất cả những/hai cái chiếc chén sứ Trung Quốc màu nâu hình vuông cỡ  
 all Pl/two FOC Cl bowl ceramic China color brown shape square size  
 trung đó của anh ấy mà tôi mới thấy hôm qua  
 medium that of elder brother that that I just see yesterday  
 ‘all those (two) brown medium-sized square Chinese ceramic bowl sets of his that I just saw yesterday’

We can see that noun phrases in Vietnamese are also consistent with the general head-initial patterns in the language, as seen in (6) below.

- (6) a. Lan thích rau VP = V DP  
 Lan like vegetable  
 ‘Lan likes vegetables.’  
 b. dưới ghế PP = P DP  
 under chair  
 ‘under the chair’  
 c. mà chú gặp hôm qua CP = C TP  
 that uncle meet yesterday  
 ‘that you met yesterday’

Most nouns in Vietnamese can combine with Qs, Nums, attributive Adjs, Dems, RCs or PPs but only through the addition of an obligatory Cl. The lack of Cls yields unacceptable NPs, as illustrated in (7).

- (7) a. mỗi **\*(con)** chó  
 each Cl dog  
 ‘each dog’  
 b. hai **\*(người)** thợ  
 two Cl worker  
 ‘two workers’

- c. **\*(cuốn)** sách hay  
Cl book good  
'the good book'
- d. **\*(bức)** tranh này  
Cl panting this  
'this painting'
- e. **\*(cái)** ghế mà tôi mới mua  
Cl chair that I just buy  
'the chair that I just bought'
- f. **\*(chiếc)** xe đạp của cô ấy  
Cl vehicle paddle of aunt that  
'her bicycle'

Although Vietnamese does not have any definite or indefinite determiners, different types of NPs show a clear division of labor among the overt morphology in terms of definite/indefinite and generic interpretations, as summarized in Table 2 below.

(8) Table 2: *Interpretations of some common Vietnamese noun phrase types*

| NP-type                   | Generic    | Indefinite |            | Definite   |            |
|---------------------------|------------|------------|------------|------------|------------|
|                           |            | Singular   | Plural     | Singular   | Plural     |
| <b>Bare N</b>             | <b>yes</b> | yes        | yes        | yes        | yes        |
| <b>Cl-N</b>               | no         | no         | no         | <b>yes</b> | no         |
| <b>một 'one'-(Cl)-N</b>   | no         | <b>yes</b> | no         | no         | no         |
| <b>Num-(Cl)-N</b>         | no         | no         | <b>yes</b> | no         | yes        |
| <b>các-(Cl)-N</b>         | no         | no         | no         | no         | <b>yes</b> |
| <b>những-(Cl)-N-(MOD)</b> | <b>yes</b> | no         | <b>yes</b> | no         | <b>yes</b> |

Much like bare nouns in many other classifier languages such as Thai or Mandarin, bare nouns in Vietnamese can be compatible with a very wide range of interpretations, depending on the predicates and the contexts. A bare noun can have generic (9), existential (10), indefinite (11) or definite readings (12). Bare nouns are also neutral in number (i.e. can be understood as singular or plural), as seen in (12).

- (9) a. Tôi thích **chó**.  
I like dog  
'I like dogs.' not: 'I like a/the dog.'
- b. **Chó** rất trung thành.  
dog very loyal  
'Dogs are very loyal.'
- (10) Có **chó** ngoài sân.  
have dog outside yard  
'There is/are a dog/dogs in the yard.'
- (11) a. **Chó** chạy ngoài sân.  
dog run outside yard  
'A dog is/Dogs are running in the yard.'
- b. Tôi mới mua **chó**.  
I just buy dog  
'I just bought dogs/a dog.'



- b. ... Tôi hay đùa với ba con chó.<sup>6</sup>  
 I often joke with three Cl dog  
 ‘...I often play with the three dogs.’

### 3 The syntactic and semantic properties of Vietnamese pluralizers

*Những* and *các* combine with Cl to build plural noun phrases. They both (i) require a Cl in the noun phrase, (ii) cannot co-occur with Nums and most Qs, except for *tất cả* ‘all’ and *hầu hết* ‘most’, for which either of the pluralizers has to be present, and (iii) are definite-like, similar to pluralizers in other classifier languages. In terms of differences, *những* is more restricted than *các*. *Những* has to be licensed by some sort of restrictive modification, while *các* does not need one, and the behavior of *các* is consistent with it being definite whereas the interpretation of *những* can vary. In this section, we will describe the distributional properties and the interpretation of these two pluralizers.

#### 3.1 Distributional properties

##### 3.1.1 *Những* requires restriction on the noun phrase

Although *những* seems to have a much higher frequency than *các* (Bui, 2000, p. 11), its distribution in fact is more restricted grammatically: in addition to the presence of a Cl, *những* needs to be licensed by some kind of modifier, such as attributive Adjs (17a), Dems (17b), RCs (17c) or PPs (17d).

- (17) a. **những** cuốn sách **hay**  
 Pl Cl book good  
 ‘good books’  
 b. **những** bức tranh **này**  
 Pl Cl painting this  
 ‘these paintings’  
 c. **những** cái ghế **mà tôi mới mua**  
 Pl Cl chair that I just buy  
 ‘the chairs that I just bought’  
 d. **những** chiếc xe đạp **của cô ấy**  
 Pl Cl vehicle paddle of aunt that  
 ‘her bicycles’

In contrast to *những*, the pluralizer *các* does not require any restriction on the noun phrase as illustrated in (18).

- (18) a. \***những** con chó  
 Pl Cl dog  
 ‘(the) dogs’  
 b. **các** con chó  
 Pl Cl dog  
 ‘the dogs’

This shows that *những* and *các* must be syntactically and semantically different from each other.

<sup>6</sup>Num-Cl-N can be interpreted as definite (i.e. ‘I often play with her three dogs’) or indefinite (i.e. ‘I often play with three dogs which are not her dogs’). However, if the speaker aims for a definite expression, this construction is less preferred than *các* (plural).

### 3.1.2 *Những* and *các* co-occur with classifiers

Similar to other units in a noun phrase such as Qs or Nums, *những* and *các* can combine with the noun only if a Cl is present, as shown in (19).

- (19) **những/các** \*(**con**) chó mực  
 Pl Cl dog ink  
 ‘(the) black dogs’

Because of the inherent plural meaning, the pluralizers must have a plural feature. However, the fact that they co-occur with pluralizers suggests that *những* and *các* are not plural morphemes in the sense of Borer (2005): they are not in the same position as Cls. Rather, they must be higher in the DP structure.

### 3.1.3 *Những* and *các* cannot co-occur with numerals and most quantifiers

The pluralizers *các* and *những* show a mixed behavior with Qs. They can combine with the Qs *tất cả* ‘all’ and *hầu hết* ‘most’, which select for plural and maybe plural definite phrases as in (20).

- (20) a. **tất cả những/các** chiếc thuyền gỗ  
 all Pl Cl boat wood  
 ‘all (of the) wooden boats’  
 b. **hầu hết những/các** chiếc thuyền gỗ  
 most Pl Cl boat wood  
 ‘most of (the) wooden boats’

In fact, the pluralizers are not optional in these noun phrases; they are syntactically obligatory for *tất cả* ‘all’ and *hầu hết* ‘most’: without *những/các*, those NPs in (20) become unacceptable, as demonstrated in (21).

- (21) \* **tất cả/hầu hết** chiếc thuyền gỗ  
 all/most Cl boat wood  
 ‘all/most (of the) wooden boats’

Meanwhile, *những/các* cannot co-occur with other Qs, such as *mấy* ‘some’ or *vài* ‘several’, as shown in (22).

- (22) a. \* **mấy những/các** chiếc thuyền gỗ  
 some Pl Cl boat wood  
 ‘some wooden boats’  
 b. \* **vài những/các** chiếc thuyền gỗ  
 several Pl Cl boat wood  
 ‘several wooden boats’

In relationship with Qs, *những* and *các* as such are similar to cardinal numbers. Examples in (23) show that numerals in Vietnamese also cannot co-occur with most Qs, except for ‘all’.

- (23) a. **tất cả năm** chiếc thuyền gỗ  
 all five Cl boat wood  
 ‘all of five wooden boats’  
 b. \* **hầu hết/mấy/vài hai** chiếc thuyền gỗ  
 most/some/several two Cl boat wood

On the other hand, both *những* and *các* cannot co-occur with cardinal numbers, as illustrated in (24).

- (24) a. \*hai **những/các** con chó mực  
           two Pl                   Cl dog ink  
           ‘two black dogs’  
       b. \***những/các** hai con chó mực  
           Pl                   two Cl dog ink  
           ‘two black dogs’

Hence, while *những* and *các* are not in complementary distribution with Cls (as shown in Section 3.1.1), they seem to compete with Nums and most Qs (but not with ‘all’ and ‘most’). This may lead us to treat them as Qs or Ds, instead of plural morphemes, and also suggests ‘all’ and ‘most’ are high Qs in comparison to other Qs and also higher than *những/các* and Nums in the tree.

### 3.2 The interpretation

In this section we discuss these pluralizers’ plural interpretation and their D-linking interpretation.

#### 3.2.1 Plurality

These pluralizers are obligatory not only for ‘all’ and ‘most’ but also for the plural interpretation of Cl-phrases. In Vietnamese, [Cl-N] is consistently interpreted as singular and can be pluralized by adding *những/các*, as shown in (25).

- (25) a. con chó (mực)  
           Cl dog ink  
           ‘the (black) dog’  
       b. **các** con chó  
           Pl Cl dog  
           ‘the dogs’  
       c. **những** con chó mực  
           Pl Cl dog ink  
           ‘the black dogs’

Similarly, [Cl-N-Dem] is singular, while [*những/các*-Cl-N-Dem] is plural.

- (26) a. con chó này  
           Cl dog D  
           ‘this dog’  
       b. **các** con chó này  
           Pl Cl dog this  
           ‘these dogs’  
       c. **những** con chó này  
           Pl Cl dog D  
           ‘these dogs’

As we have seen, every time one of these pluralizers is present we have a plural interpretation. But what is the interpretation of the plural? Nomoto (2013) claims that pluralizers in classifier languages are a ‘genuine plural’ (i.e. always have more-than-one interpretation, p. 102), unlike English

plurals, which can allow one or more-than-one interpretation in some contexts (Sauerland et al., 2005). In particular, English plural noun phrases can appear in yes/no questions and existential sentences with a one or more-than-one interpretation, as illustrated in (27) and (28), respectively.

- (27) Q: Do you have daughters?  
A: Yes, I have one daughter.

- (28) I didn't see dogs last night.

The answer to the question in (27) shows that the interpretation is not obligatorily a more-than-one interpretation. Similarly, one cannot say (28) if one saw one dog in the yard. Additionally, English plurals can behave as dependent plurals, as illustrated in (29). Dependent plurals are interpreted as distributed singular indefinites.

- (29) a. Unicycles have wheels.  
b. Unicycles have **a** wheel. (Minor, 2014, ex. 1 & 2)

Another ability of the English plural as a dependent plural is that it allows a long-distance dependency (Minor, 2014, p. 14-15). For example, if Bob wants Bill to marry Ann, who happens to be a famous linguist, and Kate wants Bill to marry Jane, who is also a well-known linguist, a plural form of *linguist* can be used in English (30a) but is prohibited in Vietnamese (30b).

- (30) a. Bob and Kate both want Bill to marry famous linguists.  
b. # Bob và Kate muốn Bill cưới **những** nhà ngôn ngữ học nổi tiếng.  
Bob and Kate want Bill marry Pl Cl language study famous

In Vietnamese, plural noun phrases are banned in questions, negative statements such as (28), and dependent plurals, presumably because *những/các* never have a weak interpretation of plurals, are discourse linked, and tend to be interpreted as definite. In these cases, a bare noun is preferred, as seen in (31)-(33).

- (31) a. Cô có con gái không?  
aunt have child female no  
'Do you have daughters?'  
b. \*Cô có **những/các** đứa con gái không?  
aunt have Pl Cl child female no  
'Do you have daughters?'

- (32) a. Có chó (mực) ngoài sân.  
have dog ink outside yard  
'There is/are (a) black dog(s) in the yard.'  
b. # Có **những/các** con chó mực ngoài sân.  
have Pl Cl dog ink outside yard  
'There is a black dog in the yard.'

- (33) a. Nhân mã có một cái sừng.  
human horse have one Cl horn  
'Unicorns have a horn.'  
b. \*Nhân mã có **những/các** cái sừng to  
human horse have Pl Cl horn big  
'Unicorns have big horns.'

These facts seem to indicate it is impossible to obtain a one or more-than-one interpretation of the pluralizers and therefore we argue that they have a more than one interpretation.

So far, our observations have shown *những* and *các*, on one hand, have an inherent strong plural interpretation, and on the other hand, do not behave exactly as plural markers in the traditional sense. This may come from the fact that they, like the plural morphemes in other classifier languages, are also portmanteau morphemes<sup>7</sup> (morphemes that encode more than one piece of information, cf. Peters, 1997). In particular, besides number features, they contain some D information.

### 3.2.2 D-linking properties

Both *những* and *các* must be D-linked, referring to a set in the discourse, as shown by the contrast between (34a) and (34b).

- (34) a. Situation 1: X asks for blue pens in a store.  
 A: \*Tiệm có/không bán **các/những** cây bút xanh  
 store yes/no sell Pl Cl pen blue  
 ‘The store does/doesn’t carry blue pens.’
- b. Situation 2: She just brought five dogs home (some are black, some are white).  
 ✓ **Các/những** con chó mực đang ngủ.  
 Pl Cl dog ink PROG sleep  
 ‘The black dogs are sleeping.’

The morpheme *các* is always compatible with a definite interpretation in the sense of satisfying familiarity and maximality (Heim, 1991). As it denotes familiarity, *các* cannot appear in existential sentences like (35) and requires discourse anaphora – it is discourse dependent ((36a) cannot be said out of blue).

- (35) Ngày xưa ngày xưa có (**\*các**) chàng hoàng tử rất thích ngựa.  
 once upon a time have Pl Cl prince very like horse  
 ‘Once upon a time, there were princes that really liked horses.’
- (36) Cô ấy nuôi năm con chó và một con mèo.  
 aunt that raise five Cl dog and one Cl cat  
 ‘She has five dogs and one cat.’
- a. **Các** con chó rất trung thành.  
 Pl Cl dog very loyal  
 ‘The dogs are very loyal.’
- b. # **Các** con chó màu đen.  
 Pl Cl dog color black  
 Intended: ‘Some (two, three, or four) of the dogs are black.’  
 OK: ‘The dogs are black.’

An indefinite reading is impossible for [*các*-Cl-N]: it cannot introduce a set of entities in the discourse, which makes (35) ungrammatical. *Các* also imposes a maximality restriction. It cannot

<sup>7</sup>While Korean *-tul*, like *những* and *các*, does not have any restrictions regarding the degree of animacy of the noun (Kim, 2008, p. 163), Mandarin *-men* and Japanese *-tachi* can be used mostly with human nouns (Li, 2009, p. 94; Nomoto, 2013, p. 103-105). When used with non-human nouns, *-men* and *-tachi* either personify the entities or express the speaker’s affection toward them (Nomoto, 2013, p. 103-105). All of them also act as specific or definite.

refer to a subset of the entities previously mentioned, as shown in (36b), but must pick the whole set in the discourse (36a) and therefore does not behave as a demonstrative, explaining why (37a) is unacceptable.

- (37) a. \* **Các** con chó đang ngủ, **các** con chó đang giỡn.  
 Pl Cl dog PROG sleep Pl Cl dog PROG play  
 Intended: ‘The dogs are sleeping, the dogs are playing.’
- b. **Các** con chó đó đang ngủ, **các** con chó đó đang giỡn.  
 Pl Cl dog that PROG sleep Pl Cl dog that PROG play  
 ‘Those dogs are sleeping, those dogs are playing.’

In addition to being discourse-anaphoric, [*các*-Cl-N] can also be used in all other primary situations licensing the use of definite determiners in English, French, and many other languages (Simpson et al., 2011, p. 172): it can refer to entities which have not been mentioned explicitly but are visible and uniquely identifiable for both speaker and hearer (38a), and *các* noun phrases are felicitous in bridging contexts (38b) and (38c) as well as for culturally unique, familiar entities (38d).

- (38) a. Đưa tôi **các** cây búa.  
 give I Pl Cl hammer  
 ‘Pass me the hammers.’
- b. She just bought a new tea set yesterday ...  
 ... **Các** cái tách hơi bé.  
 Pl Cl cup rather small  
 ‘The teacups are pretty small.’
- c. **Các** quyển sách toán ở chỗ nào?  
 Pl Cl book math at place which  
 ‘Where are the math books?’ (asking a librarian)
- d. Chiến tranh giữa **các** vì sao  
 war between Pl Cl star  
 ‘the war between the stars (Star Wars)’

As for *những*, the data is not as clear. While all studies are unanimous in saying that *các* is definite (Nguyen, 1975; Diep and Hoang, 1998; Nguyen, 2004, among others), the literature is divided with respect to the status of *những*. Most authors claim that *những* indicates only a subset of the whole given set (Thompson, 1965; Nguyen, 1975) and therefore it is not a true definite (Nguyen, 2004), but some other linguists argued the interpretation of *những* varies on a continuum between indefinite and definite (Cao, 1988; Bui, 2000).

As shown in (34b) above, *những* is compatible with anaphoric readings. The examples in (39) show that *những* can also be definite in the sense that it can refer to the whole set of contextually unique items.

- (39) a. **Những/các** bức tranh trên tường vừa được tháo xuống.  
 Pl Cl painting on wall just PASS-positive remove down  
 ‘The paintings on the wall were taken down.’
- b. Cô ấy tháo **những/các** bức tranh trên tường xuống.  
 aunt that remove Pl Cl painting on wall down  
 ‘She took the paintings on the wall down.’

Like *các*, what *những* picks out in sentences such as (39) has to be the entire set (i.e. all the pictures on the wall), not some of them. Further evidence for the definite-like nature of *những* is that *những* can be interchangeable with *các* in all contexts in (38), as long as some kind of modification is provided, as illustrated in (40) below.

- (40) a. Đưa tôi **những** cây búa màu đỏ.  
give I Pl Cl hammer color red  
'Pass me the red hammers.'
- b. She's just bought two tea sets. One is made in Japan, the other one is made in Vietnam ...  
... **Những** cái tách Nhật hơi bé.  
Pl Cl cup Japan rather small  
'The teacups in the Japanese set are pretty small.'
- c. **Những** quyển sách toán ở chỗ nào?  
Pl Cl book math at place which  
'Where are the math books?' (asking a librarian)
- d. chiến tranh giữa **những** vì sao đêm  
war between Pl Cl star night  
'the war between the night stars'

However, *những* is also compatible with many typical indefinite constructions. It can appear with *wh*-phrases while *các* cannot.

- (41) a. Cô ấy nói **những**/\***các** gì?  
aunt that say Pl what  
'What did she say?'
- b. Cô ấy đi **những**/\***các** đâu?  
aunt that go Pl where  
'Where did she go?' (speaker's assumption: She had to go to more than one place)

*Những* can appear in 'there are...' expressions but *các* would yield ungrammatical sentences.

- (42) Ngày xưa ngày xưa có **những**/\***các** chàng hoàng tử rất thích ngựa.  
once upon a time have Pl Cl prince very like horse  
'Once upon a time, there were princes that really liked horses.'

The pluralizer *những* can also allow generic readings with individual-level predicates, like those in (43), while [*các*-Cl-N] does not have this interpretation (44), unless there is a modifier of some sort on the noun phrase, as seen in (45).

- (43) a. **Những** con chó mực thường trung thành.  
Pl Cl dog ink usually loyal  
'Black dogs are usually loyal.'
- b. Tôi thích **những** con chó mực.  
I like Pl Cl dog ink  
'I like black dogs.'
- (44) a. # **Các** con chó thường trung thành.  
Pl Cl dog usually loyal  
'Dogs are usually loyal.'

- b. # Tôi thích **các** con chó.  
 I like Pl Cl dog  
 ‘I like dogs.’
- (45) a. **Các** con chó mực thường trung thành.  
 Pl Cl dog ink usually loyal  
 ‘(The) black dogs are usually loyal.’
- b. Tôi thích **các** con chó mực.  
 I like Pl Cl dog ink  
 ‘I like (the) black dogs.’

These examples in (45) show that the restriction on the noun phrase not only licenses the presence of *những* in an NP, but also allows the generic interpretation of *các*. Therefore, if there is restriction on the NP, *những* and *các* allow both generic and non-generic definite readings, depending on the context, especially when they combine with ‘most’ (46) or intentional verbs (47).

- (46) Hầu hết **những/các** tòa nhà cao tầng có thang máy.  
 most Pl Cl house tall floor have ladder machine  
 ‘Most **những/các** tall buildings have elevators.’  
 Reading 1: Most of the tall buildings (e.g. on campus) have elevators.  
 Reading 2: As for tall buildings, most have elevators.
- (47) Tôi muốn mua **những/các** con chó mực.  
 I want buy Pl Cl dog ink  
 ‘I want to buy **những/các** black dogs.’  
 Reading 1: There are specific black dogs I want to buy.  
 Reading 2: I want to buy whatever dogs that are black.

We now can summarize the syntactic and semantic properties of *các* and *những* in Table 3 below.

(48) Table 3: *The properties of những and các*

|                                          | NHỮNG      | CÁC                    |
|------------------------------------------|------------|------------------------|
| Co-occur with ‘all/most’                 | yes        | yes                    |
| Co-occur with other quantifiers          | no         | no                     |
| Co-occur with numerals                   | no         | no                     |
| Require classifiers                      | yes        | yes                    |
| Require restriction on the NP            | <b>yes</b> | <b>no</b>              |
| Require D-linked                         | yes        | yes                    |
| Co-occur with <i>wh</i> -elements        | <b>yes</b> | <b>no</b>              |
| Appear in ‘there are ...’ construction   | <b>yes</b> | <b>no</b>              |
| Allow generic reading                    | <b>yes</b> | <b>no</b> <sup>8</sup> |
| Co-occur with kinship terms <sup>9</sup> | <b>no</b>  | <b>yes</b>             |

## 4 The structures of *những* and *các*

The syntactic distribution and semantic properties of *những* and *các* as described above suggest the proposed structures have to be able to account for the following three properties.

<sup>8</sup>In general, except in the presence of modification.

<sup>9</sup>This point will be discussed in the next section.

- (i) the obligatory co-occurrence of *những/các* and Cls;
- (ii) the competition between *những/các* and numerals as well as the obligatoriness of *những/các* after ‘all/most’ and plural noun phrases when there is a Cl;
- (iii) their syntactic and semantic differences, including the fact that *những* requires restriction on the noun phrase.

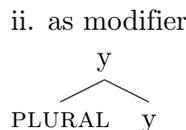
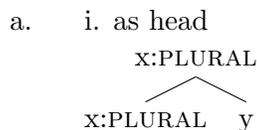
The structure of Vietnamese noun phrases and pluralizers will follow an analysis based on minimalist assumptions as implemented by Adger (2003) in order to account for the distributional properties of two pluralizers (Section 4.1 and 4.2) and the issues of modification and of interpretation (Section 4.3). Given the fact that in analyzing Vietnamese NPs we cannot apply common syntactic tests such as movement (all types of nominal modifiers are on the right) or ellipsis (the only element that can be elided in a noun phrase is the noun) and there are no morphological markings in the language (e.g. no overt agreement or obligatory number markers), we have to propose structures based on their semantic properties and distributional behavior. In other words, the structures for *những* and *các* have to satisfy the following criteria.

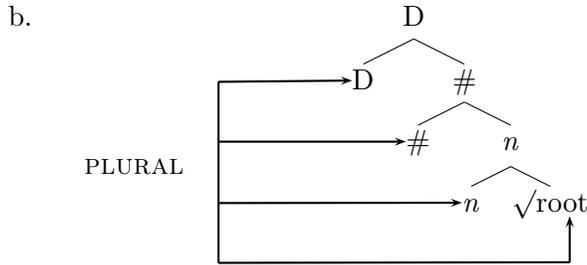
- (49) a. *Những*:
- i. word order
  - ii. restriction requirement
  - iii. plural feature; incompatibility with numerals
  - iv. interpretation ((in)definite, generic)
- b. *Các*:
- i. word order
  - ii. no restriction requirement
  - iii. plural feature; incompatibility with numerals
  - iv. interpretation (generic/definite if modified, otherwise definite)

#### 4.1 The obligatory co-occurrence of *những/các* and Cls

In the literature, after Borer’s (2005) and many others’ claim regarding the complementarity between plural markings and Cls, the existence of pluralizers in classifier languages has been accounted for in two ways. The first approach is the modifier analysis proposed by Wiltschko (2008), followed by Butler (2011) and many others. According to them, plural markings in different languages differ along two dimensions: how they are merged and where they are merged into the structure, as summarized in (50a) and (50b), respectively.

- (50) Parameters of plural markings



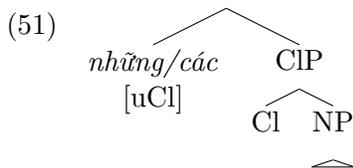


(Wiltschko, 2008, p. 688)

In languages where plural is non-inflectional or optional (e.g. classifier languages), the pluralizers can be adjoined at different levels: at the root (e.g. in Halkomelem, according to Wiltschko (2008)), *n*, *#*, or *D* (e.g. in Yucatec Maya, according to Butler (2011)). In languages where plural is grammaticalized, plural is merged as a head. Nevertheless, the idea that pluralizers in classifier languages are modifiers seems to be unable to account for the restriction requirement of *những* (specifiers do not have power over which complement types a head should take) and the obligatoriness of *những/các* with certain Qs (but not all of them) and in some other contexts in Vietnamese (cf. Section 3.2.1).

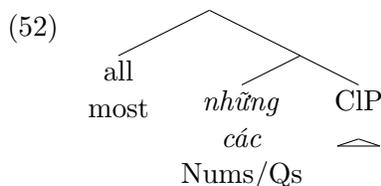
The second approach is proposed by Gebhardt (2009) in his dissertation on Persian DPs. As this is a feature-based analysis, he proposes that CIs always have an [Individuation] feature, while a plural has a [Group] feature which entails [Individuation]. He argues that there are two separate functional phrases, NumP and ClP, and whether a plural can co-occur with a CI or not in a language depends on whether the two features project on the same phrase or different phrases (Gebhardt, 2009, p. 23-24).

Inspired by this approach and based on the fact that *những/các* precede an obligatory CI in the DP, we propose that *những/các* are inserted higher than ClP and that they have a [uCl] feature which makes the presence of a CI obligatory for them. In other words, pluralizers in Vietnamese co-occur with CIs because they have a [uCl] feature instead of having a CI feature, unlike some other languages where the pluralizer has many restrictions that suggest they are portmanteau morphemes with Pl + Cl and also some D features. This again means that the plural morphemes in Vietnamese are inserted higher in the tree (assuming Distributed Morphology), as shown in the diagram (51).



## 4.2 The competition between *những/các* and numerals/most Qs

Given the linear order and that *những/các* (and Nums alike) require CIs following them and are syntactically obligatory after *tất cả* ‘all’, while they both cannot co-occur with other Qs or Nums, we can project *những/các* lower than ‘all’ and ‘most’ (high Qs) and, as argued above, higher than Cl. Following Gebhardt (2009), we can suggest that *những* and *các* occupy the same head as Nums and low Qs in the DP, as demonstrated in (52).



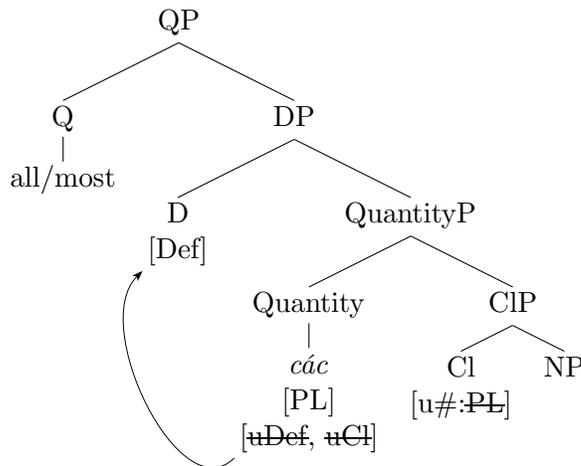
This projection is compatible with the following descriptive generalizations. First, *những/các* can co-occur with Cls because they do not compete with Cl for the same head; instead, these pluralizers, low Qs, and Nums in Vietnamese are in a complementary distribution on a ‘Quantity’ head (cf. Schmitt and Munn, 2002; Munn and Schmitt, 2005; Gebhardt, 2009, for ‘fused’ phrases). Second, the Quantity head contains the singular/plural distinction. In particular, recall that in Vietnamese, [Cl-N] and [Cl-N-Dem] are always singular and *những/các* is required to derive their pluralized counterparts. A possible way to implement this is that singular is represented by a null morpheme while *những/các* is associated with a plural feature ([Pl]) and is obligatory to pluralize a noun phrase if there is a Cl. Consequently, Cls are not singular by themselves, but rather have a [u#] feature that will be valued by the Quantity head. In the other direction (i.e. in order to account for why the pluralizers, and other Qs and Nums alike, require a Cl) there must be a [uCl] on the Quantity head, which may be equivalent to [u-indiv] in Gebhardt’s (2009) analysis. Third, ‘all’ and ‘most’ require *những*, *các*, or a Num because they are high Qs and select for plurals (or look for a [Group] feature, if we assume Gebhardt (2009)). Since ‘all’ and ‘most’ are high Qs, which are merged higher in the tree than the Quantity head, they can combine with Nums or low Qs as long as there are no semantic conflicts. The fact ‘all’/‘most’ can combine with *những/các* but not other Qs thus is because of a semantic reason which may also be reflected in the syntax: besides [Pl] feature, *những/các* can be interpreted as definite which make them a good fit for ‘all’ and ‘most’, while other Qs cannot be interpreted as definite (other meanings) clashing with the semantics of ‘all’ and ‘most’.

### 4.3 The differences between *những* and *các*

As discussed in Sections 3.1.1 and 3.2.2, *những* and *các* are syntactically and semantically different from each other with respect to the following.

- (53) a. *những* cannot occur in unmodified noun phrases, while *các* does not require any restriction on the NP;
- b. *các* is always definite unless the noun phrase is modified, which may allow a generic reading, while *những* can associate with a wide range of interpretations (generic, indefinite, or definite).

For the issues of interpretation, I will assume an analysis where definiteness is a property of D in the same way as kind-level interpretations are properties of D and *những* and *các* as the Quantity head have different features that permit certain combinations and block others. The structure for *các* then is as straightforward as seen in (54).

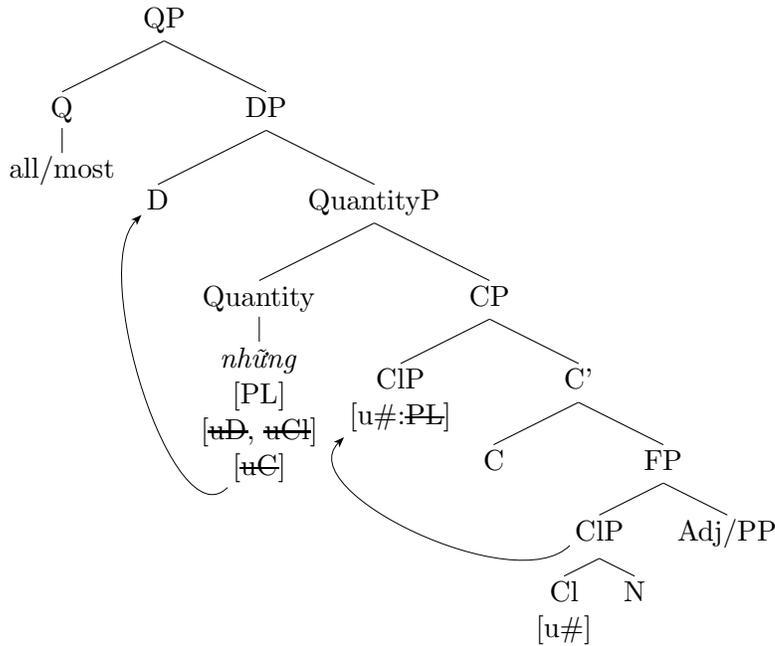
(54) *Các*'s structure:

As described in Section 3.2.2, *các* noun phrases are always interpreted as definite. I implement this by suggesting that *các* has a [uDef] which must agree with a definite feature in D. An alternative is to have *các* raise to D to be interpreted as definite. For concreteness I assume the former.

With respect to *những*, which requires restriction on the noun phrase, it is necessary to look at the literature on the phenomenon ‘licensing by modification’ which is in fact very common crosslinguistically (Mathieu, 2012; Nomoto, 2013; Leu, 2015; Kayne, 2015). This phenomenon includes two types: semantic and syntactic. The semantic licensing by modification often occurs as the ability of modifiers to allow definite nominal expressions to be associated with either generic or indefinite readings. Examples for this type are the cases of plurals in Japanese, Malay, and to some extent in Mandarin, whose definite interpretations disappear in the presence of modifiers (Nomoto, 2013, p. 123-130). The syntactic licensing of modification, on the other hand, happens when modifiers can restore the grammaticality of otherwise unacceptable structures. The bare classifier construction in Thai, *de* nominals in French, or English *one* belong to this type (Jenks, 2012; Mathieu, 2012; Kayne, 2015). The properties of *những* and *các*, as summarized in (53), seem to suggest that Vietnamese has both types of licensing by modification in NPs: syntactic (in the case of *những* which is simply ungrammatical in unmodified noun phrases) and semantic (in the case of *các* which does not allow generic readings unless the noun phrase is modified).

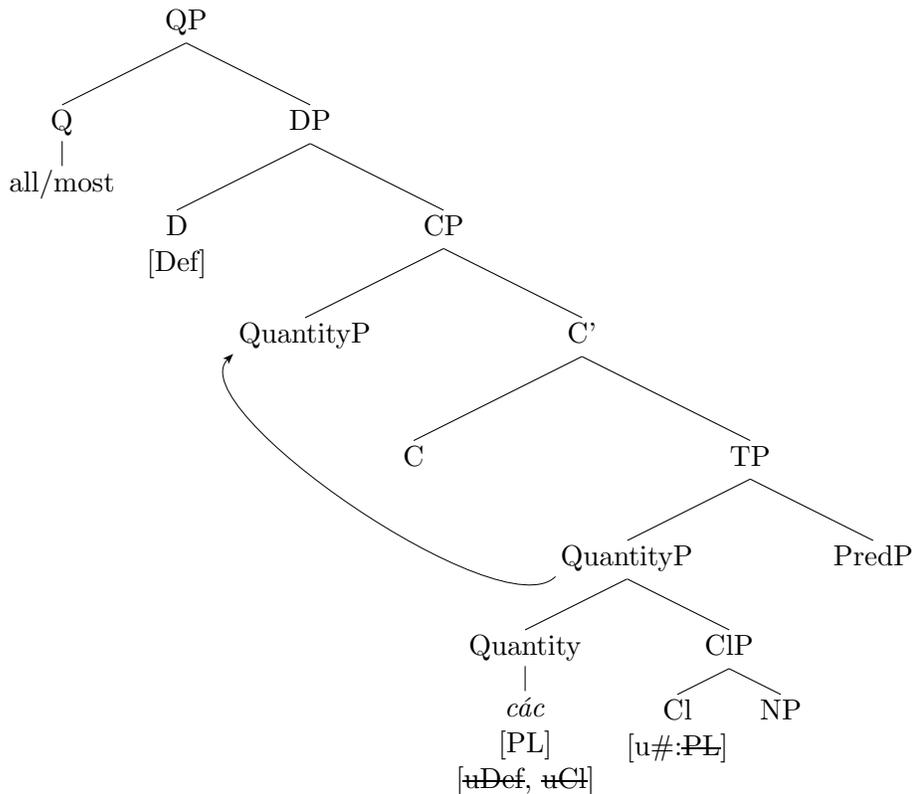
Following Kayne’s (1994) analysis that adnominal adjectives derive from relative clauses, we propose that the fact *những* needs to be licensed by modification of some sort while *các* does not reflects the difference in these pluralizers’ *c*-selection: *những* selects relative clauses (i.e. a CP) as its complement, as shown in (55), while *các* (and numerals and other quantifiers alike) selects for CIPs (cf. (54)). Therefore, while *các* has a [uCl] feature, which will be valued by a Cl in its complement, *những* possesses an interpretable [uC] feature in addition to the [uCl] feature.

(55) *Những*'s structure:



The tree in (56) demonstrates the fundamental difference between *những* and *các* in a modified NP: the modification is part of *những*'s complement, but is not in the case of *các*. In other words, in [*những*-Cl-N-MOD], CIP and MOD form a constituent which is the complement of *những*; whereas in [*các*-Cl-N-MOD], *các* and CIP are a constituent, not CIP and MOD.

(56) *Các*'s structure with MOD:



The requirement of modification can be considered a syntactic reflection of the semantic function of the pluralizer *những*: *những* noun phrases should be thought of as a partitive of sorts (e.g. ‘*những* Cl book thick’ would be thought as ‘the thick books among the books in the discourse’). In other words, semantically, *những* with [Pl] feature signals that the proper set picked out from the whole set in the discourse is a plural set. This is implemented technically through feature checking: *những* has a [Pl] feature and thus checks plural in its complement as it raises. It also has a [uCl] feature, like *các*. The ClP raises to [Spec, CP] because of the EPP feature of CP. The raising of ClP in the case of *những* in (55) and of QuantityP in the case of *các* in (56) are to ensure the linear order of a modified NP in Vietnamese: if there is an overt C, the Quantity head and the ClP have to precede the C, as illustrated in (57).

- (57)     **những/các** cánh     điều **mà** màu đỏ  
           Pl                    Cl-swing kite that color red  
           ‘the kites that are red’

The complement of *những* has to be a CP/Predicate phrase, not an unmodified NP, in order to create a proper subset; otherwise we could end up with ‘the books in the set of the books in the discourse’. There is some independent evidence for this hypothesis. First, *những* can occur with *wh*-phrases to derive ‘which of x’ expressions. Second, *những* cannot appear with kinship terms (used as personal pronouns), as seen in (58), because it would be weird to have ‘you of the set of you’ or ‘them of the set of them’.

- (58) a.     Cô   có   thích   chó   mực   không?  
           aunt yes like   dog ink   no  
           ‘Do you (SG) like black dogs?’  
       b.     [**Các/\*những** cô]   có   thích   chó   mực   không?  
           Pl                    aunt yes like   dog ink   no  
           ‘Do you (PL) like black dogs?’

If this approach is correct, we can understand (i) the requirement for a restriction, (ii) the confusion in the literature with respect to its interpretation (definite or indefinite), (iii) its unacceptability with pronouns, (iv) the acceptability with *wh*-phrases, and (v) its non-co-occurrence with Nums and Qs which comes from the fact that it is a Quantity head that selects for CPs and not for QPs, DPs, or ClPs.

The wide variety of interpretations that *những* NPs can associate with comes from the fact that *những* itself does not have a definite feature and must check some D feature (i.e. it has [uD] and this forces D-linking). In other words, the interpretations of *những* NPs are accounted for by the different features of D, which can be [ $\pm$ Def] or perhaps a kind feature. In contrast, D that is compatible with *các* has a [uDef] feature and when D is definite, it must agree with features on the Quantity head. Meanwhile, the ability of *các* NPs to be generic still needs further research but it is not uncommon crosslinguistically for modified DPs to allow more readings. If *các* takes a relative clause as its complement, then it is possible that the actual noun phrase escapes the definite feature and allows a generic flavor.

## 5 Conclusion and discussion

Vietnamese has two lexical items that have an inherent plural feature and occupy the same position as Nums and most Qs in a noun phrase: *những* and *các*. This paper is not so concerned with

their categorical labels,<sup>10</sup> but their syntactic behavior and semantic properties instead. In terms of similarities, both of them require a Cl (unlike plural morphemes in some other classifier languages), cannot co-occur with Nums or most Qs (except for high Qs ‘all’ and ‘most’), are obligatory in a pluralized version of [Cl-N] or [Cl-N-Dem] constructions, and must satisfy discourse linking requirements. However, they differ in several ways. Besides the presence of a Cl, there is no additional licensing requirement for *các* to pluralize a noun phrase while *những* only appears in modified noun phrases. In terms of interpretations, *các* is consistently definite in the sense of familiarity and maximality, and can combine with pronouns whereas *những* can vary among indefinite, definite, and generic, and can occur in indefinite expressions like *wh*-phrases or ‘there are ...’ but cannot co-occur with pronouns.

The paper proposes a unified DP structure for *những/các* in which they are quantifier-like and occupy a Quantity head. Within this proposal, their distributional properties are accounted for by the competition of heads (*những/các* compete with Nums and most Qs on the Quantity head which is higher than the Cl head) and by their *c*-selection (*những* requires restriction on the noun phrase and thus selects for a CP, while *các*, like Nums and other Qs, takes a CIP as complement).

While this analysis is incompatible with the idea that plural markers in classifier languages are always modifiers (Wiltschko, 2008; Butler, 2011) for several reasons mentioned in Section 4.1, it is not against the typological claim about the complementarity between plurals and Cls (these pluralizers are not really plural markers anyway) and follows Gebhardt’s (2009) proposal of crosslinguistic variation in which plurals and Cls being on different heads/phrases is one possibility. Although there are some speculations we have to assume in the proposed structures, because Vietnamese is a noninflectional language, this is the very first study on *những/các* under a generative grammar framework and helps expand our current knowledge of the typology of number marking in particular and of noun phrases in general.

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<sup>10</sup>Therefore, they have been simply called ‘pluralizers’ throughout the paper, instead of any syntactic labels, although the proposed analysis seems to suggest they are in fact Qs.

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# Give me a break: Determining clause boundaries in two signed languages\*

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## 1 Introduction

Delineating what constitutes a clause is crucial to the investigation of many structural phenomena in language. Whether one is concerned with basic constituent order, restrictions on anaphoric reference, or the existence of resultative constructions – to name just a few – an informed discussion of any clause-level phenomenon requires a clear understanding of where a clause starts and where it ends. Identifying clause boundaries is notoriously difficult in signed languages: not only does the sign linguistics literature lack a standard set of diagnostics for identifying them (Johnston and Schembri, 2007; Tang and Lau, 2004), but even the usefulness of the clause as a unit of grammatical organization of signed utterances has been called into question (Hodge, 2013). In this paper, I provide both an overview and a critical evaluation of syntactico-semantic diagnostics for clausehood that have been proposed in the spoken and signed language literature to date. Specifically, I examine their applicability to American and German Sign Language (ASL and DGS, respectively) and suggest modifications to existing tests. Further, I propose two additional diagnostics that, to my knowledge, have not been employed in ASL or DGS. The overall goal is to better understand the diagnostics currently at our disposal and expand their inventory.

My focus here is on two historically unrelated sign languages with different basic word orders: ASL is underlyingly SVO, whereas DGS sentences follow SOV word order. While some syntactic diagnostics are indifferent to this typological difference, some of the tests discussed here apply predominantly to SOV languages. To exemplify in how far a particular diagnostic is effective and applicable in ASL and DGS, I will draw on utterances describing complex cause-effect events. They constitute a good test case since it is unclear whether the two sign languages under discussion express such events as simple clauses vs. subordination or coordination. For the purposes of this paper, cause-effect events involve any process that brings about a particular result state, such as hammering a piece of metal flat, or devouring everything in the fridge until it is empty.

This paper is structured as follows. Section 2 identifies some of the specific issues involved in determining clause boundaries in signed languages. Section 3 looks at two syntactic diagnostics that have previously been discussed in the sign literature: extraction and subject pronoun copy. I show that A'-movement has limited applicability as a diagnostic in ASL and DGS, and propose that subject pronoun copies should be embedded in polar questions in order to provide a more effective test. I also delineate how much information about sub-sentential structure the diagnostic can provide depending on different types of signed languages. In Section 4, two further diagnostics of clause boundaries are proposed: rightward wh-movement and the position and scope of modal verbs. Both phenomena provide insights as to whether a sentence contains multiple clauses in SOV languages. Section 5 concludes the paper.

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\*I would like to take this opportunity to thank my ASL and DGS consultants for sharing their nuanced intuitions about their native languages with me. Further, I'm grateful to the SignLab Göttingen for their hospitality and for allowing me to use their resources during data collection in Germany. Further, this paper benefited from discussions with Richard Meier, David Quinto-Pozos, John Beavers, and the Sign Lab at UT Austin. Thanks also to audiences at *TISLR12*, *BLS42*, and *TLS16*, where previous stages of this work were presented.

## 2 Why are clauses difficult to spot in signed languages?

In both the generative and functionalist traditions, a clause is defined as minimally containing a predicate and its arguments. The formal literature further distinguishes small clauses consisting of a bare VP from full clauses as ‘maximal projection[s] of the highest functional category associated with a small clause’ (Wiltschko and Heim, to appear). Discourse markers, fixed expressions, gestures and adverbials are assumed to close off the periphery of a signed clause (Johnston, 2013). Semantically, clauses have been characterized as propositions that can be assigned a truth value, or as expressing ‘a complete thought’ (Koeger, 2005). Hodge (2013) notes that such complete ideas are frequently expressed as non-linguistic enactments (constructed action) in narratives produced in Australian Sign Language. Since events and their participants can thus be represented non-linguistically, she calls into question the usefulness of analyzing every signed utterance in terms of its clausal structure. However, while most signed languages documented so far make use of constructed action and dialogue to some degree, they also exhibit more conventionalized clausal structure and many show evidence of clause linkage and subordination (see Liddell, 1980; Padden, 1983; Glück and Pfau, 1997). Defining clause boundaries in signed languages is thus a worthwhile enterprise.

Carving up the sign stream into discrete clauses is complicated by two factors: on the one hand, morpho-syntactic devices marking clause boundaries such as complementizers and conjunctions are optional (Tang and Lau, 2004). On the other hand, nominal signs can take on predicative functions in many signed languages: a pointing sign may either establish a referent in the signing space in determiner-like or pronominal function; or it can predicate a particular location of said referent. In conjunction with frequent omission of arguments that have previously been established in the discourse, an utterance like (1)<sup>1</sup> may contain as many as three or as few as one clause (potential boundaries are indicated by (.)). The SOV word order in (1) has been proposed as basic in DGS (Glück and Pfau, 1998; Happ and Vorköper, 2006) but it also surfaces with aspectually marked or agreement verbs in ASL, as well as with classifier predicates (Chen-Pichler, 2001).

- (1) WOMAN (IX-rt) (.) PLATE (IX-fr) (.) LICK-plate.
- a. ‘There is a woman. There is a plate. (She) licks (it).’
  - b. ‘There is a woman. There is a plate. (She) licks the plate.’
  - c. ‘The woman licks the plate.’

The sign language literature has primarily drawn on the prosodic organization of signed utterances for cues marking clause boundaries. Prosodic markers in visual-manual languages include changes in facial expression as well as head and torso movements that structure a signed utterance rhythmically. While researchers acknowledge that there is no isomorphic relationship between syntax and prosody in signed languages, eye blinks have been identified as markers of clause boundaries in both DGS and ASL (Herrmann, 2010; Wilbur, 1994). However, blinking is neither obligatory at the end of a sentence, nor is it restricted to clausal constituents: a signer may combine several sentences under one intonational contour marked by a final blink in fast signing (Wilbur, 1994), or they may blink intra-clausally after topics, between a subject and its predicate, or within an NP containing a relative clause (Herrmann, 2010). Other candidates for boundary markers are pauses and holds, where the handshape of a sign is held for at least three frames at the final location.

<sup>1</sup>Following sign linguistic conventions, signs in ASL and DGS are represented via small capital letter glosses that represent rough translation equivalents in English. IX stands for pronominal or locative pointing signs, small letters following (pro)nouns indicate the direction of pointing or the referential locus where a sign is produced: rt = right, lf = left, fr = front. A # precedes fingerspelled signs.

Where they occur, pauses and holds often accompany the end of a sentence, but they are both optional and infrequent.<sup>2</sup> A related cue involves an utterance-final increase in sign duration, which has been discussed as phrase-final lengthening (Coulter, 1993; Grosjean and Lane, 1977; Wilbur, 1994). Grosjean and Lane (1977) show that the final signs of conjoint and independent clauses are held longer than clause-internal signs; however, the difference between conjunct-final and -internal signs only surfaces at slower-than-normal signing rates.

To summarize, no single prosodic cue has been identified that can reliably predict the end of a signed clause. This finding highlights the need for syntactico-semantic diagnostics that are sensitive to clause boundaries. The next section discusses two clausehood tests that have previously been used in the spoken or sign literature.

### 3 Existing syntactico-semantic diagnostics for clause boundaries

Now that we have seen some of the specific issues sign linguists struggle with when trying to delimit clauses, let's turn to syntactic and semantic diagnostics that work around these issues. The goal here is to identify which of the tests that have been described in the literature allow us to determine whether a given signed utterance in ASL or DGS consists of one or more clauses.

To exemplify the problem at hand, look at (2). Like most signed languages, ASL and DGS lack obligatory overt complementizers and conjunctions (but see Davidson (2013) for an overview of the syntactic distribution and semantics of ASL conjunctions), while at the same time allowing *pro*-drop for discourse-active arguments. Consequently, the underlying syntactic structure of the cause-result expression in (2) could be juxtaposed or conjoined sentences (2a), a sequence of a main clause followed by a dependent clause (2b), or a single clause (2c).

- (2) a. WOMAN IX-If SAND FLOOR SMOOTH [ASL]  
 b. 'The woman sanded the floor (and it) became smooth.'  
 c. 'The woman sanded the floor (so that it) became smooth.'  
 d. 'The woman sanded the floor smooth.'

Tang and Lau (2004) mention gapping, extraction, and negation as diagnostics that are frequently used in spoken language research to distinguish coordinated clauses from constructions involving subordination. Gapping was first discussed by Ross (1967) as a constraint on coordinate structures and involves the omission of the verb in either the second conjunct (in SVO languages like (3a)) or the first conjunct (in SOV languages like German in (3b)), given that the two verbs are identical. While forward gapping as in (3a) has been attested in ASL (Frazier and Yoshida, 2012; Liddell, 1980), the phenomenon has limited applicability as a clause diagnostic because it requires identity of predicates in the utterances under consideration. It will therefore not be considered further here.

- (3) a. Mary ate an apple and John  $\emptyset$  an orange.  
 b. Ich weiß, dass Mary einen Apfel  $\emptyset$  und John eine Orange gegessen hat.  
 I know that Mary an apple  $\emptyset$  and John an orange eaten has

In the next two subsections, I will discuss extraction and subject pronoun copy. Where applicable, I checked the original data from the studies cited here with three to five native signers of ASL and DGS each. Signers were considered native users of their respective sign language if they

<sup>2</sup>Hansen and Heßmann (2007) find no pauses and only four holds in a 33-second text, compared to, for example, 17 eye blinks.

had been exposed to it by the age of three and indicated using ASL or DGS on a daily basis. They were asked to translate target sentences in the appropriate context and to provide grammaticality and felicity judgements on the data.

### 3.1 A'-Extraction

Restrictions on syntactic movement of arguments to non-argument positions in the functional periphery of a clause are frequently cited as indicators of clause boundaries in spoken and signed languages. In this section, I describe how this diagnostic has been applied and why it is of limited usefulness for analyzing many signed utterances. Ross's (1967) Coordinate Structure Constraint first captured the observation that *wh*-words and topics can move out of dependent clauses (4a) in English, but they cannot move out of conjuncts (4b).

- (4) a. What<sub>*i*</sub> did you say John bought *t<sub>i</sub>*?  
 b. \*What<sub>*i*</sub> did John eat an apple and Jim drink *t<sub>i</sub>*?

Padden (1983) shows that this constraint holds in ASL as well, as MOTHER in (5b) cannot be topicalized out of the conjunct translated as 'he told his mother'.<sup>3</sup> Lillo-Martin (1992) goes one step further in claiming that all clauses, including subordinate ones, function as islands for movement in ASL. Her example (5a) illustrates that a DP like THAT COOKIE cannot be fronted to the topic position of the matrix clause. Glück and Pfau (1998) argue that similar extraction facts hold for DGS.

- (5) a.  $\frac{\quad}{\quad} t$   
 \*<sub>*a*</sub> THAT <sub>*a*</sub> COOKIE<sub>*i*</sub>, <sub>*b*</sub> SISTER <sub>*b*</sub> PERSUADE<sub>*c*</sub> <sub>*c*</sub> MOTHER EAT *t<sub>i</sub>*  
 Intended: 'That cookie, my sister persuaded my mother to eat (it).'
- (Lillo-Martin, 1992, p. 263)
- b.  $\frac{\quad}{\quad} t$   
 \* MOTHER, <sub>*1*</sub> HIT<sub>*i*</sub> SISTER, <sub>*j*</sub> INDEX TATTLE<sub>*k*</sub>  
 Intended: 'His mother, I hit my sister and he told.'
- (Padden, 1983, p. 77)

These facts suggest that the grammaticality of A'-extraction provides a good diagnostic for clause boundaries in ASL and DGS, since movement cannot cross a clause boundary. However, several factors conspire to reduce the applicability of this diagnostic. Lillo-Martin notes that there are several ways around actual movement out of dependent clauses. Topics, for example, may be base-generated in the functional periphery of the matrix clause as long as an overt or null resumptive pronoun remains in situ. Null pronouns of type *pro* are in turn licensed by agreement marking on the (embedded) predicate. Without getting into the somewhat contentious question of the syntactic status of agreement in signed languages, verbs can index their arguments via modifying their initial, final, or overall location to coincide with the location assigned to said arguments (their referential loci). Given their status as definites (Liddell, 1980), topical referents are typically assigned a referential locus (Engberg-Pedersen, 1993; Sze, 2008), which increases the likelihood that the predicates to which they belong agree with that locus. In fact, my consultants considered it unnatural for a predicate not to show agreement with a topicalized constituent. Hence, unless the utterances under investigation contain verbs that are categorized as 'plain' in the sign literature (Padden, 1983) because they cannot modify their location to index a referent, it is impossible to create a context where an element has to move in order to surface in the periphery of the matrix

<sup>3</sup>Transcription conventions for (5) are taken from the papers cited here: subscripts a-k indicate referential loci or trace indices, INDEX stands for pronominal pointing signs. Lines above the gloss indicate the spread of non-manual marking, in this case the brow is raised and the head slightly tilted back for topic marking. In this paper, non-manuals are only indicated where they are relevant to a syntactic argument or when occurring in a quoted example.

clause. Since it is this ability to move that would identify single clauses in ASL and DGS, the diagnostic can thus only be applied to utterances with embedded plain predicates.

Even with plain predicates, two caveats concerning the interpretation of the data need to be addressed. Contrary to the findings of Lillo-Martin (1992), clauses do not form islands for wh-movement for all ASL signers. My consultants consistently accept fronted wh-words in complex clauses containing a control clause (6a) or a full sentential complement (6b). Note that both EAT and LOVE are plain verbs that do not license a *pro* resumptive pronoun, illustrating that WHAT and WHO in (6) have truly moved.

- (6) a. WHAT<sub>i</sub> YOU FORCE-1f #JOHN-1f EAT IX-1f t<sub>i</sub>  
 ‘What did you force John to eat?’  
 b. WHO<sub>i</sub> IX-rt #BILL THINK IX-1f #JOHN LOVE t<sub>i</sub>  
 ‘Who does Bill think John loves?’

Similar differences in grammaticality judgments arose for topic movement in DGS. I could not replicate Glück and Pfau (1997) findings that clauses block DP fronting, since my consultants allow topic movement out of control structures (7a) and full sentential complements (7b). In summary, extraction can only be used to identify single clauses when they contain morphologically plain predicates and after establishing that, in the signer’s idiolect, clauses form islands for topic and wh-extraction.

- (7) a.  $\frac{t}{\text{CAKE}_i \text{ IX-rt, I FORCE-fr EAT } t_i \text{ IX-fr}}$   
 ‘The cake, I forced you to eat (it).’  
 b.  $\frac{t}{\text{CAKE}_i \text{ IX-fr, I THINK I FINISH EAT } t_i}$   
 ‘The cake, I think I’ve eaten (it).’

### 3.2 Subject pronoun copy

Subject pronoun copy is likely the most frequently cited clausehood diagnostic in the sign language literature. Liddell (1980) first observed that a pronominal point in utterance-final position in ASL can refer back to the sentential subject, whether that subject is expressed overtly or not. Such pronoun copies are frequently accompanied by a head nod and are not separated by a pause from the rest of the utterance. Padden (1983) was the first to note syntactic constraints on the co-reference of final pronoun copies that can be exploited for distinguishing coordinate structures from subordination and simple clauses. As illustrated in (8a), a pronominal copy may be co-referential with the subject of a simple clause such as IX-rt WOMAN (IX-rt). Padden claims that such a co-reference relation can be established when a subordinate clause intervenes between subject and copy, as is the case for the *pro*-dropped subject of FORCE in (8b) and the final first-person pronoun. Crucially, however, a pronoun copy cannot refer back to the subject of the first conjunct in a coordinated structure: the final index sign in the ungrammatical (8c) shares the referential locus ‘a’ with ANN, the subject of the first conjoined clause. According to Petronio (1993), the final pronoun copy right-adjoins to the matrix C and m-commands a co-referential subject. In a coordinated structure, the final copy can only look inside the second conjunct, where it does not find a co-referential subject, resulting in ungrammaticality.

- (8) a. IX-rt WOMAN IX-rt READ SOMETHING IX-rt  
 ‘The woman is reading something.’

- b.  $_1$ FORCE $_i$  MAN  $_i$ GIVE $_j$  BOY  $_j$ POSS BOOK  $_1$ INDEX  
 ‘I forced the man to give the boy his book, I did.’ (Padden, 1983, p. 73)
- c. \*  $_a$ ANN $_i$  SAD BUT  $_b$ JOHN HAPPY  $_a$ INDEX $_i$   
 ‘Ann $_i$  is sad, but John is happy (she $_i$ ).’ (Padden, 1983, p. 29)

Subject pronoun copies have also been observed in DGS and a number of other signed languages. For all of them, the literature agrees that simple clauses with pronoun copies like (8a) are acceptable, while such copies in coordinate structures like (8c) are not acceptable. However, signed languages seem to vary systematically when it comes to the acceptability of pronoun copies in sentences containing embedded clauses. Languages like ASL allow pronominal subject copies following all types of complement clauses, while for example Sign Language of the Netherlands (NGT) does not allow final pronouns to refer back across any kind of subordinate clause (Gijn, 2004). For a third class of signed languages, the nature of the embedded clause seems to matter. Göksel and Kelepir (2016) have recently shown that final pronoun copies are only acceptable following complements of WANT-type verbs but not of KNOW-type verbs in Turkish Sign Language (TiD). Only WANT-type verbs allow center-embedding of their complements, a property that Geraci and Aristodemo (2016) have linked to taking a non-sentential complement in SOV languages like TiD and LIS (Italian Sign Language). It thus stands to reason that languages like TiD disallow final pronoun copies following full sentential complements, but that such pronouns can refer back to the matrix subject if a constituent smaller than a full clause (e.g. a raising or control clause) intervenes.<sup>4</sup> The examples in (9) summarize the typological possibilities for pronoun copies following dependent clauses: (9a) in conjunction with (8b) show that ASL allows subject pronoun copies with full and reduced complement clauses; (9b) and (9c) illustrate that NGT does not allow subject pronoun copy with any type of subordinate structure; and (9d) and (9e) show that, in TiD, final pronoun copies are accepted with complements of WANT but not of KNOW.

- (9) a. IX-1 DECIDE IX-i SHOULD  $_i$ DRIVE $_j$  SEE CHILDREN IX-1 [ASL]  
 ‘I decided he ought to drive over to see his children, I did.’ (Padden, 1983, p. 73)
- b. \* MARIJKE IX-rt KNOW INGE IX-lf lf-COME-1 IX-rt [NGT]  
 Intended: ‘Marijke knows that Inge comes to me.’
- c. \* IX-lf WANT HOUSE GO.TO IX-lf  
 intended ‘He wants to go home.’ (Gijn, 2004, p. 92, 94)
- d. \*? ALI-k IX-k IX-1 UNIVERSITY WORK KNOW IX-k [TiD]  
 Intended: ‘Ali knows that I am working at the university.’
- e. ALI-k IX-1 UNIVERSITY WORK WANT IX-k  
 ‘Ali wants me to work at the university.’ (Göksel and Kelepir, 2016, p. 73)

DGS seems to pattern with TiD rather than with ASL or NGT. My five DGS consultants produced and evaluated 18 variants of the sentences in (10) and rejected 13 of them. Of the five accepted utterances, three are tokens of (10c), which contains a control clause rather than a full sentential complement. Two of the DGS signers also produced the utterances in (10) as polar questions and judged only one token acceptable, again the one using the control verb FORCE. The fact that the signers reject pronoun copies following full dependent clauses but sometimes accept

<sup>4</sup>Since signed languages tend not to mark tense morphologically and lack obligatory subordinating conjunctions, I adopt the suggestion of Geraci and Aristodemo (2016) to consider full sentential complements those clauses that behave like independent clauses except for potential non-manual marking accompanying them. Crucially, full sentential complements need to exhibit overt subjects that do not depend on any arguments of a matrix clause (control and raising structures).

them with a WANT-type verb suggests that DGS and TID share similar restrictions on subject pronoun copies.

- (10) a. IX-1 BELIEVE-NOT DOCTOR EXIST TIME FOR-fr IX-1 [DGS]  
 ‘I don’t think the doctor has time for you.’  
 b. IX-1 HOPE #JOHN IX-rt rt-EMAIL-fr IX-1  
 ‘I hope John emails you soon.’  
 c. IX-1 #HANS IX-rt FORCE-rt WORM EAT IX-1  
 ‘I forced Hans to eat a worm.’

Recognizing such typological differences in subject pronoun copy has important repercussions for its applicability as a diagnostic of clause boundaries. While the phenomenon can only distinguish between coordinate clauses and a higher degree of syntactic integration in languages like ASL, it can identify monoclausal utterances in NGT, since only those allow the addition of subject pronoun copies. In languages like TID and potentially DGS, utterance-final pronouns can identify whether a particular constituent forms a full clause or shows a higher degree of syntactic integration with the matrix clause, as control constructions do.

I further propose that, to use this diagnostic most effectively, subject pronoun copies should be embedded in polar questions rather than used in declaratives. During my data collection for both ASL and DGS, some consultants initially rejected subject pronoun copies in simple declarative clauses even when they were presented in contexts that invited emphasis on the subject. In her typological overview of interrogative constructions in signed languages, Zeshan (2004) points out that final pronoun copies typically accompany yes/no questions and that they can be used felicitously in non-emphatic contexts. This observation is echoed by (Petronio, 1993), who notes that in ASL, doubling constructions including pronoun copy are common in polar questions. Hence framing the diagnostic as a polar question obviates the need to set up an emphatic context for its use. In my data collection, embedding final pronominal points in a polar question improved their overall acceptability in simple clauses for at least two signers. A further advantage of this modified diagnostic is that it provides an additional prosodic cue for clause boundaries. The entire polar question, including the final point, is marked by the non-manual feature brow raise, suggesting that the utterance in question forms at least an intonational phrase.

Two final notes on applying the diagnostic may be useful. First, it is important to keep in mind that the various subject-like referents in the utterance under investigation cannot be identical if the diagnostic is to offer any syntactic insights. The acceptability of the hypothetical (11a) does not allow the conclusion that the utterance contains a subordinate rather than two coordinate clauses. Both predicates have a first person subject, so the final pronoun copy can m-command a co-referential subject in the second clause. It does not need to look for a subject in the first clause to m-command; hence there is no way to ascertain whether this type of government is possible.

- (11) a. IX-1 COKE DRINK THEN BURP IX-1  
 ‘I drank a coke and then burped, I did.’  
 b. IX-rt WOMAN MAN IX-lf SHAKE-lf WAKE.UP-lf IX-rt  
 #‘The woman shook the man awake, she did.’  
 ? ‘The woman shook the man. She woke up.’

A second related caveat concerns marginally acceptable cases of pronoun copies that nonetheless indicate a coordinate structure. In (11b), the intended subject of WAKE.UP-lf is the man, as indicated by both the extralinguistic context (the action sequence was presented on video) and the

indexing -lf on the verb. Nonetheless, the only available interpretation for this utterance is that the woman woke up. This strongly suggests that the clauses containing SHAKE and WAKE.UP are at best coordinated, since the final pronoun cannot look outside of the clause containing WAKE.UP for a co-referential subject. In order to salvage the utterance, the phonologically null subject of WAKE.UP is interpreted as co-referential with IX-rt, namely the woman. In summary, it is important to ascertain that the final pronoun is not co-referential with the subject of the immediately preceding clause.

## 4 Introducing two further diagnostics

Having evaluated two diagnostics that are well known in the sign language literature, I now propose two additional syntactico-semantic tests that, to my knowledge, have not been discussed in much detail. Since they identify right-dislocated clauses, which are frequently found in SOV languages without clausal center-embedding, I will focus on DGS rather than on ASL here.

### 4.1 Restrictions on rightward wh-movement

The occurrence of wh-words in utterance-final position presents a diagnostic for clause boundaries that, to my knowledge, has not been discussed in the literature. Like many other sign languages, DGS and ASL allow final wh-words (Aarons et al., 1992; Grin, 2014; Jahnke and Volk, 2015) and thus arguably rightward wh-movement (but see Quadros (1999); Aboh et al. (2005) for recent accounts of final wh-words as leftward movement of the wh-element plus remnant IP movement). Since Ross (1967), it has been known that rightward movement is subject to strict locality conditions, possibly due to the greater processing load associated with maintaining the filler-gap dependency across several syntactic domains (Ackema and Neeleman, 2002). Geraci and Aristodemo (2016) observe that long-distance rightward movement in Italian Sign Language (LIS) may not cross an extraposed complement clause, as illustrated in (12). Like LIS, DGS is an SOV language in which clausal objects are obligatorily extraposed. The examples in (13) show that, while wh-elements in DGS occur sentence-finally in simple clauses (13a), rightward movement across a conjunct is blocked (13b), as predicted by the Coordinate Structure Constraint. More importantly, DGS behaves like LIS in that wh-elements cannot move across an extraposed subordinate clause (13c).

- (12) \*  $t_{\text{WHO}}$  THINK [PIERO BIKE FELL] WHO [LIS]  
 Intended: ‘Who thinks that Piero fell off the bike?’  
 (Geraci and Aristodemo, 2016, p. 115)

- (13) a.  $t_{\text{WHO}}$  SUSI IX-fr PURSE BIRTHDAY GIVE-fr WHO [DGS]  
 ‘Who gave Susi a purse for her birthday?’  
 b. \*  $t_{\text{WHO}}$  SNEEZE [THEN BABY WAKE-UP] WHO  
 Intended: ‘Who sneezed and then the baby woke up?’  
 c. \*  $t_{\text{WHO}}$  CRY [REASON CHAMPIONSHIP OVER] WHO  
 Intended: ‘Who cries because the (world) championship is over?’

These restrictions on rightward wh-movement can then serve to diagnose whether seemingly extraposed material such as secondary result predicates project a clause of their own. In (14), for example, we have two utterances describing different cause-result events; and we want to know whether the result predicates SMOOTH and PREGNANT project their own clauses. The grammaticality of rightward wh-movement in (14a) suggests that the utterance contains no (extraposed) dependent clause, but rather a complex predicate SAND SMOOTH. Example (14b) shows that a

surface string with identical word order can be judged ungrammatical, most likely because rightward movement of WHO is blocked by an intervening result clause whose subject MARY has been fronted. This is not surprising if we assume that sanding a table smooth forms a more proto-typical cause-result sequence than performing magic to impregnate a person, and that the former event is thus more likely to be expressed via a monoclausal resultative construction. To ask for the subject of CHARM, one might use (14c), which allows rightward wh-movement since the result clause is fronted.

- (14) a.  $t_{\text{WHO}}$  TABLE SAND SMOOTH WHO [DGS]  
 ‘Who sanded the table smooth?’  
 b. \*  $t_{\text{WHO}}$  MARY CHARM PREGNANT WHO  
 Intended: ‘Who put a spell on Mary to make her pregnant?’  
 c. MARY PREGNANT,  $t_{\text{WHO}}$  CHARM WHO?  
 ‘(Given that) Mary is pregnant, who put a spell (on her)?’

It remains an open question whether any intervening full clause blocks rightward wh-movement or whether it is the added processing load of a right-dislocated element that constrains such movement, as suggested for LIS by Geraci and Aristodemo. In either case, the phenomenon can serve as a diagnostic for the presence of (extraposed) clausal material in postverbal position, and has the advantage of being applicable across different verb classes. It does require the availability of rightward movement, which seems to differ across sign languages and across grammatical functions: while all DGS consultants accept WHO in final position in (13a) (and this position is also attested in DGS corpora, see Grin 2014), my primary ASL consultant judged the ASL equivalent of (13a) ungrammatical and preferred a fronted WHO. This confirms Petronio and Lillo-Martin (1997) findings that final subject interrogatives vary in acceptability.

An additional factor to check when using rightward wh-movement as a diagnostic is that the predicate argument structure of the underlying utterance is preserved. In other words, an acceptable final wh-word does not yet a monoclausal utterance make. Said interrogative also needs to be interpreted as an argument of the main verb. Utterance (14b), for example, is rejected as a question that asks for the identity of the person performing magic, but it would be acceptable for stating that Mary put a spell on someone and we want to know who is pregnant.

## 4.2 Distribution and scope of modal verbs

Modal verbs in DGS occur either in second position or clause-finally and are limited to one modal per clause (Pfau and Quer, 2007). As the examples in (15) show, a final modal scopes only over the clause it immediately precedes. In (15b), an extraposed complement clause intervenes between the matrix predicates BELIEVE or SAY and MUST; hence the modal can only be interpreted with respect to the subordinate clause.<sup>5</sup> In order for MUST to scope over BELIEVE or SAY, the modal needs to precede the right-dislocated complement clause (15c). To complete the picture, a final modal verb takes semantic scope over the second conjunct only in a coordination structure (15d).

- (15) a. IX-1 APPLE EAT MAY  
 ‘I am allowed to eat an apple.’  
 b. IX-1 BELIEVE/SAY IX-fr APPLE EAT MUST  
 ‘I believe/say that you must eat an apple.’  
 #‘I have to believe/say that you are eating an apple.’

<sup>5</sup>Happ and Vorköper (2006) note that deontic MUST is only used to refer to external obligations of a first person subject. It is in that context that an acceptable MUST was elicited in (15b) and (15c).

- c. IX-1 BELIEVE MUST IX-fr APPLE EAT  
'I must believe that you are eating an apple.'
- d. IX-1 APPLE EAT IX-fr WATER DRINK MUST  
'I eat an apple and you have to drink water.'  
# 'I have to eat an apple and you (must) drink water.'

The syntactic distribution of modal verbs in SOV languages, in conjunction with their scopal properties, can serve as a diagnostic for whether postverbal material projects its own (small) clause. Take an utterance like (16), where the causing predicate SPRAY is followed by a predicate that denotes the result state of that action, WET. The question arises whether WET is contained in a clausal projection whose null subject is co-referential with the object HAIR of the main clause. The fact that MUST in (16) takes scope over the main verb (the hairdresser has an obligation to spray) speaks against such a clausal analysis.

- (16) PERSON-lf HAIRDRESSER IX-rt HAIR SPRAY-rt WET-rt MUST  
'The hairdresser has to spray the hair wet.'

## 5 Conclusion

Given the importance of understanding clause structure for investigating a wide range of syntactic phenomena, the present paper has critically evaluated and augmented the inventory of tools that are vital for comprehensive grammatical descriptions of signed languages. First, a number of shortcomings of syntactic diagnostics for clause boundaries have been identified. Some of them seem problematic independent of modality, such as the identical subject requirement on gapping. Others are more specific to signed languages, in particular the limited applicability of the extraction diagnostic to morphologically plain verbs. Variability with respect to grammaticality judgements of the same type of data constitutes another problem sometimes found in the sign literature. As I have shown here, extraction in particular should only be applied as a diagnostic after verifying that the consultants treat clauses as islands for wh- or topic movement.

Further, this paper took a closer look at subject pronoun copy, a well-established and much-cited diagnostic. It was shown that final pronouns differ in informativeness across signed languages: while they can identify any clause-like subsentential unit in NGT, they can only differentiate coordination from higher degrees of syntactic integration in ASL. In a third type of signed language including DGS and TlD, the acceptability of a final pronoun signals that the utterance does not consist of more than one full clause, but it may still contain smaller clause-like constituents such as control clauses.

Lastly, I have contributed two new diagnostics and a modification of the subject pronoun copy test to the inventory of clausehood tests. Restrictions on rightward wh-movement and the distribution and scope of modal verbs have been shown to pick out postverbal clausal material in DGS (and potentially other SOV languages). I have further suggested that subject pronoun copies should be embedded in polar questions to avoid problems with contextual emphasis requirements and in order to benefit from brow raise as an additional prosodic cue to intonational boundaries in the target utterance.

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# What do children use complements for? Representing speaker perspectives in recounting conversations\*

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## 1 Introduction

This study examines the development of preschool children's perspective-taking as evidence for their perception and interpretation of interactive communication. Children's ability to take and shift perspectives has been studied in various contexts (e.g. Clark, 1997; Selman, 1980). The focus here is on children's ability to take the point of view of different characters (Bruner, 1986; Kielar-Turska, 1999; Veneziano and Hudelot, 2009), and more specifically to represent the characters' perspectives as participants in a conversation. Previous research has shown that between ages 3 and 5, children begin to develop the ability to understand others' mental states and points of view (Piaget, 1932; Gopnik and Wellman, 1992) and gradually master the particularities of conversational interaction (Tomasello, 2003). The present study examines how these abilities are manifested in children's use of complement constructions (Clark, 2009; Diessel, 2004; Limber, 1973) in a narrative elicitation task (Berman and Slobin, 1994; Verhoeven and Strömquist, 2001).

Narrative elicitation tasks have been shown to provide a rich and diverse source of data for investigating developmental trends. On the one hand, narrative elicitation allows speakers to express themselves freely by describing characters' speech and thoughts and making evaluative comments on each given situation. On the other, narrative elicitation provides a common basis for comparison between responses, since they can be evaluated in relation to a single stimulus (Bamberg, 2012; Bamberg and Damrad-Frye, 1991; Berman, 1993; Holmqvist et al., 2004; Küntay and Nakamura, 2004; Slobin, 2004). This elicitation method was chosen here in order to compare the way that children in different age-groups respond to the open-ended task of recounting conversational interaction. The present analysis examines how children take perspectives in describing conversations and the types of linguistic constructions they utilize for perspective-taking.

The linguistic constructions used to express speech and/or thoughts of characters are COMPLEMENT CLAUSES, defined in general terms as encoding the content of the predicate of the main clause (e.g. *he said 'I ate breakfast'*; *he thought that he ate breakfast*; *he asked if it was time for breakfast*). These constructions allow the speaker to choose not only the type of speaking or thinking (e.g. *say, ask, think, wonder*), but also the level of involvement in the event – by choosing between direct speech complements (e.g. *he said 'I ate breakfast'*) and reported speech, and between declarative (e.g. *he thought that he ate breakfast*) and interrogative form (e.g. *he asked if it was time for breakfast*). Such constructions have been shown to occur in children's speech from around the age of two and a half (Clark, 2009; Diessel, 2004) and so are expected to be available to preschool children when approaching a conversation recounting task. But is that all it takes to recount a conversation? Consider the following conversational exchange between four characters.

- (1) Transcript of a conversation (from one of the cartoons used in the present study)

Character A: 'I'm hungry'

Character B: 'What time is it anyway?'

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Character C: ‘Breakfast time!’ (starts chewing his blanket)

Character B: ‘My tummy’ (rubbing her growling tummy) ‘It is breakfast time!’

Character D: ‘Piggy is right, let’s go see if breakfast is ready!’

And this is how a five-year-old, quite elaborately, recounted this conversation.

(2) Example of a response recounting the conversation in 1

They were sleeping and the doggy woke up and sa, and then, I don’t know what this one is, I think it was a chicken said ‘It’s breakfast time’. And then all the friends said, ‘Yeah, he is right’, and then the piggy’s tummy was getting hungry, so she said, ‘Oh, it sure is breakfast time, let’s go downstairs!’

It appears that even recounting such a simple conversation requires a lot. After presenting the initial setting of the conversation – the characters waking up from their sleep – the child describes who said what, and presents the sequence of speech in a meaningful order, with the accumulative value added by each speech string: one character says it is breakfast time, followed by confirmation from another character, and then a third character confirms again and offers to go eat breakfast, based on the fact that it is known that it is breakfast time. That is, recounting conversational interaction necessitates the expression of the accumulative, unpredictable, and causal nature of conversation (Clark, 1996). In order to reflect the accumulative nature of conversational exchange, the speaker has to include the content of the speech of at least two (and in the case of (2) above, three) speakers in the conversation. It therefore appears that two basic requirements in recounting conversation are (a) using complement constructions to describe the content of the speaker’s speech and/or thoughts, and (b) switching between at least two speaker perspectives in order to reflect the accumulative nature of conversation. These two basic skills required to recount conversations guide the categories of analysis in the present study, as elaborated below.

## 2 Method

The data for the study were elicited using a story retelling task. Each participant was asked to recount five conversations presented in five short cartoons. Participant responses were analyzed in relation to the type of linguistic constructions used and the number of speaker perspectives represented, as described in Section 3.

### 2.1 Participants

Analyses cover data from 54 preschool children (age range: 3;4-5;4). An additional 11 children were tested but did not complete the whole task, so their data were excluded from analysis. All participants attended Bing Nursery School at Stanford University. They were tested individually by the author.

### 2.2 Procedure and materials

Each child was invited into a quiet room with a small table with a laptop on it, and was asked to sit across from the experimenter. The experimenter then told the child that she had lots of homework to do with her headphones on, and therefore she could not watch (or overhear) the cartoons she had on her computer. She asked the child if s/he was willing to watch the cartoons and tell her everything that happened in them. If the child agreed to do so, the experimenter offered to watch one cartoon together before the child watched the rest of them on his/her own. After watching

the first cartoon together, the experimenter demonstrated to the child how she would have told a person who had not seen the cartoon what was happening in it, and let the child contribute what s/he could to the retelling. After this training phase, the experimenter put her headphones on and let the child watch the rest of the cartoons on his/her own. The child was instructed to raise his/her hand at the end of each cartoon so that the experimenter would know to take off her headphones and listen to the child telling her what had happened in the cartoon. Each cartoon included a ~20-second-long conversational interaction between two or more characters discussing events, thoughts, or ideas they had (see (1)). The child was asked to tell the experimenter everything s/he could remember after each cartoon. All sessions were videotaped by the laptop video camera.

### 2.3 Transcription and coding

All experimenter and children’s speech output was transcribed using the CHAT program (MacWhinney, 2005). Child utterances were coded for inter-clausal syntax and number of speaker perspectives, as specified in Section 3.

## 3 Coding categories

The following coding categories were applied to all children’s responses.

### 3.1 Inter-clausal syntax

Analysis of inter-clausal syntax took into account all types of clause combining (i.e. coordinate clauses, adverbial clauses, and relative clauses), with special attention to complement clauses, defined here as encoding the content of the predicate of a preceding main clause. Such constructions were coded for the complement-taking verb (e.g. *say*, *think*, *ask*), and the type of complement, including question complements (either wh-questions or yes/no questions), direct speech complements, and reported speech complements (either introduced by the subordinator *that* or zero-marked), as exemplified in (3).

- (3) Complement types demonstrated with examples from the database. Complement clauses are bolded, and complement-taking verbs are underlined.

| Complement Type               | Example from Database                                                                                                              |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Q-Complement: Wh-question     | They wanna be characters, but they don’t <u>know</u> <b>which character they wanna be.</b> [girl, 5;0]                             |
| Q-Complement: Yes-no question | They <u>forgot</u> <b>if someone had eyes.</b> [girl, 4;6]                                                                         |
| Direct Speech Complement      | Piggy said she was hungry, and then the other people <u>said</u> ‘ <b>I think Piggy is right, come on everybody.</b> ’ [boy, 3;11] |
| <i>That</i> -Complement       | She threw (=threw) away the other paper, and the frog <u>said</u> <b>that they can get her another paper</b> [boy, 3;10]           |
| 0-Complement                  | They <u>thought</u> <b>it was breakfast time</b> , but it was, and they were hungry. [girl, 4;4]                                   |

### 3.2 Number of speaker perspectives

In addition to syntactic structure, all child responses were coded for the number of speaker perspectives represented by the complement constructions. Consider again the following transcript of a conversation shown in one of the cartoons presented to the children.

- (4) Transcript of a conversation from one of the cartoons used in the present study, repeated from (1) above.

Character A: 'I'm hungry'

Character B: 'What time is it anyway?'

Character C: 'Breakfast time!' (starts chewing his blanket)

Character B: 'My tummy' (rubbing her growling tummy) 'It is breakfast time!'

Character D: 'Piggy is right, let's go see if breakfast is ready!'

Children's responses when retelling what they have just seen and heard in these cartoons were coded as either: (a) not representing any speaker perspective, (b) representing a single speaker perspective, or (c) representing two or more perspectives. (5) demonstrates these three types of responses in retelling what happened in the conversation transcribed above in (4).

- (5) Response types in terms of speaker perspectives

- a. Zero perspectives

'They were just hungry for breakfast. And the baby was eating her blanket!'

- b. Single perspective

'It was breakfast time, and the frog said "Oh, yeah, Piggy's right", and then he's going: "Let's go see if breakfast is ready."'

- c. Two (or more) perspectives

'There was a pig who said, "It's breakfast time", and a frog said, "Piggy is right, let's go see if it's breakfast time."'

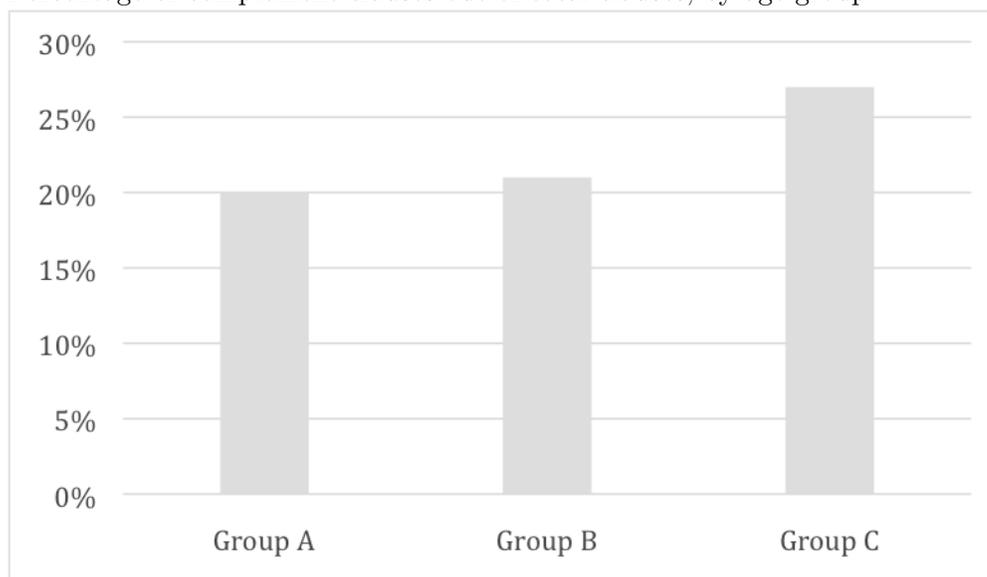
The response in (5a) does not include any description of conversation. The child does appear to understand the content of the conversation – saying that the characters were hungry – but she does not incorporate even a single speech string in her description. The response in (5b) does include several complement clauses, but they represent only the speech of a single character (the frog). Only in the response in (5c) does the child describe an interchange of speech between two characters, thus representing a dynamic conversation. The three types of responses thus represent three degrees of interaction description, ranging from non-representation of speech exchange, to partial representation, to fully interactive representation of conversation. Below the results of the study are presented in terms of children's use of complement constructions and the number of perspectives they represented in their responses.

## 4 Results

In order to examine developmental trends, results are presented here by three age-groups with 18 children in each group: Group A, with age range 3;4-4;0; Group B, 4;1-4;8; and Group C, 4;9-5;4. Each response was coded for the number and type of complement clauses and the number of speaker perspectives represented by the complement clauses. This yielded a total of 270 responses (18x5=90 per age group).

The proportion of complement clauses out of total clauses does not show a substantial increase between age groups, as shown in (6) below.

(6) Percentage of complement clauses out of total clauses, by age group



In addition, the array of complement-taking verbs in Group A responses appears to be quite diverse, and includes most of the verbs used by children in the other two age groups, as shown in (7).

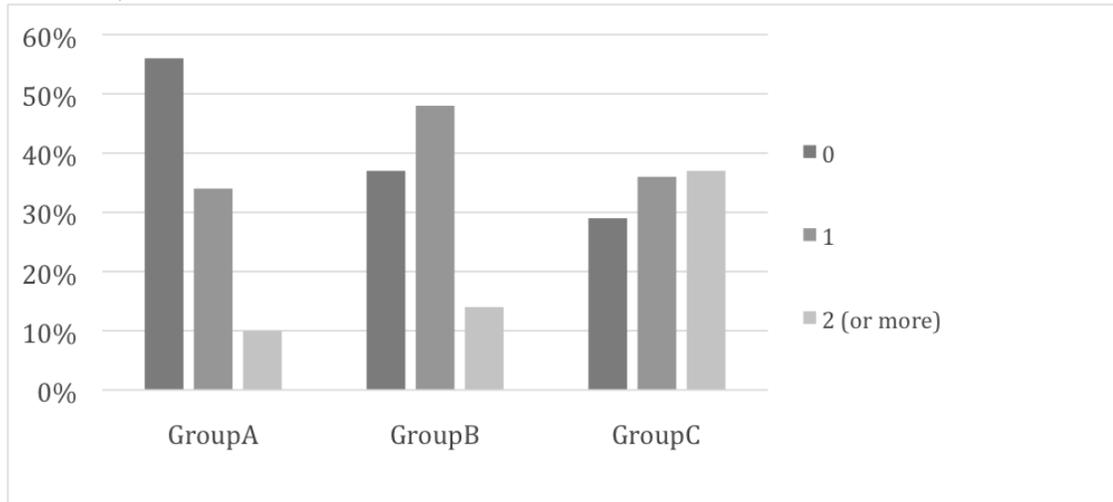
(7) Complement-taking verbs across age groups ('+/-' = occurring/non-occurring in this age group)

|       |     | Verb  |     |       |      |                   |     |        |        |      |      |  |
|-------|-----|-------|-----|-------|------|-------------------|-----|--------|--------|------|------|--|
| Group | say | think | see | check | know | like <sup>1</sup> | ask | forget | notice | tell | talk |  |
| A     | +   | +     | +   | +     | +    | +                 | +   | -      | -      | -    | -    |  |
| B     | +   | +     | +   | +     | +    | +                 | +   | +      | -      | +    | +    |  |
| C     | +   | +     | +   | +     | +    | +                 | +   | +      | +      | +    | -    |  |

The data in (6) and (7) show that there are no clear lexical or syntactic developmental trends in the children's use of complement constructions. Complements were used freely and introduced by a variety of complement-taking verbs in all age groups. However, if we consider the levels of perspective-taking represented by such complement constructions, we do find some developmental trends. The graph in (8) below shows the proportion of each response type (zero-perspective, single perspective, and two or more perspectives) in each age group.

<sup>1</sup>like here refers to the complement-taking quotative element *like*, as in: *He was like, 'It's breakfast time!'*.

- (8) Proportion of each response type (zero-perspective, single perspective, or two or more perspectives), by age group



The figures in (8) show the following developmental trends. First, the proportion of responses representing zero speaker perspectives is high for Group A children (56%), but decreases with age (37% for Group B and 29% for Group C). Second, the proportion of multi-perspective responses (only 10% in Group A) increases with age, reaching 37% of the total responses in Group C. Third, single-perspective responses are the most frequent in Group B, but their proportion decreases in Group C, where they are slightly less frequent than multi-perspective responses.

These results show that while there is no age-related increase in the proportion of complement usages or the diversity of complement-taking verbs, there are developmental trends in children's perspective-taking. The youngest children generally favor responses that do not include any string of conversation. This result is relatively surprising, considering the fact that all cartoons showed conversations. Yet the children in Group A manage to bypass the conversation, tracking on the non-conversational events (such as the character chewing on a blanket, in (5a)) and describing them in more detail. Moreover, it does not seem that Group A children do not understand the content of the conversations in the cartoons – since they usually refer to the conversations' content directly (again, see (5a)) – but rather that they tend to avoid reporting the event in a conversation-like pattern when retelling what they saw and heard. The children in the second age group (Group B) favor single-perspective responses, so although they incorporate one or several strings of speech in their response, they typically report speech by only one of the characters in the cartoon. This response-type constitutes almost half of their responses, with a decrease in the zero-perspective responses and a slight increase in the multi-perspective responses. This strategy shows that children in this age group represent speech events as a pivotal element in conversation recounting, but still struggle with representing an interchange of speech. The oldest age group (Group C) has the highest rate of multi-perspective responses. Multi-perspective responses represent almost 40% of their conversation recounting, and single-perspective responses represent a slightly lower proportion, while zero-perspective responses make up less than 30% of the total. That is, Group C children still use all three perspective-taking strategies, but tend to represent speech in their responses most of the time, and represent speech interchanges markedly more than children in the other two groups.

## 5 Discussion

The results of the study indicate that in this task of story retelling, the children's responses do not show syntactic development in terms of the proportion or the diversity of complement-clause constructions, since even the children in the youngest age group use such constructions quite freely. This finding is in line with previous research showing that children start using complement constructions before age three (Clark, 2009; Diessel, 2004). However, if we consider the function these constructions serve in representing perspective-taking in conversation, we do see a developmental curve that can be generally described as an increase in the number of speaker perspectives represented in retellings. In the children's conversation recounting, they advance from not representing any speaker perspective, to representing the perspective of a single speaker in the conversation, to representing an interchange of speech.

Such development involves not only structural knowledge of complement constructions, but also the cognitive abilities required to represent the interactional facet of conversation. This includes the accumulative nature of conversation, where each string of speech is dependent on a preceding string uttered by another participant, and adds more information (Clark, 1996), requiring the child to construct the retelling of the event in a relatively constrained sequence. In addition to this accumulative component, conversation recounting also requires the ability to take different perspectives on a single situation in a story (Duchan et al., 1995) which develops gradually during preschool years (O'Neil and Shultis, 2007).

When recounting conversation, children must choose among the complement constructions available in their language, each of which poses a different set of challenges. Unlike reported speech (e.g. *he said that he was hungry*), direct speech complements (e.g. *he said 'I am hungry'*) are never introduced by a connective (*that*), and do not involve person or tense changes from the original speech (*'I am hungry' ~ he was hungry*). In this sense, direct speech complements are structurally simpler. However, recounting a conversation through direct speech complements also requires the ability to portray several characters, which demands constant switching between different first-person perspectives. Reported speech complements, in contrast, although structurally more complex (in terms of connective use and person and tense change) allow the child to describe the conversation from a third-party point of view, thus saving the effort of switching between different first-person perspectives. The two types of complement constructions can, of course, be used in combination to emphasize certain speech strings or the emotional state of a character.

The complexity and variety of choices facing the child, even when recounting a relatively simple situation such as a short conversation, may explain why the youngest children in the sample tend to 'stick to the facts' in each cartoon and avoid using complements; why the middle age-group children choose to 'hold on' to one speaker only, and by this avoid switching between speaker perspectives; and why the older age-group children use multi-perspective responses more frequently than the children in the younger groups.

This gradual developmental pattern provides new evidence for the role of form-function relations in language development: familiar linguistic forms gradually serve new functions, while familiar functions are expressed by new forms (Berman, 1996, 2009; Slobin, 2001). These studies have shown that although some forms emerge early on in children's speech, they have a prolonged developmental route in terms of the array of functions they serve. Children gradually master the particularities of form-function relations in their language, and therefore the route to establishing grammatical knowledge involves an interplay between cognitive development and the properties of the ambient language. In the context of this study, the familiar forms of complement constructions are gradually used to reflect the dynamic and accumulative nature of conversational interaction. From this form-function point of view, these findings shed new light on the cognitive processes

involved in constructing extended discourse, and especially in representing the multi-faceted nature of conversation.

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# Catalan allomorphy, Lexical Selection, and gradient constraints\*

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## 1 Introduction

Lexical Selection (LS; Mascaró, 2007) is an OT-based theory of suppletive allomorphy which uses multiple underlying representations of morphemes in the input. Under LS, allomorphs are all present in the input and choice between listed allomorphs is made by markedness constraints. This is illustrated in (1) where the allomorphs [e] and [en] are listed in the input. Here two candidates are generated – one with each allomorph – and the winner is determined by the interaction of ONSET and NOCODA. This results in the unmarked form surfacing, which is referred to as the emergence of the unmarked (TETU; McCarthy and Prince, 1994). Much of suppletive allomorphy has been argued to be motivated by TETU (Drachman et al., 1996; Kager, 1996; Lapointe, 2001; Mascaró, 1996a,b; McCarthy and Prince, 1994; Perlmutter, 1998; Rubach and Booij, 2001; Tranel, 1996).

- (1) *LS analysis of a/an allomorphy in English (Mascaró, 2004, p. 517)*

| {e, en} impossible  | ONSET | NOCODA |
|---------------------|-------|--------|
| ☞ a. e.n impossible | *     |        |
| b. e. impossible    | **!   |        |

Yet in some cases, a language’s choice of allomorph does not result in TETU. This can be seen in the allomorphy of definite article suffixes in Haitian Creole. Haitian Creole has two definite article allomorphs, *-la* and *-a*, with *-la* surfacing after stems that end in a consonant or glide, as in (2a) through (2c), and *-a* surfacing after stems that end in a vowel, as in (2d), though hiatus is often resolved via glide insertion, as in (2e) and (2f) (Bonet et al., 2007).

- (2) *Haitian Creole definite article allomorphy (Bonet et al., 2007, p. 908)*

|            |          |           |              |
|------------|----------|-----------|--------------|
| a. /liv/   | ‘book’   | [livla]   | ‘the book’   |
| b. /fat/   | ‘cat’    | [fatla]   | ‘the cat’    |
| c. /bagaj/ | ‘thing’  | [bagajla] | ‘the thing’  |
| d. /papa/  | ‘father’ | [papaa]   | ‘the father’ |
| e. /lapli/ | ‘rain’   | [laplija] | ‘the rain’   |
| f. /bato/  | ‘boat’   | [batowa]  | ‘the boat’   |

This pattern results in the emergence of marked structure. The use of *-la* violates NOCODA, something the use of *-a* would avoid. The use of *-a* in (2d) violates a number of markedness constraints (e.g. NOHIATUS, ONSET) that the use of *-la* would avoid. Also, the use of *-a* in the other forms leads to glide epenthesis, thus violating DEP, which could be avoided by using *-la*.

To account for cases of non-TETU allomorphy, LS allows for the ordering of lexically listed allomorphs. Respect of ordering is ensured through the constraint PRIORITY in (3).

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- (3) PRIORITY – respect lexical priority (ordering) of allomorphs.

Given an input containing allomorphs  $m_1, m_2, \dots, m_n$ , and a candidate  $m_i'$ , where  $m_i'$  is in correspondence with  $m_i$ , PRIORITY assigns as many violation marks as the depth of ordering between  $m_i$  and the highest dominating morph(s) (Mascaró, 2007, p. 726).

In the case of three allomorphs,  $m_1, m_2$ , and  $m_3$ , which are ordered as  $\{m_1 > m_2 > m_3\}$ , PRIORITY assigns one violation for using allomorph  $m_2$  and two violations for using allomorph  $m_3$ .

While necessary for ensuring respect of lexical priority, PRIORITY is not without issues. Specifically, Wolf (2008) notes that there is no upper limit on the number of ordered allomorphs and that PRIORITY must evaluate candidates gradually. Gradience is an undesirable characteristic in a constraint (McCarthy, 2003, 2004). Mascaró (2007) argues that PRIORITY is a categorical constraint, noting that the locus of the PRIORITY violation is that use of lower-ordered allomorphs fails to satisfy the dominance relation entailed in the ordering. But this issue can be avoided entirely by reinterpreting PRIORITY as a markedness constraint and positing that there is only ever a default/non-default distinction among ordered allomorphs, that is,  $\{m_1 > m_2, m_3\}$ .

This paper proposes the revision of PRIORITY from a gradient faithfulness constraint to a categorical markedness constraint.

- (4) PRIORITY (revised) – Assign one violation mark for the use of any allomorph other than the default allomorph.

I propose there is only a binary distinction among ordered allomorphs – default and non-default – and PRIORITY is only violated when the non-default allomorph is used. One implication of this revision is that languages never distinguish a second allomorph from a third in terms of ordering and violation marks. Of analyses using LS with ordered allomorphs, there are only two that posit more than two ordered allomorphs: Bonet et al. (2007) for Catalan and Bradley and Smith (2011) for Judeo-Spanish. This paper presents a reanalysis of Bonet et al. (2007) to provide evidence for a binary PRIORITY.

To support this reinterpretation of PRIORITY and my interpretation of the Catalan data, I first present the pertinent data, which centers on plural formation and schwa epenthesis in Catalan. This is followed by an analysis that posits a binary distinction among masculine plural allomorphs. This analysis requires the use of Harmonic Serialism (HS; McCarthy, 2000; Prince and Smolensky, 1993/2004). I then present Bonet et al.’s analysis. This is followed by a comparison of my two-allomorph analysis with their three-allomorph analysis and discussion on why my analysis is preferable.

## 2 Catalan

### 2.1 Plural formation

In Catalan, the plural is formed by the addition of the suffix  $/-s/$ , as shown in (5). But there is allomorphic variation. As shown in (6), masculine forms can surface with an intervening  $[u]$  and feminine forms with an intervening  $[\ə]$ .

- (5) *Catalan plural formation*<sup>1</sup>
- |    |         |           |                  |                              |
|----|---------|-----------|------------------|------------------------------|
| a. | [gót]   | [gót-s]   | ‘glass(es).MASC’ | (Bonet et al., 2007, p. 916) |
| b. | [mósu]  | [mósu-s]  | ‘lad(s).MASC’    | (Bonet et al., 2007, p. 916) |
| c. | [əksió] | [əksió-s] | ‘action(s).FEM’  | (Wheeler, 1979, p. xiii)     |
| d. | [sál]   | [sál-s]   | ‘salt(s).FEM’    | (Bonet et al., 2007, p. 916) |

<sup>1</sup>The following abbreviations are used in this paper: MASC=male, FEM=female, PL=plural, SG=singular.

- (6) *Variation in Catalan plural formation*
- |    |           |           |                 |                              |
|----|-----------|-----------|-----------------|------------------------------|
| a. | /pas-s/   | [pásus]   | ‘steps.MASC’    | (Bonet et al., 2007, p. 916) |
| b. | /fəlis-s/ | [fəlisəs] | ‘happy.MASC.PL’ | (Bonet et al., 2007, p. 917) |

This variation is phonologically conditioned and is affected by the gender of the nominal.<sup>2</sup>

### 2.1.1 Masculine nominals and plural formation

Masculine nominals (nouns and adjectives) in Catalan can end in a licit coda consonant, as in (7a), (7b), and (7c), a consonant cluster as in (7d) through (7g), or a vowel, as in (7h) through (7l).

- (7) *Masculine singular nouns*
- |    |          |           |                              |
|----|----------|-----------|------------------------------|
| a. | [gót]    | ‘glass’   | (Bonet et al., 2007, p. 916) |
| b. | [pás]    | ‘step’    | (Bonet et al., 2007, p. 916) |
| c. | [báɲ]    | ‘bath’    | (Hualde, 1992, p. 379)       |
| d. | [míkst]  | ‘mixed’   | (Wheeler, 1979, p. 22)       |
| e. | [gólf]   | ‘gulf’    | (Wheeler, 2005, p. 221)      |
| f. | [imféɾn] | ‘hell’    | (Wheeler, 1979, p. 16)       |
| g. | [báɫz]   | ‘waltz’   | (Hualde, 1992, p. 275)       |
| h. | [mósu]   | ‘lad’     | (Bonet et al., 2007, p. 916) |
| i. | [páɾə]   | ‘father’  | (Bonet et al., 2007, p. 916) |
| j. | [biulí]  | ‘violin’  | (Wheeler, 2005, p. 98)       |
| k. | [katalá] | ‘Catalan’ | (Hualde, 1992, p. 386)       |
| l. | [kəfé]   | ‘coffee’  | (Hualde, 1992, p. 386)       |

Typically, the plural is formed by affixing the suffix /-s/ to the stem, as shown in (5) above and here in (8).

- (8) *Masculine plural nouns with [-s]*
- |    |        |          |             |                              |
|----|--------|----------|-------------|------------------------------|
| a. | [gót]  | [gót-s]  | ‘glass(es)’ | (Bonet et al., 2007, p. 916) |
| b. | [mósu] | [mósu-s] | ‘lad(s)’    | (Bonet et al., 2007, p. 916) |
| c. | [páɾə] | [páɾə-s] | ‘father(s)’ | (Bonet et al., 2007, p. 916) |
| d. | [káɫk] | [káɫk-s] | ‘calque(s)’ | (Hualde, 1992, p. 381)       |

In cases where the masculine noun ends in a sibilant, such as [s], [z], [ʃ], and [ʒ], as in (6a) above and in (9) below, the form surfaces with an intervening [u]. This is due to a prohibition against adjacent sibilants, which is typically attributed (Bonet and Lloret, 2002; Bonet et al., 2007; Wheeler, 2005) to the Obligatory Contour Principle (OCP; Goldsmith, 1976; Leben, 1973).

- (9) *Masculine plural nouns with [-us]*
- |    |        |          |             |                              |
|----|--------|----------|-------------|------------------------------|
| a. | [pás]  | [pásus]  | ‘step(s)’   | (Bonet et al., 2007, p. 916) |
| b. | [grás] | [grásus] | ‘fat(s)’    | (Bonet et al., 2007, p. 916) |
| c. | [báɫz] | [báɫzus] | ‘waltz(es)’ | (Hualde, 1992, p. 275)       |

It is unlikely that this is a case of epenthesis, as the epenthetic vowel in Catalan is schwa (Bonet et al., 2007; Wheeler, 2005). As noted below, schwa epenthesis also occurs in other parts of speech to resolve OCP-sibilant issues, including verbs and feminine adjectives. Epenthetic schwa occurs with masculine nouns that end in unallowable codas, as discussed in Section 2.2. Thus the occurrence of [-us] then is most likely due to suppletive allomorphy and not epenthesis.

<sup>2</sup>In Catalan, adjectives agree with nouns in number and gender (Hualde, 1992).

In summary, the plural is formed in masculine nominals with the addition of the suffix /-s/, which can appear as [-us] when the stem ends in a sibilant. I treat this variation as plural allomorphy, and as is shown in Section 4, Bonet et al. (2007) treat it as gender marker allomorphy.

### 2.1.2 Feminine nominals and plural formation

As with the masculine, the phonotactics of Catalan feminine nominals pattern after language-wide phonotactics. Catalan feminine nominals can end in a licit coda consonant (or cluster) or vowel with the plural being formed by adding /-s/, as seen in (10a) through (10e). As with the masculine, there are certain idiosyncrasies. Within feminine nominals, nouns and adjectives are treated differently with regards to plural formation. Feminine nouns that end in sibilants are unmarked for plural, such as that seen in (10f) and (10g), while feminine adjectives, like masculine nominals, are sensitive to OCP-sibilant effects. This is seen in (11), where the adjectives end in a sibilant, [s], and appear with an intervening schwa.

(10) *Catalan feminine noun allomorphy*

- |    |         |          |             |                              |
|----|---------|----------|-------------|------------------------------|
| a. | [tákə]  | [tákəs]  | ‘stain(s)’  | (Bonet et al., 2007, p. 916) |
| b. | [əksió] | [əksiós] | ‘action(s)’ | (Wheeler, 1979, p. xiii)     |
| c. | [sál]   | [sáls]   | ‘salt(s)’   | (Bonet et al., 2007, p. 916) |
| d. | [lúm]   | [lúms]   | ‘light(s)’  | (Hualde, 1992, p. 381)       |
| e. | [kárn]  | [kárns]  | ‘meat(s)’   | (Wheeler, 2005, p. 228)      |
| f. | [póls]  | [póls]   | ‘dust(s)’   | (Wheeler, 1979, p. 22)       |
| g. | [fáls]  | [fáls]   | ‘sickle(s)’ | (Wheeler, 1979, p. 22)       |

(11) *Vowel alternations*

- |    |         |           |                       |                              |
|----|---------|-----------|-----------------------|------------------------------|
| a. | [fəlis] | [fəlisəs] | ‘happy.FEM.SG/PL’     | (Bonet et al., 2007, p. 917) |
| b. | audaç   | audaç[əs] | ‘audacious.FEM.SG/PL’ | (Hualde, 1992, p. 333)       |
| c. | veloç   | veloç[əs] | ‘fast.FEM.SG/PL’      | (Hualde, 1992, p. 333)       |

As schwa epenthesis is a language-wide pattern, both Bonet et al. (2007) and I analyze this phenomenon as a case of epenthesis.

## 2.2 Schwa epenthesis

Schwa epenthesis is a language-wide phenomenon in Catalan, being used to resolve a variety of problematic phonotactic configurations, including adjacent sibilants (as seen above with plural formation in feminine adjectives) and word final consonant clusters that violate the Sonority Sequencing Principle (SSP; Clements, 1990, p. 285).

The use of schwa epenthesis to break up adjacent sibilants at word edges is seen in feminine adjectives, as shown above, and is also seen in inflected verbs, as shown in (12). In (12b), the verb ends in /s/ and is followed by the second person singular inflectional suffix, /-s/. Schwa is epenthesized to break up these two adjacent sibilants.

(12) *Schwa epenthesis in verbs with OCP-sibilant problems (Bonet et al., 2007, p. 917)*

- |    |         |         |               |
|----|---------|---------|---------------|
| a. | /tus/   | [tús]   | ‘s/he coughs’ |
| b. | /tus-s/ | [túsəs] | ‘you cough’   |

In addition to the schwa epenthesis seen in verbs with OCP-sibilant issues, there are cases where Catalan employs schwa epenthesis to resolve SSP issues. This occurs when an underlying consonant

cluster violates the sonority requirements of the language. While Catalan allows complex onsets and codas, they must rise and fall in sonority respectively.<sup>3</sup>

Schwa is epenthesized when a word-final (or initial) cluster violates SSP. In (13), the consonant clusters violate the sonority sequencing requirements of Catalan. In (13a) and (13b), the coda's sonority falls then rises and in (13c) the onset falls then rises in sonority.

- (13) *Schwa epenthesis for SSP issues (Bonet et al., 2007, p. 916)*
- a. /templ/ [témplə] ‘temple’
  - b. /tendr/ [téndrə] ‘tender’
  - c. /striptis/ [əstriptis] ‘striptease’

When forming the plural with the forms in (13a) and (13b) above, they surface with schwa and the allomorph [-s], not [-us], as shown in (14).

- (14) *Schwa epenthesis in masculine plural formation (Bonet et al., 2007, p. 916)*
- a. /templ+s/ [témpləs] ‘temples’
  - b. /tendr+s/ [téndrəs] ‘tender.PL’

The occurrence of [-us] in the forms in (9) is a case of suppletive allomorphy, while schwa in both the feminine adjectives and masculine forms in (14) are cases of epenthesis.

### 2.3 Summary

I propose treating the patterns in this section as a case of suppletive allomorphy for the masculine plural alternation of [-s]/[-us] and as schwa epenthesis in the case of masculine nominals ending in unallowable codas and in the case of feminine adjectives with OCP-sibilant issues.

In feminine adjectives, it is most likely a case of epenthesis and not feminine plural allomorphy as the feminine nouns ending in sibilants are not marked for plural, as seen in (10f) and (10g), and feminine adjectives marked for plural undergo schwa epenthesis to resolve OCP-sibilant issues, as in (11), just like other parts of speech, as the verbs in (12) show. I treat the variation in the masculine nominals as suppletive allomorphy in the plural. This is based on the fact that this alternation only occurs in masculine nominals ending in sibilants, a rather restricted environment, and the use of [u] as an epenthetic vowel is not seen outside this environment. For example in (13), [ə] and not [u] is used to resolve SSP issues. The use of [-us] would resolve this issue, but is unattested here. If this were a case of [u] epenthesis then it would be expected that SSP issues would be resolved by using [u] also. Instead, the alternation of [-s]/[-us] can be explained by positing suppletive plural allomorphy in the masculine, which resolves OCP-sibilant issues, and positing schwa epenthesis to resolve SSP issues in general and OCP-sibilant issues outside the masculine.

## 3 Analysis of Catalan plural allomorphy & schwa epenthesis

### 3.1 Masculine nominals

I posit that the masculine plural morpheme /-s/ has an ordered pair of {-s>-us}. In the plural morpheme, the allomorph [-s] is the default allomorph, with the [-us] form appearing only when there is an OCP-sibilant issue. The choice of [-s] as the default allomorph is due to the fact that

<sup>3</sup>Except in the case of clusters derived by the addition of the plural morpheme /-s/. Clusters created with the addition of the plural /-s/ are acceptable regardless of the sonority profile of the cluster (Caro Reina, 2014). This is not unexpected, as in many languages /s/ patterns differently than other fricatives with regards to the Sonority Sequencing Principle (see Parker 2002 for discussion on sonority and /s/).

the use of [-s] can result in the creation of word final consonant clusters that violate the SSP, such as those shown in (15). In the codas in (15a) and (15b) sonority falls, then rises. In (15c) and (15d), the coda cluster created by the use of [-s] results in a sonority plateau. All of these violate SSP.

- (15) *Word final coda clusters formed with the plural [-s]*
- |    |          |           |                              |
|----|----------|-----------|------------------------------|
| a. | [bálps]  | ‘numb.PL’ | (Hualde, 1992, p. 381)       |
| b. | [gólfɪs] | ‘gulfs’   | (Wheeler, 2005, p. 228)      |
| c. | [góts]   | ‘glasses’ | (Bonet et al., 2007, p. 916) |
| d. | [əmíks]  | ‘friends’ | (Caro Reina, 2014, p. 373)   |

The use of the other allomorph [-us] would avoid these coda clusters and lead to less marked syllable structure, yet this allomorph is not used. The [-us] allomorph only surfaces when the word ends in a sibilant and the use of [-s] would violate the constraint against adjacent sibilants – OCP-SIBILANT (OCP-SIB). Thus, the default allomorph surfaces in most circumstances and the non-default allomorph only surfaces when forced by adjacent sibilants.

To account for this variation using LS in parallel OT, OCP-SIB must outrank PRIORITY, as PRIORITY favors the use of [-s] while OCP-SIBILANT favors the use of [-us]. This is demonstrated in the tableaux in (16) and (17).

In the analysis in (16), the default allomorph surfaces, as the word ends in an obstruent. To ensure realization of an allomorph, the constraint REALIZE (Kurisu, 2001) is used to penalize a candidate for failing to realize any allomorphy, as in candidate (16a). The use of the non-default allomorph is penalized by PRIORITY in candidate (16c).

- (16) *LS analysis of [gáts] ‘cats’*

|      | /gat {-s>-us}/ | OCP-SIB | REALIZE | PRIORITY | SSP |
|------|----------------|---------|---------|----------|-----|
| a.   | gát            |         | *!      |          |     |
| ☞ b. | gáts           |         |         |          | *   |
| c.   | gátus          |         |         | *!       |     |

In the analysis in (17), the stem ends in a sibilant, which leads to OCP-SIBILANT issues. There are several ways to resolve this issue. One is to not realize any allomorph, which is penalized by REALIZE in candidate (17a). Another is to epenthesize schwa between the two sibilants. This is penalized by DEP with candidate (17d). Instead the non-default allomorph [-us] surfaces in candidate (17c), as PRIORITY is lower ranked than the other relevant constraints.

- (17) *LS analysis of [pásus] ‘steps’*

|      | /pas {-s>-us}/ | OCP-SIB | REALIZE | DEP | PRIORITY | SSP |
|------|----------------|---------|---------|-----|----------|-----|
| a.   | pás            |         | *!      |     |          |     |
| b.   | páss           | *!      |         |     |          | *   |
| ☞ c. | pásus          |         |         |     | *        |     |
| d.   | pásəs          |         |         | *!  |          |     |

Up until this point, the data can be accounted for through parallel OT using LS. Yet, attempting to analyze [témpləs] ‘temples’ this way is unsuccessful as there is a ranking contradiction. To derive [pásus], as in (17) above, DEP must outrank PRIORITY but to derive [témpləs], PRIORITY and SSP must outrank DEP. This is seen in below in (18).

(18) *Ranking contradiction in parallel OT with LS*

| /templ {-s>-us}/ | OCP-SIB | REALIZE | DEP | PRIORITY | SSP |
|------------------|---------|---------|-----|----------|-----|
| • a. témpls      |         |         |     |          | *   |
| b. témplus       |         |         |     | *!       |     |
| ☞ c. témpləs     |         |         | *!  |          |     |

This problem can be resolved with an ordering of the processes. Allomorph selection takes place before schwa epenthesis. To reflect this ordering of processes in a constraint based analysis, I appeal to HS with LS (HS/LS) (McCarvel, 2016). In HS/LS, allomorph selection and schwa epenthesis are treated as unique changes and cannot co-occur in a single step to due to HS's gradualness restriction.

In (19), allomorph selection occurs first, due to high-ranking REALIZE. Epenthesis, while satisfying SSP, cannot co-occur with allomorph selection in HS. After allomorph selection in Step 1, schwa epenthesis occurs in Step 2. The form [témpləs] is converged upon in Step 3.

 (19) *HS/LS analysis of [témpləs] 'temples'*

 a. *Step 1 of [témpləs] 'temples'*

| /templ {-s>-us}/     | OCP-SIB | REALIZE | PRIORITY | SSP | DEP |
|----------------------|---------|---------|----------|-----|-----|
| i. témpl {-s>-us}    |         | *!      |          | *   |     |
| ☞ ii. témpls         |         |         |          | *   |     |
| iii. tém.plus        |         |         | *!       |     |     |
| iv. tém.plə {-s>-us} |         | *!      |          |     | *   |

 b. *Step 2 of [témpləs] 'temples'*

| témpls         | OCP-SIB | REALIZE | PRIORITY | SSP | DEP |
|----------------|---------|---------|----------|-----|-----|
| i. témpls      |         |         |          | *!  |     |
| ☞ ii. tém.pləs |         |         |          |     | *   |

 c. *Step 3 of [témpləs] 'temples' (convergence)*

| tém.pləs       | OCP-SIB | REALIZE | PRIORITY | SSP | DEP |
|----------------|---------|---------|----------|-----|-----|
| ☞ i. tém.pləs  |         |         |          |     |     |
| ii. tém.pə.ləs |         |         |          |     | *!  |

The analysis above requires PRIORITY to outrank DEP, which would seem to preclude an accounting of [pásus]. But when allomorph selection is treated as a change, then an HS/LS analysis of [pásus] is possible. This is seen in (20). In Step 1 of (20) there are two possible changes: allomorph selection (candidates (20a.ii) and (20a.iii)) or epenthesis (candidate (20a.iv)). But critically, both operations cannot apply to a single candidate in a single step. Allomorph selection takes place first in Step 1, which removes the environment for epenthesis. Instead the non-default allomorph, [-us] in candidate (20a.iii) wins and is converged on in Step 2.

 (20) *HS/LS analysis of [pásus] 'steps'*

 a. *Step 1 of [pásus] 'steps'*

| /pas {-s>-us}/    | OCP-SIB | REALIZE | PRIORITY | SSP | DEP |
|-------------------|---------|---------|----------|-----|-----|
| i. pás {-s>-us}   |         | *!      |          |     |     |
| ii. páss          | *!      |         |          | *   |     |
| ☞ iii. pá.sus     |         |         | *        |     |     |
| iv. pásə {-s>-us} |         | *!      |          |     | *   |

b. *Step 2 of [pásus] ‘steps’ (convergence)*

| pá.sus       | OCP-SIB | REALIZE | PRIORITY | SSP | DEP |
|--------------|---------|---------|----------|-----|-----|
| ☞ i. pá.sus  |         |         |          |     |     |
| ii. pá.su.sə |         |         |          |     | *!  |

In both (19) and (20) allomorph selection takes place in the first step, but has different results. This is due to the relative rankings of PRIORITY and the active markedness constraints. In (15) PRIORITY prevents the use of [-us] to resolve the SSP problem. This is due to PRIORITY outranking SSP. In (20) [-us] surfaces as OCP-SIB is ranked higher than PRIORITY. Using HS/LS and treating allomorph selection as a change allows for an accounting of the variation seen in forming plural in the masculine.

### 3.2 Feminine adjectives

With the feminine, there appears to be allomorphic variation between [-s] and [-əs], but unlike the masculine, there is reason to believe that this is schwa epenthesis and not suppletion. Schwa is the general-purpose epenthetic vowel in Catalan. Unlike the masculine, feminine nouns that end in sibilants do not surface with [-əs]. Instead they surface with no overt plural marking ([póls] ‘dust’, [pól̩s] ‘dusts’). By treating the feminine as a case of epenthesis, there is no competition between allomorphs, thus PRIORITY is not necessary.

In the analysis in (17), in Step 1, there is one choice: realize the plural morpheme or not. Failure to realize the plural morpheme violates REALIZE, which must outrank OCP-SIB. This poses no issue for the previous analyses. Epenthesis occurs in Step 2, where MAX outranks DEP, as the language wide preference is to epenthesize rather than delete offending segments in cases of OCP-SIBILANT and SSP issues. In Step 3, [fə́l̩səs] is converged upon.

(21) *HS/LS analysis of [fə́l̩səs] ‘happy.FEM.PL’*

a. *Step 1 of [fə́l̩səs] ‘happy.FEM.PL’*

| /fə́l̩s <sub>1</sub> -s <sub>2</sub> /   | REALIZE | OCP-SIB | MAX | DEP |
|------------------------------------------|---------|---------|-----|-----|
| i. fə́l̩s <sub>1</sub>                   | *!      |         |     |     |
| ☞ ii. fə́l̩s <sub>1</sub> s <sub>2</sub> |         | *       |     |     |

b. *Step 2 of [fə́l̩s] ‘happy.FEM.PL’*

| fə́l̩s <sub>1</sub> s <sub>2</sub>         | REALIZE | OCP-SIB | MAX | DEP |
|--------------------------------------------|---------|---------|-----|-----|
| i. fə́l̩s <sub>1</sub> s <sub>2</sub>      |         | *!      |     |     |
| ii. fə́l̩s <sub>1</sub>                    |         |         | *!  |     |
| ☞ iii. fə́l̩s <sub>1</sub> əs <sub>2</sub> |         |         |     | *   |

c. *Step 3 of [fə́l̩s] ‘happy.FEM.PL’ (convergence)*

| fə́l̩s <sub>1</sub> əs <sub>2</sub>      | REALIZE | OCP-SIB | MAX | DEP |
|------------------------------------------|---------|---------|-----|-----|
| ☞ i. fə́l̩s <sub>1</sub> əs <sub>2</sub> |         |         |     |     |

### 3.3 Summary

These analyses cannot be achieved by treating allomorphy as purely phonological. Instead, LS is required. An account in parallel OT without LS would require positing two different epenthetic vowels, [u] for masculine nouns ending in a sibilant and [ə] for everything else. In parallel OT with LS, in order to ensure [pásus], DEP must outrank PRIORITY but to derive [témpləs], PRIORITY and SSP must outrank DEP. To resolve this issue, I appeal to HS/LS. Bonet et al. (2007) resolve this

issue in parallel OT with LS by using Output-Output correspondence (Benua, 1995, 1997/2000), alignment constraints, subcategorization, and null allomorphs. While this accounts for data, as shown in Section 4 below, it may not be the most desirable approach, as discussed in Section 5.

## 4 Bonet et al. (2007) analysis

Bonet et al. (2007) analyze the variation of certain word final segments in Catalan as allomorphic variation of gender markers. They interpret the peculiarity of [u] in masculine words to indicate that [u] is in fact a separate morpheme – a gender marker. They extrapolate from this that schwa in words like [párəs] ‘fathers’ is also a masculine marker, and for masculine words with neither of those suffixes, they posit a null masculine suffix. The necessity of this third, null allomorph suggests that there is no masculine suffix after all: masculine words can end with any segment, as shown above in (7) and discussed below in Section 5, and there is no evidence for a productive gender suffix.

Bonet et al. (2007) argue that  $\emptyset$  is the unmarked and most common ending among Catalan masculine nouns, followed by the marked forms of [u] and [ə]. This is reflected in their proposed ordering of  $\{\emptyset > u > ə\}$ . In cases such as (22d), where [u] is not found in the underlying form but appears in the plural due to SSP issues, they propose that the [u] is not epenthetic or part of the plural suffix but is the masculine allomorph [u].

- (22) *Masculine nominal allomorphs (Bonet et al., 2007, p. 916)*
- a. /mos-u/ [mósu] /mos-u-s/ [mósus] ‘lad(s)’
  - b. /par-ə/ [pár-ə] /par-ə-s/ [pár-əs] ‘father(s)’
  - c. /gət- $\emptyset$ / [gót] /gət- $\emptyset$ -s/ [gəts] ‘glass(es)’
  - d. /pas- $\emptyset$  [pás] /pas-u-s/ [pásus] ‘step(s)’

Stems surface with a null allomorph ((22c) and (22d)) unless the stem has a lexical subcategorization requirement for one of the two marked allomorphs [u] and [ə], as in (22a) and (22b) respectively.<sup>4</sup> The selection of the correct allomorph is ensured by the constraint RESPECT, defined in (23). If a stem does not subcategorize for an allomorph, as is the case of masculine nouns with the null allomorph, RESPECT is not violated by use of other allomorphs.

- (23) RESPECT – Respect idiosyncratic lexical specifications (Bonet et al., 2007, p. 918).

By ranking RESPECT over PRIORITY, lexically marked forms select the marked allomorphs [u] and [ə] when subcategorized for, as demonstrated in (24).

- (24) *Tableau illustrating allomorph choice in Catalan (Bonet et al., 2007, p. 919)*

| /mos <sub>u</sub> -{ $\emptyset$ >u>ə}/ | RESPECT | PRIORITY |
|-----------------------------------------|---------|----------|
| a. mós                                  | *!      |          |
| <u>b. mósu</u>                          |         | *        |
| c. mósə                                 | *!      | **       |

These constraints are outranked by SSP to account for the epenthetic schwa, which is underlined, in cases where peripheral consonant clusters do not abide by SSP, as in (25).

- (25) a. /templ/ [témplə] ‘temple’  
 b. /templ/ [témpləs] ‘temples’ (Bonet et al., 2007, p. 916)

<sup>4</sup>The subcategorization requirement of a stem is indicated with a subscript segment on the stem in the input.

In the tableau in (26), candidates (26a) and (26d) abide by PRIORITY as they contain the highest-ordered allomorph,  $\emptyset$ , but candidate (26a) violates SSP. Use of the lower-ordered allomorphs in candidates (26b) ( $[-u]$ ) and (26c) ( $[-\emptyset]$ ) is penalized by PRIORITY. Candidate (26d), despite the similarity of the epenthetic vowel to the allomorph schwa, does not violate PRIORITY as the schwa is epenthetic.

(26) *Schwa epenthesis to resolve SSP violations (Bonet et al., 2007, p. 920)*

| /templ- $\{\emptyset > u > \emptyset\}$ / | SSP | RESPECT | PRIORITY | DEP |
|-------------------------------------------|-----|---------|----------|-----|
| a. t $\acute{e}$ mpl $\emptyset$          | *!  |         |          |     |
| b. t $\acute{e}$ mplu                     |     |         | *!       |     |
| c. t $\acute{e}$ mpl $\emptyset$          |     |         | *!*      |     |
| ☞ d. t $\acute{e}$ mpl $\emptyset$        |     |         |          | *   |

For feminine nominals, Bonet et al. (2007) propose that schwa is the default allomorph and rank the allomorphs as  $\{\emptyset > \emptyset\}$ . As with the masculine, the lower ranked allomorph surfaces due to lexical subcategorization requirements on the stem. This analysis works the same as that in (24), but with  $\{\emptyset > \emptyset\}$ .

In cases such as (27), where OCP-SIBILANT issues arise, Bonet et al. (2007) treat the feminine differently than the masculine. They analyze schwa as epenthetic, not as the feminine allomorph.

(27) [fəlís] [fəlísəs] ‘happy.FEM.SG/PL’ (Bonet et al., 2007, p. 917)

Bonet et al. (2007) propose the following ranking: OCP-SIB, RESPECT  $\gg$  PRIORITY  $\gg$  DEP to motivate epenthesis between sibilants. In (28) OCP-SIB motivates the overriding of the subcategorized null allomorph and RESPECT penalizes use of the allomorphic schwa in candidate (28b). The candidate with the epenthetic schwa, candidate (28c), wins.

(28) *Schwa epenthesis in Catalan feminine forms (Bonet et al., 2007, p. 921)*

| /fəlís $\emptyset$ - $\{\emptyset > \emptyset\}$ -s/ | OCP-SIB | RESPECT | PRIORITY | DEP |
|------------------------------------------------------|---------|---------|----------|-----|
| a. fəlíss                                            | *!      |         | *        |     |
| b. fəlísəs                                           |         | *!      |          |     |
| ☞ c. fəlísəs                                         |         |         | *        | *   |

While this constraint ranking accounts for Bonet et al.’s interpretation of the feminine, it makes the wrong prediction with respect to masculine allomorphs. This ranking predicts incorrectly that masculine OCP-SIB violations will be resolved with schwa epenthesis, as shown in (29). Subcategorizing for [u] in this case would solve this issue, but only in the case of the plural. This is due to the fact that subcategorization would result in [u] surfacing in the singular also, which is incorrect as the singular of /pas/ is [pás] not \*[pásu].

(29) *Incorrect prediction of schwa epenthesis for masculine (Bonet et al., 2007, p. 921)*

| /pas- $\{\emptyset > u > \emptyset\}$ -s/ | OCP-SIB | RESPECT | PRIORITY | DEP |
|-------------------------------------------|---------|---------|----------|-----|
| a. páss                                   | *!      |         |          |     |
| ☞ b. pásus                                |         |         | *!       |     |
| c. pásəs                                  |         |         | *!*      |     |
| ☞ d. pásəs                                |         |         |          | *   |

Bonet et al. (2007) resolve this issue and account for the asymmetry between the masculine and feminine by proposing that formation of the plural is paradigmatic in nature and appeal to Output-Output correspondence. They argue the plural form is the affixed form based on the singular form

and propose an Output-Output (OO) constraint for vocalic segments. This constraint, defined in (30), penalizes any output that does not faithfully realize all the vowels present in the base.

- (30) OO – Every vocalic segment in the base has a correspondent in the affixed form (Bonet et al., 2007, p. 922).

In addition, they propose an alignment constraint that requires the edge of morphemes to align, as defined in (31).

- (31) ALIGN-MM – Align the left edge of a morph X with the right edge of a morph Y (Bonet et al., 2007, p. 922).

The interaction of OO and ALIGN-MM results in epenthesis in the case of feminine OCP-SIB violations, but prevents it in cases of masculine OCP-SIB violations, as seen in (32) and (33) respectively. Here OO is not violated as the vowels present in base are all present in the outputs. In (32), OCP-SIB and RESPECT eliminate candidates that result in adjacent sibilants (candidate (32a)) or that violate the subcategorization requirement of the stem (candidate (32b)), respectively.

- (32) *OO-based analysis of feminine plural (Bonet et al., 2007, p. 924)*

| /fəlis-{\ə>Ø}-s/<br>Base: [fəlis ] | OCP-SIB | RESPECT | OO | ALIGN-MM | PRIORITY | DEP |
|------------------------------------|---------|---------|----|----------|----------|-----|
| a. fəlíss                          | *!      |         |    |          |          |     |
| b. fəlísəs                         |         | *!      |    |          |          |     |
| ☞ c. fəlísəs                       |         |         |    | *        | *        | *   |

In (33) OCP-SIB penalizes candidate (33a) due to adjacent sibilants. The problematic epenthesis candidate, candidate (33d), is eliminated by ALIGN-MM as the schwa forces a misalignment between the stem and the suffix. PRIORITY is the distinguishing constraint that penalizes use of the allomorphic schwa (candidate (33c)) to a greater degree than the use of the allomorph [-u] (candidate (33b)).

- (33) *OO-based analysis of masculine plural (Bonet et al., 2007, p. 923)*

| /pas-{\Ø>u>ə}-s/<br>Base: [pás] | OCP-SIB | OO | ALIGN-MM | PRIORITY | DEP |
|---------------------------------|---------|----|----------|----------|-----|
| a. páss                         | *!      |    |          |          |     |
| ☞ b. pásus                      |         |    |          | *        |     |
| c. pásəs                        |         |    |          | **!      |     |
| d. pásəs                        |         |    | *!       |          | *   |

In cases of epenthesis, OO penalizes the use of other vowels to repair SSP violations, though it is PRIORITY that is the critical constraint. In (34) SSP penalizes candidate (34a), as no repair of the disallowed coda consonant cluster has occurred. Candidates (34a), (34b), and (34c) all violate OO, as they do not contain the epenthetic schwa found in the base, but as candidate (34d) violates equally ranked ALIGN-MM, it is PRIORITY that determines the winner – candidate (34d) – as it uses the default allomorph, Ø.

(34) *OO-based analysis of masculine plural (Bonet et al., 2007, p. 923)*

|                            | /templ-{Ø>u>ə}-s/ | SSP | OO | ALIGN-MM | PRIORITY | DEP |
|----------------------------|-------------------|-----|----|----------|----------|-----|
| Base: [témplə]             |                   |     |    |          |          |     |
| a. témp̄ls                 |                   | *!  | *  |          |          |     |
| b. témp̄lus                |                   |     | *  |          | *!       |     |
| c. témp̄ləs                |                   |     | *  |          | *!*      |     |
| § <sup>5</sup> d. témp̄ləs |                   |     |    | *        |          | *   |

The parallel OT with LS analysis presented by Bonet et al. (2007) does account for the data. They treat the variation in forming the plural in masculine nominals as one of allomorphic variation of the masculine gender marker, and variation in forming the plural in feminine adjectives as one of epenthesis. The ranking needed to account for epenthesis in feminine adjectives with OCP-SIBILANT issues and masculine nominals with SSP issues makes the wrong prediction with regards to nominal stems that end in sibilants. To resolve this issue, they appeal to Output-Output and alignment constraints. Their analysis also requires null allomorphs and a three-way distinction among the masculine gender allomorphs, which entails a gradient PRIORITY constraint. PRIORITY is not the only gradient constraint they use; alignment constraints also have been criticized (McCarthy, 2003, 2004, 2009) as being gradient. Gradient constraints, null allomorphs, and subcategorization can be avoided by using HS/LS.

## 5 HS/LS analysis vs. Bonet et al.’s analysis

Bonet et al.’s analysis does account for the data, as interpreted by them, but it is not necessarily the most desirable solution. Bonet et al. (2007) treat the variation seen in the masculine as a case of allomorphic variation within the masculine gender marker and not the plural morpheme. First, there is little evidence for gender-marking morphemes. As noted above, Catalan nominals can end in any licit consonant, consonant cluster, or vowel, regardless of gender. This is seen in the data in (35) and (36).<sup>5</sup>

(35) *Word final consonants*a. *Masculine*

- |      |          |         |                        |
|------|----------|---------|------------------------|
| i.   | [gót]    | ‘glass’ |                        |
| ii.  | [pás]    | ‘step’  |                        |
| iii. | [báɲ]    | ‘bath’  |                        |
| iv.  | [mál]    | ‘badly’ | (Hualde, 1992, p. 379) |
| v.   | [már]    | ‘sea’   | (Hualde, 1992, p. 379) |
| vi.  | [imfèrn] | ‘hell’  |                        |

b. *Feminine*

- |      |          |          |                        |
|------|----------|----------|------------------------|
| i.   | [səlut]  | ‘health’ | (Wheeler, 2005, p. 7)  |
| ii.  | [fəlis]  | ‘happy’  |                        |
| iii. | [lúm]    | ‘light’  |                        |
| iv.  | [sál]    | ‘salt’   |                        |
| v.   | [mártir] | ‘martyr’ | (Wheeler, 2005, p. 25) |
| vi.  | [kárn]   | ‘meat’   |                        |

<sup>5</sup>Some of the data in these examples have already been cited in the paper, those that have not been cited previously are cited here.

(36) *Word final consonants*

|                     |             |                                       |
|---------------------|-------------|---------------------------------------|
| a. <i>Masculine</i> |             |                                       |
| i.                  | [sufá]      | ‘sofa’ (Hualde, 1992, p. 386)         |
| ii.                 | [kəfé]      | ‘coffee’ (Hualde, 1992, p. 386)       |
| iii.                | [kərə]      | ‘street’ (Wheeler, 2005, p. 33)       |
| iv.                 | [só]        | ‘sound’ (Wheeler, 2005, p. 331)       |
| v.                  | [fəlkó]     | ‘hawk’ (Wheeler, 2005, p. 41)         |
| vi.                 | [biulí]     | ‘violin’ (Wheeler, 2005, p. 98)       |
| vii.                | [mósu]      | ‘lad’ (Bonet et al., 2007, p. 916)    |
| viii.               | [párə]      | ‘father’ (Bonet et al., 2007, p. 916) |
| b. <i>Feminine</i>  |             |                                       |
| i.                  | [má]        | ‘hand’ (Wheeler, 2005, p. 98)         |
| ii.                 | [biəddʒé]   | ‘traveler’ (Wheeler, 2005, p. 109)    |
| iii.                | [fló]       | ‘flower’ (Wheeler, 2005, p. 333)      |
| iv.                 | [əksíó]     | ‘action’ (Wheeler, 1979, p. xiii)     |
| v.                  | [təstimóni] | ‘testimony’ (Hualde, 1992, p. 386)    |
| vi.                 | [kámə]      | ‘leg’ (Wheeler, 1979, p. 26)          |

In addition, there is an active vowel reduction process in Catalan. Catalan has a seven vowel phoneme inventory: /ɔ, o, u, a, ε, e, i/, all of which surface in stressed syllables (Crosswhite, 1999; Hualde, 1992; Mascaró, 1976). In the unstressed position, vowels reduce to [i], [u], and [ə], as illustrated in (37).

(37) *Vowel reduction in Catalan (Crosswhite, 1999, p. 138)*

|    |     |          |                     |
|----|-----|----------|---------------------|
| a. | /a/ | sák      | ‘sack’              |
|    |     | səkét    | ‘small sack’        |
| b. | /ε/ | pél      | ‘hair’              |
|    |     | pəlút    | ‘hairy’             |
| c. | /e/ | sérp     | ‘snake’             |
|    |     | sərpótə  | ‘big snake’         |
| d. | /ɔ/ | pórt     | ‘harbor’            |
|    |     | purtuári | ‘related to harbor’ |
| e. | /o/ | gós      | ‘dog’               |
|    |     | gusás    | ‘big dog’           |
| f. | /i/ | prím     | ‘thin’              |
|    |     | əprimá   | ‘to make thin’      |
| g. | /u/ | lúm      | ‘light’             |
|    |     | luminós  | ‘light (adj.)’      |

The front non-high vowels /a/, /ε/, and /e/ reduce to [ə], while the back vowels /ɔ/ and /o/ reduce to [u]. The vowels /i/ and /u/ surface faithfully as [i] and [u] respectively. Due to the preservation of the vowels [ɔ, o, a, ε, e] in stressed positions and the possibility of word final stress, all vowels are attested word finally.

The null allomorph posited by Bonet et al. (2007) then must surface after all consonants and all vowels, except [u] and [ə] in the masculine forms and [ə] in the feminine forms. The fact that the null allomorph is the default form highlights the fact that there is no commonality among the masculine or feminine forms that would suggest a gender-marking morpheme. In addition, the vocalic gender allomorphs they propose ([u] and [ə]) coincide with the vowels found in unstressed positions. In Catalan, penultimate stress is the general pattern for words that end in a vowel (Hualde, 1992).

Thus most word final vowels are unstressed. Given the vowel reduction process in Catalan, it seems less likely that the markers posited by Bonet et al. (2007) are indeed gender allomorphs. It is more likely that they simply reflect the vowel inventory in unstressed positions. My analysis preserves the masculine feature associated with [u] by treating it as part of the masculine plural allomorph.

In addition, their analysis also invokes the use of subcategorization requirements in order to account for the shape of the word final segment. In LS, subcategorization and allomorph ordering are two independent mechanisms that effectively do the same thing – ensure proper allomorph insertion. There is no reason LS should have this redundancy. Instead the proper analysis is to posit that the segment is part of the lexical entry for the word.<sup>6</sup> This avoids the need for the RESPECT constraint to enforce supposed lexical idiosyncrasies, it eliminates a morpheme whose default allomorph is null, and it obviates much of the theoretical machinery Bonet et al. (2007) require.

Bonet et al.’s analysis also requires the use of Output-Output correspondence, a mechanism that can be avoided by reinterpreting the word final variation and using HS/LS. Yet their use of Output-Output correspondence does not appear to be necessary. In all of the tableaux using the Output-Output constraint presented herein, which are all of the tableaux using the constraint OO in Bonet et al. (2007), OO is never critical, that is, it is never the deciding constraint between two candidates. Instead it is the alignment constraint and PRIORITY that prove critical.

As noted above, alignment constraints have been criticized as being gradient and resulting in certain pathologies (McCarthy, 2003, 2004, 2009). By using HS/LS, alignment constraints are no longer needed. This is not surprising, as the architecture of HS has made the use of alignment constraints for other phonological phenomena, such as feature spreading and affix displacement, unnecessary (McCarthy, 2009).

The need for three distinct allomorphs is unnecessary in Catalan. Using a three-way distinction requires a gradient PRIORITY. Reanalyzing the data brings the language in line with the hypothesis that there is only a single distinction in allomorph ordering, that of default and non-default. PRIORITY can then be recast as a markedness constraint that is categorical and penalizes the use of the more marked, that is, non-default, allomorph.

- (38) PRIORITY (revised) – Assign one violation mark for use of any allomorph other than the default allomorph.

With PRIORITY only sensitive to a binary distinction (default vs. non-default) the issue of gradience falls away, and, crucially, a language that is otherwise evidence for the original version of PRIORITY falls away. As an added benefit, the analysis for Catalan is now simpler, no longer requiring lexical subcategorization, alignment constraints, null allomorphs, and Output-Output correspondence.

## 6 Conclusion

Using HS/LS allows for the revising of PRIORITY to resolve the gradiency issue associated with the original instantiation of the constraint and still allows for an accounting of the Catalan data. My redefinition of PRIORITY bolsters LS and addresses shortcomings noted by Wolf (2008). It also establishes LS as a sound competitor to other theories of allomorphy in HS, such as Optimal Interleaving (OI; Wolf, 2008). This is significant because, as Bonet (2013) shows, OI, the dominant approach to allomorphy in HS, cannot account for the Catalan facts that LS handles easily.

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<sup>6</sup>Certain segments are not part of the stem, such epenthetic schwa and segments that are part of suffixes, for example, the masculine plural suffix allomorph [-us].

With this correction, LS can be incorporated into HS to replace OI as a framework for suppletive allomorphy.

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# Specifying why a doctor isn't Mary\*

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## 1 Introduction

The specificational clause is one of the varieties of copular clauses identified by Higgins (1973), characterized by an apparently predicative DP in subject position (DP1) and an argumental DP in post-copular position (DP2). They contrast with predicational copular clauses in which DP1 is argumental and DP2 is predicational.

- (1) a. **Specificational**  
My favorite book is *War & Peace*.
- b. **Predicational**  
*War & Peace* is my favorite book.

In predicational clauses, DP1 can be any argumental DP and DP2 can be any DP predicate. In specificational clauses (SCCs), there is a restriction on indefinite subjects.

- (2) a. **Specificational**  
\*A book is *War & Peace*.
- b. **Predicational**  
*War & Peace* is a book.

The restriction on indefinite SCC subjects, which this paper addresses, presents a puzzle for any syntactic or semantic analysis of SCCs because it is not an absolute ban on indefinite DPs in subject position. Rather, as I will discuss in Section 2, the fact that some indefinite DPs are able to act as SCC subjects, as demonstrated below in (3), means that, before we can adduce the indefinite restriction as evidence for or against a particular analysis of SCCs, we must first understand its provenance.

- (3) a. i. \* A doctor is Mary.  
ii. A newly-minted doctor is Mary.
- b. i. \* A linguist is Eric Lenneberg.  
ii. An underrated linguist is Eric Lenneberg.
- c. i. \* A building is Robarts.  
ii. A building no one likes is Robarts.

In the remainder of this paper I argue that the indefinite restriction is pragmatic in nature. Specifically, I claim that there is a requirement that SCC subjects contain both 'new' and 'old' information. In Section 2 I will review two previous accounts of the indefinite restriction. Section 3 introduces Büring's (2003) notion of *contrastive topic* which I use to account for the indefinite restriction. In Section 4 I present and discuss my account of the indefinite restriction, and conclude in the following section.

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## 2 Previous accounts

In this section I will discuss two previous attempts to explain the indefinite restriction. The first is a pragmatic account by Mikkelsen (2004) and the second is a semantic account by Heycock (2012). I will argue that, while neither can fully account for the distribution of indefinite SCC subjects, Mikkelsen's (2004) account provides a better starting point for a full account.

### 2.1 Mikkelsen (2004)

Line Mikkelsen's dissertation contains one of the only attempts to define the restriction on indefinite SCC subjects. Though she admits that her attempt falls short of a proper explication of the restriction, the attempt itself provides an excellent starting point for my attempt.

After arguing in favor of a predicate inversion analysis of SCC, Mikkelsen considers the restriction on indefinites and concedes that, as Heycock and Kroch (1999) argue, it is not predicted by the inversion analysis. She does not concede, however, that it represents a strong argument against the inversion analysis. The restriction on indefinites would only be strong evidence against an inversion analysis if it were a categorical restriction, which it is not.

Mikkelsen demonstrates the non-categorical nature of the restriction with the following examples.

- (4) **A philosopher who seems to share the Kiparskys' intuition on some factive predicates** is Unger (1972) who argues that ...<sup>1</sup>
- (5) **Another speaker at the conference** was the *Times* columnist Nicholas Kristof, who got Wilson's permission to mention the Niger trip in a column.<sup>2</sup>
- (6) **One Iraqi émigré who has heard from the scientists' families** is Shakir al Kha Fagi, who left Iraq as a young man and runs a successful business in the Detroit area.<sup>3</sup>
- (7) **A doctor who might be able to help you** is Harry Barcan.<sup>4</sup>

Since the restriction is not categorical, she argues, it is not due to a semantic type mismatch, rather it must be pragmatic in nature.

Mikkelsen points out that, unlike predicational clauses, SCCs have a fixed information structure. As demonstrated in (8), SCCs are infelicitous in contexts that focus the initial DP, while predicational clauses are more flexible.

- (8) a. Q: Who is the winner?  
       A1: The winner is JOHN. [Specificational]  
       A2: JOHN is the winner. [Predicational]
  - b. Q: What is John?  
       A1: #The WINNER is John. [Specificational]  
       A2: John is the WINNER. [Predicational]
- (Mikkelsen, 2004)

Mikkelsen argues that this fixed information structure of SCCs follows from SCCs being inversion structures. Following Birner (1994, 1996), she assumes that the discourse function of inversion is to

<sup>1</sup>Delacruz (1976, p. 195 fn8) cited by Mikkelsen (2004)

<sup>2</sup>Seymore M. Hersh 'The Stovepipe', *The New Yorker*, Oct 27, 2003, p. 86, cited by Mikkelsen (2004)

<sup>3</sup>Seymore M. Hersh 'The Stovepipe', *The New Yorker*, Oct 27, 2003, p. 86, cited by Mikkelsen (2004)

<sup>4</sup>Mikkelsen (2004)

mark the inverted material as linking a clause to previous discourse. The inverted material, then, must be more discourse-familiar than the post-verbal logical subject. Mikkelsen then shows that these discourse familiarity considerations can explain the acceptability of (4)-(7).

This pragmatic account, while sufficient to explain the acceptability of (4)-(7), does not explain why the restriction on simple indefinites as SCC subjects, as shown in (3), seems to be categorical. That is, even if the material in a simple indefinite is familiar, the indefinite cannot be the subject of an SCC.

- (9) Bill is a doctor. #A doctor is John (too).

Mikkelsen suggests that the discourse familiarity requirement of inverted material clashes with the Novelty Condition on indefinites (Heim, 1982). She points out, however, that this cannot be the entire story, since the Novelty Condition only requires that indefinites introduce new discourse referents. This means that, since the two instances of *a doctor* in (9) do not share a discourse referent, the Novelty Condition does not rule out the indefinite subject.

Mikkelsen also suggests that those instances of familiar yet unacceptable simple indefinite SCC subjects might be infelicitous because there is a general ban on repeating indefinites, as in the example below.

- (10) Sally is a doctor. #A doctor came to dinner last night.

This, however, does not seem to hold. Utterances, such as (10), that are barred because of repeated indefinites are made better if the first occurrence of the indefinite is modified. If the barred utterance has an SCC with an indefinite subject, as in (9), then only changing the SCC will improve it.

- (11) I know many doctors.  
 a. # A doctor is Patrick.  
 b. A doctor came to dinner last night.

To sum up, Mikkelsen observes that there seems to be a requirement that SCC subjects be topical. She attempts to use this requirement to explain the restriction on indefinite subjects, arguing that topics must be given, while indefinites tend to be novel, so indefinites are not good topics and, as a corollary, indefinites tend to make poor SCC subjects. She notes, however, that this account runs into a problem in that even when simple indefinites can be made topical, they cannot be SCC subjects.

## 2.2 Heycock (2012)

Addressing the indefinite restriction, Heycock (2012) begins with the information structure pattern shown in (8), which she frames as a restriction on focusing SCC subjects. She notes that this is parallel to a fact about scrambling in German observed by Lenerz (1977).

- (12) a. Wem hat Peter das Futter gegeben?  
 who.DAT has Peter the.ACC food given  
 ‘Who has Peter given the food?’  
 i. Peter hat der Katze das Futter gegeben.  
 Peter has the.DAT cat the.ACC food given  
 ‘Peter has given the cat the food.’ [Default order]  
 ii. Peter hat das Futter der Katze gegeben.  
 Peter has the.ACC food the.DAT cat given  
 ‘Peter has given the food to the cat.’ [Scrambled order]

- b. Was hat Peter der Katze gegeben?  
 what.ACC has Peter the.DAT cat given  
 ‘What has Peter given (to) the cat?’
- i. Peter hat der Katze das Futter gegeben.  
 Peter has the.DAT cat the.ACC food given  
 ‘Peter has given the cat the food.’ [Default order]
- ii. # Peter hat das Futter der Katze gegeben.  
 Peter has the.ACC food the.DAT cat given  
 ‘Peter has given the food to the cat.’ [Scrambled order]

As (12) demonstrates the canonical order for ditransitive objects in German is  $\text{DAT} \prec \text{ACC}$ . The scrambled order,  $\text{ACC} \prec \text{DAT}$ , is unavailable when the accusative argument is focused, as shown in (12b-ii). Just as SCC subjects cannot be focused in English, scrambled objects cannot be focused in German.

With this information structure parallel established, Heycock (2012) attempts to extend the comparison of English SCC subjects with German scrambled objects to a semantic parallel. Following de Hoop (1992) and Diesing (1992), Heycock assumes that scrambled DPs in German are necessarily interpreted as strong DPs. She claims that SCC subjects are also restricted to strong interpretations. As evidence for this claim, she presents another parallel. A property of weak indefinites, according to Milsark (1974), is that they cannot serve as subjects of Individual-Level predicates, as shown in (13).

- (13) I had been struggling with a complicated set of data ...
- a. ?\* A problem was particularly hard.  
 b. One problem was particularly hard.  
 c. {?A/one} problem that I came across was particularly hard.  
 d. One of the problems was particularly hard. (Heycock, 2012)

Heycock argues that the same pattern holds for indefinite SCC subjects as shown in (14).

- (14) a. ?\* A problem was that we didn’t understand all the parameters.  
 b. One problem was that we didn’t understand all the parameters.  
 c. {A/one} problem that I came across was that we didn’t understand all the parameters.  
 d. One of the problems was that we didn’t understand all the parameters. (Heycock, 2012)

Given these parallels, Heycock proposes that the indefinite restriction is actually a restriction on *weak* indefinites as SCC subjects.

Assuming Heycock is using the terms *weak* and *strong* to refer to those DPs that do not, and those DPs that do show Milsark’s (1974) Definiteness Effect, respectively, this proposal is problematic for two reasons. First, the terms *weak* and *strong* in this context properly refer to interpretations rather than lexical items. A determiner is called *strong* if it is always interpreted as strong, while *weak determiners* can be interpreted as either weak or strong depending on the context (Diesing, 1992). So, supposing we take Heycock’s (2012) analysis to be correct, the question changes from ‘Why is the indefinite X a licit SCC subject, while Y is illicit?’ to ‘Why can X receive a strong interpretation, while Y cannot?’.

The second, and perhaps more compelling, argument against Heycock’s (2012) proposal is that it is not borne out by the data. Although most weak quantifiers are ambiguous between weak and

strong,  $a(n)$  and  $sm$  (the reduced form of the strong quantifier *some*) do not seem to be. Despite not being strong though,  $a(n)$  and  $sm$  can head SCC subjects.

- (15) a. An UNDERrated figure in the history of generative grammar is Eric Lenneberg.  
 b. Sm SIDE effects are headache, blurred vision and sore throat.

DPs with strong quantifiers, however, do not seem to be able to function as SCC subjects, as demonstrated below in (16).

- (16) a. Each doctor is Mary, Bill, Sue, and John. (\*Specificational)  
 b. ?Most early generative grammarians are Chomsky and Halle. (\*Specificational)  
 c. ?SOME side effects are drowsiness and blurred vision. (\*Specificational)

Copular clauses with strong indefinite subjects, instead, are most naturally interpreted as identificational. Consider also the minimal pair in (17), with only strong/weak varying between the two.

- (17) a. SOME side effects are drowsiness and blurred vision. (\*Specificational)  
 b. Sm side effects are drowsiness and blurred vision.

The subject in (17b) is a weak indefinite because it and others like it can be used in existential constructions.

- (18) a. There is **a building no one likes** on St George Street.  
 b. **A building no one likes** is Robarts.  
 (19) a. There are **sm side effects**.  
 b. **Sm side effects** are headaches and dizziness.

Contrary to Heycock's (2012) proposal, it is the weak counterpart that can be the subject of an SCC. It seems, then, that the proposal that weak indefinites are barred from being SCC subjects cannot stand.

### 2.3 Summary

Each of the two approaches to explaining the indefinite restriction reviewed in this section has its own issues. The pragmatic approach of Mikkelsen (2004) covers a greater portion of the data but lacks a precise and cohesive account of it. The semantic approach of Heycock and Kroch (1999) and Heycock (2012) is more precise at the expense of its empirical coverage. In the following sections I will outline a pragmatic explanation of the indefinite restriction that increases not only the precision of Mikkelsen's (2004) approach, but its empirical coverage.

## 3 Theoretical background: Contrastive topics

The notion of *contrastive topic* (CT) comes from Büring's (2003) analysis of Jackendoff's (1972) A- and B-accent, demonstrated below in (20) and (21).

- (20) (Well, what about FRED? What did HE eat?)  
 FRED<sub>B</sub> ate the BEANS<sub>A</sub>.  
 (21) (Well, what about the BEANS? Who ate THEM?)  
 FRED<sub>A</sub> ate the BEANS<sub>B</sub>.

For Büring, the A-accent, which corresponds to a Wh-antecedent, marks focus and the B-accent marks CT. The function of CT-marking, Büring argues, is to generate alternatives, just as the function of focus-marking is according to Rooth (1985, 1992). Each sentence with CT and focus marking, then, has a CT-value which is derived from its focus-value by the algorithm in (22).

(22) CT-value formation:

Step 1: Replace the focus with a *wh*-word and front the latter; if focus marks the finite verb or negation, front the finite verb instead.

Step 2: Form a set of questions from the result of step 1 by replacing the contrastive topic with some alternative to it. (Büring, 2003)

Note, as demonstrated below, this algorithm generates a set of questions, which is a set of sets of propositions (Groenendijk and Stokhof, 1996). This way, Büring (2003) is able to build into his representations the fact that a CT-F structure presupposes a question under discussion (QUD) and a strategy for answering it (cf. Roberts, 2012).

(23) a. [Hilary]<sub>CT</sub> ate [bagels]<sub>F</sub>.

b. CT-value formation:

Step 1: What did Hilary eat?

Step 2:  $\left\{ \begin{array}{l} \text{What did Hilary eat?} \\ \text{What did Robin eat?} \end{array} \right\}$

c.  $\llbracket [\text{Hilary}]_{CT} \text{ ate } [\text{bagels}]_F. \rrbracket^{ct} = \{ \{x \text{ ate } y | y \in D_e\} | x \in D_e \}$

Under this analysis of CT-value, the CT-F structure of an utterance is represented by the value. So the CT-value of (23a) is distinct from that (24a), below, which inverts the CT-F structure.

(24) a. [Hilary]<sub>F</sub> ate [bagels]<sub>CT</sub>.

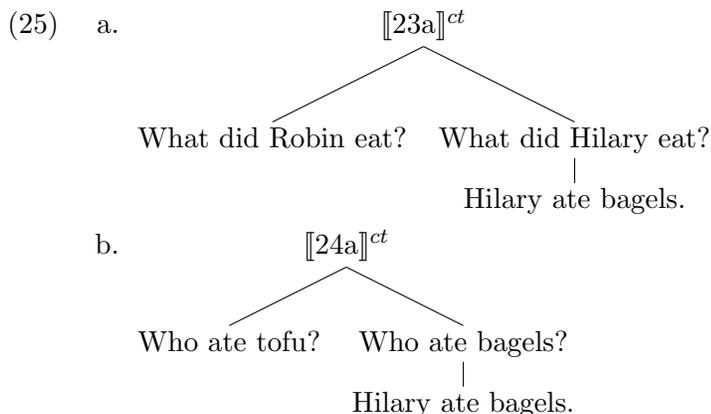
b. CT-value formation:

Step 1: Who ate bagels?

Step 2:  $\left\{ \begin{array}{l} \text{Who ate bagels?} \\ \text{Who ate tofu?} \end{array} \right\}$

c.  $\llbracket [\text{Hilary}]_F \text{ ate } [\text{bagels}]_{CT}. \rrbracket = \{ \{x \text{ ate } y | x \in D_e\} | y \in D_e \}$  ( $\neq \llbracket [23a] \rrbracket^{ct}$ )

The nested nature of these CT-values, makes them directly translatable into d-trees which I provide below.



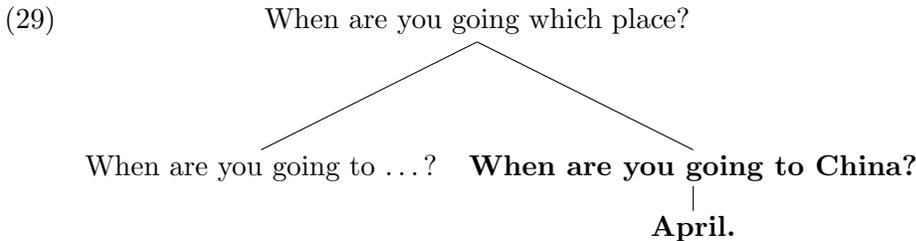
D-trees provide a perspicuous way of representing various aspects of discourse structure in a way that leverages a vocabulary already used by generative linguists. They allow us to define pragmatic notions such as assertions, questions, alternatives, etc. in terms of nodes, sisterhood, dominance,

etc. For instance, assertions and questions are distinguished by the fact that the former are terminal nodes while the latter are non-terminal.

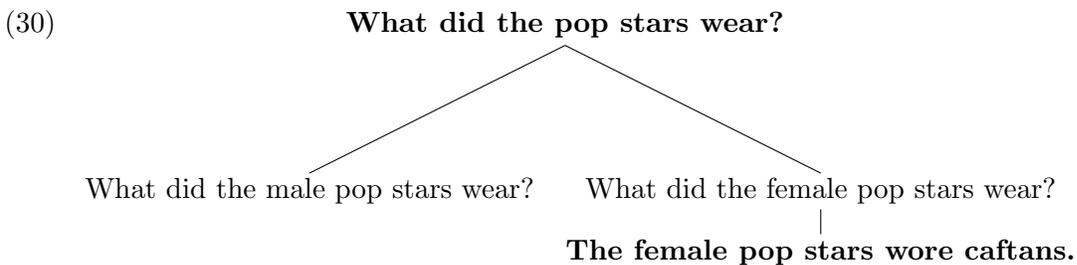
It should be noted that CT-F structures are used in a variety of discourse contexts to achieve subtly different conversational goals. Consider the following examples.

- (26) A: When are you going to China? (Roberts, 2012)  
 B: I'm going to [China]<sub>CT</sub> in [April]<sub>F</sub>.
- (27) A: What did the pop stars wear? (Büring, 2003)  
 B: The [female]<sub>CT</sub> pop stars wore [caftans]<sub>F</sub>.
- (28) A: Who's a good psychiatrist?  
 B: [My sister Monica]<sub>F</sub> is a [psychologist]<sub>CT</sub>.

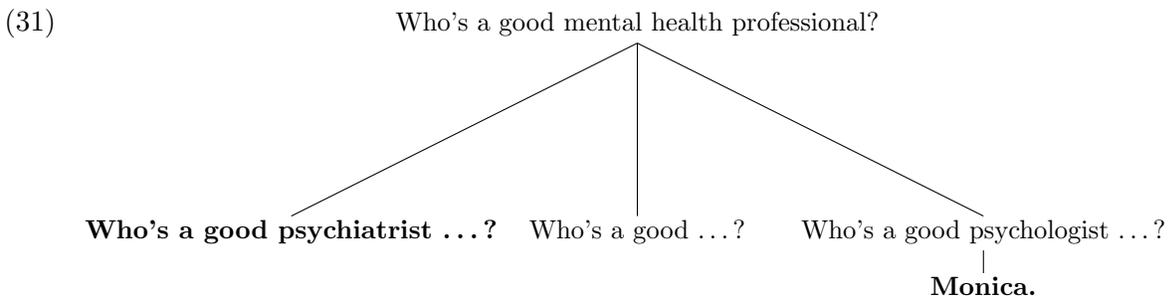
All of these instances of CT-F structures signal what Büring calls *implicit moves*. Each instance has a different sort of implicit move that can be easily represented by its d-tree. In (26) the assertion directly answers the question, but implies the existence of a relevant superquestion (*When are you going to which place?*). The d-tree in (29) shows this by marking the explicit moves in bold.



The assertion in (27), on the other hand, does not answer the explicit question, but instead answers an implied subquestion (*What did the female pop stars wear?*). Again this can be represented clearly in the d-tree in (30).



Finally, the assertion in (28) answers neither the explicit question, nor an implied subquestion. Instead, it answers an implicit subquestion of a superquestion of the explicit question, as we can see in its d-tree in (31).



So, although a given CT-F structure can be mapped onto a single d-tree in a predictable way, the context in which it is uttered determines its place in and effect on the discourse. Implicit in Büring (2003) is an informal condition on CT felicity which I give in (32).

- (32) M is a move that uses a CT-F structure.  
 Q is a question.  
 M is felicitous in the context of the QUD Q iff the M defines a d-tree DT such that Q is represented in DT.

Though informal, this condition can effectively rule out several examples of infelicitous CT-F structures. The infelicity of the CT-Foc structures in (33) and (34) is predicted by the fact that the explicit question that they answer is not found in the d-trees they project.

- (33) a. A: Who ate bagels?  
 B: # [Hilary]<sub>CT</sub> ate [bagels]<sub>F</sub>.  
 b. [[Hilary]<sub>CT</sub> ate [bagels]<sub>F</sub>]<sup>ct</sup>  
 What did who eat?
- 

- (34) a. A: Who's a good psychiatrist?  
 B: # [My sister Monica]<sub>CT</sub> is a [psychologist]<sub>F</sub>  
 b. Who's a good mental health professional?
- 

With an explicit conception of CT to guide us, we are now able to see how we can account for the indefinite restriction in terms of CT-Foc structure.

## 4 Contrastive is the right kind of topic for SCC subjects

I am now prepared to modify Mikkelsen's (2004) analysis of SCCs so that it properly captures the indefinite restriction. Recall that Mikkelsen argued that SCCs have a fixed information structure, with the postcopular DP being focus and the subject being topic, as shown in (35) below, and that for Mikkelsen, topicality requires discourse familiarity.

- (35) [My favorite singer]<sub>Top</sub> is [Ian]<sub>F</sub>.

I propose that SCC subjects must *contain* (but not be) a *contrastive* topic, in the sense of Büring (2003, to appear). I will show, in the remainder of this section, that this addition to Mikkelsen's analysis effectively captures the indefinite restriction. Specifically, requiring SCC subjects to contain a CT will account for the fact that more complex/heavy indefinites (such as those in (4)-(7)) are more likely to be acceptable SCC subjects as well as the fact that simple indefinites are almost never allowed as SCC subjects.

**(36) The Contrastive Topic requirement on Specificational Clauses**

A clause of the form  $X$  BE  $Y$  is a licit specificational clause iff

- a.  $\llbracket X \rrbracket(\llbracket Y \rrbracket)$  is defined,
- b.  $Y$  is F-marked, (Mikkelsen, 2004)
- c. Some constituent of  $X$  is CT-marked, and
- d.  $X$  is not CT-Marked.

In the above definition, (36a) restricts the requirement to possible SCCs, and (36b) incorporates Mikkelsen's observation of the fixed information structure of SCCs. The final two parts of the requirement, (36c) and (36d), are what I will argue for in the following two sections.

I have framed this proposal as a condition on SCCs in general rather than one on indefinite subjects of SCCs for reasons of parsimony. While indefinite subjects play an important role in the discussion that follows, I intersperse SCCs with definite subjects for ease of demonstration.

**4.1 SCC subjects must contain contrastive topics**

The first claim of my proposal that must be justified is that *contrastive* topichood, rather than givenness or aboutness topichood, is the relevant notion for SCC subjects. This claim can be further divided into three claims. First, CT-Foc structure is a licit information structure for SCCs. Second, SCC subjects cannot be entirely discourse given. Finally, SCC subjects cannot be aboutness topics. In the following subsection I will present evidence for each of these claims in turn. Following that, I will address the second component claim of my proposal, that SCC subjects cannot be wholly CT-marked.

**4.1.1 CT-Foc structure is compatible with SCCs**

English SCCs are most naturally uttered with intonational stress on some part of their subject as shown in (37).

- (37) a. A building on campus *no one* **LIKES** is Robarts.
- b. A building on campus **NO ONE** likes is Robarts.
- c. A building on **CAMPUS** no one likes is Robarts.
- d. A building **ON** campus no one likes is Robarts.
- e. A **BUILDING** on campus no one likes is Robarts.
- f. ? A building on campus no one likes is Robarts.

English intonational stress is associated with informational prominence, and since, as Mikkelsen shows, DP2 position in SCCs is necessarily focused, the intonational stress in the subjects of (37) cannot be primary focus.

Pragmatically, CT-Foc structures are characterized by association with a complex discourse strategy of a question and subquestion. SCCs can indeed be associated with a question-subquestion strategy. Consider the example in (38).

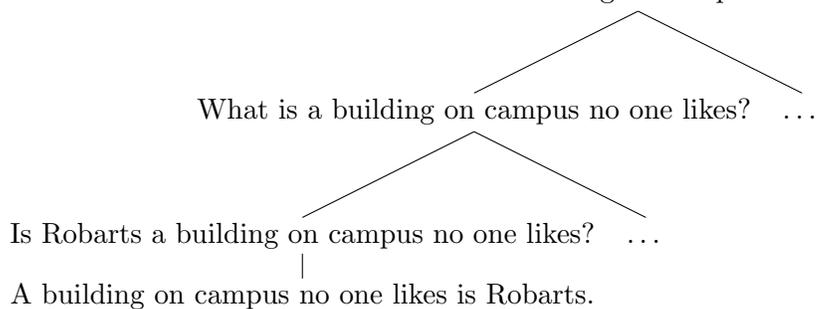
- (38) (Not many people like the Athletic Centre.)  
A building on campus **NO ONE** likes is Robarts.

If DP2 is Foc-Marked, and the stressed constituent *no one* is CT-Marked, then we can use Büring's (2003) CT-value formation procedure to construct the d-tree associated with it.

(39) CT-value formation:

- Step 1: What's a building on campus no one likes?  
 Step 2:  $\left\{ \begin{array}{l} \text{What's a building on campus no one likes?} \\ \text{What's a building on campus someone likes?} \\ \dots \\ \text{What's a building on campus everyone likes?} \end{array} \right\}$

(40) What is a building on campus who likes?



Similarly, we can see that the felicity conditions on the accent placement in SCC subjects match the those of the canonical CT-Foc structures demonstrated in (33) and (34). So, the SCCs in question need to imply a question and subquestion to which they provide a (partial) answer, and this question-subquestion-answer sequence must be congruent with the QUD.

- (41) Everyone likes Hart House  
 # A BUILDING on campus no one likes is Robarts.
- (42) A: What's a building on campus no one knows?  
 B: # A building on campus [everyone LIKES] is Hart House.

So, intonational stress in SCC subjects is consistent with CT-Foc structure.

#### 4.1.2 SCC subjects are not wholly givenness topics

If Mikkelsen (2004) is correct, and SCC subjects are necessarily givenness topics, we would expect that a maximally given DP is the ideal SCC subject. As (43a) demonstrates, however, maximally given DPs are not good SCC subjects, but SCC subjects that are minimally contrastive are acceptable.<sup>5</sup>

- (43) Many philosophers have written about the mind-body problem.  
 a. # A philosopher who has written about the mind-body problem is Chomsky.  
 b. A modern philosopher who has written about the mind-body problem is Chomsky.

So, SCC subjects are not givenness topics.

---

<sup>5</sup>The infelicity is not due to a constraint on repeating indefinites. Consider the following pair:

- (i) Many philosophers have written about the mind-body problem.  
 a. # A philosopher who has written about the mind-body problem is Chomsky.  
 b. A philosopher who has written about the mind-body problem came to dinner last night.

### 4.1.3 SCC subjects are not wholly aboutness topics

Reinhart (1981) argues that the important notion associated with topichood is aboutness rather than givenness. If we wish to retain Mikkelsen's (2004) analysis, the natural move would be to claim that licit SCC subjects are characterized by aboutness. Aboutness is diagnosable by a paraphrasing test.

(44) **Reinhart's test for aboutness**

If sentence S is about constituent X, then S is paraphrasable by the sentence *They said about X, that S'*, where S' is derived by replacing X in S with a proform.

As (45) shows, when the entire SCC subject is the aboutness topic, as diagnosed by Reinhart's test, it is interpreted *de re*, rendering the copular clause equational rather than specificational. Conversely, when the subject is not entirely the aboutness topic, it is interpreted *de dicto* rendering the clause specificational.

(45) **Background:** David Bowie = John's favorite singer.

- (Mary said that) John's favorite singer is Iggy Pop. (Identificational/Specificational)
- a. Mary said of John's favorite singer that {he/?it}'s Iggy Pop.  
(=Mary said David Bowie is Iggy Pop) (Identificational/\*Specificational)
  - b. Mary said of singers that John's favorite (one) is Iggy Pop.  
(≠Mary said David Bowie is Iggy Pop) (\*Identificational/Specificational)
  - c. Mary said of John that his favorite singer is Iggy Pop.  
(≠Mary said David Bowie is Iggy Pop) (\*Identificational/Specificational)
  - d. Mary said of people's favorite singers that John's is Iggy Pop.  
(≠Mary said David Bowie is Iggy Pop) (\*Identificational/Specificational)

In the above examples, Mary's claim that John's favorite singer is Iggy Pop is invariably false, but varies in the exact claim being made. In the case that *John's favorite singer* is understood *de re*, Mary is wrongly identifying David Bowie as Iggy Pop. When *John's favorite singer* is understood *de dicto*, Mary is wrongly specifying the singer that John prefers above all other singers is Iggy Pop.

It has been suggested to me that it is the pronominal subject of (45a) that forces its identificational reading. While I am not prepared to concede this point, even if it were true, we are left with (45b)–(45d) which cannot be captured by this claim. If pronominal subjects forced Identificational readings, the reverse could not be true, as most SCCs with full (definite) DP subjects are ambiguous with identificational readings. If we were to apply this hypothesis to (45b)–(45d) it would be non-predictive, so we would need a further explanation for the fact that specificational readings are forced when only part of the subject is an aboutness topic as in (45b)–(45d).

So, absent any compelling argument otherwise, it seems that while some part of an SCC subject can be an aboutness topic, the entire subject DP cannot be the aboutness topic.

### 4.1.4 Summary

Since SCC subjects are compatible with CT marking and cannot be givenness or aboutness topics, it is reasonable to assume that the presence of CT is necessary for SCC subjects.

## 4.2 SCC subjects cannot entirely be contrastive topics

The second claim of my proposal is that SCC subjects cannot be CT-marked constituents. So, if the entirety of the SCC subject is new/contrastive, the SCC is unacceptable.

- (46) A: Tell me about your home university?  
B: # A BUILDING on campus no one likes is Robarts.

If SCC subjects must minimally contain a CT-marked constituent, it follows directly from the unacceptability of simple indefinite SCC subjects that SCC subject DPs cannot be CT-marked. Consider the unacceptable SCC *\*A doctor is Mary*. The subject *a doctor* must contain a CT-marked constituent, in this case *doctor*. Since the indefinite article does not encode any particular information, CT marking on the nominal is equivalent to CT marking on the entire DP.

It is worth noting here that indefinite articles can be CT-marked when a definiteness contrast is relevant in a discourse. In these cases, simple indefinites can be SCC subjects.

- (47) Who is the guitarist?  
[ej] guitarist is John.

So, simple indefinites can be SCC subjects if they contain but do not comprise a CT-marked constituent.

### 4.3 Apparent counter-examples

#### 4.3.1 *One* and *another*

As mentioned above, the determiner-like elements *one* and *another* can serve as CTs in SCC subjects.

- (48) a. \*A doctor<sub>CT</sub> is Mary.  
b. One<sub>CT</sub> doctor is Mary.  
c. Another<sub>CT</sub> doctor is Mary.

In this section I argue that *one* and *another* can be CT-marked, meaning they encode enough semantic material to generate alternatives. Where possible I will attempt to sketch what is encoded by these items and what their alternatives might be. Since *one* and *another* each warrant a dedicated research project, these sketches are decidedly preliminary.

Let's consider *another* first. Following Heim et al. (1991), I take the meaning of *other* to include two crucial parts: anaphoricity and distinctness. Consider the sentence in (49).

- (49) Alice met with another student.

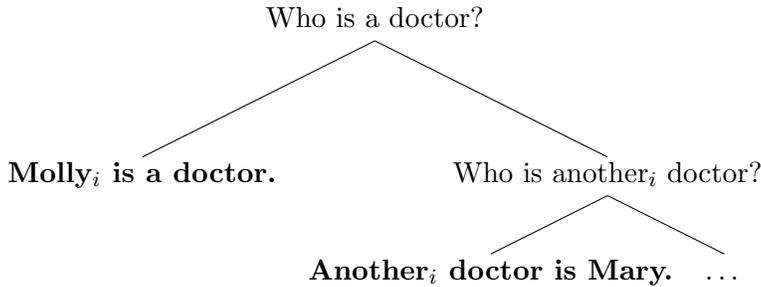
This sentence presupposes that there is a previously mentioned student (anaphoricity) and asserts that the student Alice met with is distinct from the presupposed antecedent (distinctness). As we can see from (50), the anaphoricity projects when embedded, but the distinctness does not.

- (50) a. Alice didn't meet with another student  
i. # ...she never met with any student.  
ii. ...it was the same student.  
b. If Alice met with another student, she would have told us.  
i. # She didn't tell us because she hadn't met with a student previous to this one.  
ii. She didn't tell us because it was the same student.  
c. Alice probably met with another student.  
i. # but she might not have met with a student previous to this one.  
ii. but it might have been the same student.

- d. Johan thought that Alice met with another student.
- i. # He was wrong. She hadn't met with a student previous to this one.
  - ii. He was wrong. It was the same student.

The SCC in (48c), then, is roughly paraphrasable as *A doctor [OTHER than x] is Mary*, where the value of *x* is resolved contextually. Assuming that *other* is CT-marked in (48c), and, following Heim et al. (1991), that *other* is a three-place predicate,<sup>6</sup> we can calculate the SCC's CT-value.<sup>7</sup> If we calculate the CT-value of (48c) given this understanding of its semantics, we can see that its acceptability is expected under my proposal.

- (51) a. i.  $\llbracket \text{ANOTHER}_{CT} \text{ doctor is Mary}_F \rrbracket^f$   
 $= \{ \text{doctor}(x) \wedge \text{other}(x)(\wedge \text{doctor})(y) | x \in D_e \} (y \text{ is a doctor})$   
 (Who is another doctor?)
- ii.  $\llbracket \text{ANOTHER}_{CT} \text{ doctor is Mary}_F \rrbracket^{ct}$   
 $= \{ \{ \text{doctor}(x) \wedge P(x)(y)(\wedge \text{doctor}) | x \in D_e \} | P \in D_{\langle e, \langle e, \langle e, t \rangle \rangle} \}$   
 ( $\approx$  Who is a doctor?)
- b. Molly<sub>i</sub> is a doctor.  
 Another<sub>i</sub> doctor is Mary.
- c. Who is a doctor?



So, *ANOTHER doctor* contains both new/contrastive information in *other* and given/presupposed material in *doctor*, thus it is a licit SCC subject.

The SCC in (48b) shows the inverse felicity conditions, it requires that doctors have been discussed but none have been named.

- (52) a. Let me tell you about doctors.  
 One doctor is Mary.
- b. Molly is a doctor.  
 #One doctor is Mary.

If *one* is merely the stressed pronunciation of *a/an*, then the account I have proposed would likely require serious revision. Fortunately, there are good reasons to think that *one* and *a/an* are distinct lexical items. First, it is unlikely that *one* is the stressed version of *a/an*, since *a/an* has another stressed version pronounced [ej]/[æɪ], which usually marks a contrast of definiteness.

<sup>6</sup>Heim et al. (1991), discussing the reciprocals *each other* and *one another* give the following denotation for *other*: *z* is an atomic part of *y*, a plural individual, and *z* is distinct from *x*.

(i)  $\llbracket \text{other} \rrbracket = \lambda x \lambda y \lambda z (x \cdot \Pi y \wedge z \neq x)$

If we were to translate this directly into the example under discussion (*Another doctor is Mary.*), *x* would be the contextually given doctor, *y* would be the plural individual *doctor* and *z* would be *Mary*. So the SCC roughly means that *x* is a doctor, Mary is not *x*, and Mary is a doctor.

<sup>7</sup>There may be good reason to question the particulars of both of these assumptions. There is also good reason to believe that the particulars of these assumptions are irrelevant to the discussion at hand.

- (53) A: Are you the professor?  
 B: I'm [ej] professor.

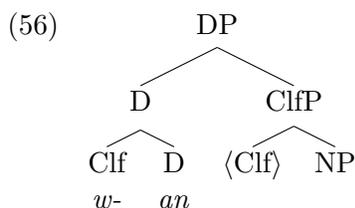
Also, Kayne (2015) presents several pieces of evidence that *one* is lexically distinct from *a/an*. While *a/an NP* can be interpreted as generic, *one NP* cannot.

- (54) a. A spider has eight legs and many eyes. (generic/specific)  
 b. One spider has eight legs and many eyes. (\*generic/specific) (Kayne, 2015)

He also notes that the syntactic distribution of *a/an* differs from *one* as shown below.

- (55) a. i. too long a book  
 ii. \*too long one book  
 b. i. a few books  
 ii. \*one few books  
 c. i. \*They're selling a-drawer desks in the back of the store.  
 ii. They're selling one-drawer desks in the back of the store.  
 (Kayne, 2015)

Kayne argues that *one* is a complex determiner composed of *a/an* and a *singular classifier*, with the syntactic structure given below in (56). Since the locus of CT marking is not the indefinite article, it must be the *singular classifier*, which means that the classifier ought to be contentful enough to generate alternatives.



The licit SCC *One doctor is Mary* would, by hypothesis, have the following CT-Foc structure.

- (57) **CT:**  $\llbracket w- \rrbracket$   
**Focus:** Mary  
**given/presupposed:** doctor/doctors/a doctor

If this is correct, then the singular classifier must be able to generate alternatives. The question is, what counts as an alternative to *one*. A proper answer to that question would require an in-depth study of the semantics and pragmatics of *one*, which is beyond the scope of this paper.

### 4.3.2 Simple definite SCC subjects

Heycock (2010) and Béjar and Kahnemuyipour (2013) discuss a particular reading of SCCs with simple definite subjects, called ‘the Poirot reading’ which is shown below in (58).

- (58) And Poirot pointed at the Major and said ‘For a long time now we have been trying to establish the identity of the murderer. But now I know...  
 ... The murderer is you’

At first blush, this seems to be a counterexample to my proposal. In this context, the existence and relevance *the murderer* is entirely given/presupposed, while the fact that the identity of the

murderer is Poirot's addressee seems to be new/contrastive. This would mean that no part of the subject is CT-marked, which should render the clause unacceptable.

If we consider the context carefully, we can see that this is not the entire story. The sentence *The murderer is you* would occur at the culmination of a murder mystery at which point many properties of *the murderer* have been gleaned from the evidence. The only relevant 'property' left is *the murderer's* identity. So, what is given is the existence, salience and uniqueness of some murderer and several of *the murderer's* properties. What is new/contrastive is the identity of *the murderer*, and that that identity is Poirot's addressee.

Consider the following alternative discourse:

- (59) We already know the following: The murderer is 6 feet tall. The murder has dark hair. The murderer walks with a limp. From this I have deduced that...  
... The murderer is you.

In the discourse leading up to *The murderer is you*, we can see that *the murderer* is only used referentially. The culminating accusation shifts the usage of *the murderer* to that of a predicate. For the purposes of this paper, I will assume that shifting *the murderer* from *e* to  $\langle e, t \rangle$  is accomplished by an IDENT operator (cf. Partee, 1987). The SCC in (59) and (58), then, has the following CT-Foc structure:

- (60) The murderer is you.  
**Focus:** *you*  
**CT:** IDENT  
**Given/presupposed:** *the murderer*

So, simple definite SCC subjects can, in fact, be accounted for by the proposal in this paper, and therefore do not represent a counterexample.

#### 4.4 Difficulties in expressing the CT condition syntactically

Since the CT-condition is a restriction on a particular syntactic structure, it should be expressible in syntactic terms. Mikkelsen (2004) proposes that SCCs arise when the T head of a copular clause bears an uninterpretable topic feature [*u*Top] which is satisfied by moving a topic marked predicative DP into its specifier.

Adapting this analysis to reflect the CT condition, however, is problematic. To demonstrate this, I will assume that a CT feature on the predicative DP triggers/licenses SCCs (at least with indefinite subjects). Consider the SCC in (61), below.

- (61) [<sub>DP</sub> A figure [<sub>PP</sub> in the history [<sub>PP</sub> of generative<sub>CT</sub> grammar ]]] is Eric Lenneberg.

In this case the CT feature is on an adjective in a PP, which is embedded in a PP in the SCC subject, rather than on the SCC subject itself. If we assume that CT-marking behaves like F-marking, then it ought to project in the manner that Selkirk (1996) describes.

- (62) **Focus Projection** (Selkirk, 1996)  
a. F-marking of the *head* of a phrase licenses the F-marking of the phrase.  
b. F-marking of an *internal argument* of a head licenses the F-marking of the head.

Crucially, according to Selkirk, non-arguments do not project focus, so CT-marking of *generative* in (61) would not project to the entire subject.

Suppose, however, the CT condition is satisfied by Agree. It is still not clear that this could account for the SCC in (61), as the CT-marked constituent is contained in a strong island (i.e. a

complex NP). In standard theories, Agree has the same structural requirements as movement, so we expect it to obey strong island constraints, rendering the the CT-Marked constituent *generative* inaccessible to Agree.

It seems, then, that more work will be required to express the CT condition syntactically.

## 4.5 Summary

In this section I have presented evidence that the restriction on indefinite SCC subjects comes from a requirement that SCC subjects contain, but not be, CT-marked constituents. I first showed that *contrastive* rather than aboutness or givenness topichood is the source of the restriction. I then argued that the ban on simple indefinite SCC subjects is neatly predicted if the SCC subject is banned from being the CT-marked constituent.

## 5 Conclusion

This paper addressed the restriction on indefinite subjects of specificational copular clauses. Working from the observations by Mikkelsen (2004) that specificational subjects must be topics, and that heavier indefinite DPs are more likely to be acceptable as specificational subjects, I argued for a pragmatic account of the restriction. According to the account proposed above, an indefinite DP is a licit specificational subject if and only if it is partially CT-marked. This account was shown to predict not only the standard examples in (3) but some apparent counterexamples. Finally, though it seems to make the correct predictions, integrating the account proposed above into linguistic theory presents difficulties which will require further work.

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## **Special Session: Learnability**



# Predicting the unpredictable: Capturing the apparent semi-regularity of rendaku voicing in Japanese through Harmonic Grammar\*

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## 1 Introduction

Semi-regular phonological processes occur often in natural language. For example, rendaku voicing in Japanese fails to occur in a seemingly random fashion among roughly 16% of certain classes of compounds. This presents an analytical challenge for generative theories with exceptionless rules or categorical constraints: irregularity of any kind must arise within lexical representations, not the grammar. For example, the compound in (1) predictably voices by the rule of rendaku voicing McCawley (1968, *inter alia*) but the compound in (2) doesn't. There is no known phonological distinction between *kuti* and *sake* that enables a rule or constraint to explain the difference.

(1) kuti + kuse → kuti-guse  
'mouth' 'habit' 'way of speaking'

(2) sake + kuse → sake-kuse  
'sake' 'habit' 'drinking habit'

Kawahara (2015) confronts the question of whether semi-regular processes such as rendaku voicing in Japanese should be considered phonological or purely lexical, in view of its many exceptions. He addresses an apparently lexicalist view of rendaku taken by Vance (2014), and presents a number of arguments in favor of its status as a bona-fide phonological process. In describing what is at stake with respect to the question of whether rendaku is lexical or phonological, he points out that 'rendaku and its properties have been extensively used for phonological argumentation, and that rendaku has been made famous among the field of phonological theory in general' (Kawahara, 2015, p. 4). As he discusses, the irregularity of rendaku undermines its phonological status inasmuch as its production in a generative framework will be short-circuited by lexical listings that apply to a whole compound in cases where the process fails to apply. Given the fact that the same word will voice in some compounds but not in others, it is not enough to list something about the voicing of a word in its independent lexical entry – at least it so appears. In familiar types of generative frameworks, it would seem necessary for the lexicon to separately list any compound, such as *sake-kuse* above, that happens to block the process of voicing.

Not only does rendaku exhibit irregularity (McCawley, 1968, *inter alia*), but, as is well known, the preference or dispreference for a given word to undergo voicing in a compound shows gradience across the lexicon, as will be shown on page 237 in (3) and (4) below, where we see a continuum that goes from complete resistance to rendaku in some words all the way across the scale to a state of exceptionless voicing by other words (Haruo Kubozono, *p.c.*, 2000; Irwin, 2015, *inter alia*). There is no way in standard rule-based (e.g. Chomsky and Halle, 1968) or constraint-based frameworks

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(e.g. Prince and Smolensky, 1993) in which features are binary or privative rather than scalar, to give a word a feature that will determine its precise degree of preference for voicing.<sup>1</sup>

This work proposes a new analysis of rendaku that solves this problem, allowing the correct output forms to be generated with little or no specification of voicing for particular, ‘exceptional’ compounds. I adopt the framework of Gradient Symbolic Computation (Smolensky and Goldrick, 2015, henceforth GSC), a type of Harmonic Grammar (Legendre et al., 1990a) that allows weighted constraints and features with continuous activation levels. In this analysis, rendaku voicing occurs by the coalescence of two stem-specific, partially activated [+voi] features that occur as attributive affixes on compound-forming stems: a variation of the junctural morpheme for rendaku proposed by Itô and Mester (1998). Only when the additive combination of these features exceeds some threshold  $t$  does voicing occur. In the above examples,  $[+voi]_{kuti} + [+voi]_{kuse} > t > [+voi]_{sake} + [+voi]_{kuse}$ . The contribution of *both* conjuncts to voicing captures not only the well-known gradient continuum of voicing preference/dispreference among second conjuncts but also a lesser-known gradient effect of first conjuncts on voicing.

Adopting the principle of Minimum Description Length (Goldsmith, 2009) I will show that GSC can provide a better model of this semi-regular phenomenon than other frameworks by reducing the degree of lexicalization with minimum cost to the grammar. Moreover, computer-simulated algorithms show that this proposed grammar is learnable. This analysis holds promise that the GSC model can shed new light on the lexicalization versus grammaticalization question with respect to other semi-regular processes.

This analysis also accounts for the gradient nature of rendaku, where the preference or dispreference for voicing of a given word can be shown to be due to the activation strength of its underlying voicing feature. An intrinsic part of that explanation will be the proposal that not only do words that occur as the second conjunct of a compound exhibit gradient preferences for voicing, but the first conjunct in a two-member compound also arguably exhibits the same kind of gradient preference for triggering voicing in the word that follows it. This phenomenon is not as easy to see unless it is viewed as part of the overall interaction between the voicing activation values of the two conjuncts. Evidence that supports the hypothesis of gradience for triggering as well as for voicing will be demonstrated by creating a noncontradictory hierarchy of voicing feature activation values – a hierarchy that will be shown to be statistically very unlikely if the first conjuncts of the set of compounds were to just occur randomly.

## 2 Examples of the gradient nature of rendaku voicing

A database of 921 noun-noun compounds was used in this analysis. The first conjuncts (henceforth ‘N1’s’) occurred among a set of 233 Yamato (native Japanese) nouns and the second conjuncts (henceforth ‘N2’s’) among a set of 306 Yamato nouns. The database was limited to compounds of native Yamato origin in which the total moraic count does not exceed four (i.e. compounds of the form  $1\mu + 1\mu$ ,  $1\mu + 2\mu$ ,  $1\mu + 3\mu$ ,  $2\mu + 1\mu$ ,  $2\mu + 2\mu$ , or  $3\mu + 1\mu$ ).<sup>2</sup> Compounds in which rendaku voicing is blocked because of Lyman’s Law or because of belonging to the class of coordinative or

<sup>1</sup>In Rosen (2001) I proposed a partial solution to some of these problems by having the lexical listing of a compound occur representationally as pointers to the listings of the individual constituents, but it addressed the issue of gradience only in a very coarse-grained way.

<sup>2</sup>The database was limited to compounds that fall within this length limit because of evidence that compounds of greater length are much less resistant to rendaku voicing – what Rosen (2001, 2003) calls the ‘prosodic size factor’ (see also Kawahara and Sano, 2014). There is a similar reason for limiting the database to Yamato morphemes only. If we adopt the stratification of the Japanese lexicon proposed by Itô and Mester (1995), compounds show increasing resistance to rendaku as we move outside of the Yamato stratum of the lexicon to other strata.

dvandva compounds, which also block rendaku (Martin, 1987, p. 9), were also excluded. Common placenames and family names, which show evidence of being lexicalized as single words, were also omitted. If we examine the frequency at which a noun experiences rendaku voicing within this set, we find the following examples of a range of voicing frequencies among nouns that occur in at least six compounds:

|     |                  |      |       |      |       |      |      |
|-----|------------------|------|-------|------|-------|------|------|
| (3) | N2               | saki | kusa  | te   | hara  | ki   | kawa |
|     | Gloss            | tip  | grass | hand | field | tree | skin |
|     | Freq. of rendaku | 0    | 0.12  | 0.21 | 0.25  | 0.33 | 0.5  |
|     | Num. of examples | 16   | 17    | 19   | 8     | 18   | 14   |

|     |                  |      |      |        |       |
|-----|------------------|------|------|--------|-------|
| (4) | N2               | tori | hune | hito   | hue   |
|     | Gloss            | bird | boat | person | flute |
|     | Freq. of rendaku | 0.84 | 0.93 | 1.0    | 1.0   |
|     | Num. of examples | 13   | 21   | 16     | 12    |

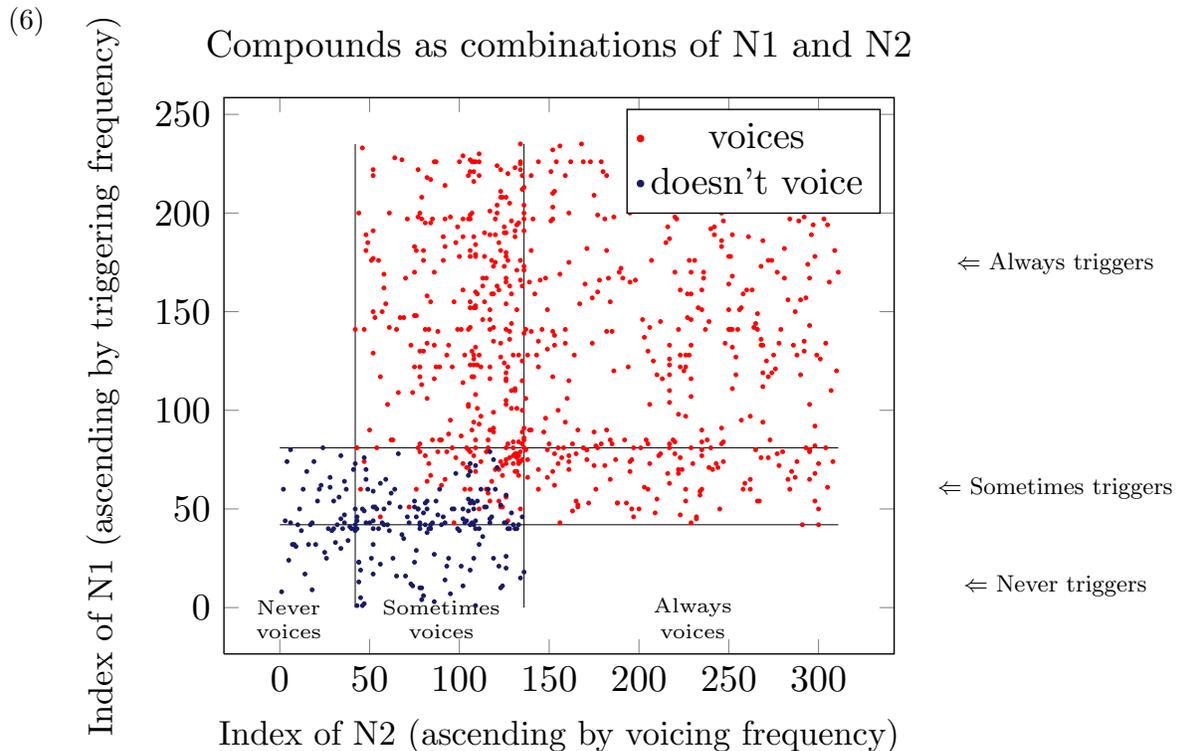
(5) shows the triggering frequency of some N1s as the first conjuncts of two-member compounds. Fewer nouns occur as abundantly in this position, since the number of nouns that can occur as the nonhead of the compound will be less semantically and pragmatically limited than for the head noun.

|     |                  |        |     |       |      |          |      |                                |
|-----|------------------|--------|-----|-------|------|----------|------|--------------------------------|
| (5) | N1               | niwa   | me  | mizu  | ura  | yama     | yoko | hana <sub>2</sub> <sup>3</sup> |
|     | Gloss            | garden | eye | water | back | mountain | side | flower                         |
|     | Freq. of rendaku | 0.16   | 0.5 | 0.7   | 0.75 | 0.81     | 0.9  | 1.0                            |
|     | Num. of examples | 6      | 12  | 17    | 12   | 22       | 10   | 10                             |

The following graph shows the voicing behavior of the compounds in the dataset, with N1, the first conjunct, represented as a distance along the y-axis and N2's on the x-axis, arranged in order of voicing tendency on both axes. Red dots represent a compound that voices, blue dots one that doesn't. The graph is subdivided into three rows and three columns in each dimension according to the overall voicing behavior of the stems. The graph shows the patterning of gradient voicing preferences among stems. Overall, 16% of compounds in this set fail to voice. In the lowest row and leftmost column are N1's and N2's that always block voicing; in the highest row and rightmost column, N1's and N2's that always participate in voicing. But in the middle rectangle we find both blue dots and red dots. The fact that clustering of colors occurs on this graph is a clue towards the analysis of rendaku that shall be presented.

The next section introduces the Gradient Symbolic Computation framework under which this analysis will be developed.

<sup>3</sup>Numbers occurring after lexical items indicate indices that were used in the database to distinguish between homophones such as *hana<sub>1</sub>* 'nose' and *hana<sub>2</sub>* 'flower' whose phonological forms differ only by pitch accent pattern.



### 3 The Gradient Symbolic Computation framework (Smolensky and Goldrick, 2015)

This grammar architecture consists of two levels: (a) a symbolic level of discrete symbol structures in which symbols such as representations of phonemes are assigned to a set of roles such as positions in a string; (b) a subsymbolic or subconceptual level which is a kind of neural connectionist network that consists of distributed representations in which a given binding between a filler such as a phoneme and a role such as a position is distributed over the whole network. Specifically, there is an activity pattern for a given filler-role binding which is calculated by the tensor product of activity vectors that encode the filler and the role at this subsymbolic level. The way the symbolic level is derived algorithmically from the subsymbolic level involves two important factors: (i) a gradually decreasing ‘temperature’ factor  $T$  of added Gaussian noise that creates a simulated annealing process for optimization and (ii) a gradually increasing quantization factor  $q$  that forces the output to be discrete (at least to some degree, although blended representations are still possible).

At the symbolic level, the grammar belongs to the class of Harmonic Grammars (e.g. Smolensky, 1986; Legendre et al., 1990a,b; Goldsmith, 1993; Pater, 2009), where, as Smolensky and Goldrick describe, ‘the grammatical wellformedness of a symbol structure  $S$  is measured by a grammar-Harmony function  $H_G$ .  $H_G(S)$  is the weighted sum of  $S$ ’s violations of constraints on co-occurrence of filler/role bindings’. In this symbol structure, structural positions are occupied by blends of symbols that can have partial levels of activation.

Of particular interest to us here is the way, in this kind of harmonic grammar, the interaction of partially-weighted constraints with partially activated input features will derive particular outputs. The analysis of rendaku to be presented here parallels, in certain ways, an analysis of French liaison in the GSC framework by Smolensky (2015), to which the reader is referred.

## 4 A GSC account of rendaku voicing

The apparent semi-regularity of Japanese rendaku becomes grammatical and explainable if we adopt the hypothesis that there are partially activated [+voice] features at the edges of morphemes whose activation values reflect, for the first conjunct, that morpheme’s inclination to trigger rendaku in the following stem, and, for the second conjunct, that morpheme’s inclination to undergo rendaku. The combined effects of the two coalescing, partially activated features will determine whether a [+voice] feature surfaces.

This requires a slight modification of the proposal of Itô and Mester (1998) of rendaku as a junctural prefix:

$$(7) \text{ [yoko] + [voi]}_{\rho} + \text{[tsuna]} \rightarrow \text{yokodzuna ‘horizontal rope’} \quad (\text{Itô and Mester, 1998, p. 29})$$

In the present account the rendaku morpheme is both a prefix and a suffix, whose features coalesce to one feature in the output as shown in (8). In (9), coalescence occurs but fails to produce voicing, which shall be explained forthwith.

$$(8) \begin{array}{l} \text{kuma-[voi]}_{\rho_1} + \text{[voi]}_{\rho_2}\text{-te} \rightarrow \text{kuma-} \overset{\rho_{1,2}}{\text{te}} = \text{kuma-**de**} \\ \text{‘bear’} \quad \text{‘hand’} \quad \text{‘rake’} \end{array}$$

$$(9) \begin{array}{l} \text{yama-[voi]}_{\rho_1} + \text{[voi]}_{\rho_2}\text{-te} \rightarrow \text{yama-} \overset{\rho_{1,2}}{\text{te}} = \text{yama-te} \\ \text{‘mountain’} \quad \text{‘hand’} \quad \text{‘mountainside’} \end{array}$$

If a particular N1 triggers voicing in a significant majority of compounds, it will have a strongly activated voicing feature that reflects its tendency (modulo the effects of the activation on N2) to trigger voicing in a compound. The same is true for N2’s, where a strongly activated N2 reflects its type-frequency of voicing in various compounds.

At the symbolic level, the GSC framework has weighted constraints that act on features that can be partially activated. We shall see that the effects of weighted constraints such as MAX and DEP, whose general properties are familiar from Optimality Theory (Prince and Smolensky, 1993), are such that there is a threshold for the sum of the activations of the [+voi] features on N1 and N2, above which voicing will occur and below which it will not.

The following harmonic tableaux show how voicing is determined by the effects of weighted MAX and DEP constraints on partially-activated [+voi] features, to which, for the time being, we assign hypothetical values. We give MAX a weight of 1 and DEP a weight of  $-1$ . A MAX constraint creates positive harmony: its weight times the activation of the feature in question that surfaces. A DEP constraint creates negative harmony: its (negative) weight times the difference in activation values between a feature’s underlying form and surface form. The winning candidate is the one with the highest harmony value.

(10)

|                                                           |                             |                             |                 |             |
|-----------------------------------------------------------|-----------------------------|-----------------------------|-----------------|-------------|
| <i>kuma</i> ([+voi] · (0.4)) ((0.225) · [+voi]) <i>te</i> | 1<br>Max[+voi] <sub>1</sub> | 1<br>Max[+voi] <sub>2</sub> | -1<br>Dep[+voi] | H           |
| <b>☞ kuma-de</b>                                          | 0.4                         | 0.225                       | -0.375          | <b>0.25</b> |
| kuma-te                                                   |                             |                             |                 | 0           |

- DEP violation is  $1 - (0.4 + 0.225) = -0.375$ .

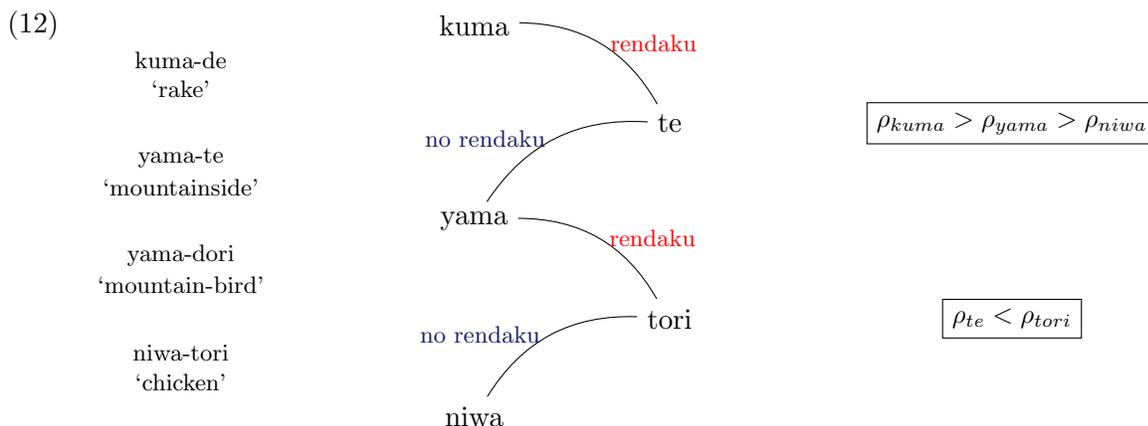
(11)

|                                                       |                             |                             |                 |          |
|-------------------------------------------------------|-----------------------------|-----------------------------|-----------------|----------|
| $yama([+voi] \cdot (0.225)) ((0.225) \cdot [+voi])te$ | 1<br>Max[+voi] <sub>1</sub> | 1<br>Max[+voi] <sub>2</sub> | -1<br>Dep[+voi] | H        |
| yama-de                                               | 0.225                       | 0.225                       | -0.55           | -0.1     |
| <b>☞ yama-te</b>                                      |                             |                             |                 | <b>0</b> |

- DEP violation is  $1 - (0.225 + 0.225) = -0.55$ .
- The rendaku suffix (0.225) on *yama* ‘mountain’ is posited to have a lower activation value than the one on *kuma* ‘bear’ (0.4).
- So the combined weights are not enough to surpass the threshold and cause voicing.

In general, we can show that the threshold for voicing will be given by  $\frac{D}{M+D}$ , where  $M$  is the weight of MAX and  $-D$  is the weight of DEP.

Having rendaku voicing determined by whether the sum of voicing feature activation levels on N1 and N2 surpasses some threshold will depend completely on whether there can be a strict, noncontradictory domination hierarchy of voicing activation values on morphemes that reflects their triggering and voicing tendencies. Consider, for example, the following interleaved set of morphologically minimal pairs of compounds, shown in the diagram below, where the first two are repeated from (8) and (9) above. Under our hypothesis that voicing is determined by the combined strength of [+voi] rendaku affixes on N1 and N2, these examples establish a hierarchy of activation values for these affixes shown in the boxes below.



From this data we establish, for example, that  $\rho_{kuma} > \rho_{yama} > \rho_{niwa}$  for stem rendaku suffixes.

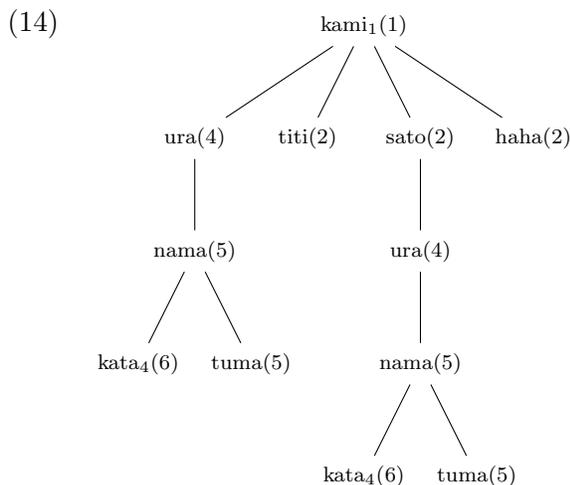
So if *kuma* ‘bear’ and *niwa* ‘garden’ both combined with the same stem (e.g. *kinu* ‘silk’) to form compounds, the following morphologically minimal pair should be impossible:

- (13)  $\left. \begin{array}{l} *kuma-kinu \\ *niwa-ginu \end{array} \right\}$  Contradicts the hierarchy  $\rho_{kuma} > \rho_{niwa}$

These are not real compounds, but if they existed, we predict that they could not have this kind of voicing contrast. If such contradictions are found to exist in the data, then our hypothesis – that voicing is determined by the sum of innate voicing activation levels of affixes on stems – will not be viable. But if no such contradictions can be found, and if such contradictions *are* likely to occur in a dataset of randomly voiced compounds, then the current hypothesis is supported. The following algorithm was used to search for contradictions in the data among both N1 rendaku suffixes and N2 rendaku prefixes. (Subscripts on N’s here are to distinguish between different stems, not to distinguish between the first and second conjunct of a compound.)

1. Find all immediate domination instances from morphologically minimal pairs:  
 $\rho_{N_1} > \rho_{N_2}$  iff  $N_1N_3$  voices and  $N_2N_3$  doesn't voice.  
 e.g.: kuma-de vs. yama-te (previous page)
2. By transitivity of domination, ( $\rho_{N_1} > \rho_{N_2}$  and  $\rho_{N_2} > \rho_{N_3} \rightarrow \rho_{N_1} > \rho_{N_3}$ ), create a dominance tree.
3. Search the tree, depth first, for contradictions.

The following is a fragment of what such a domination tree would look like:



It is significant that no contradictions turned up in the data set. We might ask how likely it is that a lack of contradictions would occur randomly. To try to answer this question, the following computer simulation was carried out:

1. Go through the list of compounds, randomly altering the voicing on N2, so that voicing occurs 84% of the time.
2. Do this 10 times.
3. Check each list for contradictions in domination for  $\rho_{N_1}$  and  $\rho_{N_2}$ .

Each run of the simulation produced 5 to 11 contradictions, suggesting that the lack of contradiction in the real data reflects some real property.

Having established that there exists a set of non-contradictory activation levels that is consistent with the data, we next need to consider two related questions: what is an actual set of levels that can correctly derive the voicing of compounds in the data, and how can this set of activations be learnable?

A number of learning algorithms were tested by computer simulation, each with certain advantages and disadvantages. It would exceed the limitations on length of this paper to describe all of them, so I shall focus on one that has certain advantages with respect to Minimum Description Length, which shall be discussed in the following section, after which, a learning algorithm for activation levels will be presented.

## 5 Minimum Description Length (Goldsmith, 2011)

Minimum Description Length is an evaluation metric by which we shall argue that deriving the correct voicing outcome in compounds through the grammatical combination of partial voicing

features is preferable to a model that regards the surface forms as resulting from a choice of a lexically listed allomorph. Our objective is to avoid unnecessary lexicalization of the phonology of compound words in cases where the grammar can determine correct outputs from underlying features. We want to find an optimal middle ground between two extremes: (a) an unwieldy lexicon that unnecessarily gives a full phonological description of every morphologically complex output form and (b) and unwieldy grammar that overfits the data. For the purpose of making a scientific judgment of how well a particular linguistic model fits the data that is being studied, Goldsmith (2002, 2011) and Goldsmith and Riggle (2012) develop the principle of Minimum Description Length or MDL, based on work by Rissanen (1989), which gives us a way of choosing the optimal trade-off between the lexical specification of output forms and a grammar that generates output forms from the sparsest possible set of input forms. Formally, MDL is calculated in bits as the sum of the two quantities we want to minimize: the negative log probability of the grammar plus the negative log probability of the data given the grammar:  $\operatorname{argmin}(-\log_2 p(g) - \log_2 p(D|g))$ , where  $p(D, g) = p(g)p(D|g)$  and thus  $-\log_2 p(D, g) = -\log_2 p(g) - \log_2 p(D|g)$ . With respect to the present compound data we can calculate the description length of the data using the information-theoretic principle that data  $D$  can be encoded with  $n$  bits when the  $n$  is the positive log probability that the grammar assigns to  $D$  (Goldsmith and Riggle, 2012).

In calculating the MDL of a grammar that derives morphologically complex output forms from a composition of simple lexemes, we need to consider the question of which combinations of morphemes can combine: for example, which stems can combine with which affixes in the case of affixation or which stems can combine with which other stems in the case of compounding. To represent these kinds of combinatorial possibilities, Goldsmith proposes *signatures*: ‘structures indicating which stems may appear with which affixes’.

In the case of the compounds we are considering, suppose that whether or not rendaku voicing occurred is determined through the pairing of allomorphs of stems in a signature structure, where allomorphs can be voiced or nonvoiced. A nonexhaustive signature for stems that can follow *mugi* ‘barley’ in a compound might look something like the following, where a voiced allomorph of the second conjunct occurs in the first and third entries.

$$(15) \quad \{mugi \text{ ‘barley’}\} \left\{ \begin{array}{l} \text{bue ‘flute’} \\ \text{ko ‘flour’} \\ \text{batake ‘field’} \\ \text{mesi ‘food’} \end{array} \right\}$$

In the case of the proposed analysis of rendaku voicing in the GSC framework, a signature can also list, for a given stem, the level of activation of a rendaku affix it combines with. If every stem has an affix with a slightly different activation level than any of the others, then no affix could share its signature with more than one stem. On the other hand, if the voicing of compounds could be derived with a small number of discrete levels of activation on affixes, where each stem has a signature pointer a certain level, the burden on the lexicon will be less since the listing of signatures can be made more compact. Suppose, for example that a number of stems that can occur as N1’s all associate with a rendaku affix with the same activation level, which we can for the time being call ‘strong’ then a signature for that set of stems might look like the following:

$$(16) \quad \left\{ \begin{array}{l} \text{kuma ‘bear’} \\ \text{kusa ‘grass’} \\ \text{umi ‘sea’} \\ \vdots \end{array} \right\} \{\rho_{\text{strong}}\}$$

With respect to MDL, then, it becomes important to find a learning algorithm that can find a small number of discrete activation levels for rendaku affixes rather than a different level for the affix that occurs with each stem. The next section introduces an algorithm that can achieve this.

## 6 A learning algorithm for activation levels of affixes

The following algorithm was tested through computer simulation.

1. Initialize the activation level of each N1 and N2 affix to zero, based on the hypothesis that stems will be encountered first in their simplex form, where there is no evidence for any [+voi] activation.
2. Initialize the weights of MAX and DEP constraints at 1 and  $-1$  respectively.
3. Initialize  $\eta$ , the stepsize for MAX and DEP increments and for random noise perturbations at 0.01.
4. Initialize  $t$ , a temperature factor for simulated annealing on MAX and DEP weights at 1.
5. For each iteration:
  - (a) For each compound in the database:
    - i. If voicing occurs and  $a_{N1} + a_{N2} + \text{Gaussian noise} < \frac{D}{M+D}$  (threshold):
      - A. Increment DEP by  $\text{stepsize} \times a_{N1} + a_{N2} - 1 + \text{Gaussian noise} \times \text{temperature}$
      - B. Increment MAX by  $\text{stepsize} \times a_{N1} + a_{N2} + \text{Gaussian noise} \times \text{temperature}$
      - C. Randomly choose  $N_i$  (one of N1 or N2) to increment first by some set amount (e.g. 0.05)
      - D. If  $a_{N_i} < \text{threshold}$  (i.e. won't voice in simplex word), increment  $a_{N_i}$
      - E. If still  $a_{N1} + a_{N2} + \text{Gaussian noise} < \frac{D}{M+D}$  (threshold), increment other affix's activation
    - ii. If voicing does not occur and  $a_{N1} + a_{N2} + \text{Gaussian noise} > \frac{D}{M+D}$  (threshold):
      - A. Follow the above 4 steps but in opposite direction.
    - iii. If either N1 or N2 activation on its own with added Gaussian noise is above the threshold, decrement its activation by 0.05.
  - (b) Drop the temperature factor to one-fourth of its value
  - (c) Drop the stepsize for MAX and DEP to 99.9% of its value
  - (d) Stop if all compound activations gave a correct voicing value.

The results of a computer simulation of this algorithm were convergence after 482 iterations with the following final results.<sup>4</sup>

|      |                       |      |
|------|-----------------------|------|
| (17) | MAX                   | 1.07 |
|      | DEP                   | 0.85 |
|      | threshold             | 0.44 |
|      | Correct predictions   | 885  |
|      | Incorrect predictions | 0    |
|      | N1 activation levels  | 8    |
|      | N2 activation levels  | 7    |

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<sup>4</sup>Other algorithms are possible. For example, an informal algorithm that factors in pitch accent can be shown to reduce the number of activation levels to three for each of N1 affixes and N2 affixes; however, this algorithm requires the set of compounds to be looked at somewhat globally rather than learning strictly from encounters of one compound at a time. Although this algorithm may be associated with model that has a slightly better MDL than a seven-level model, length limitations on this paper preclude a full discussion of such a model.

We shall now compare the model with activation levels derived from the algorithm described above with models that lexically list exceptional compounds.

## 7 Feature activation values and minimum description length

We shall consider here five possible models that account for the rendaku data at hand and compare them by each MDL:

**Full lexical specification of compounds** with each compound being listed separately in the lexicon.

**Two separate allomorphs** (with voicing and without) for all the N2's that show alternations in voicing and a single allomorph for the N2's that do not alternate. Compounds are derived through *signatures* (see above) that structure the combinations of co-occurring allomorphs

**GSC account: 7 activation level classes** The grammar generates output forms for compounds in the GSC framework as described above in Section 4 with partially activated features for voicing that can have seven different possible values.

**Signatures with single allomorphs plus lexical listing of exceptions** For all the compounds to which rendaku voicing applies, have signatures with single, voiced allomorphs for each of the N2's involved and lexically list the remaining nonundergoing compounds with no signatures.

For each of these models we need to calculate the following quantities whose sum will be the MDL for that model with respect to rendaku voicing of the dataset. Notice that we are abstracting away from a model of the whole language, but comparing how various models deal with the semi-regular process of rendaku voicing in a certain set of noun-noun compounds.

**Cost of URs** Unigram bit cost, phoneme by phoneme, of listing the UR or each simplex N1 and N2. Since these simplex forms can all exist on their own as monomorphemic words, in any model the allomorph that does not undergo rendaku needs to be listed anyway, so given that we are comparing models, we shall only be concerned here with the cost of listing voiced allomorphs.

**Cost of fully-listed compounds** Unigram bit cost, phoneme by phoneme, of listing each full compound on its own.

**Cost of pointers to signatures** If signatures are part of the model, the bit cost of all the pointers from signatures to the allomorphs involved.

**Cost of partially activated feature representation** If partially activated voicing features on N1's and N2's are part of the model, the bit cost of representing each feature. This cost will depend on the number of activation level classes.

**Cost of grammar description** The description cost of the relevant part of the grammar that derives output forms.

(18)

| Summary of bit cost for various models         |                        |                           |                         |                  |                  |          |
|------------------------------------------------|------------------------|---------------------------|-------------------------|------------------|------------------|----------|
| Model                                          | pointers to signatures | voicing activation values | grammar (network model) | extra allomorphs | listed compounds | total    |
| Full specification                             | 0                      | 0                         | 0                       | 0                | 22,506           | 22,506.0 |
| Full allomorphs                                | 5,123.0                | 0                         | 0                       | 2,903.3          | 0                | 8,026.3  |
| 7 levels                                       | 2,963.9                | 1,248.0                   | 363.1                   | 0                | 0                | 4,575.0  |
| Voicing through signatures & listed exceptions | 2,352.3                | 2,903.3                   | 0                       | 0                | 6,781.9          | 11,737.7 |

In the foregoing calculation of MDL for various models to account for patterns of rendaku voicing, the GSC model with seven levels of activation came out with a substantially better MDL score than the other models, all of which account for the semi-regularity of rendaku through some kind of lexicalization for explaining exceptions.<sup>5</sup>

The following tableaux give derivations of two compounds, that were given above with hypothetical activations in (10) and (11), now based on activation levels that were derived from the algorithm given above in Section 6.

(19)

|                                                     |                                |                                |                    |              |
|-----------------------------------------------------|--------------------------------|--------------------------------|--------------------|--------------|
| $kuma([+voi] \cdot (0.35)) ((0.15) \cdot [+voi])te$ | 1.07<br>Max[+voi] <sub>1</sub> | 1.07<br>Max[+voi] <sub>2</sub> | -0.85<br>Dep[+voi] | H            |
| <b>☞ kuma-de</b>                                    | 0.35                           | 0.15                           | -0.425             | <b>0.075</b> |
| kuma-te                                             |                                |                                |                    | 0            |

- DEP violation is  $(1 - (0.35 + 0.15)) \times 0.85 = -0.425$ .

(20)

|                                                     |                                |                                |                    |          |
|-----------------------------------------------------|--------------------------------|--------------------------------|--------------------|----------|
| $yama([+voi] \cdot (0.25)) ((0.15) \cdot [+voi])te$ | 1.07<br>Max[+voi] <sub>1</sub> | 1.07<br>Max[+voi] <sub>2</sub> | -0.85<br>Dep[+voi] | H        |
| yama-de                                             | 0.25                           | 0.15                           | -0.51              | -0.11    |
| <b>☞ yama-te</b>                                    |                                |                                |                    | <b>0</b> |

- DEP violation is  $(1 - (0.25 + 0.15)) \times 0.85 = -0.51$ .

## 8 Partially-activated [+voice] features as attributive affixes

The underlying, partially-activated [+voice] feature that we are proposing here can be seen as an extension of the idea of morphological paradigms. Some researchers have argued (e.g. Itô and Mester, 1998) that rendaku occurs because of a junctural morpheme of the form [+voice] which effects some kind of compositional linking between the two morphemes, in the same way that the particle *no* does when it occurs after nouns in Japanese, allowing them to compose syntactically with certain following elements. The junctural morpheme hypothesis is supported by historical

<sup>5</sup>As pointed out by Paul Smolensky (p.c.) the idea of partitioning affixes on N1 and N2 into subclasses of different strengths could also be achieved in categorical OT through varying the rankings of MAX-VOI and \*VOI constraints to different subgrammars, each of which corresponds to a different activation level in a GSC account. The OT model appears to require an increased description length for a grammar that has a more complex constraint ranking, with separate faithfulness and markedness constraints with respect to voicing for each lexical subclass. A very rudimentary bitwise comparison of the MDL for an OT account versus a GSC account gives a bit cost of 264.7 for an OT model and 136.5 for a GSC model. Quite independent of the choice between the two models, what enables us to avoid over-lexicalization in accounting for rendaku's semi-regularity is the previously unexplored idea of combining the effects of both N1 and N2 on voicing, which can be done with either model.

evidence that this [+voice] feature is in fact the reflex of the particle *no* that occurred between two nouns in the same configuration at an earlier stage of the language (Martin, 1987). A slight modification of Itô and Mester’s proposal is that the junctural morpheme is realized as both a suffix and a prefix on nouns rather than an independent morpheme or clitic in the same way that independent morphemes may evolve into suffixes or prefixes on words with which they often associate, forming morphological paradigms. Given the productivity of the way that Japanese lexical morphemes combine to form compounds, it would not be unreasonable to suppose that the surface realization of a noun with an added [+voice] is a kind of attributive affix. The alternation of the affixless form of a noun when it occurs in simplex form with the affixed form in compounds can be compared to the same kind of contrast between surface realizations of adjectives in German. Adjectives in German are inflected with either strong or weak declension suffixes when they occur attributively but are unsuffixed when they occur predicatively:

(21) ein            klein-er            Hund  
 a.M.NOM.SG small-M.NOM.SG dog  
 ‘a small dog’  
 (inflection on attributive adjective)

(22) Der            Hund ist            klein  
 the.M.NOM.SG dog    be.3.SG small  
 ‘The dog is small’  
 (no inflection on predicative adjective)

So in Japanese we can think of an underlying form /asi- $v_1$  +  $v_2$ -kata/ ‘foot+shape: footprint’ as having partially-activated voicing features  $v_1, v_2$  that realize a morphological paradigm whose allomorphs determine the attributive and nonattributive forms of the noun.

## 9 Previous accounts of rendaku’s gradient, semi-regular nature

Vance (2014) places the burden of exceptions or gradience on the lexicon, not on the grammar. He cites an account in Ohno (2000) based on analogy, in which stems exhibit the same rendaku behavior if they are semantically or phonologically similar, for example, *siro* ‘white’ is proposed to behave similarly with respect to rendaku as *kuro* ‘black’, and *mimi* ‘ear’ to *hana* ‘nose’. In Ohno’s account, *kami* ‘hair’ a robust voicer (e.g. *kabe-gami* ‘wall-paper’) happens not to be voiced in *kuro-kami* ‘black hair’. So he concludes that semantically similar *siro* ‘white’ should also block voicing in 2nd conjunct, which is what he finds in a psycholinguistic experiment in which novel compound *siro-kami* ‘white hair’ is chosen over a voiced version by subjects.

He also finds that *ti* ‘blood’ is a robust **non**-voicer except in *hana-zi* ‘nosebleed’. So semantically similar *mimi* ‘ear’ should also block voicing in a 2nd conjunct. His evidence is novel compound *mimi-zi* ‘ear-blood’ which was chosen over a non-voiced version because of analogy with *hana-zi* ‘nosebleed’.

Some problems with an analogical account are the following. ‘Analogy’ is a descriptive term to which it is difficult to assign the status of a rigorous principle of a formal grammar. And classifying stems by semantic category in a way that can predict voicing across the board seems impossible, given the following examples:

- (23)
- *tori* ‘bird’ doesn’t voice after *niwa* ‘garden’ or *mizu* ‘water’
  - It does voice after *tutu* ‘pipe’, *yama* ‘mountain’, *hina* ‘chick’, *umi* ‘sea’ (note semantic relation to ‘water’ above), *huyu* ‘winter’, *oya* ‘parent’, *muku* ‘yew’, *natu* ‘summer’, *koma* ‘shogi piece’.

This leaves us with the question of how to semantically distinguish the two lists. GSC, on the other hand, captures Ohno’s examples in a more formal way through voicing activations that resulted from the learning simulation discussed in Section 6 above. For example, *siro*-[+voi] · 0.15 and *kuro*-[+voi] · 0.05 both had low activations in addition to the fact that they happen to have some semantic similarities.

## 10 Summary and conclusion

The dataset used in this study was purposely restricted in order to control the number of variables involved in what we are testing. By limiting the data to noun-noun compounds only that fall within a certain prosodic size limit and the same lexical stratum,<sup>6</sup> we can control for the possible effects on rendaku voicing of (a) syntactic category of the members of the compound (b) the effects of prosodic size and (c) lexical stratum, all of which have been shown to have an effect on whether or not rendaku voicing occurs (Kubozono, 2005, *inter alia*). Further study could look at ways in which these factors can be incorporated into an analysis within the same framework.

Notice also that even though the feature activation values we are positing are gradient, the predictions they make are categorical inasmuch as the output of N1+N2 for a given compound is not estimated to vary from speaker to speaker or utterance to utterance – at least within what we can take to be standard dialect.<sup>7,8</sup>

The GSC framework, by virtue of the way that gradience and blending of symbolic structures are an intrinsic part of its system, allows us to approach and understand gradient irregular patterns such as rendaku voicing in a way that is difficult or impossible with some other systems. The foregoing analysis of the irregularity of rendaku voicing arguably solves the problem of having its irregular patterns at cross-purposes with the productivity of generative rules or constraints. For the seven-level model, no lexical exception needs to be specified in a lexical listing for the whole compound. Another result of this approach is that it creates a more equal division of labor between the lexicon and the rest of the grammar in accounting for observed patterns in the language. Some of the gradient patterns we observe, such as the variable behavior among morphemes to undergo this process can only be accounted for through the way the lexical listing of individual morphemes acts in tandem with the generative process. This is because there are no robust correlations between phonological properties of the morphemes and their willingness to undergo the rendaku process, that could be accounted for by some phonological rule or constraint.

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<sup>6</sup>Paul Smolensky (p.c.) suggests that these proposed activation level classes can be seen as further subdividing the lexicon into substrata.

<sup>7</sup>Judgments that were made here with respect to whether or not voicing occurs for a given compound were made to conform with listed pronunciations in the NHK (Japanese Broadcasting Corporation) Pronunciation and Accent Dictionary (Nippon Hoosoo Kyookai (Japanese Broadcasting Corporation), 1998).

<sup>8</sup>Some may imagine that this kind of Harmonic Grammar is overly prone to making the kinds of ‘vague, soft, or non-categorical predictions’ that Goldsmith et al. (to appear, p. 4) observes that some linguists may incorrectly imagine will be the result of probabilistic models – models that share much in common with Harmonic grammars. The GSC model is not expressly a probabilistic model, but the Harmony function operates in many ways like the probability function of probabilistic and information theoretic grammars such as those proposed by Goldsmith (1993, 2002) and Goldsmith and Riggle (2012).

In this analysis, then, some of the patterning that we see in the language stems from grammatical processes and some also results from patterning in the lexicon. The lexicon in this view is therefore not completely random in the way that a framework such as OT (Prince and Smolensky, 1993) would seem to insist on.<sup>9</sup> At the same time, there is no evidence that the approach to the gradience of rendaku voicing described in this paper creates a ‘duplication problem’, since the lexicon and the rest of the grammar are arguably performing separate, nonoverlapping functions in determining voicing.

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<sup>9</sup>For example, Smolensky et al. (2004, p. 1) write, regarding the strong output-oriented nature of OT: ‘The strongest hypothesis is that all systematic, language-particular patterns are the result of output constraints – that there is no other locus from which such patterns can derive. In particular, the input is not such a locus’.

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## **Parasession: Austronesian Linguistics**



# Pivot $\neq$ Absolute: Evidence from Formosan\*

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## 1 Introduction

Austronesian languages known as the Philippine-type are recognized for their typologically unique voice system, as characterized by the following traits (1).

- (1) *Typical traits of a Philippine-type voice system*
  - a. In each clause, only one phrase can be  $\bar{A}$ -extracted. This phrase is conventionally called the Pivot.
  - b. The selection of the Pivot in each clause is indicated by affixal morphology on the verb, conventionally called ‘voice affix’.
  - c. When an argument is non-Pivot-marked, it carries a fixed morphological marking (depending on its thematic role) regardless of voice type.

The case pattern in these languages is presented in (2), using the labels Pivot, X, Y, and Z to stand for the morphological marking on Pivot phrases, non-Pivot external arguments, non-Pivot internal arguments, and Locative phrases, respectively.<sup>1</sup>

- (2) *Shared case pattern in conservative Philippine-type languages*

|                             | Actor voice | Patient voice | Locative voice | Circumstantial voice |
|-----------------------------|-------------|---------------|----------------|----------------------|
| External argument           | Pivot       | X             | X              | X                    |
| Internal argument           | Y           | Pivot         | (Y)            | (Y)                  |
| Locative                    | (Z)         | (Z)           | Pivot          | (Z)                  |
| Instrumental/<br>Benefactor | (Y)         | (Y)           | (Y)            | Pivot                |

Whether the case system in (2) morphologically encodes an accusative, ergative, or typologically unique alignment has been a long-standing question in Austronesian syntax. One well-accepted theory built on the ergative approach to these languages argues for the following analysis (3) for the case pattern in (2).

- (3) *The ergative approach to a Philippine-type voice system (Aldridge, 2004, et seq.)*
  - a. Pivot-marking realizes structural case from T (Absolute).
  - b. X marks inherent case from transitive Voice assigned to its specifier (Ergative).

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<sup>1</sup>The following glosses are used throughout the paper: ACC=accusative; AV=actor voice; ABS=absolute; APPL=applicative; C=complementizer; CAU=causative; CV=circumstantial voice; DF=definite; ERG=ergative; FOC=focus; ID=indefinite; LV=locative voice; NEG=negation; NMZ=nominalizer; NOM=nominative; OBL=oblique; PART=particle; PFV=perfective; PL=plural; PN=proper name; PST=past; POSS=possessor; PV=patient voice; SG=singular; TOP=topic.

- c. Y marks (inherent) lexical case from V assigned to its complement (Oblique).
- d. Locative-voice (LV) and Circumstantial-voice (CV) affixes are the morphological reflexes of high applicative heads, which license a specific non-core argument (e.g. Locative, Instrument, Benefactive) at the highest internal argument position ([Spec ApplP]).

In this paper, I revisit the hypothesis in (3) with a careful look at (i) causative, (ii) ditransitive, and (iii) LV/CV clauses with a ‘non-core’ phrase as Pivot in three Philippine-type Austronesian languages spoken in Taiwan: Puyuma, Amis, and Seediq, and demonstrate that the case patterns in these constructions are difficult to account for under an ergative analysis. These languages each belong to a different Austronesian primary branch and have a canonical Philippine-type voice system and an elaborate four-way case distinction presented in (2).<sup>2</sup> With a closer look at (i)-(iii) based on novel data, I argue for the following analysis (4).

(4) *Main claim of the paper*

- a. Pivot-marking does not realize Absolutive case.
- b. X marks Nominative case from finite T.
- c. Y marks Accusative case from Voice. The internal arguments of Actor voice (AV) clauses are structurally licensed transitive objects.
- d. LV and CV affixes are not reflexes of high applicative heads.

With this proposal and the shared case pattern in (a)-(c) across Formosan languages, I argue against the following assumptions commonly adopted in the Formosan literature (5) (e.g. Aldridge, 2004; Liao, 2004; Chang, 2011a,b; Teng, 2008).

(5) *Previous assumptions of Philippine-type Formosan languages*

- a. AV clauses are intransitive/antipassive; AV objects are non-core oblique phrases.
- b. LV and CV clauses involve argument structure alternation and the applicativization of the Pivot-marked phrase (e.g. Locative/Instrument/Benefactor).

The paper is organized as follows. I begin by summarizing the controversies in the applicative analysis for LV/CV affixes in Section 2 and outline the core questions to be explored. Section 3 examines the case-licensing mechanism in productive causatives, and shows that it is incompatible with the ergative analysis. Section 4 discusses the absence of argument structure alternation in ditransitives and its implications for the analysis of Pivot-marking. Section 5 investigates binding relations in LV/CV clauses with a Locative/Instrument/Benefactor phrase as Pivot, which argues against the applicative analysis of LV/CV affixes. Section 6 presents a Nominative-Accusative analysis for the three languages with the claim that Pivot marks topic/focus, which is in line with previous proposals for relevant languages (e.g. Chung, 1994; Richards, 2000; Pearson, 2005a). Section 7 concludes.

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<sup>2</sup>Note that the morphological distinction between non-Pivot external arguments (X) and non-Pivot internal arguments (Y) is unattested in many extra-Formosan Philippine-type languages, including Tagalog, Chamorro, and Malagasy. Nevertheless, given the wide distribution of X/Y distinction in higher-level Philippine-type languages it is uncontroversial that the four-way distinction in (2) can be traced back to Proto-Austronesian (Blust, 2015; Ross, 2006).

## 2 Theoretical issues in the applicative analysis of LV/CV clauses

In ongoing investigation of the Philippine-type voice system, two families of analyses have been proposed to account for the characteristics described in (1)-(2): the ergative approach (e.g. Payne, 1982; Mithun, 1994; Guzman, 1988; Liao, 2004; Aldridge, 2004) and the accusative approach (e.g. Guilfoyle et al., 1992; Richards, 2000; Rackowski, 2002). A main divergence between the two approaches lies in the treatment of Pivot-marking. The former claims it to mark structural Absolutive case from T, whereas the latter analyzes it as a topic/focus marker (Richards, 2000; Rackowski, 2002; Pearson, 2005a). A crucial assumption for the former analysis is that only the structurally highest caseless argument can be Pivot-marked. A question thus arises when it comes to LV and CV clauses, where specific non-core arguments (Locative, Instrument, or Benefactor) receive Pivot status, leaving the direct object ‘Oblique’-marked, as in the Puyuma data (6a)-(6b).

- (6) a. *Case-marking in LV clauses*  
 ku=pubini'-ay dra dawa na uma.  
 1SG.X(ERG)=SOW-LV Y(OBL) millet PIVOT field  
 ‘I sowed millet in the field.’ [Puyuma]
- b. *Case-marking in CV clauses*  
 ku=pangasip-anay dra kuraw na 'urtati.  
 1SG.X(ERG)=FISH-CV Y(OBL) fish PIVOT earthworm  
 ‘I fished fish with earthworms.’ [Puyuma]

To account for how these ‘non-core’ phrases receive Absolutive case, LV and CV affixes have been analyzed as reflexes of a high applicative head that licenses a specific non-core phrase as applied object (e.g. Aldridge, 2004; Chang, 2015). Under this analysis, the applied object is accessible to structural case from T, with the external and internal argument inherently licensed with Ergative and Oblique case, respectively, as illustrated in (7).

- (7) a. *LV clause with a Locative Pivot*
- 
- b. *CV clause with an Instrument/Benefactor Pivot*
- 

However, the case patterns in causatives and ditransitives in higher-level Austronesian languages pose empirical challenges to the applicative analysis of LV/CV affixes. Consider the following pattern of Pivot-selection in causatives and ditransitives shared among Formosan languages (8).

(8) *What receives Pivot-marking in LV- and CV-marked causatives and ditransitives*

|                | Locative voice | Circumstantial voice     |
|----------------|----------------|--------------------------|
| simple clauses | Locative       | Instrumental, Benefactor |
| ditransitive   | Recipient      | Transported theme        |
| causative      | Causee         | Caussum <sup>3</sup>     |

As shown in (8), Philippine-type Formosan languages commonly mark Recipient as Pivot in LV-marked ditransitives and Transported theme in CV-marked ditransitives; as for productive causatives, Pivot-marking consistently falls on the Causee in LV-marked causatives and on the Caussum in CV-marked causatives.<sup>4</sup> With the analysis that what receives Pivot-marking in LV/CV clauses is what undergoes applicativization, CV-marked ditransitives would have to be analyzed as involving a Transported theme licensed as an applied object. Similarly, CV-marked causatives must be analyzed as having an applied-object Caussum that is structurally higher than the Causee. These predictions appear incompatible with current crosslinguistic understanding of ditransitive and causative constructions.

In addition, LV and CV clauses in higher-level Austronesian languages show no morphological evidence for a valency increasing process. As in (6a)-(6b), LV/CV clauses in Formosan languages employ no transitivity marking combined with the LV/CV affix. These observations call for a reconsideration of the basic assumptions of the ergative analysis in (3).

In what follows, I begin with the discussion of the three constructions with a core concern of whether the case-licensing mechanism in these constructions is compatible with the predictions of the ergative/applicative analysis (9).

(9) *Predictions of the ergative approach*

- a. Pivot-marked phrases in LV/CV clauses are licensed as applied objects.
- b. The licensing of Pivot-marking ('Absolutive') must respect locality.
- c. The distribution of Y-marked ('Oblique') phrases is restricted to internal argument position.
- d. Voice alternation is accompanied by argument structure alternation.

For the sake of consistency, I follow the ergative analysis and use the label 'Absolutive' (Pivot), 'Ergative', and 'Oblique' to gloss the morphological marking on Pivot, non-Pivot external argument, and non-Pivot internal argument, respectively.

### 3 Productive causative

In this section, I discuss the case pattern in productive causatives, and investigate its implications for the predictions of the ergative approach (9). As in many other Austronesian languages, productive causatives in Puyuma, Amis, and Seediq are formed by affixal morphology on the verb. As shown in the non-causal/causal contrast between (10a) and (10b)-(10d), the causative prefix *pa-* introduces the causing event, and freely combines with different voice markers. Productive causatives in these languages thus exhibit voice alternation similar to that in simple clauses. Importantly, every productive causative carries only one voice affix; the base verb of the sentence does not carry a separate voice marker.<sup>5</sup>

<sup>3</sup>Based on previous descriptions in the literature, the pattern in (8) is attested in Tsou, Paiwan, Saisiyat, Atayal, Puyuma, Amis, Seediq, and Bunun (Lin, 2009; Chang, 2006; Zeitioun, 2000; Huang, 2005).

<sup>4</sup>In this paper, I use the term 'Caussum' to refer to the theme of the caused event.

<sup>5</sup>As to why (bi-eventive) productive causatives in Philippine-type languages involve only one voice affix per sentence, see the analysis in Section 6.

- (10) *Voice alternation in Puyuma productive causative*
- a. tr<em>ima i            senten dra    aputr.  
 <AV>buy    SG.ABS Senten ID.OBL flower  
 ‘Senten bought flowers.’ [simple clause]
- b. Ø-pa-trima=ku            kan    senten dra    aputr.  
 <AV>-CAU-buy=1SG.ABS SG.OBL Senten ID.OBL flower  
 ‘I asked Senten to buy flowers.’ [AV-causative]
- c. ku=pa-trima-aw/-ay    i            senten dra    aputr.  
 1SG.ERG=CAU-buy-PV/LV SG.ABS Senten ID.OBL flower  
 ‘I asked Senten to buy flowers.’ [PV/LV-causative]
- d. ku=pa-trima-anay    kan    senten na    aputr.  
 1SG.ERG=CAU-buy-VV SG.OBL Senten DF.ABS flower  
 ‘I asked Senten to buy flowers.’ [CV-causative]

Across the three languages, productive causatives share the case pattern in (11).<sup>6</sup> As shown in the Puyuma examples above, when a productive causative is marked in AV, ‘Absolutive’-marking falls on the Causer, with both the Causee and the Causum ‘Oblique’-marked (10b). When the sentence is marked in PV or LV, ‘Absolutive’-marking falls on the Causee, with the Causer and Causum ‘Ergative’ and ‘Oblique’-marked, respectively (10c).<sup>7</sup> Finally, when the sentence is marked in CV, ‘Absolutive’-marking falls on the Causum, with the Causer and Causee ‘Ergative’ and ‘Oblique’-marked, respectively (10d). For the sake of simplicity, I refer to these constructions as AV-causative, PV-causative, and CV-causative in the following discussion.

- (11) *Shared case patterns in productive causatives in Puyuma, Amis, and Seediq*

|        | Actor voice           | Patient/Locative voice | Circumstantial voice  |
|--------|-----------------------|------------------------|-----------------------|
| Causer | [ <b>Absolutive</b> ] | [Ergative]             | [Ergative]            |
| Causee | [Ergative]            | [ <b>Absolutive</b> ]  | [Oblique]             |
| Causum | [Oblique]             | [Oblique]              | [ <b>Absolutive</b> ] |

The case pattern in CV-causatives deserves special attention, where ‘Absolutive’-marking falls on the Causum, which is presumably the lowest argument in a causative sentence, with the Causee marked as ‘Oblique’. Under the ergative analysis that Absolutive marks structural case from T, an ‘Absolutive’-marked Causum may be accounted for under one of the following analyses (12a)-(12c).

- (12) *Three possible structural relations in CV-causatives*

- a. The Causum is introduced as a high applicative phrase and base-generated higher than the Causee (under the applicative analysis of the CV affix).
- b. The Causee is inherently case-licensed by a by-phrase.
- c. The Causee is inherently case-licensed by an applicative head.

<sup>6</sup>According to the available literature, the case pattern in (10) is shared by the following Formosan languages: Paiwan (Chang, 2006), Tsou (Lin, 2009), Puyuma (primary data), Amis (primary data), Seediq (primary data, Tsukida, 2015), Bunun (Zeitioun, 2000), Atayal (Huang, 2005), Saisiyat (Zeitioun, 2000). The same pattern is also attested in Tagalog (Rackowski, 2002), Cebuano (Tanangkingsing, 2009), and Ilocano (Silva-Corvalán, 1978).

<sup>7</sup>In the three languages discussed in this paper, LV-marked causatives take the same case pattern with PV causatives and are reported to have little differences with PV-causatives. According to my Puyuma and Amis consultants, the only difference is that LV-causatives seem to denote an event that had been completed earlier than that of PV-causatives.

The analysis in (12a) is in line with the proposal of the ergative analysis, in which the CV affix realizes a high applicative head that introduces the Pivot-marked phrase as an applied object. Under (12b) and (12c), the Causee is case-licensed either by a preposition or with an inherent case, thereby allowing Absolutive case to be assigned to the Caussum.

Binding diagnostics on the three languages suggest that the analyses in (12a)-(12b) are untenable. Under (12a)-(12b), the Causee is expected to be unable to bind into the Caussum. However, as shown in (13a)-(13c), an ‘Oblique’-marked quantifier Causee can bind into an ‘Absolutive’-marked pronominal Caussum in CV-causatives in all three languages, suggesting that the Causee is structurally higher than the Caussum.

(13) *CV-causatives: A Causee can bind into a Caussum*

- a. ku=pa-deru-anay kana bulraybulrayan driya tu=bujir.  
 1SG.ERG=CAU-cook-CV DF.OBL girl every 3.POSS.ABS=taro  
 ‘I asked every girl<sub><i></sub> to cook her<sub><i/j></sub> taro.’ (bound variable reading) [Puyuma]
- b. sa-pa-pi-tangtang aku tu cimacima a ina ku futing nira.  
 CV-CAU-PI-cook 1SG.ERG OBI every LK mother ABS fish 3SG.POSS  
 ‘I asked every mother<sub><i></sub> to cook her<sub><i/j></sub> fish.’ (bound variable reading) [Amis]
- c. s-p-seeliq=mu knkingal risaw ka rodux daha.  
 CV-CAU-butcher=1SG.ERG every young.man ASB chicken 3PL.POSS  
 ‘I asked every young man<sub><i></sub> to butcher his<sub><i/j></sub> chicken.’ (bound variable reading)  
 [Seediq]

This leaves us with (12c), according to which a Causee is inherently licensed by an applicative phrase, leaving the Caussum the highest caseless DP that can access Absolutive case. However, a closer look at CV-causatives shows that (12c) is also untenable. It has been observed crosslinguistically that causatives with an applicative Causee are mono-eventive and incompatible with (i) adverbs of frequency, and (ii) agent-oriented adverbs that modify the caused event (e.g. Pykkänen, 2002; Legate, 2014). However, the examples below show that CV-causatives in all three languages can be modified by (i) and (ii).

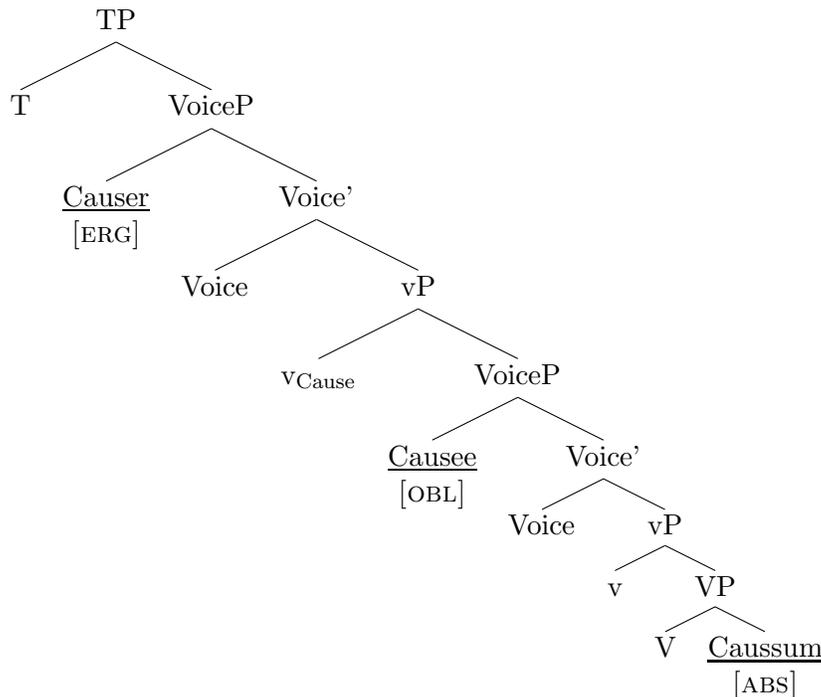
(14) *CV-causatives: The caused event can be modified by an adverb of frequency*

- a. ku=pa-base-anay kan akang masal na kiping.  
 1SG.ERG=CAU-wash-CV SG.OBL Akang again DF.ABS clothes  
 ‘I asked Akang to wash the clothes again.’ (Akang did so again) [Puyuma]
- b. kuna maeded-ay a wacu, sa-pa-pi-palu heca aku ci kulas-an.  
 that.ABS bad-NMZ LK dog, CV-CAU-PI-beat again 1SG.ERG PN Kulas-OBL  
 ‘As for that bad dog, I asked Kulas to beat it again.’ (Kulas did so again) [Amis]
- c. wada=mu s-p-pahu robo dungan ka lukus nii.  
 PFV=1SG.ERG CV-CAU-wash Robo again ABS clothes this  
 ‘I asked Robo to wash the clothes again.’ (Robo did so again) [Seediq]

- (15) *CV-causatives: The caused event can be modified by agent-oriented adverbs*<sup>8</sup>
- a. ku=pa-sabsab-anay kan sawagu pakirep na kuse.  
 1SG.ERG=CAU-wash-CV SG.OBL Sawagu severely DF.ABS shoes  
 ‘I asked Sawagu to wash the shoes severely.’ (Sawagu did so thoroughly) [Puyuma]
- b. sa-pa-pi-tangtang aku ci Panay-an ku futing pina’un.  
 CV-CAU-PI-cook 1SG.ERG PN Panay-OBL ABS fish carefully  
 ‘I asked Panay to cook the fish carefully.’ (Panay did so carefully) [Amis]
- c. s-p-sebuc=mu Walis ka knhenguq s<m>ebuc laqi nii.  
 CV-CAU-beat=1SG.ERG Walis.OBL ABS severely <AV>beat child this  
 ‘I asked Walis to beat this child severely.’ (Walis did so severely) [Seediq]

The observation above suggests that CV-causatives in the three languages are best analyzed as bi-eventive with two independent VoicePs, rather than mono-eventive with an applicative Causee. Under this analysis, the Causee is introduced at [Spec VoiceP] as an external argument and c-commands the Caussum, as in (16).

- (16) *The structure and case of CV-causatives in Puyuma, Amis, and Seediq*



The present analysis provides us with a picture in which Pivot-marking is free to ‘skip’ an external-argument Causee and licenses the Caussum, indicating that the licensing of Pivot-marking is not subject to locality. A careful look at AV- and PV-causatives in the same languages provides further clues to the nature of Pivot-marking. Binding patterns with the arguments in the AV- and PV-causatives show the same results as CV-causatives, in which a quantifier Causee can bind into a pronominal Caussum regardless of voice type and case pattern, but not vice versa. Due to space limitation, I present only Puyuma data in this paper (17a)-(17b); the same observations were found in Amis and Seediq.

<sup>8</sup>The use of agent-oriented adverbs in Seediq CV-causatives is not as productive as those in Puyuma and Amis. Nevertheless, given that CV-causatives in Seediq are fully compatible with the adverb of frequency ‘again’ (14c) and a distinct temporal adjunct that modifies the caused event, I argue that they are bi-eventive as well.

(17) *Puyuma AV and PV-causatives: A Causee can bind into a Caussum*

- a.  $\emptyset$ -pa-base=ku                      kana    bangsaran   driya   kantu=katring.  
 AV-CAU-wash-CV=1SG.ABS DF.OBL young.man every 3.POSS.OBL=pants  
 ‘I asked every young man<sub><i></sub> to wash his<sub><i/j></sub> pants.’ (bound variable reading) [AV]
- b. ku=pa-base-aw                      na            bangsaran   driya   kantu=katring.  
 1SG.ERG=CAU-wash-CV DF.ABS young.man every 3.POSS.PBL=pants  
 ‘I asked every young man<sub><i></sub> to wash his<sub><i/j></sub> pants.’ (bound variable reading) [PV]

Further, parallel to that observed with CV-causatives, AV and PV-causative in all three languages are compatible with (i) adverbs of frequency, and (ii) agent-oriented adverbs that modify the caused event (18a)-(18b), suggesting invariable structural relations among arguments unaffected by voice type.

(18) *Puyuma AV and PV-causatives: Caused event’s compatibility with types of adverbs*

- a.  $\emptyset$ -pa-base=ku                      kana    walak   masal   paseket    kana    kiping.  
 AV-CAU-wash-CV=1SG.ABS DF.OBL child    again    thoroughly DF.OBL clothes  
 ‘I asked the child to wash the clothes thoroughly again.’ (the child did so again) [AV]
- b. ku=pa-base-aw                      na            walak   masal   paseket    kana    kiping.  
 1SG.ERG=CAU-wash-PV DF.ABS child    again    thoroughly DF.OBL clothes  
 ‘I asked the child to wash the clothes thoroughly again.’ (the child did so again) [PV]

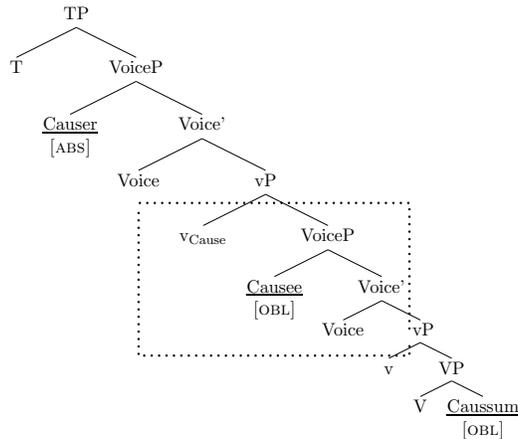
Given the observations so far, two generalizations can be made on the structure and case-licensing mechanism in productive causatives across the three languages (19).

(19) *The structure of productive causatives in Puyuma, Amis, and Seediq*

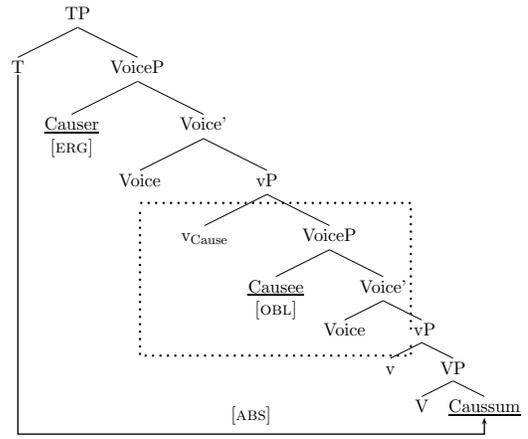
- a. Productive causatives do not vary in their structural relation among arguments regardless of voice alternation: Causer > Causee > Caussum
- b. Pivot-licensing does not respect locality, but marks the 1st, 2nd, and 3rd highest argument in the causative structure under AV, PV, and CV, respectively.

A final question to be discussed in this section is the property of ‘Oblique’-marking (Y) on the Causee in AV and CV-causatives. Given the observation that a Causee always behaves like an external argument, the presence of ‘Oblique’-marking on it is unexpected, under the analysis that ‘Oblique’ marks lexical case from V that inherently licenses antipassive objects along with theta-licensing (Aldridge, 2004, et seq.). The absence of a lexical case licenser at the external argument position (20a) suggests that the licensing of X might not be inherent/lexical, but structural.

The same ‘Oblique’-marking on the Causee in CV-causatives raises a further challenge to the ergative analysis, in that ‘structural Absolutive’ (i.e. Pivot) appear to skip a lexically licensed external argument and licenses a lower argument (i.e. the Caussum). This is unexpected on an Absolutive-case analysis for Pivot, which predicts Pivot-licensing to strictly obey locality.

(20) *Case-licensing in productive causatives: The ergative approach*a. *Case-licensing in AV-causatives*

- No ‘OBL’-licensor for the external-argument Causee

b. *Case-licensing in CV-causatives*

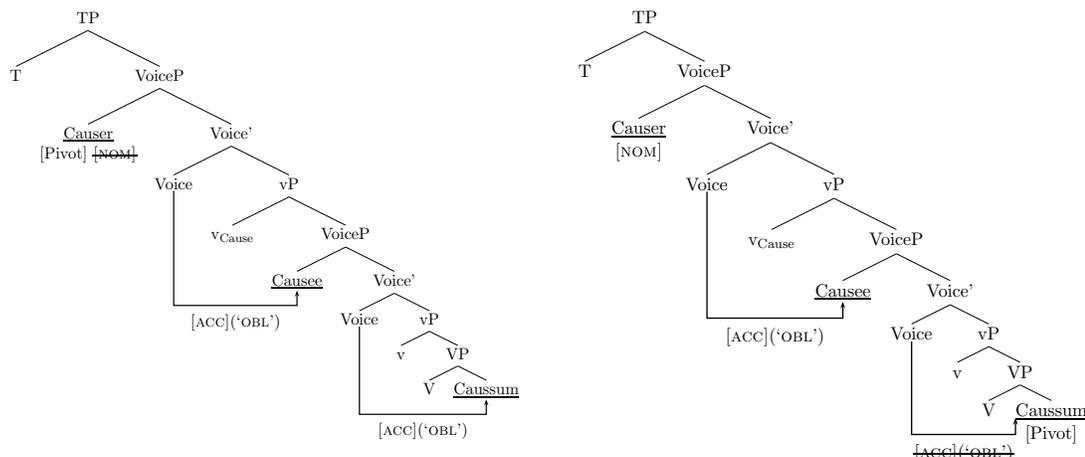
- No ‘OBL’-licensor for the external-argument Causee

- non-locality in ‘ABS’-licensing

I argue that an Accusative analysis for ‘Oblique’ (Y) can better account for the distribution of ‘Oblique’-marked phrases in productive causatives. Under the analysis that Y marks structural Accusative, it is predicted to be able to case-license the external argument position in an ECM-like configuration. The case pattern in AV-causatives can thus be captured under the analysis that the ‘Oblique’-marking on the Causee and Caussum realizes structural Accusative case from the matrix and embedded Voice, respectively, as in (21a).<sup>9</sup>

What about the ‘Oblique’-marking on the Causee in CV-causatives? Under the present analysis that Accusative case is available in AV clauses, AV clauses are true transitives with structurally licensed internal arguments. This suggests that the conventionally assumed transitivity distinction between AV and non-AV clauses can thus be eliminated. Given the analysis developed here, the nature of ‘Ergative’-marking (X) requires a new treatment as well, as it was previously assumed to be tied to transitive clauses. I argue that (i) the ‘Ergative’-marking (X) essentially realizes structural Nominative from T that always licenses the highest argument in a clause, and that (ii) Pivot-marking is a type of morphological marking that overrides morphological case, and falls on the 1st, 2nd, and 3rd highest argument in a causative sentence. Under the present analysis, both the Causee and Caussum in CV-causatives are analyzed as Accusative-licensed under the same way as that in AV-causatives (21a). The only difference is that Pivot-marking falls on the Causer in AV-causatives while the Caussum in CV-causatives, giving rise to the case pattern in (12). This proposal is illustrated in (21b). A more detailed discussion on Case-licensing in causatives is presented in Section 6.

<sup>9</sup>See Chen and Fukuda (to appear) for a similar Accusative analysis of ‘Oblique’ based on restructuring and raising-to-object data from the same languages.

(21) *Case-licensing in productive causatives: The present proposal*a. *Case-licensing in AV-causatives*b. *Case-licensing in CV-causatives*

## 4 Ditransitive

Ditransitive constructions offer another ideal environment for the investigation of case-licensing and voice in Philippine-type systems. Similar to the case of productive causatives, ditransitive verbs in Formosan languages can freely combine with different voice markers and show corresponding case alternation (22), as exemplified in the Puyuma data in (23).<sup>10</sup>

(22) *Shared case patterns in ditransitives across Puyuma, Amis, and Seediq*

|           | Actor voice           | Patient/Locative voice | Circumstantial voice  |
|-----------|-----------------------|------------------------|-----------------------|
| Agent     | [ <b>Absolutive</b> ] | [Ergative]             | [Ergative]            |
| Recipient | [Oblique]             | [ <b>Absolutive</b> ]  | [Oblique]             |
| Theme     | [Oblique]             | [Oblique]              | [ <b>Absolutive</b> ] |

(23) *Ditransitive alternation with the verb 'send' in Puyuma*<sup>11</sup>

- a. paatedr=ku kan nanali dra tigami.  
 send.AV=1SG.ABS SG.OBL my.mother ID.OBL letter  
 'I sent my mother a letter.' [AV-ditransitive]
- b. ku=paatedr-ay i nanali dra tigami.  
 1SG.ERG=send-LV SG.ABS my.mother ID.OBL letter  
 'I sent my mother a letter.' [LV-ditransitive]
- c. ku=paatedr-anay kan nanali na tigami.  
 1SG.ERG=send-CV SG.OBL my.mother DF.ABS letter  
 'I sent my mother a letter.' [CV-ditransitive]

<sup>10</sup>Ditransitive alternation in Formosan languages has attracted some attention in the literature (Huang, 2005; Chang, 2011b; Tsukida, 2015; Kuo, 2015). However, to the best of my knowledge, the relationship between case-marking, voice type, and the structural relation among arguments has not been carefully examined.

<sup>11</sup>Similar to the case of PV and LV-marking in productive causatives, LV-marked ditransitives in the three languages share the same case pattern with PV-marked ditransitives (when a PV form is applicable). In Puyuma, many verbs have lexical gap between the PV and the LV form, and employ the LV form to introduce the argument structure of PV verbs, including the verbs *beray* 'give' and *paatedr* 'send'. On the other hand, transfer verbs in Seediq and Amis allow both the PV form and LV form.

As in (22)-(23), in AV-marked ditransitives, ‘Absolutive’-marking falls on the Agent, with both the Recipient and the Transported theme ‘Oblique’-marked. In PV and LV-marked ditransitives, ‘Absolutive’-marking falls on the Recipient, with the Agent and theme ‘Ergative’ and ‘Oblique’-marked, respectively. Finally, in CV-marked ditransitives, ‘Absolutive’-marking falls on the Transported theme, with the Agent and Recipient case-marked in the same way where they are non-Pivot. A crucial question concerning the above case pattern is whether the change in voice marking reveals a change in argument structure, thereby allowing different arguments to become the highest caseless DP in the clause under different voice types. Specifically, whether it reflects the alternation attested crosslinguistically between double-object construction and prepositional dative, as exemplified in the English examples (24a)-(24b).

(24) *Ditransitive alternation in English*

- a. John gave the girl a book. [double-object construction]  
 b. John gave a book to the girl. [prepositional dative]

Considering the structural difference between (24a) and (24b), the case pattern in CV-ditransitives (23c) deserves special attention, where the Transported theme receives Pivot-marking, with the Recipient ‘Oblique’-marked. The ergative analysis predicts CV-ditransitives to have the structure of prepositional dative construction (PDC), in which the Recipient (Goal) is introduced as a PP and licensed with ‘Oblique’ case, with structural Absolutive assigned to the internal argument (i.e. Transported theme).

To clarify the question, I follow the well-accepted assumption that DOC involves a Recipient that asymmetrically *c*-commands the Transported theme, whereas PDC involves a Recipient and a Theme that *c*-command each other (e.g. Pylkkänen, 2002; Bruening, 2010). The exact structure of ditransitives under different voice types (23a)-(23c) can thus be clarified through appropriate diagnostics. For the following tests, I follow the assumption that quantificational possessors can bind pronouns outside their possessive hosts (Higginbotham, 1983; Reinhart, 1983; Barker, 2012), which is supported by empirical observations from the three languages (see the data presented in Section 5).

The availability of bound-variable reading of the pronouns inside the theme suggests that ditransitives across the languages have the same basic structure, where the Recipient *c*-commands the Transported theme regardless of voice alternation. In all three languages, a quantifier Recipient can bind into a pronominal Theme in CV-ditransitives (25), but not vice versa (26).

(25) *Binding relations in CV-ditransitives: A Recipient can bind into a Theme*

- a. ku=beray-anay [tu=lribun] [kana sini driya].  
 1SG.ERG=give-CV [3.POSS.ABS=wages] [DF.OBL teacher every]  
 ‘I gave every teacher<sub><i></sub> his<sub><i/j></sub> wages.’ (bound variable reading) [Puyuma]
- b. sa-paqefer aku [tu cimacima a mitiliday] [ku wuheng nira].  
 send-CV SG.ERG [OBL every LK student] [ABS book 3SG.POSS]  
 ‘I sent every student<sub><i></sub> his<sub><i/j></sub> wages.’ (bound variable reading) [Amis]
- c. s-paadis=mu [knkingal seediq] [ka pila=daha].  
 CV-send=1SG.ERG [every person] [abs money=3PL.POSS]  
 ‘I sent every person<sub><i></sub> his<sub><i/j></sub> money.’ (bound variable reading) [Seediq]

(26) *Binding relations in CV-ditransitives: A Theme cannot bind into a Recipient*<sup>12</sup>

- a. ku=beray-anay [kantu walak] [tu=lribun kana sinsi driya].  
 1SG.ABS=give-CV [3.POSS.OBL child] [3.POSS.ABS=wages LK teacher every]  
 ‘I gave his<sub><i></sub> child every teacher’s<sub><\*/j></sub> wages.’ (no bound variable reading) [Puyuma]
- b. sa-pafeli aku [tu wawa nira] [ku paysu nu cimaxima a tamdaw].  
 CV-send 1SG.ERG [OBL child 3.POSS] [ABS money POSS every LK person]  
 ‘I gave his<sub><i></sub> child every person’s<sub><\*/j></sub> money.’ (no bound variable reading) [Amis]
- c. wada=mu s-bege [laqi=daha] [ka pila na knkingal seediq]  
 PFV=1SG.ERG CV-give [child=3.PL.POSS] [ABS money POSS every person]  
 ‘I gave his<sub><i></sub> child every teacher’s<sub><\*/j></sub> wages.’ (no bound variable reading) [Seediq]

The fact that the quantifier inside the Transported theme cannot bind into the pronominal Recipient in (26) suggests that the Recipient asymmetrically *c*-commands the Transported theme in CV-ditransitives, which contradicts the PDC analysis. Significantly, the same structural relation is consistently attested in both AV-ditransitives and PV/LV ditransitives across the three languages, again suggesting the absence of voice-type conditioned argument structure alternation in ditransitives. Again, I present only Puyuma data below (27)-(28), with the same observation of AV and PV ditransitives in Amis and Seediq.

(27) *Binding relations in AV-ditransitives*

- a. Ø-beray=ku [kantu=lribun] [kana sinsi driya].  
 AV-give=1SG.ABS [3.POSS.OBL=wages] [DF.OBL teacher every]  
 ‘I gave every teacher<sub><i></sub> his<sub><i/j></sub> wages.’ (bound variable reading)
- b. Ø-beray=ku [kantu=lribun kana sinsi driya] [kantu=walak].  
 AV-give=1SG.ABS [3.POSS.OBL=wages] [DF.OBL teacher every] [3.POSS.OBL=child]  
 ‘I gave his<sub><i></sub> child every teacher’s<sub><\*/j></sub> wages.’ (no bound variable reading)  
 [Puyuma]

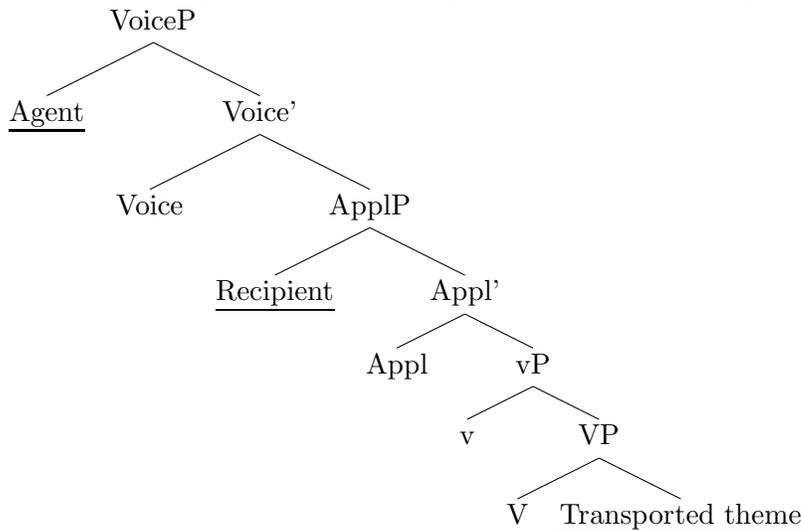
(28) *Binding relations in PV/LV-ditransitives*

- a. ku-beray=ay [kantu=lribun] [na sinsi driya].  
 1SG.ERG-give=LV [3.POSS.OBL=wages] [DF.ABS teacher every]  
 ‘I gave every teacher<sub><i></sub> his<sub><i/j></sub> wages.’ (bound variable reading)
- b. ku=beray-ay [tu=walak] [kantu=lribun kana sinsi driya].  
 1SG.ERG=give-LV [3.POSS.ABS=teacher] [3.POSS.OBL=wages LK teacher every]  
 ‘I gave his<sub><i></sub> child every teacher’s<sub><\*/j></sub> wages.’ (no bound variable reading)  
 [Puyuma]

The findings that a Recipient always asymmetrically *c*-commands a Transported theme regardless of voice type strongly supports a DOC analysis for ditransitives across the three languages, as illustrated in (29). This analysis is additionally supported by the ‘Oblique’-marking on both the Recipient and the Transported theme in AV-ditransitives (23a), which, under the Accusative analysis for ‘Oblique’ developed in Section 3, is in line with the double-Accusative marking on the objects in the majority of languages that employ a DOC structure (Pylkkänen, 2002).

<sup>12</sup>Note that the absence of a bound variable reading in (26a)-(26c) is not because the transported theme involves an embedded quantifier such that it cannot *c*-command outside of the DP, given the availability of bound variable reading in CV-ditransitives like (29), which has a Recipient with an embedded quantifier.

(29) *The structure of ditransitive in Puyuma, Amis, and Seediq*



(30) *Structural relations among arguments in Puyuma, Amis, and Seediq ditransitives*

- a. Ditransitives under different voice types show invariable structural relation among arguments: Agent > Recipient > Theme
- b. The case-marking on the argument does not affect the structure of ditransitives.
- c. Given (a)-(b), Pivot-licensing in ditransitives does not respect locality.

## 5 Transitive clauses with a ‘non-core’ phrase as Pivot

Given the findings that causatives and ditransitives across the three languages lack voice-type conditioned argument structure alternation, I have argued in the preceding sections that Pivot does not mark Absolutive. In this section, I discuss the binding relations in LV and CV clauses with a ‘non-core’ phrase (Locative/Instrument/Benefactor) as Pivot, which provides additional evidence for this claim.

As discussed in Section 2, an applicative analysis for Pivot-marked ‘non-core’ phrases in LV/CV clauses is necessary for the ergative approach to Philippine-type voice systems. This analysis predicts that the internal argument in LV/CV clauses should be unable to bind into the ‘Absolutive’-marked phrase, as it is expected to be c-commanded by the ‘Absolutive’-marked applied object, as in (31a).

Alternatively, if Pivot does not realize structural case from T, LV/CV clauses may not involve the applicativization of specific non-core phrases; these phrases may remain as adjunct PPs that adjoin to the verb phrase, and may be bound by the internal argument when the PP is right-adjoined (Bruening, 2010), as in (31b).<sup>13</sup>

<sup>13</sup>According to Bruening’s (2014) proposal of precede-and-phase-command, when an adjunct PP is right-adjoined to the verb phrase, it is possible to be bound by the internal argument, given that (i) the internal argument precedes the PP in linear order, and (ii) both are under the same phase (i.e. VoiceP).



The finding that the ‘Oblique’-marked internal argument can bind into the ‘Absolutive’-marked phrase casts further doubts on the applicative analysis for LV/CV affix, and lends support to the generalization from the preceding Sections 3 and 4 that voice alternation is not accompanied by argument structure alternation.

## 6 Proposal

### 6.1 Proposal: Philippine-type ‘voice affix’ as $\bar{A}$ -agreement markers

Having demonstrated the incompatibility of the case patterns of the three constructions with the ergative analysis in (3), I argue that the Philippine-type voice system in the three languages are better analyzed as Nominative-Accusative, with Pivot-marking as a topic/focus marker independent of Case, which overrides the morphological case of the target phrase. The case pattern in causatives and ditransitives understood in this way can thus be captured under the following analysis in (34).

(34) *Case patterns in causative and ditransitives under a Nom-Acc analysis*

|                  | Actor voice          | Patient/Locative voice | Circumstantial voice |
|------------------|----------------------|------------------------|----------------------|
| Agent/Causer     | [Nom] <b>‘Pivot’</b> | [Nom]                  | [Nom]                |
| Recipient/Causee | [Acc]                | [Acc] <b>‘Pivot’</b>   | [Acc]                |
| Theme/Caussum    | [Acc]                | [Acc]                  | [Acc] <b>‘Pivot’</b> |

As in (34), with an AV affix, Pivot-marking falls on the Nominative-marked phrase in a clause, no matter whether the target phrase is a Causer, Agent, or Patient-like unaccusative subject; with a PV/LV affix, Pivot-marking falls on the first Accusative-marked phrase, which can be a direct object, Causee, or Recipient.<sup>14</sup> Finally, with a CV affix, Pivot-marking falls on a lower argument in the structure, ranging from a Transported theme, a Caussum, to adjuncts. The hierarchical nature of Pivot-selection is akin to the Noun Phrase Accessibility Hierarchy (35), and suggests a connection between ‘voice-marking’ and  $\bar{A}$ -extractions.

(35) *Noun Phrase Accessibility Hierarchy (Keenan and Comrie, 1979)*

- a. Subject > Direct Object > Indirect Object (> ...)

Under the analysis developed here, I propose that Philippine-type ‘voice affixes’ essentially realize an obligatory  $\bar{A}$ -agree relation between a functional head that encodes information-structural status (Topic/Focus) and a particular argument in a clause (see similar proposals for Chamorro (Chung, 1994), Malagasy (Pearson, 2005a,b), and Atayal (Erlewine, to appear)).<sup>15</sup> A phrase under the Agree relation carries obligatory Pivot-marking, with the remainder of the arguments in the clause carrying their overt morphological case, giving rise to the case pattern in (34). This proposal is illustrated below in (36a)-(36c).

<sup>14</sup>It is important to note that although I argue for an Accusative analysis for the case assigned to AV objects, I do not mean to claim that all phrases marked as ‘Y’ (‘Oblique’) in (2) are Accusative-marked. I propose that Formosan languages lack morphological distinction between Accusative and Oblique (as similar to English). Hence, both the direct objects of AV clauses and adjunct phrases in (2) receive the same morphological marking, Y.

<sup>15</sup>See also (Erlewine et al., to appear) for a similar  $\bar{A}$ -analysis of the Philippine-type voice system.



Under the ergative analysis, the definite CP complement in (37) and (38) would have to be treated as an antipassive object and its transitive-object counterpart, respectively. Alternatively, under the topic/focus account for Pivot, the alternation between the two sentences follows from the analysis that (37) and (38) have the topic/focus status fall on the Agent and CP complement, respectively. Such an analysis is compatible with native speakers' judgements of (37)-(38), in which the AV-marked sentence presents a neutral description of a fact (37), while its NAV-marked counterpart places specific emphasis on the event described in the CP (38).

### 6.2.2 Topic/focus-marking in Puyuma and Amis

The shared morphological marking on topic/focus and Pivot phrases lends further support to the current analysis. First, both foci and topics in Puyuma share the same morphological marking with Pivot. As shown in the question sentences in (39a)-(39b), the *wh*-phrases 'who' (*i manay*) and 'what' (*a manay*), which serve as the focus phrase in pseudo-clefts, must bear the same marking as the Pivot phrase. Base-generated hanging topics in the language also share the same morphological-marking with Pivot-marking. As shown in (40), the topic phrase 'Atrung' is thematically linked to the X-marked agent inside the non-AV-marked embedded clause via the aboutness condition, yet must carry a morphological marking identical to Pivot-marking at the hanging topic position.

(39) *Focus-marking in Puyuma pseudo-clefts*

a. *wh-cleft with 'who'*

[i manay] na [babayan]?  
[FOC thing] DF.PIVOT [woman]

'Who is the woman?'

b. i nanali i, na babayan.

FOC my.mother PART DF.PIVOT woman

'The woman is my mother.'

c. *wh-cleft with 'what'*

[a manay] i [drini]?  
[FOC thing] SG.PIVOT [this]

'What is this?'

d. [a bunga] i [drini].

[FOC yam] SG.PIVOT [this]

'This is a yam.'

[Puyuma]

(40) *Topic-marking in Puyuma*

i atrungi i, ma-ladram=ku [kana ngay [dra tui=pukpuk-aw i  
TOP Atrung PART AV-know=1SG.PIVOT [DF.ACC rumor [C 3.NOM=beat-PV SG.PIVOT  
pilay]].  
Pilay]]

'As for Atrung, I know the rumor that (she) beat Pilay.'

[Puyuma]

Second, the selection of the Pivot phrase in natural data suggests a potential connection between Pivot-marking and topichood. As shown in the Amis dialogue (41), in answering the question 'What happened to Sawmah?', the discourse topic 'Sawmah' must be marked as Pivot (41b). A sentence describing the same event but not marking the topic as Pivot is considered infelicitous (41c).

- (41) *Question formation in Amis*
- a. na ma-maan ci sawmah?  
 PST PV-what PN Sawmah.PIVOT  
 ‘What happened to Sawmah?’
- b. ma-palu ni kulas cingra.  
 PV-beat NOM Kulas 3SG.PIVOT  
 ‘She was beaten by Kulas.’
- c. \*mi-palu=tu ci kulas cangranan.  
 AV-beat=PFV PN Kulas.PIVOT 3SG.ACC  
 (‘Kulas beat her.’) [Amis]

As shown above, independent observations from these languages suggests a close relationship between the Pivot marker and information-structure marking, lending further support to the present analysis.

## 7 Conclusion

In this paper, I present novel data from causative (Section 3), ditransitive (Section 4), and LV/CV clauses with a ‘non-core’ phrase as Pivot (Section 5) from Puyuma, Amis, and Seediq, three Philippine-type Formosan languages. With evidence from the three constructions, I demonstrate that (i) Pivot-marking does not realize Absolutive case from T, (ii) AV clauses are not intransitive/antipassive, but true transitives, and (iii) LV and CV affixes are inappropriately analyzed as the morphological reflexes of high applicative heads. Based on the present findings, I argue for an Agreement analysis of Philippine-type voice affixes and a topic/focus analysis for Pivot-marking, which is in line with previous proposals for Chamorro and Malagasy. With the case patterns in the three constructions shared across Formosan languages, I propose that the voice systems of higher-level Philippine-type languages can be accounted for under the standard assumptions of a Nominative-Accusative system.

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# Definiteness and implicatures in Tagalog\*

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## 1 Introduction

The use of an indefinite NP often implies that the NP's descriptive content is instantiated by more than one individual. But do indefinites conventionally signal this notion of nonuniqueness or does nonuniqueness arise pragmatically, via reasoning about scalar alternatives? In this paper I argue that in Tagalog, indefinite bare NP patients are only able to implicate nonuniqueness if there is a grammatical alternative utterance employing a definite. In cases where the alternative utterance with a definite is blocked by the rules of Tagalog grammar (in particular word order configurations), the nonuniqueness implicature does not arise. I show that these results provide evidence for the pragmatic view of nonuniqueness. Building on this result, I discuss a model of implicature calculation which is sensitive to the syntactic well-formedness of pragmatic alternatives.

In focus is the interpretation of bare NPs in Tagalog. Tagalog demonstrates a puzzling paradigm (noted by McFarland, 1978; Schachter and Otones, 1982; Adams and Manaster-Ramer, 1988, amongst others), whereby the definiteness of the patient NP appears to be sensitive to the order of constituents within its containing clause. In verb-initial sentences, genitive case-marked patients are indefinite (1a). In actor-initial sentences, such as the cleft structure in (1b), this interpretive constraint on the genitive patient NPs is lifted, and it becomes compatible with a definite interpretation.

- (1) a. Nakakita siya [ng Amerikano]  
PERF.AV.see NOM.3SG GEN American  
'He saw **an** American.' (McFarland, 1978)
- b. [Siyai]<sub>pivot</sub> [ang nakakita ---i [ng Amerikano]]<sub>cleft</sub>  
NOM.3SG NOM PERF.AV.see GEN American  
'He's the one that saw **a/the** American.' (McFarland, 1978)

The goals of this paper are to make this generalization precise. I characterize the phenomenon as the emergence of a 'nonuniqueness' implicature in clauses like (1a) which is suspended in clauses like (1b). I argue that this sensitivity of implicatures to clausal syntax is expected if we allow grammatical constraints to enter into the reasoning behind implicature calculation.

The argument proceeds as follows. I first introduce Tagalog's voice system, typical of western Austronesian languages. I show how in verb-initial sentences, the speaker can choose between expressing a transitive verb in ACTOR VOICE with a genitive patient, or in PATIENT VOICE with a nominative patient. I show that in cases where the patient lacks any quantificational material, a nominative NP will be interpreted as a definite, while a genitive NP is interpreted as an indefinite. Next, I show that this choice between forms has the potential to create implicatures. Given certain contextual factors, the utterance of an indefinite genitive patient can implicate nonunique instan-

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detected by the felicity of uttering the presupposition trigger given certain contextual assumptions. An analysis of a BNomPat as a definite should predict that it is felicitous in contexts which entail its presuppositions, and infelicitous in those that do not. I provide some evidence below that BNomPats behave as predicted by a definite analysis, while BGenPats behave like indefinites. The diagnostics are adapted from Tonhauser et al. (2013).

The utterance contexts in (3) minimally differ as to whether they entail the existence of an individual that instantiates the property of being a singer (*Context A*) or not (*Context B*). After being read one of these contexts (in English), consultants were asked to judge the felicity of the Tagalog utterances in (4a) or (4b).

- (3) a. *Context A*: Maria and Juan approach a closed room. They hear someone singing on the other side of the door. Maria walks in, shuts the door behind her. After a while, she emerges again and says to Juan: {(4a) | (4b)}
- b. *Context B*: Maria and Juan approach a closed room. Maria walks in, shuts the door behind her. After a while, she comes out again and says to Juan: {(4a) | (4b)}
- (4) a. Nakilala ko [ang mang-aawit]<sub>BNomPat</sub> sa kuwarto  
 PERF.PV.meet GEN.1SG NOM singer OBL room  
 ‘I met the singer in the room.’  
*Response (Context A)*: Sounds natural, maybe she was in the room with the singer.  
*Response (Context B)*: Sounds unnatural
- b. Nakakilala ako [ng mang-aawit]<sub>BGenPat</sub> sa kuwarto  
 PERF.AV.meet NOM.1SG GEN singer OBL room  
 ‘I met a singer in the room.’  
*Response (Context A)*: It’s correct, but there’s a possibility that the *mang-aawit* is not the one she heard singing.  
*Response (Context B)*: It’s correct.

Consultants rejected (4a) as infelicitous with *Context B*, which does not entail the existence of a singer, but accepted the utterance with *Context A*, which does. This data supports the analysis that BNomPats like *ang mang-aawit* impose a felicity constraint on the utterance context, thus behaving like a presuppositional definite. (4b) was accepted in both contexts, supporting the view that indefinite BGenPats like *ng mang-aawit* do not impose such constraints on the utterance context. Note that the consultant response to (4b) in *Context A* is suggestive of the nonuniqueness effect mentioned in the introduction: the consultant offered a scenario in which multiple individuals instantiate the property of being a singer.

Additionally, we can test whether BNomPats similarly require that the utterance context entail that their descriptive content is *uniquely* instantiated. Consultants were presented with the context in (5) in English, and again asked to judge Tagalog sentences containing BNomPats (6) for their felicity. The context in (5) does not contain prior mention of the BNomPats in (6). This is to avoid anaphoric uses of definites which are known to interfere with the uniqueness requirement imposed by definiteness (see Neale, 2004; Beaver and Coppock, 2015, etc.).

- (5) *Context*: Maria is calling an insurance agent about her damaged car. The insurance agent asks Maria which part of the car is damaged. Maria says: {(6a) | (6b)}
- (6) a. Nasira ko [ang gulong]<sub>BNomPat</sub>.  
 PERF.PV.damage GEN.1SG NOM tire  
 ‘I damaged the tire.’ (*Response*: It’s unhelpful. She should answer which part.)

- b. Nasira ko [ang manibela]<sub>BNomPat</sub>.  
 PERF.PV.damage GEN.1SG NOM steering.wheel  
 ‘I damaged the steering wheel.’ (*Response*: That’s correct.)

The target utterances vary as to whether discourse participants are expected to assume that the BNomPat’s descriptive content is uniquely instantiated (given normal assumptions about the make-up of cars). The utterance context (5) does not entail unique instantiation of the BNomPat’s descriptive content in (6a), as the car probably has more than one tire. However, the context entails unique instantiation in (6b), as the car can be assumed to have just one steering wheel.

The judgments of (6a) as infelicitous and (6b) as felicitous are suggestive that BNomPats impose a requirement that the utterance context entail that its descriptive content is uniquely instantiated (see Paul et al., 2016; Collins, 2016, for additional discussion and data).

BNomPats stand in contrast to BGenPats. The indefinite status of BGenPats is evidenced by the judgment in (4b) where the presence of the BGenPat biased the consultant towards a *non*-unique reading of the NP. Further, (7) shows that the existential meaning component of BGenPats can be targeted by entailment canceling operators like negation. This behavior is consistent with an analysis of BGenPats as indefinite.

- (7) Hindi ako bumili [ng saging]<sub>BGenPat</sub>  
 not NOM.1SG PERF.AV.buy GEN banana  
 ‘I didn’t buy any banana.’ (*never* ‘There was a banana the man didn’t buy.’)

### 3 Nonunique interpretations of genitive patients

I propose the semantic analysis of basic clauses like (2a–2b) in (8). Here propositions are represented as partial functions from possible worlds to truth values, defined just in case the input world validates any presuppositions of the proposition. In the notational system of Heim and Kratzer 1998, ‘ $\lambda a : \phi . c$ ’ represents a partial function with a definedness condition  $\phi$ .

The patient voice clause with a BNomPat (2a) is interpreted as a partial function, which can be phrased as follows: the proposition expressed by (2a) is a partial function from worlds to truth values, and given a world  $w$ , is defined just in case the cardinality of the set  $\llbracket \mathbf{banana}_w \rrbracket$  is exactly 1, and where defined returns true iff the unique banana is bought by the speaker. The proposition expressed by (2b) is a total function, interpreted as an existential claim about an individual which is both a banana and bought by the speaker. See Collins 2016 for an analysis of how these readings are derived compositionally.

- (8) a. (2a)  $\rightsquigarrow \lambda w : \exists!x[\mathbf{banana}_w(x)] . \mathbf{buy}_w(\iota(\mathbf{banana}_w))(Sp)$   
 b. (2b)  $\rightsquigarrow \lambda w . \exists x[\mathbf{banana}_w(x) \wedge \mathbf{buy}_w(x)(Sp)]$

The previous section argues for a definite interpretation of BNomPats. The analysis in (8a) holds that BNomPats introduce a presupposition of uniqueness. Contexts must entail unique instantiation of the BNomPat’s descriptive content in order for its use to be felicitous (though this is potentially subject to covert domain restriction, as discussed in Section 3.3). We see the opposite kind of effect for indefinite BGenPats which appear to imply nonuniqueness in particular contexts.

- (9) a. Nadiskubre ni Karlos [ang buwan]<sub>BNomPat</sub>  
 PERF.PV-discover GEN Karlos NOM moon  
 ‘Karlos discovered the moon.’  $\rightsquigarrow$  *There is only one moon (in the discourse context)*

- b. Nakadiskubre si Karlos [ng buwan]<sub>BGenPat</sub>  
 PERF.AV-discover NOM Karlos GEN moon  
 ‘Karlos discovered a moon.’  $\rightsquigarrow$  *There is more than one moon (in the discourse context)*

The effect is even more dramatic where the descriptive content of the BGenPat is strongly biased towards being interpreted as uniquely instantiated. The NP *mundo* in unexceptional discourse contexts is interpreted as a singleton-set denoting property **earth**. In (10b), the BGenPat *ng mundo* appears to imply the existence of multiple earths, contrary to contextual assumptions.

- (10) a. pinoprotektahan ko [ang mundo]<sub>BNomPat</sub>  
 protect.PV GEN.1SG NOM earth  
 ‘I protect the earth.’  
 b. ?nagpoprotekta ako [ng mundo]<sub>BGenPat</sub>  
 AV-protect NOM.1SG GEN earth  
 ‘I protect an earth.’ (*Comment: Sounds like a galactic being or something.*)

The semantic analysis of BGenPats in (8b) does not encode for the nonuniqueness implication observed in (9b,10a). Should (8b) be updated to incorporate this implication?

The observation that indefinites can imply nonuniqueness relates to a persistent question in the literature on indefinites. Do indefinites, like English DPs headed by *a* or Tagalog BGenPats, conventionally signal nonuniqueness? Or does nonuniqueness arise via pragmatic reasoning, via an inference that involves reasoning about a competitor? In the following subsection, I argue that the Tagalog data provides an argument for the latter view, as far as Tagalog BGenPats are concerned: an implication of nonuniqueness with respect to a BGenPat’s descriptive content arises via competition with BNomPats. The nonuniqueness implication arises as a CONVERSATIONAL IMPLICATURE in contexts where an analogous use of a BNomPat would signal unique instantiation.

### 3.1 The pragmatic view of nonuniqueness

Below I lay out some initial evidence for the status of the nonuniqueness implication of BGenPats as a conversational implicature. Firstly, the implication is cancelable and reinforceable, both properties of conversational implicatures but not of conventionalized entailments (Hirschberg, 1985). (11) shows the application of these tests to a well studied implicature. The English sentence *some of the students passed the test* is generally taken to implicate *Not all of the students passed the test*. (11) shows that this implicature can be felicitously canceled or reinforced.

- (11) a. Some of the students passed the test, in fact all of them did. (*cancellation*)  
 b. Some of the students passed the test, but not all. (*reinforcement*)

(12a) provides a typical example of a BGenPat implying nonuniqueness: the sentence in isolation biases towards an interpretation in which there are at least two authors of the book in question. (12b), accepted as felicitous by consultants, shows it is possible to follow an utterance like (12a) with a denial of the nonuniqueness implication. As conversational implicatures are understood in a Gricean framework to arise via collaborative inference between discourse participants, we may expect that speakers may actively prevent their interlocutors from calculating an implicature with a continuation like (12b). Similarly, the nonuniqueness implication of (12a) can be reinforced by the continuation in (12c), again accepted by consultants as felicitous. The implication can be explicitly signalled with little perceived redundancy (see Levinson, 2000).

- (12) a. nakakilala ako ng may-akda ng aklat na iyon...  
 PERF.AV.meet NOM.1SG GEN author GEN book LK that...  
 ‘I met an author of that book...’
- b. ...at, siya lang ang nag-iisang may-akda  
 and NOM.3SG only NOM only author  
 ‘...in fact, he was the only author.’
- c. ...at meron ibang mga may-akda bukod sa kanya  
 and exist other PL author besides OBL him  
 ‘...and there were other authors besides him.’

The uniqueness implication of BNomPats, on the other hand, does not show these behavioral characteristics. As expected, (13a) implies unique instantiation of the NP’s descriptive content (i.e. that there is just one author of the book). Attempting to reinforce this implication (13b) results in a judgment of redundancy of the sort not observed with the analogous (12c). Likewise, attempting to cancel the uniqueness implication (13c) is somewhat more marked than the analogous (12b), though not entirely infelicitous. This haziness is somewhat expected if we allow speakers to update their knowledge of the cardinality of authors incrementally. Potentially, the mini-discourse (13a–13c) represents the speaker learning about the existence of authors in addition to the referent of the BNomPat in (13a).

- (13) a. nakilala ko ang may-akda ng aklat na iyon...  
 PERF.PV.meet GEN.1SG NOM author GEN book LK that...  
 ‘I met the author of that book...’
- b. ...at, siya ang nag-iisang may-akda ng aklat na iyon  
 and NOM.3SG NOM only author GEN book LK that  
 ‘...and he is the only author of that book.’ (*Comment: you can omit at siya ang nag-iisang may-akda, it sounds redundant.*)
- c. ...at, meron ibang mga may-akda ng aklat na iyon bukod sa kanya  
 and exist other PL author GEN book LK that besides OBL OBL.3SG  
 ‘...and there are other authors of that book besides him.’ (*Comment: It sounds like you’re saying and as a matter of fact!.*)

The contrast between (12) and (13) suggests that the nonuniqueness implication of BGenPats is derived pragmatically, while the uniqueness implication of BNomPats is conventionally encoded.

Just like the English alternative sentences in (11), the Tagalog actor voice and patient voice alternative sentences in (12a) and (13a) are ordered by semantic strength. Given the semantic proposal in (8), a patient voice sentence with a bare NP patient is semantically stronger than the alternative actor voice sentence with a bare NP patient. (8) is rewritten below, replacing the definite variant in (8a) with an equivalent existential statement (14a). The rewrite makes it clear that the definite and indefinite variants differ only by the presupposition triggered by the definite.

- (14) a.  $\lambda w : \exists!x[\mathbf{banana}_w(x)] . \exists x[\mathbf{banana}_w(x) \wedge \mathbf{buy}_w(x)(Sp)]$   
 b.  $\lambda w . \exists x[\mathbf{banana}_w(x) \wedge \mathbf{buy}_w(x)(Sp)]$

Intuitively, if the speaker had intended to convey uniqueness, she would have employed (14a), which encodes uniqueness in its presuppositional content. If she uses the non-presuppositional version, she must intend to signal the opposite: nonuniqueness. The listener takes nonuniqueness to

be a belief of the speaker in order to maintain the assumption that the speaker is being cooperative. (15) sketches this reasoning process, based on the outline of implicature reasoning in Potts 2013.

- (15) *Utterance*: ‘*Nakakilala ako ng may-akda*’ (= I met an author).  
*Implicature*: There is more than one author. (i.e. *nonuniqueness/nonmaximality*)
- a. *Contextual premise*: *Sp* knows whether or not there is more than one author in the relevant discourse context.
  - b. *Contextual premise*: *Sp* is cooperative (i.e. will choose the alternative utterance which is optimal given Gricean maxims).
  - c. There is an alternative utterance (‘*Nakilala ko ang may-akda*’), with content *q* (= I met the (one and only) author) which *Sp* could have uttered.
  - d. *q* is preferential to *p*, the content of *Sp*’s actual utterance.
  - e. *p* and *q* are equally relevant.
  - f. by (b–e), *Sp* did not express *q* because *Sp* lacks evidence that *q* is true.<sup>3</sup>
  - g. by (a) and (f), *Sp* lacks evidence for the presupposition of *q* because it is false (i.e. there is more than one author).

Nonuniqueness can be inferred if we assume the speaker would have used the definite form (a BNomPat) if she took uniqueness to hold in the discourse context. As she uses the somehow less preferred BGenPat, she must take uniqueness to not hold, and thus implicate nonuniqueness. In the following subsection, I discuss the mechanism which determines that the patient voice variant of the utterance serves as the pragmatic alternative in (15c). Later, in Section 3.3, I discuss the premise in (15d) with reference to the proposal in Heim 1991 that there is a general preference for presupposition triggers like definites via the principle *Maximize Presupposition*.

### 3.2 Calculating alternatives

The use of step (15c) in order to derive the nonuniqueness implicature comes from a line of previous work starting with Hawkins (1991) and Heim (1991). These works focus on the contrast between English articles *a* and *the*. Like the present analysis, they reject the idea that the indefinite conventionally encodes for nonuniqueness. Instead, *a* and *the* are assumed to form a conventionalized scale of lexical alternatives. Thus the utterance of a sentence with *a* triggers a reasoning process like (15c): why did the speaker choose the indefinite form *a* over its ‘scalemate’ *the*?

I propose something similar in order to account for the Tagalog data. As Tagalog lacks articles like *the* (Collins, 2016; Paul et al., 2016), I propose a different approach, namely, that the actor voice and patient voice morphemes form a conventionalized scale of lexical alternatives, ⟨AV, PV⟩. The utterance of an actor voice sentence triggers a comparison with the patient voice alternative, deriving the premise (15c). See Collins (to appear) for more arguments and discussion of this proposal.<sup>4</sup>

<sup>3</sup>In a semantics assuming three truth values (true, false, undefined), a proposition’s truth value is undefined for any world in which its presuppositions are not true. If its presuppositions are true, a proposition may map a world to true or false. (f) states that *Sp* did not utter *q* because she lacks evidence *q* is true, meaning *q* is either false or undefined. If *q* is false, its presuppositions are true, and its non-presuppositional content is false. By uttering *p*, *Sp* commits herself to believing the non-presuppositional content of both *q* and *p* (there is at least one author that I met), and thus *q* can only be undefined.

<sup>4</sup>Under this proposal, the AV and PV competing lexical items are not necessarily ordered in terms of semantic strength. In fact, there is no evidence that the semantic contributions of AV and PV in relation to the quantification of the patient can be compared semantically. This is discussed further in Collins to appear.

Generating an alternative to an uttered sentence requires some notion of syntactic replacement. The following principle is adapted from Singh (2011). It states that for any tree structure which contains a lexical item with a scalar alternative, we can reconstruct an alternative tree structure with the lexical item in question swapped out for its scalemate.

- (16) If  $\langle \alpha, \beta \rangle$  is a scale, and  $S$  is a tree structure containing lexical item  $\alpha$  as a terminal node, and  $S'$  is a tree structure identical to  $S$  except that at some terminal node, it contains  $\beta$  where  $S$  contains  $\alpha$ , then  $S$  and  $S'$  are alternatives.

However, as stated, (16) encounters some morphosyntactic difficulties. The English case of swapping *a* for *the* is relatively simple, as the tree structure apart from the article remains consistent. However, in Tagalog, swapping out a voice morpheme for another voice morpheme has the effect of altering the case assignment to the verb's arguments. We must ensure that swapping the voice morpheme includes altering the concomitant case marking on the verb's arguments. In order to account for this, I provide a refinement of (16) in (17) which is one way of spelling out this notion.

- (17) If  $\langle \alpha, \beta \rangle$  is a scale, and  $S$  is a tree structure containing lexical item  $\alpha$  as a terminal node, and  $S'$  is a tree structure identical to  $S$  except that:
- i. at some terminal node, it contains  $\beta$  where  $S$  contains  $\alpha$ ,
  - ii. for all subtrees  $s$  of  $S$  such that  $s$  is in a syntactic dependency with  $\alpha$  (agreement, case, S-selection, etc.),  $s$  is replaced with a subtree  $s'$  in  $S'$  such that  $s'$  is identical to  $s$  except that the syntactic dependency is re-established with  $\beta$  in  $S'$
- then  $S$  and  $S'$  are alternatives.

There are other applications of the principle in (17ii), such as pragmatic accounts of plurality (e.g. Krifka, 1989; Sauerland et al., 2005) which assume that plural NPs (18a) compete with singular alternatives (18b). (17ii) ensures that (18a) does not compete with the ungrammatical (18c). Instead the alternative (18b) is calculated, with the subject-copula agreement re-established.

- (18) a. Some boys are tall.                      b. Some boy is tall.                      c. \*Some boy are tall.

Given (17ii), we can calculate the patient voice alternative of an actor voice sentence, like (19a), by swapping out the actor voice prefix *naka-* for the patient voice prefix *na-*, and making the concomitant changes to the case assignment of the two argumental NPs, deriving (19b).

- (19) a.    nakakilala      ako      ng    may-akda  
           PERF.AV.meet NOM.1SG GEN author  
           'I met an author.'
- b.    nakilala      ko      ang    may-akda  
           PERF.PV.meet GEN.1SG NOM author  
           'I met the author.'

We can refer to the patient voice variant of an actor voice sentence as its scalar alternative, and thus replace (15c) with the generalized version (20). As the scalar alternative of an actor voice sentence (with a bare NP patient) will be the corresponding patient voice sentence with a definite patient,  $q$  in (20) will be ensured to encode for the definite presupposition.

- (20) There is a scalar alternative to  $Sp$ 's actual utterance, with content  $q$ , which  $Sp$  could have uttered.

### 3.3 Pragmatic enrichment and assumptions about cardinality

The derivation in (15) takes the nonuniqueness inference to be highly context dependent, relying on several assumptions about the mutual beliefs of the discourse participants. This predicts a high amount of indeterminacy with regards to the emergence of a nonuniqueness implicature. We expect that the implicature should fail to arise in contexts where certain assumptions fail to be met. Hirschberg (1985) cites this indeterminacy as an identifying property of conversational implicatures. As predicted, BGenPats may fail to imply nonuniqueness under certain conditions. The naturally occurring (21) is such an example, intuitively not implying the existence of multiple big fish. The example closely corresponds to Heim's (1991, p. 32) *Robert caught a 20ft. catfish*, which is intended to illustrate the same point.

- (21) Isang araw, nakahuli si Hangdangaw ng malaking isda.  
 one.LK day PERF.AV.catch NOM Hangdangaw GEN large.LK fish  
 'One day, Hangdangaw caught a large fish.' (↗ *there are multiple fish*)

The premise (20) asserts that the calculation of the implicature relies on the existence of a scalar alternative (i.e. the patient voice variant of (21)) which the speaker *could have* uttered. The patient voice variant contains the definite BNomPat *ang malaking isda*.

We can assume a context which does not entail the existence of one or more large fish, such as a discourse context where it is known that Hangdangaw is a keen fisherman, but it is unknown whether there were any big fish for him to catch on the day in question. Prior to an utterance of (21) in such a context, discourse participants entertain the possibility that there are no big fish. Thus, we should expect that (21), with an indefinite BGenPat is felicitous, as it does not impose an existential presupposition. However, its patient voice alternative should be infelicitous, as the existential presupposition of the definite BNomPat is not satisfied.

Therefore, on a speaker's utterance of (21) in the described context, the discourse participants cannot infer that (20) is true. It is false that the speaker *could have* uttered the patient voice alternative with a definite *ang malaking isda* 'the large fish', as to do so would create a presupposition failure. As the premise (20) does not hold, the reasoning sketched in (15) does not go through, and a nonuniqueness implicature does not arise.

I hypothesize the following generalization.

- (22) An actor voice sentence with a BGenPat does not implicate nonuniqueness in utterance contexts which do not entail the existence of individuals instantiating the BGenPat's descriptive content (i.e.  $||NP|| \geq 0$ ).

By way of example, the effect is more dramatic with NPs which Schein (2015) characterizes as biased towards non-existence, such as those referring to stains, spills, mistakes, and dents. For example, (23) does not seem to implicate the existence of multiple stains. Prior to the utterance of (23), we can assume the discourse participants considered the possibility of (or were even biased toward) there being no stains. As such, the definite, patient voice form would be infelicitous, and the actor voice form in (23) does not generate a nonuniqueness implicature.

- (23) nakakita ako [ng mantsa ng dugo]  
 PERF.AV.see NOM.1SG GEN stain GEN blood  
 'I saw a blood stain.'  
 ([www.wattpad.com/176142735-minsan-may-isang-tanga-one-shot-minsan-may-isang](http://www.wattpad.com/176142735-minsan-may-isang-tanga-one-shot-minsan-may-isang))

BGenPats appear to implicate nonuniqueness in discourse contexts which entail that the BGenPat's descriptive content is instantiated by at least one individual. For example, given normal expectations that books have at least one author, (12a) is naturally interpreted in a context entailing the existence of an author, and as expected, the utterance does implicate nonuniqueness in such a context. I hypothesize the following generalization.

- (24) An actor voice sentence with a BGenPat implicates nonuniqueness in utterance contexts which entail the existence of one or more individuals instantiating the BGenPat's descriptive content (i.e.  $\llbracket NP \rrbracket \geq 1$ ).

Here I propose an explanation of why (24) might hold. The proposal is based on Heim's (1991) principle in (25). Variants of this principle have been termed *Maximize Presupposition* in later work. This principle is employed in order to ensure that the definite variant of a sentence is preferred to the indefinite variant, thus motivating the premise (15d).

- (25) In utterance situations where the presupposition for the definite is already known to be satisfied, it is not permitted to utter the indefinite (cf. Heim, 1991, p. 33)

As stated, this principle does not help explaining the generalization in (24). In utterance contexts where  $\llbracket NP \rrbracket \geq 1$  is assumed, the existence presupposition of a definite is entailed, but not the uniqueness presupposition. So in such contexts, the use of the definite should not be licensed.

Following previous work (e.g. Von Stechow, 1994; Stanley and Szabó, 2000, and many others), I assume quantificational expressions like definites and indefinites are implicitly restricted. Under this theory, the presupposition of uniqueness imposed by a definite like *ang may-akda* is not merely evaluated with respect to the overt descriptive content **author**. Instead, uniqueness is evaluated with respect to the intersection of the set  $\llbracket \mathbf{author}_w \rrbracket$  with an implicit contextually supplied restriction set  $C$ , such that  $\llbracket \mathbf{author}_w \rrbracket \cap C = 1$ . This method ensures that an utterance of the definite *ang may-akda* does not encounter a presupposition failure due to the existence of multiple non-salient authors in the entire universe of discourse. Likewise, the existential claim of an indefinite is made with respect to the set  $\llbracket \mathbf{author}_w \rrbracket \cap C$ .

Under this theory, there is pragmatic uncertainty as to the value of  $C$  for any NP. The utterance of a definite will ensure that  $C$  gets a value such that  $\llbracket \mathbf{author}_w \rrbracket \cap C = 1$  in order to satisfy the definite's presuppositions. No such requirement is in place if an indefinite is uttered.

Suppose a speaker utters a BGenPat *ng may-akda* in a discourse context such that  $\llbracket \mathbf{author}_w \rrbracket \geq 1$ . The audience reasons that the speaker would have uttered *ang may-akda*, so long as the domain restriction  $C$  was such that  $\llbracket \mathbf{author}_w \rrbracket \cap C = 1$ , according to Heim's constraint in (25). As the speaker chose not to utter a definite, she must intend to convey that  $\llbracket \mathbf{author}_w \rrbracket \cap C > 1$ , (i.e. that there is more than one author), thus implicating nonuniqueness.

This theory also helps us explain why there is a discrepancy between contexts in which existence is not assumed ( $\llbracket NP \rrbracket \geq 0$ ), and contexts where existence is assumed but uniqueness is not ( $\llbracket NP \rrbracket \geq 1$ ). Both contexts fail to satisfy the presuppositions of the unrestricted definite. In the latter case, covert domain restriction will rescue an utterance of a definite from potential presupposition failure. However, the same cannot be said of contexts where existence is not assumed. If it is possible that the set  $\llbracket NP \rrbracket$  is empty, then it is possible that any subset of  $\llbracket NP \rrbracket$  is empty.

Finally, we come to the infelicitous examples like (10b), in which the use of a BGenPat is infelicitous. I hypothesize that the following generalization holds.

- (26) An actor voice sentence with a BGenPat is infelicitous in utterance contexts which entail that the BGenPat's descriptive content is uniquely instantiated (i.e.  $\llbracket NP \rrbracket = 1$ )

This effect of indefinites has been well observed in the literature, motivating the notion of *Maximize Presupposition*, a version of which is stated in (25). Heim, as well as later authors (Percus, 2006; Sauerland, 2008), phrases the condition as something like a felicity condition. In cases where the presupposition of the definite is satisfied in the discourse, such that  $||NP|| = 1$ , and the flexibility afforded by covert domain restriction is not available, then the condition in (25) prevents the indefinite from being felicitous.

## 4 Word order effects on indefiniteness

The notion of *Maximize Presupposition* prevents certain utterances of indefinite BGenPats from being felicitous, such as (27).

- (27) #sumukat                   ako           **ng kabilugan ng ulo ni John**  
 PERF.AV.measure NOM.1SG GEN circumference GEN head GEN John  
 ‘I measured **a** circumference of John’s head.’

As discourse participants naturally assume John’s head has just one circumference, the discourse context entails  $||NP|| = 1$ . If (27) is alternatively rendered as a patient voice sentence with a BNomPat, the presuppositions associated with the definite alternative are defined. Therefore, *Maximize Presupposition* explains why (27), with an indefinite, is blocked.

However, as observed by McFarland 1978, Schachter and Otnes 1982, and Adams and Manaster-Ramer 1988, amongst others, this constraint is suspended in clauses where the actor NP is extracted to a preverbal position. For example, (28) is a clefted variant of (27) in which the actor NP is extracted to a clause-initial position. Here, the infelicity observed in (27) is no longer present.

- (28) [ako<sub>i</sub>]<sub>pivot</sub> [ang sumukat                   ---<sub>i</sub> **ng kabilugan ng ulo ni John**]<sub>cleft</sub>  
 NOM.1SG NOM PERF.AV.measure           GEN circumference GEN head GEN John  
 ‘I’m the one that measured **the** circumference of John’s head.’

The nonuniqueness implicature, observed in examples like (29a) (repeated from earlier), appears to surface in verb-initial sentences, but not in actor-initial sentences. (29b) is formed by extracting the actor NP, here via a *wh*-question structure. The nonuniqueness implicature is absent, and (29b) is compatible with a context in which there is just one moon (see McFarland, 1978; Schachter and Otnes, 1982, for more examples).

- (29) a. **Nakadiskubre** si Karlos **ng** buwan  
 PERF.AV-discover NOM Karlos GEN moon  
 ‘Karlos discovered a moon.’ ( $\rightsquigarrow$  *There is more than one moon*)  
 b. [sino<sub>i</sub>] [ang **nakadiskubre** ---<sub>i</sub> **ng** buwan]  
 NOM.who NOM PERF.AV-discover           GEN moon  
 ‘Who discovered the/a moon?’ ( $\rightsquigarrow$  *There are one or more moons*)

I propose that this suspension of the nonuniqueness implicature in actor-initial sentences is due to a *failure of pragmatic enrichment*. This proposal is tied to a well-observed morphosyntactic phenomenon, the so-called western Austronesian ‘Extraction Restriction’ (Schachter and Otnes, 1982; Georgopoulos, 1985; Gerassimova, 2007, a.o.). The Extraction Restriction states that extraction of non-nominative NPs to a pre-verbal position is syntactically blocked. This means that agent-initial sentences (as in (28) and (29b)) *must* have the AV morpheme on the verb, and concomitantly, genitive case on the patient. Thus, extracting the nominative actor in (30a) is fine,

but, the corresponding PV version (30b) is ungrammatical, or at least highly marked, as a genitive is extracted in violation of the Extraction Restriction.

- (30) a. [Siya] [ang nakadiskubre ---i ng buwan]  
 NOM.3SG NOM PERF.AV-discover GEN moon  
 ‘He is the one who discovered the moon.’
- b. \*/?? [Niya] [ang nadiskubre ---i ang buwan]  
 GEN.3SG NOM PERF.PV-discover NOM moon

Applying the theory of pragmatic competition described in the previous section to (30), we gain an understanding of why the nonuniqueness implicature does not arise in actor-initial sentences. Recall that in Section 3.2, I proposed that the actor voice and patient voice were lexicalized scalar alternatives. Upon an utterance of (30a), discourse participants may reason about its patient voice alternative. However, in constructing the alternative according to the principle sketched in (17), the constructed alternative to an actor-initial clause like (30a) is the ungrammatical (30b).

Given that there is no viable grammatical alternative, (30a) does not pragmatically compete with a patient voice alternative. (31) is a reconstruction of how a nonuniqueness implicature fails to arise after an utterance of (30a).

- (31) *Utterance*: ‘Siya ang nakadiskubre ng buwan’ (= He is the one who discovered.AV ng moon).  
*Failed implicature*: There is more than one moon. (i.e. *nonuniqueness/nonmaximality*)
- a. *Contextual premise*: *Sp* knows whether or not there is more than one moon in the relevant discourse context.
- b. *Contextual premise*: *Sp* is cooperative (i.e. will choose the alternative utterance which is optimal: supported by evidence, most relevant, informative, least costly etc.).
- c. It is **false** that there is an alternative utterance ‘Niya ang nadiskubre ang buwan’ (= He is the one who discovered.PV ang moon), with content *q* (= He discovered the (one and only) moon)), which *Sp* could have uttered.
- d. by (c), *Sp* has reasons for not expressing the scalar alternative besides its presupposition being false, as it is not well-formed.
- e. by (d), there is no evidence that *Sp* believes *q*’s presupposition is false.

The theory proposed in this paper has a very constrained notion of what structures count as scalar alternatives. The theory of alternative generation in (17), following Horn 1972, Gazdar 1979, Hirschberg 1991 and others, makes crucial use of conventionalized alternative lexical items, used to generate scalar alternative sentences. This view of alternative generation is highly syntacticized. It is not the case that in (31), the discourse participants can reason about a large range of structures with meanings that approximate the presuppositional definite (e.g. structures without a cleft structure, structures with demonstratives, structures with definite uses of the oblique case marker *sa*, and so on). The shape of the alternatives is highly constrained by the mechanism of alternative generation in (17), which employs simple substitution of one lexical item for its scalemate, plus any concomitant changes in case and agreement, but no other alteration.

This highly constrained theory of alternative generation forces the discourse participants to recreate the ill-formed (30b) as an alternative of (30a). As the speaker had good reason not to utter the alternative (30b), the participants cannot conclude that the speaker failed to utter (30b) due to a presupposition failure. Therefore no implicature is generated.

This perspective taken in this paper of the interaction between grammaticality and pragmatic competition does not correspond exactly to standard implementations of pragmatic principles like

*Maximize Presupposition*. For example, Schlenker (2012, p. 393) provides the following formulation of *Maximize Presupposition*.

- (32) *Maximize Presupposition*: If  $S$  is a **alternative** to  $S'$ , and the context  $C$  is such that:
- a. the presuppositions of  $S$  and  $S'$  are satisfied within  $C$ ;
  - b.  $S$  and  $S'$  have the same assertive content relative to  $C$ ;
  - c.  $S$  carries a stronger presupposition than  $S'$ ,
- then  $S$  should be preferred to  $S'$

(32) is not enough to account for the failure of nonuniqueness to arise in (30a). If (30a) and (30b) are pragmatic competitors, then the strengthening inference via MP should arise, as (30b) is preferable via MP. By the reasoning in (31), the ungrammaticality of (30b) (due to the Extraction Restriction) prevents it from pragmatically competing with (30a), and thus prevents (30a)'s implicature from arising. Thus I advocate for the constraint in (33) that states grammatical well-formedness is a pre-condition for pragmatic competition.

- (33) If  $S$  and  $S'$  are pragmatic alternatives, then  $S$  and  $S'$  are grammatically well-formed.

As the alternative (30b) is not syntactically well-formed, it cannot be a pragmatic alternative to (30a), and the strengthening inference from MP fails to arise. (33) is intended as a pragmatic principle applicable beyond *Maximize Presupposition* to other sorts of implicatures: the syntactic well-formedness of an alternative is a necessary condition for its pragmatic competition. Assessment of an alternative's viability must involve grammatical information, such as well-formedness.

## 5 Comparison with previous accounts

The observed interactions of word order and definiteness in Tagalog has been previously noted in descriptive literature (Schachter and Otones, 1982; McFarland, 1978; Adams and Manaster-Ramer, 1988). Previous accounts of this phenomena within formal frameworks, like the present account, associate the phenomenon with Tagalog's Extraction Restriction (Aldridge, 2005; Rackowski, 2002; Gärtner, 2004; Rackowski and Richards, 2005). Unlike the present account, previous accounts do not attempt to explain the interactions of word order and definiteness in terms of conversational implicature. Having introduced the outline of the pragmatic account in the previous sections, I will now consider analyses which appeal to other kinds of explanations.

### 5.1 Gärtner

Gärtner (2004) employs Optimality Theory in order to analyze cases of morphosyntactic constraints overriding violable interpretative constraints. Tagalog case marking is one such case. The theory centers around a family of markedness constraints called 'Unambiguous Encoding' (UE), which serve to ensure that distinct interpretations of an NP are differentiated morphosyntactically. Gärtner suggests that such constraints could find a Gricean explanation in terms of maxims like 'be perspicuous' and 'avoid ambiguity'. The relevant variant of UE employed for Tagalog is instantiated as in (34).

- (34) UNAMBIGUOUS ENCODING (TAGALOG):
- a. Indefinite patients are *ng*-marked.
  - b. Definite patients are *ang*-marked.

The intuition behind the OT account of Tagalog case marking is that the constraint in (34) is violable, and may be overridden by a higher ranked constraints which determine case marking. One such constraint, SYN1, determines the link between case marking and verbal morphology (35). SYN1 ensures that actor NPs are nominative in actor voice sentences, patient NPs are nominative in patient voice sentences, and so on.

(35) SYN1: *Ang*-markers on NPs correspond to verbal morphology.

A second constraint, SYN2, encodes for Tagalog’s Extraction Restriction. The constraint states that traces/null operators bound by extracted NPs must take the place of an *ang* marked NP. Gärtner phrases the constraint in terms of relativization, but presumably the constraint should extend to various kinds of extraction phenomena.

(36) SYN2: Relative operators are *ang*-marked.

The constraints SYN1 and SYN2 are unranked with respect to each other (symbolized by  $\langle\langle\rangle\rangle$ ), but both outrank UE.

(37) SYN1  $\langle\langle\rangle\rangle$  SYN2  $\gg$  UE

This system derives the basic fact that genitive patients may be interpreted as either indefinites or definites in clauses with extracted agents. The competition in (38) shows how an agent relative clause (with a null operator agent) with an indefinite patient is mapped to a syntactic structure given the above constraints. Candidates with alternative mappings of nominative and genitive to the agent and patient are considered, as well as actor voice and patient voice variants of the verb.

A violation is incurred for cases in which the thematic role of the nominative NP does not match the thematic role referenced by the verbal morphology (SYN1). A violation is incurred for cases in which the operator bound by the relativized agent is not assigned nominative (SYN2). Finally, a violation is incurred for nominative encoding of the indefinite patient (UE). The winning candidate is (a), the indefinite patient being expressed as a genitive (as observed).

(38)

| <i>input: indefinite patient</i> |                                              | SYN1 | SYN2 | UE |
|----------------------------------|----------------------------------------------|------|------|----|
| ☞                                | a. AV.verb NOM- $Ag_{Op}$ GEN- $Pat_{Indef}$ |      |      |    |
|                                  | b. AV.verb GEN- $Ag_{Op}$ NOM- $Pat_{Indef}$ | !*   | *    | *  |
|                                  | c. PV.verb NOM- $Ag_{Op}$ GEN- $Pat_{Indef}$ | !*   |      |    |
|                                  | d. PV.verb GEN- $Ag_{Op}$ NOM- $Pat_{Indef}$ |      | !*   | *  |

The competition in (39) shows how definite readings of genitives emerge in this system. The syntactic forms of the candidates are held constant from (38). However, now the intended interpretation of the patient is definite. As SYN1 and SYN2 are not sensitive to the change in definiteness of the patient, the same violations of these constraints are incurred. Candidates violate UE in cases where definites are assigned genitive case. The winning candidate violates UE, as the definite patient is assigned genitive. However, as other encodings of the clause violate the higher ranked syntactic constraints, the definite reading of the genitive is licensed, despite the violation of UE.

(39)

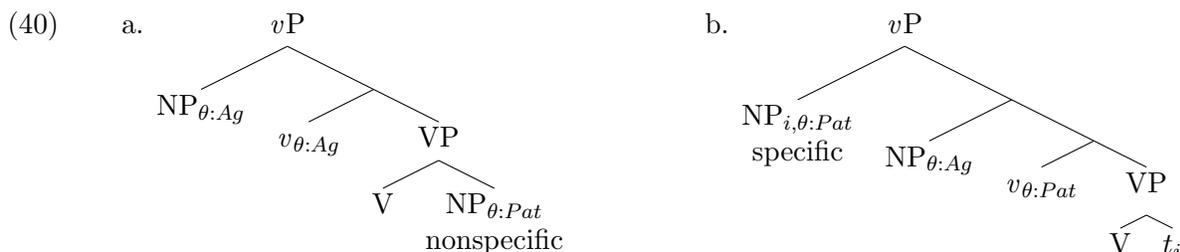
| <i>input: definite patient</i> |                                            | SYN1 | SYN2 | UE |
|--------------------------------|--------------------------------------------|------|------|----|
| ☞                              | a. AV.verb NOM- $Ag_{Op}$ GEN- $Pat_{Def}$ |      |      | *  |
|                                | b. AV.verb GEN- $Ag_{Op}$ NOM- $Pat_{Def}$ | !*   | *    |    |
|                                | c. PV.verb NOM- $Ag_{Op}$ GEN- $Pat_{Def}$ | !*   |      | *  |
|                                | d. PV.verb GEN- $Ag_{Op}$ NOM- $Pat_{Def}$ |      | !*   |    |

Although Gärtner’s analysis differs very much from the present analysis in terms of implementation, certain characteristics are similar. For example, genitive patients can in principle take on definite interpretations. However, in cases where the nominative patient is licensed, this possibility is blocked. Actor extraction blocks the expression of a definite as nominative and licenses a definite reading of the genitive.

## 5.2 Rackowski and Richards

Rackowski and Richards’ (2005) analysis of the interaction of word order and definiteness in Tagalog is situated within a broader discussion of the interaction of extraction and the syntactic operation Agree. The discussion in this subsection focuses primarily on their treatment of emergent definite readings of genitive patients. Under their account, definite readings and indefinite readings of patients are conventionally encoded by different syntactic positions. In clauses with actor-extraction, genitive patients may appear in the syntactic position associated with definite readings, or in the syntactic position associated with indefinite readings, with no observable effect on the linear order of constituents. Thus the ambiguity between definite and indefinite readings of genitives corresponds to a syntactic ambiguity.

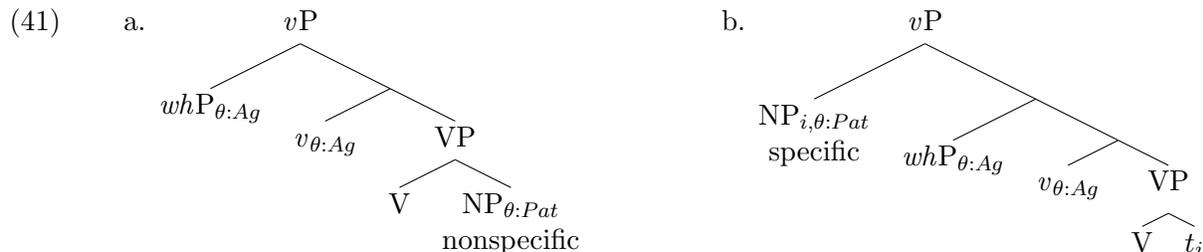
Under their proposed system, the first step of the syntactic derivation places transitive patient NPs as the complement of V. If they remain in this position, as in (40a), they inherit a ‘nonspecific’ (p. 567) interpretation. On the other hand, the patient NP can move to a higher position (40b), a second specifier of *v*P. In this position, they are interpreted as ‘specific’ (p. 567).



The movement of the NP in (40b) is preceded by agreement between the NP and *v*. By this process, *v* inherits the thematic features of the patient NP, which is spelled out as the patient voice morpheme. In cases where no NP moves, *v* inherits the thematic features of the agent NP, and *v* is spelled out as the actor voice morpheme. Rackowski and Richards generalize this syntactic operation as agreement with the highest specifier of *v*P. This process of agreement between *v* and the NP in its highest specifier results in the assignment of nominative case to the NP. This proposal corresponds to Gärtner’s SYN1, which determines that the thematic role signalled by the verbal morpheme is matched by the NP marked with *ang*. The proposal is not explicit about how genitive case is assigned, though we can postulate that it is assigned to argumental NPs which do not agree with *v*.

Moving to cases of agent-extraction, Rackowski and Richards propose that the syntactic generalizations outlined above are suspended in constructions with *wh*-movement. Under their account, *v* will always agree with the NP undergoing *wh*-movement, regardless of whether it occupies the highest specifier of *v*P or not. Although Rackowski and Richards do not spell out this analysis in terms of Optimality Theory, their prose formulation suggests the assumption of ranked, violable constraints: ‘The difference receives a natural account if we assume that Tagalog verbs agree preferentially with *wh*-phrases’ (p. 590). The *v*P structures above are redrawn with *wh*-phrases in the agent position, prior to the point in the derivation where they are extracted to a higher position.

In these structures, *v* always inherits the thematic features of the *wh*-phrase and so *v* is realized as actor voice. The *wh*-extracted NP is always assigned nominative.



This generalization clearly parallels Gärtner’s SYN2, which determines that operators bound by *wh*-movement are assigned nominative case. In the accounts of both Gärtner and Rackowski and Richards, the agent’s status as an NP targeted by *wh*-movement ensures the assignment of nominative to the actor. In both accounts, this constraint overrides the ordinary process of nominative case assignment, which is sensitive to the interpretation of the patient as (in)definite or (non)specific.

### 5.3 Underspecification and ambiguity

The above accounts are intricate and offer much insight into the interaction of morphosyntax and definiteness, in Tagalog and cross linguistically. A thorough review of their arguments would be outside the scope of this paper but is a worthwhile task for future work. In this section, I focus on one issue: the construal of the distinction between the definite and indefinite readings of genitive patients as ambiguity or underspecification.

Under the account presented in this paper, the definite interpretation is understood as a special case of the indefinite interpretation. For example, (42) is a variant of an earlier example which shows the two readings.

- (42) Si Karlos ang nakadiskubre [ng buwan]  
 NOM Karlos NOM PERF.AV-discover GEN moon  
 ‘Karlos discovered a/the moon.’

The definite interpretation emerges where the set denoted by the NP’s descriptive content is assumed to have just one member. But otherwise, the entailments are the same as those of the indefinite interpretation. Represented schematically, where *A* corresponds to the set  $\llbracket \mathbf{moon} \rrbracket$  (the NP’s descriptive content) and *B* represents the set  $\llbracket \lambda x. \mathbf{discover}(x)(k) \rrbracket$ .

- (43) a.  $|A| = 1 \wedge A \cap B \neq \emptyset$  (*Definite reading*)  
 b.  $A \cap B \neq \emptyset$  (*Indefinite reading*)

The approach in this paper has been to assign (43b) as the conventional meaning of a sentence with a bare genitive patient, and allowed the singleton cardinality of the NP’s descriptive content ( $|A| = 1$ ) to arise as a contextual premise. In cases where the patient voice variant is available (i.e. in verb initial structures), this contextual premise is pragmatically blocked. Thus, the approach taken here could be characterized as one of *underspecification*: only one conventional meaning is associated with bare genitive patients (43b), which may optionally be enriched (43a), contingent on certain contextual and structural factors outlined in this paper.

Both previous accounts construe the definite and indefinite readings of genitive patients in actor-initial sentences as derived via *ambiguity*. Under Gärtner’s account, *definite* and *indefinite*

are treated as two distinct input values which are both mapped to the genitive form in extraction sentences by the stipulated constraints. Under Rackowski and Richards' account, the two readings are encoded as a structural ambiguity in the syntax. Here, I explore some predictions of the ambiguity account of these previous analyses versus the underspecification account of this paper.

Definite and indefinite NPs show distinct sensitivity to negation. If genitive patients are ambiguous between definite and indefinite readings, the two possible readings should show a similar kind of distinction in behavior under negation. In (44–45), all accounts assume the definite and indefinite readings are morphologically distinguished. Under negation, the indefinite genitive patient necessarily scopes below negation (44).<sup>5</sup> Thus, as expected, the second clause in (44) is contradictory.

- (44) Hindi nakapanuod si Karlos [ng pelikula], #pero napanuod niya ang Star Wars  
 not PERF.AV.see NOM Karlos GEN film but PERF.PV.see he NOM Star Wars  
 'Karlos didn't see a film, but he saw Star Wars.' (*Comment*: No, you have to put *ibang* ['other'], *Hindi nakapanuod si Karlos ng ibang pelikula* [Karlos didn't see any other films].)

With (45) on the other hand, the second clause is non-contradictory.<sup>6</sup> The second clause simply affirms that Karlos saw a film different to the film referred to by the definite.

- (45) Hindi napanuod ni Karlos [ang pelikula], pero napanuod niya ang Star  
 not PERF.PV.see GEN Karlos NOM film but PERF.PV.see GEN.3SG NOM Star  
 Wars  
 Wars  
 'Karlos didn't see the film, but he saw Star Wars.'

(46) is an actor-initial sentence which includes negation. Under the ambiguity approach of the two previous analyses discussed in this section, (46) should be ambiguous between (negated) definite and indefinite readings. Under the approach pursued in this paper, (46) should simply be a negated indefinite. The judgment of (46) is that the continuation is contradictory, in much the same way as the negated genitive in (44).

- (46) Si Karlos ay hindi nakapanuod [ng pelikula], #pero napanuod niya Star  
 NOM Karlos TOP not PERF.AV.see GEN film but PERF.PV.see GEN.3SG Star  
 Wars  
 Wars  
 'Karlos didn't see any film, but he saw Star Wars.' (*Comment*: You were saying he didn't see a movie, but you also were saying he watched a film. You need *ibang* 'other'.)

If the first clause in (46) were truly ambiguous between a definite and indefinite construal of *ng pelikula*, a definite reading of *ng pelikula* should be possible, generating the same kind of discourse as in (45). If a definite reading of *ng pelikula* were possible, referring to a film which is not Star Wars, this discourse should be possible, contrary to the observed facts.

<sup>5</sup>See Collins (2016) for an account of the obligatory narrow scope of BGenPats.

<sup>6</sup>There is a question as to why the mention of *Star Wars*, a distinct film from the film referred to by the BNomPat in the first clause, does not seem to contradict the uniqueness presupposition of the definite and create a presupposition failure (in either the Tagalog sentence or its English translation). Here, I again appeal to the theory that the uniqueness presupposition of a definite is calculated after the descriptive content is implicitly restricted. For example, if the discourse participants were discussing a particular film prior to the utterance in (45). Thus the set  $\llbracket \mathbf{film} \rrbracket$  is not necessarily singleton, but intersected with an implicit restriction  $C$ ,  $\llbracket \mathbf{film} \rrbracket \cap \llbracket C \rrbracket = 1$ .

The apparent contradiction can be explained if we assume an existential reading of the genitive patient in both actor-initial and verb-initial sentences, as proposed under the present analysis. Under negation, the first clause can be schematized as  $[A \cap B = \emptyset]$ , where  $A$  corresponds to the set of films and  $B$  corresponds to the set of things Karlos saw. As *Star Wars* is contained in the set  $A$ , the second clause is correctly predicted to be contradictory.

## 6 Conclusion

The interpretation of Tagalog patients as definite or indefinite and the interaction of this interpretation with word order has been a persistent puzzle in Austronesian linguistics. I propose a pragmatic solution. Speakers and hearers reason about the choice between actor voice and patient voice variants of sentences. If a speaker chooses actor voice over patient voice, she implicates that the uniqueness implication of the nominative patient doesn't hold. However, if the patient voice alternative is morphosyntactically blocked, an utterance of an actor voice sentence does not generate the same implicatures.

I argue that the Tagalog data provides evidence that pragmatic alternatives must be grammatically well formed to enter into pragmatic competition. This account requires that syntactic information must be available for the pragmatic component of interpretation, requiring discourse participants to reason about syntactic information in the calculation of an implicature.

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# Of referents and recipients: Pohnpeian humiliatives and the functional organization of Austronesian honorific registers\*

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## 1 Introduction

There are two clustered sets of honorific registers in Austronesian, those found in Indonesia and whose greatest elaboration is centered around the island of Java, and those found in island Melanesia, Micronesia, and Polynesia, but most robustly developed and attested in western Polynesia. Following the received terminology, I will refer to these as *SPEECH LEVEL SYSTEMS* and *CHIEFLY LANGUAGES*, respectively. This paper compares and contrasts the organization of these honorific vocabularies associated with, in turn, the Nuclear Malayo-Polynesian and Oceanic branches of the Austronesian language family. While early scholars sought to outline connections between the honorific registers employed on and around Java (e.g. Javanese, Madurese, Sundanese, Balinese) and the honorific registers employed in western Polynesia (e.g. Samoan, Tongan, Uvean), there are notable and important differences in the functional organization of honorific repertoires in these two regions (for an overview of the history of this debate, see Haugen and Philips 2010, p. 592). In island Southeast Asia, honorific repertoires tend to be differentiated in terms of the participant roles from whom, and to whom, deference entitlements are signaled. Even controlling for cases where the discourse referent is also a discourse recipient, formally distinct repertoires can be shown to defer to discourse recipients and discourse referents. In Oceanic languages, however, honorific vocabularies almost always signal deference entitlements of the associated discourse referent (but see the discussion of Pohnpeian humiliatives below). Honorific vocabularies in these languages are differentiated in terms of the social category of individuals with respect to whom they are stereotypically or appropriately employed.

This paper seeks to understand this complementarity in the functional organization of Austronesian honorific registers. I argue that in order to account for these differences we must attend to the ways in which the formal and functional structure of honorific vocabularies, patterns of honorific usage, cultural ideologies of rank and associated social structural distinctions, all mutually informed one another in the diachronic development of these registers. The method of diachronic reconstruction follows Silverstein's (1979) programmatic formulation of the relationship between linguistic ideology, language structure, and discursive usage. Having looked at this distinction in the way honorific vocabularies are organized, the paper homes in on the interaction of context-specific factors with the predominantly referentially-based honorific strategies employed in Oceanic languages. Where recipient-based factors do not condition the development of formally distinct register repertoires, how do context-specific factors become integrated into the system? It is here that Pohnpeian honorific vocabularies, and in particular the 'humiliatives', take on a special importance.

## 2 Distribution of honorific registers

*SPEECH LEVEL SYSTEMS* (SLSs) are found in quite a number of languages of island Southeast Asia. The best studied SLSs are those found on or around the island of Java, including Javanese

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(Errington, 1988), Madurese (Davies, 2010), Sundanese (Anderson, 1993), Balinese (Arka, 2005) and, further east, Sasak (Meyerhoff, 2015, p. 123). But there are also speech level phenomena reported for eastern Indonesia in the area surrounding Sulawesi (Buginese, Sangir, Taba; Bowden 2001). SLSs were historically associated with the sultanates empires that crisscrossed the region. So, for instance, Sundanese speech levels are thought to have been borrowed from Javanese in the 16th century, when the Mataram empire controlled west Java (Müller-Gotama 2001, p. 3, citing Purwo 1993, p. 252). See Fox (2005) for an overview.<sup>1</sup>

So-called CHIEFLY LANGUAGES (CLs) form a distinct cluster. These are best known from Western Polynesian languages like Tongan (Philips, 2010), Samoan (Milner, 1961), Fijian (Hocart, 1929; Schmidt, 1988), Rotuman (Schmidt, 2003), Uvean (also known as Wallis, Burrows 1937), and Niuean (Smith, 1983, p. 45). See Blixen (1969) for an overview. There is an interesting east-west split in where such registers are found; chiefly languages are not reported for Hawaii, New Zealand, Tahiti, or the Marquesas. Indeed, the Tongan empire seems to have been vital in the diffusion of honorific language in western Polynesia and Polynesian outliers.

Still deeper connections or homologies seem likely when comparing western Polynesian honorification with that found in island Melanesia and Micronesia. In Micronesia there are descriptions of honorific speech for Pohnpeian (Garvin and Riesenber, 1952; Keating, 1998), as well as for Pingelapese (Hattori, 2012). The best known CLs from Melanesia are those found in New Caledonia, especially the descriptions of Drehu and Nengone (Loyalty Islands) in Leenhardt (1946). The Melanesian cases beyond New Caledonia have been underappreciated in the secondary literature. In his essential compendium on social speech registers in Austronesian languages, Gary Simons gives evidence for the existence of honorific registers in the Solomon Islands functionally parallel to canonical CLs. Simons (1982, p. 218, n.9) describes CL-type phenomena from a number of languages in the area (Kia, also known as Zabana; Kwara'ae; and To'abaita, also known as Toqabaqita). See also his descriptions of Alu (Shortland Islands, Solomons) and Kahua (San Cristobal, Solomons) (cf. Maranda, 2001, p. 98 on Lau, Malaita). In these cases usage is gendered: women use honorifics in addressee-reference to (high status) men (see also Guiart, 1952; Fox, 1996, for Vënen Taut, also known as Big Nambas, in Vanuatu). As with Polynesian and Micronesian CLs, body-part terms and labels for comestibles are robustly attested.

### 3 Functional organization of register repertoires

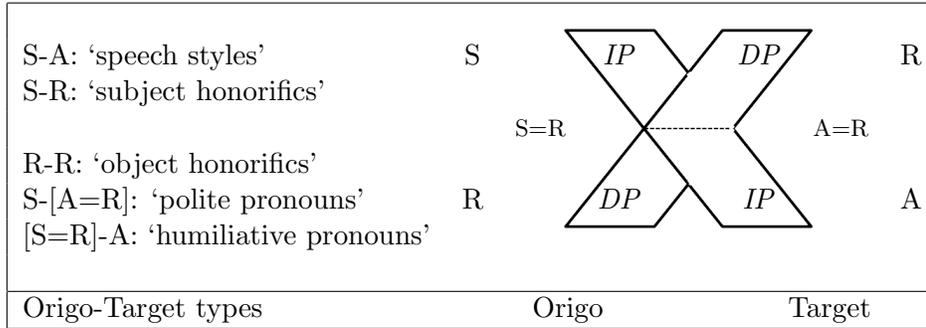
Returning to the broader comparison: we can observe that these two kinds of honorific register are not functionally organized in the same manner. Indeed, speech level systems (SLSs) and chiefly languages (CLs) reveal two functional principles for organizing honorific registers. I will distinguish these in terms of a functional typology by indexical focus of the honorific index, on the one hand, and a functional typology in terms of the social category of the indexical target, on the other. First we outline the theoretical apparatus.

Building upon Asif Agha's work in this area (Agha, 1993a), I treat honorific tokens as having the default function of indexing deference entitlements to a TARGET of honorification from some ORIGO of honorification. Honorifics imply such a minimally two-place relation. For instance, a

<sup>1</sup>I must apologize for not having a fuller discussion of honorification in eastern Indonesia; I either do not have access to the relevant literature or am unable to read the languages in which it is written. Two cases from eastern Indonesia, Taba and Tetun, are discussed in Section 3.3 and Section 6.5, respectively. Another potential candidate from eastern Indonesia is the Leti speech variety called *lirmarna* ('royal language'). This, however, would appear to be a distinct, if potentially related, phenomenon from the speech registers discussed in this paper (van Engelenhoven, 1997). This is an oratorical style in which lexical pairs, often specific to the genre, are employed together. The use of lexical pairs of this sort is a widely attested poetic trope in Indonesia (Fox, 1988).

polite second-person pronoun, like French *vous*, has the speaker as its origo, and the addressee-referent as its target of honorification. The set of interactional roles which serves as origo and target of an honorific index we will call the INDEXICAL FOCUS.

- (1) *Principal indexical focus types of honorifics which draw on the interactional roles of Speaker, Addressee, and Referent*<sup>2</sup>



Honorifics typically signal aspects of the social relationships which obtain between individuals occupying the interactional roles of speaker, addressee, bystander, and referent (Comrie, 1976; Levinson, 1983). On the left of (1) some canonical types of honorifics are represented in terms of their indexical focus characteristics. (I have glossed these types with labels often employed in the well-developed literature on Korean and Japanese honorifics.) On the right side of the display I have represented the relationship between origo and target of the honorific index in relation to the two overlapping functional planes which serve to specify the interactional roles of Speaker (S), Addressee (A), and Referent (R). The speech participant roles of Speaker and Addressee are specified on the INTERACTIONAL PLANE (IP) in and through the act of linguistic signaling. The interactional role of Referent, however, is specified on the DENOTATIONAL PLANE (DP) in relation to the propositional content of the utterance, whether that referent be the recoverable possessor of an honorific noun, or the subject or indirect object of an honorific verb.

This way of diagramming the relationships between indexical origo and target reveals certain asymmetries in the functional organization of honorifics. Honorifics typically have speaker as indexical origo and some other interactional role as indexical target. This makes sense if we think of honorifics as in some sense modalizing the speaker’s evaluation of deference entitlements owed the target by the origo of the index (cf. Potts 2005 on conventional implicatures, honorifics included, as involving ‘speaker orientation’ and ‘commitment’). Nevertheless, the speaker is not always the origo of an honorific index, even if we would like to say that speaker is still ‘committed’, in some sense, to the ‘conventional implicature’ of the index. Discourse referent can also serve as the honorific origo. Take for instance, the Javanese verb *caos* ‘to give’. The indexical presuppositions of this form are that the referent associated with the benefactive argument of the verb is owed deference entitlements by the referent associated with the subject of the verb. It is a Referent<sub>origo</sub>-Referent<sub>target</sub> index. So-called ‘object’ or ‘non-subject’ honorifics in Japanese and Korean have this structure as well, whatever other structured pragmatic implicatures these carry concerning the relative status of speaker to discourse referent (Uehara, 2011).<sup>3</sup>

<sup>2</sup>Labels for these types are taken from the Japanese and Korean tradition. Abbreviations: S for Speaker; A for Addressee; R for Referent; IP for Interactional Plane; DP for Denotational Plane (cf. Silverstein’s (1992) distinction between interactional text and denotational text). Paralleling Jakobson’s classic analysis of person deixis, where the participant roles of speaker and addressee are themselves presupposed by the type-level semantics of tokens occurring in the denotational text, some interactional roles are determined at the intersection of the interactional and denotational planes. This is indicated by the dotted line and the associated labels S=R, or, the Speaker is the Referent, and A=R, or, the Addressee is the Referent.

<sup>3</sup>Referent<sub>origo</sub>-Referent<sub>target</sub> honorifics deserve more attention as a problem for pragmatic analysis. One question

Notably, there is a structured asymmetry in which interactional roles can serve as possible origo or target of common indexical focus types of honorifics; indexical origo is equal to or higher than the indexical target on a hierarchy of the following sort.

$$\boxed{\text{Speaker} > \text{Addressee} > \text{Referent}}$$

Thus S-A, S-R, and R-R focus types are all attested as default projections of honorifics, but \*R-A, \*R-S, and \*A-S not. This hierarchy reflects the fact that honorifics are projections which are anchored in and built up from the interactional plane. Hence their properties as non-referential indexes whose signification is logically distinct from that of the denotational text (Silverstein 1976, 1992; cf. Potts 2005).

### 3.1 Indexical focus and speech level systems

Speech level systems (SLs) involve a quite rich subcategorization of honorific vocabulary by indexical focus type. Taking the very well described Javanese system as a point of departure (and I largely follow Errington’s 1988 definitive account here), we can note that there are at least three functional types. The vocabulary sets called *krama*, *madya*, and *ngoko* index speaker’s deference towards addressee. We will say that these forms have a Speaker<sub>origo</sub>-Addressee<sub>target</sub> focus (S-A). Another vocabulary set, *krama inggil*, is used to indicate speaker’s deference towards discourse referent. We will call these Speaker<sub>origo</sub>-Referent<sub>target</sub> focal honorifics (S-R). And yet a third set of vocabulary, so-called *krama andhap* (or ‘humble’ *krama*) indexes the relative statuses of two discourse referents. I will call these Referent<sub>origo</sub>-Referent<sub>target</sub> focal honorifics (R-R). (The corresponding honorific types for Korean and Japanese are ‘speech-styles’, S-A; ‘subject honorifics’, S-R; and ‘object’ or ‘non-subject’ honorifics, R-R.) I exemplify these distinctions with three Javanese lexemes which can be glossed as ‘to give’ but which differ in the indexical focus of their honorific function.

(2) *The verb ‘to give’ across three honorific repertoires in Javanese (Errington, 1988)*

| ORIGO-TARGET OF HONORIFIC      | ‘TO GIVE’     | REGISTER            |
|--------------------------------|---------------|---------------------|
| Speaker-Addressee              | <i>wènèh</i>  | <i>ngoko</i>        |
| Speaker-Referent=Subject/Agent | <i>paring</i> | <i>krama inggil</i> |
| Referent-Referent=Recipient    | <i>caos</i>   | <i>krama andhap</i> |

I should clarify a potentially misleading implication of the table in (2). Following Errington 1988, we should remember that the folk metapragmatic terminology (i.e. labels like *ngoko*, *krama andhap*, etc.) is not totally isomorphic with our analysis of functional types by indexical focus. That is, not all forms labeled by speakers as *krama andhap* forms function as R-R indexes, and so

here concerns the involvement of speaker in the evaluation of the status relationship between the two referents. For Tibetan, Agha (1993b, p. 97) writes of R-R honorifics that they represent ‘agent’s deference to recipient as estimated by speaker’. In Korean, the pragmatic implicature may be stronger. R-R honorifics in Korean are felicitous only where the referent associated with the grammatical ‘object [is] socially superior both to the subject/topic referent as well as the speaker’ (Brown 2011, p. 37, citing Yun 1993, p. 18; see also Kim and Sells 2007). If this is accurate then R-R honorifics in Korean might be treated as having a triadic focus, with two indexical origos (i.e. Speaker and Referent), much as with trirelational kin terms in the Australianist tradition (Garde, 2013). R-R honorifics seem to be prototypically employed in predications involving first person subjects and second person objects or indirect objects. They thus have interesting functional parallels to metapragmatic verbs which can function as ‘explicit performatives’ (Silverstein, 1987). The prototypicality of a use of these forms where both the denotational roles and the indexical focus roles projected by the form-type are laminated onto the speech-participant dyad likely accounts for local metapragmatic typifications of these forms as humbling (e.g. Japanese *kenjigoo* ‘self-humbling’; Javanese *krama andhap* ‘humble krama’; cf. the discussion below of humiliatives employed in first person reference).

and so forth. There is thus a probabilistic relationship between native classification by repertoire item and our functional types.

Now when we compare chiefly languages (CLs) along this parameter, they look relatively impoverished. Leaving aside the Micronesian cases (see below), we can observe that all CLs are organized in terms of only one indexical focus type—the Speaker<sub>origo</sub>-Referent<sub>target</sub> (S-R) focus type. That is, honorifics always index speaker’s deference to a discourse referent (whether the subject of an honorific verb, the possessor of an honorific noun, etc.). Evidence for this claim is presented in the following sections, but the topic has already been intensively discussed in Völkel (2010), which definitively shows that Tongan is a S-R system (see also Section 6.1).

### 3.2 Social category of target and chiefly languages

But indexical focus type is not the only way in which honorific repertoires can be functionally differentiated. There can also be a differentiation of honorific vocabularies in terms of the social category of the honorific target—that is, by restricting the set of individuals in reference to whom honorifics are, either stereotypically (qua honorific types) or prototypically (qua honorific tokens), employed (cf. Agha, 2007, p. 148 *infra*). Now if speech level systems more elaborately differentiate honorific vocabulary by indexical focus type, they also lack relative specificity in the social category of honorific targets. Taking Javanese again as our example, honorific language stereotypically indexes deference to persons who have a relatively high status within multiple social configurations: kinship (grandchild-grandparent relation; cf. Geertz 1989, p. 20), schooling (student-teacher relation), politics (subject-royal relation; Errington 1988), etc. As Blust (2013, p. 135) observes in comparing Polynesian and Indonesian honorific systems, ‘the Javanese system appeals more to achieved status than ascribed status’. Like T/V-systems in modern European languages, honorifics are resources for negotiating an indefinitely great number of social relationship types (see, for instance, Morford 1997 on French).

CLs contrast markedly with SLSs with respect to this parameter. For CLs, usage is tightly linked, at least at the level of norms of usage, to the ascribed social identity of the target of honorification (cf. Philips 2010 on divergences between explicit indexical stereotypes of honorific vocabulary usage and actual discursive practices of using them). The sensitivity of honorific forms to the social identity of the target is the single most important principle underlying the functional organization of CLs. For instance, in Tongan, there are three distinct vocabularies, one set stereotypically employed in reference to commoners, another in reference to chiefs, and a third for the king and his family. Extension of this vocabulary in the modern era has not involved a generalized usage but still a usage keyed to the particular social identities of honorific targets. Kingly vocabulary is used for the royal family, God/Jesus, and heads of state; chiefly terms for members of a chief’s family, elected members of parliament, judges, and magistrates (Philips, 2010). In Pohnpeian, honorifics are keyed to the statuses of secondary and paramount chiefs, and chieftesses. Even in systems which make a simply binary distinction between honorific and common forms, like Uvean, the social category of individuals towards whom honorific forms may be appropriately extended is rigidly circumscribed (Burrows, 1937). As Garvin and Riesenberg (1952, p. 203) write of the Pohnpeian semiotics of status, ‘attitudes with regard to rank, that is, title, are more clearly defined and more definitely formalized than those contingent upon other determinants of status’.

In (3) I exemplify this mode of register organization with three Samoan lexemes that can all be glossed as ‘to go’ but which differ in the social category of person for whom they are appropriately used.

(3) *The verb ‘to go’ across three repertoires in Samoan (Keating and Duranti, 2006)*

| ORIGO-TARGET OF HONORIFIC | ‘TO GO’      | SOCIAL IDENTITY OF TARGET |
|---------------------------|--------------|---------------------------|
| Speaker-Referent          | <i>afio</i>  | <i>ali’i</i> (chief)      |
| Speaker-Referent          | <i>maliu</i> | <i>tulāfale</i> (orator)  |
| Speaker-Referent          | <i>alu</i>   | commoner                  |

The difference in the functional organization of SLSs and CLs is reflected in a corollary distinction between the two register types; in CLs there is no mixing of honorific repertoires (Philips, 2010, p. 324). That is, speakers do not mix forms used for orators and forms used for chiefs, kings and titled nobility, etc. Meanwhile, in the speech level systems, register-mixing is ubiquitous. Indeed, such register-mixing is precisely what allows speakers to carefully grade status relationships with respect to one another. The effect of such mixing is a greater ambiguity in the classification of lexical items as discrete members of particular register repertoires.

### 3.3 Addenda and caveats to the typological generalizations

We have discussed the Oceanic and Indonesian types of honorific registers in terms of a set of exemplars – Javanese for the SLSs, Samoan for the CLs. Although these are largely representative examples, some cases do deviate enough from the expected pattern that they merit a brief discussion on their own terms. There are two cases from eastern Indonesia that require special attention, Taba and Tetun. I discuss Tetun in Section 6.5, so now we turn to the case of Taba, spoken in North Maluku province. Taba is probably the easternmost language in Indonesia attested to possess speech levels. The metapragmatic terminology employed to describe the different vocabulary sets is clearly related to that employed in other Indonesian languages; levels are distinguished as *alus* ‘refined’, *biasa* ‘ordinary’, and *kasar* ‘coarse’ (Bowden, 2001, p. 21). Bowden observes that ‘many of the *alus* forms. . . are loans from Ternatan, and presumably these derived their *alus* status from their association with the sultanate of Ternate’ (Bowden, 2001, p. 22). Although Bowden’s description is preliminary, we can nevertheless note the absence of differentiation by indexical focus type – all honorific forms are S-A focused; that is, equivalents to Javanese *krama inggil* or *krama andhap* are lacking. Typologically this is a rare pattern; where S-A focus is found S-R focus is almost always also found (see Agha 2007, p. 315-322 and further discussion in Fleming 2014a, p. 122-123). It suggests that the weakly developed SLS in Taba is a sociolinguistic contact phenomenon. The use of *alus* forms appears to be generalized to a wide set of social relationships; ‘*alus* forms should be used when one speaks to an addressee who is older than or of greater status than the speaker’ (Bowden, 2001, p. 21). Notably then, in terms of both the relative elaboration of S-A focus and in the relative underspecification of honorific targets by social category, Taba patterns more in line with other SLSs than with the CLs. This is expectable given the historical links with sultanates.

Malagasy represents another interesting case in terms of the typology as outlined. Interestingly, in terms of our functional criteria Malagasy honorifics appear to have patterned more in line with the Polynesian type than the Indonesian one. Sibree (1892, quoting personal communication from Rajaonáry) lists terminology current among the Betsileo for making reference to chiefs (cf. wordlists in Last 1896). There are three vocabulary sets differentiated by the social category of their referentially specified target: terms for commoners, terms for chiefs whose parents are still living, and terms for elderly chiefs (i.e. whose parents are deceased). (On Malagasy CL, see also Verguin 1957; Fee and Gueunier 2003.) Similar to Pohnpeian, Fijian, and Tongan, Malagasy honorific terminology draws upon meteorological metaphors to denote the body parts and actions of chiefs, perhaps a reflection of similar ideologies of divine kingship. Additionally, body-part terms are differentially affected, a central site for the elaboration of honorific vocabulary in the Melanesian

and Polynesian registers. One should note also the elaboration of post-mortem name *fady* (taboo) in Madagascar, paralleling chiefly name taboo in Polynesia (Salmon 1927 for Tahiti, Erskine 1853, p. 44 for Samoan, and Simons 1982 for a survey).

## 4 Fluid focus: A third functional type

In addition to the two strategies that we have discussed for differentiating honorific repertoires, there is a third way in which honorific repertoires become functionally stratified. This third type, represented by Australian Aboriginal MOTHER-IN-LAW LANGUAGES (MILLs), will aid us in our later discussion of Pohnpeian humiliatives. Affinal avoidance vocabularies were historically employed across a wide swath of Aboriginal Australian speech communities. These MILLs are most robustly attested in northern Queensland (e.g. Dyirbal, Yanyuwa), Cape York Peninsula (e.g. Guugu-Yimidhirr, Wik, Umpila, Kunjen), Arnhem Land (e.g. Mangarayi), and the Kimberley (e.g. Worora, Gooniyandi) (see Fleming 2014a,b, 2015 for overview and citations). In terms of their register repertoires, MILLs consist of large vocabularies (repertoires are typically exclusively made up of open-class items) which substitute for everyday vocabulary items across a range of indexical focus types. This can be seen in (4) for the language Wik (Cape York Peninsula).

- (4) *Gradient avoidance of everyday speech, and corresponding usage of MILL, by kin relationship of indexical origo to indexical target in Wik (Sutton, 1978; Thomson, 1935)*<sup>4</sup>

|                 | RECIPIENT-TARGET | ADDRESSEE-TARGET | REFERENT-TARGET |
|-----------------|------------------|------------------|-----------------|
| Wife's mother   | x                | *                | x               |
| Wife's brother  | x                | x                | x               |
| Younger sister  | -                | x                | x               |
| Father          | -                | -                | x               |
| Father's father | -                | -                | -               |

In MILLs the range of indexical focus types across which speakers employ the avoidance vocabulary is an iconic-index of how heightened the avoidance relationship is between  $origo(=speaker)$  and target. For the most tabooed social relationships, like the one between mother-in-law and son-in-law, the MILL was employed whenever the two found themselves in each other's co-presence. That is, the MILL functioned as a recipient-focal index. For other, less ritually sensitive avoidance relationships—like the relationship between an elder brother and a younger sister—the avoidance register was employed in address but not in all co-present linguistic communication. For still other respect relationships, like the alternate generation consanguineal relationship between father and daughter, MILL vocabulary might be employed in reference to the actions of the relative while elsewhere everyday vocabulary was employed.

I call honorific or avoidance registers of this kind FLUID FOCUS systems, since tokens of the same honorific types have different indexical focus characteristics depending upon the identity of the indexical target. Such fluid focus systems are structured at the intersection of the two strategies discussed above. If SLSs rely on indexical focus to the exclusion of social categorization of indexical target, and CLs rely on social categorization of indexical target to the exclusion of indexical focus, then in MILLs both principles operate together to determine the target of the index. Note that the potential for conflicting interpretations of honorific values are reduced by the following de facto pragmatic hierarchy of indexical focus types:

<sup>4</sup>An 'x' indicates the normative obligation to use MILL, an '\*' indicates a taboo on use of all speech (i.e. address-avoidance). The kinterm propositus is here equivalent to the indexical origo and the kinterm referent to the indexical target. The diagram is from the perspective of a male ego and speaker.

Recipient &gt; Addressee &gt; Referent

This hierarchy is meant to reflect the fact that recipient-focal usage functionally suspends (not ‘neutralizes’, note) addressee-focal usage, and both recipient-focal and addressee-focal usages suspend referent-focal usage. We will return to fluid focus systems, and the ordered relationship between recipient- and referent-focused honorific functions later in the paper. In the meanwhile, let’s return to the Austronesian data.

## 5 Diachronic development of chiefly languages

Having underlined the distinction in how Oceanic and Indonesian honorific registers are functionally differentiated, I now turn to the question of the diachronic development of chiefly languages (CLs). What drives the functional stratification of honorific languages by social category of indexical target? In accounting for this development we must attend to the relationships between social and linguistic structures, semiotic practices, and cultural ideologies particular to Oceanic contexts. Crucially, I argue that this process is motivated by what we might term RECIPIENT-EFFECTS.

### 5.1 Recipient effects on speaker-referent honorification

In an interesting experimental study of person reference in English, Murphy (1988) illustrates an important interaction of the relationship between speaker and discourse recipient on the choice of sociopragmatic variant employed in reference to an absent third party. Simplifying considerably, Murphy showed that speakers<sub>i</sub> often employ more exaltive or deferential kinds of person referring expressions than they<sub>i</sub> otherwise would, in favor of expressions that current discourse recipients<sub>u</sub> would themselves<sub>u</sub> employ for the referents<sub>o</sub> in question. That is, I might refer to my colleague<sub>o</sub> with [First Name] in general, but in speaking to his<sub>o</sub> or her<sub>o</sub> student<sub>u</sub> employ [Title + Last Name] to refer to him<sub>o</sub> or her<sub>o</sub>. Let’s call this effect HONORIFIC RAISING, since speakers employ a more deferential form than they might otherwise employ as a function of the social relationship between recipient and referent. Honorific raising seems to be linked to an egalitarian ethos where status asymmetries between speaker and recipient are downplayed through choice of pragmatic variant used for referent. (Name-dropping as a gauche practice of self-raising relies precisely on the opposite principle—the speaker employs a person referring expression which discourse recipients are not socially authorized to employ.)

Notably, in Polynesian ethnography there is evidence for the opposite process. Elizabeth Bott offers an ethnographic description of this kind of process in the Tongan context:

[W]ithin the confines of their own village, people may think of their title-holder as ‘*eiki* [‘chief’] and when speaking to him may use the ‘chiefly language’ – special terms of respect which are used to people of high rank – even if he is not an aristocrat by blood, BUT THEY WILL NOT USE THIS CHIEFLY LANGUAGE TO THEIR TITLE-HOLDER WHEN OUTSIDERS OF HIGHER RANK ARE PRESENT. (Bott 1981, p. 11, cited in Völkel 2010, p. 234, n.18; cf. Blixen 1966, p. 22)

Let’s call this process HONORIFIC LOWERING, since speakers employ less deferential forms than they would otherwise employ as a function of the status relationship between recipient and referent. Within the framework presented in Agha (2007, p. 328), both honorific raising and honorific lowering involve transposition of the origo of deference from the speaker to discourse recipient. Now if honorific-raising has the effect of augmenting the production of honorific forms (when speaking to an

addressee who normatively would or should use them), honorific-lowering telescopes honorific usage: in the co-presence of the highest status individuals, honorifics tend to be only used in reference to those individuals. And indeed, in descriptions of Polynesian honorific usage we find that honorifics are restricted in their use (a) in making reference to only the highest ranking individuals, and (b) to contexts where those individuals are present. It is no accident that descriptions of Oceanic honorifics are almost always centered in the ceremonial contexts where high-status individuals are co-present with one another (cf. Duranti's 1981 work on the Samoan *fono* or Keating's 2000 work on Pohnpeian feasting, or the various other thick descriptions of *kava* ceremonies).

Though more research is needed to substantiate the theory, it is plausible that honorific lowering has played an important role in the diachronic development of the register. At the same time, restrictions in the application of honorific forms to members of particular social strata is clearly linked to widespread ideologies of rank particular to Polynesian and Micronesian chiefdoms. Polynesian chiefdoms are often described as having a conical hierarchical structure wherein each individual has an absolute rank with respect to every other individual in the society (Kirch, 1984). In Polynesia, rank hierarchy is an all-encompassing model. These rank hierarchies are underwritten by cultural ideologies which frame the distinction between nobles and commoners as a distinction of essence. These social structures and culture ideologies clearly contoured how speakers understood honorifics. The idea of chiefly *tapu*, for instance, is reflected in the semantic domains differentially affected by honorific language. There is an analogy between the avoidance of the body of the chief, his shadow, his leftovers, and the avoidance of common terms in referring to his actions and appurtenances (Shore, 1989). Indeed, there is a high frequency of body-part terms and terms for comestibles in honorific vocabularies, terms whose denotata are circumscribed by non-linguistic taboo-avoidances (Schmidt, 1988).

My tentative conclusion is that a pattern of usage (honorific lowering) which tends to mirror the absolute rank hierarchy not only between speaker and referent, but also between discourse recipient and referent, links up with an ideological articulation of social hierarchy which draws a stark dividing line between nobles and commoners. Together, these factors motivated a diachronic development wherein honorific variants became keyed to only the highest ranking classes of the society. In particular, since honorifics 'ascend' the social hierarchy on this model, we expect terminology for highest ranks to be oldest, with subsequent honorific vocabularies attaching to the next-lower group (i.e. kingly honorifics should be historically older than chiefly honorifics). Interestingly, this sequence is supported by the diachronic reconstruction of kingly and chiefly levels in Tongan in Haugen and Philips (2010).

## 6 Recipienthood in Micronesian registers

At this point I would like to shift to focus on Micronesian honorific registers in particular. This is because I think these crystallize the interesting interplay between reference and recipienthood that I have argued is central to the development of CLs. In the literature on so-called 'social deixis', Pohnpeian is often cited as an exemplar of 'bystander honorifics' (Levinson, 1983, p. 90-91). But how should we understand recipient-sensitivity in Pohnpeian honorifics?

Levinson cites Garvin and Riesenbergs (1952, p. 203), where we find the following description: 'Honorific speech, especially to royalty, is used not only in addressing superiors, but in any act of speech in their immediate presence. The use of royal honorifics is mandatory in speaking also of the two highest titles even in their absence'. There is a certain ambiguity in interpretation here, one reflected elsewhere in descriptions of CLs (cf. Keating and Duranti 2006). Oceanic honorifics

are commonly described as being used ‘of or to’ a high status referent.<sup>5</sup>

Note that there are two possible readings of these formulations, one disjunctive and the other conjunctive. On the disjunctive reading, the same honorific vocabularies would be used either in referring to chiefs (regardless the identity of discourse recipients) or in addressing chiefs (regardless the identity of discourse referents). That is, CLs would pattern, just like MILLS, as a fluid focus system, with recipient focus outranking referent focus (see Section 4 above). (Remember that in SLSs of western Indonesia these different indexical functions are achieved, only by formally distinct vocabulary sets.) Alternatively, one could read these descriptions conjunctively. On this reading, honorific vocabulary would be employed when referring to a chief who was also a discourse recipient of the token in question. In line with the analysis in Völkel (2010), the conjunctive reading yields a more accurate picture of the sociolinguistic realities of Oceanic honorification. Evidence suggests use of honorific vocabulary is indeed ‘mandatory’ in ceremonial contexts where highest ranking individuals are present (Garvin and Riesenberg 1952, p. 203, 206; cf. Shore 1982 for Samoan). But even where exaltive honorific variants are employed in the co-presence of those targets, they are still only employed in reference to them. We can see this in Philips’ (2010) careful analysis of honorific tokens in Tongan. Philips (2010, p. 329, Table 5) distinguishes ‘referent’ and ‘addressee’ disjunctively as distinct indexical targets of honorific usage. But a close analysis of the transcripts provided in the text illustrates that all of the ‘addressee’-targeting tokens (all but one are tokens of the verb of motion *me’a* ‘to come/go’) are also cases where the addressee is the referent (Philips 2010, p. 325, transcripts 4 and 5).<sup>6</sup>

The takeaway here is that honorific tokens in Oceanic discursive practice almost always specify the target of honorification by their co-textual association with referring expressions that pick that individual out; they are referent focal honorific registers. Nevertheless, because of the way in which the use of honorifics becomes tied to the status signaling of discourse recipients, as well as discourse referents, the contexts in which tokens are most ubiquitously employed are the ones in which highest status individuals are co-present. What is notable in the Micronesian languages of Pohnpeian and Pingelapese is that there is evidence that this tight correlation between recipienthood and honorific usage has itself been grammaticalized. That is, there is evidence that in these cases the social identity of discourse recipients is part of the default (or first-order) signification of honorific vocabularies. Since the Pohnpeian data are much richer, the majority of my discussion will focus on that language.

<sup>5</sup>Here are some representative examples: ‘When SPEAKING OR REFERRING TO A BIG MAN, special lexical items are used in place of common terms for many body parts and bodily actions’ (Simons, 1982, p. 204, on Zabana); ‘Of chiefs there are three grades, not distinguished by particular titles, but by the terms which are USED IN SPEAKING OF OR TO THEM’ (Hale, 1846, p. 28, on Samoan); ‘There was a special series of words used in referring to the king, or in addressing him, which were not used in other cases or in ordinary conversation’ (Smith, 1983, p. 44-45, on Niuean); ‘... persons who are ADDRESSED AND SPOKEN ABOUT in “polite style”...’ (Krupa, 1973, p. 82).

<sup>6</sup>These examples come from a church service where the congregation is collectively addressed using the honorific forms. It would seem, then, that usage does not follow the cultural expectation that honorifics be employed only for indexical targets of particular ascribed social identities. Notably, however, informants rationalize the use of exaltive forms in addressing a crowd within the logic of social category specificity—the use is explained by the fact that a noble personage might potentially be a member of the collectivity to whose actions reference is made. It is not just in Tongan that ‘formal’ usage is complexly tied up with the potential of high ranking individuals being a possible discourse recipient. The use of honorific language on Pohnpeian radio is understood as necessary because a chief might be listening (Keating, 2000). Similar considerations obtain for the use of Javanese courtly honorific register *basa kedhaton* in written missives sent to and from the court at Yogyakarta (Errington, 1982); the king is a potential reader of the message. It is interesting to think about the way in which the potentate is figured as an overhearer in these instances, and thus as cueing an ethical comportment of respect in his or her subjects. Contrast this with the Western visually based model of state power through panopticon-themed oversight.

## 6.1 Pohnpeian honorific repertoires

Pohnpeian honorific registers can be functionally differentiated into at least four distinct types (the labels I employ follow those employed by Keating 1998): (1) the unmarked, everyday, or ‘common’ vocabulary items; (2) the canonical honorifics, which Keating refers to as ‘exaltives’—within this category there are different vocabulary sets employed for paramount chief (*Nanmwarki*), the secondary or talking chief (*Nahnken*), and for their close family members; (3) polite pronouns used in addressee-reference (*komwi* is the polite pronoun used widely in addressee-reference, not just for chiefs, while the third plural, *ihr*, is prototypically used for addressee-reference to paramount chiefs, Keating 1998, p. 45);<sup>7</sup> (4) lastly, what Keating (following Rehg 1981) labels ‘humiliatives’. We will be most interested in the exaltive and humiliative classes.

Pohnpeian honorifics occur in possessive classifiers, verbs, and nouns, though not all the same semantic domains are covered by both exaltive and humiliative vocabularies. For instance, there are exaltive body part terms but no corresponding terms in the humiliative repertoire (Keating, 1998, p. 49). The exaltive forms are used in reference to the person, action, or appurtenances of chiefs. Humiliatives are used in all other human reference (and perhaps even for non-human referents). A structural fact of particular note in looking at the humiliative repertoire is the marked cross-repertoire hypernymy of humiliative forms, which involves a complete neutralization of intra-paradigm structural-sense oppositions. All possessive classifiers of common Pohnpeian are replaced by one form—the common general classifier (which inflects for person) plus the form *tungoal* (see Keating 1997 for the network of semantic and symbolic associations connected with this term). Similar paradigm-internal neutralization can be observed for ‘locative verbs and transitive verbs involving location, knowledge, and speaking’ (Keating, 1998, p. 73). A range of intransitive verbs of motion as well as transitive verbs of speaking and cognition are substituted for in honorific speech. Notably, the humiliative paradigm of verb roots is again neutralized, maintaining only a minimal structural-sense contrast of verbal valence by use of the humiliative transitivizer *-wan*. Even though the humiliative paradigm reduces to one stem (*patoh-*) the use of the elaborate set of directional suffixes allows for a wide range of locative verbal actions to be expressed (e.g. *patoh-di*, where *-di* is the downward directional suffix, can be glossed as ‘to sit’; see Keating 1998, Table 3.1 for examples).

(5) *Verb forms across Pohnpeian register repertoires (Keating, 1998, p. 47)*

| ‘COMMON’       | GLOSS         | ‘EXALTIVE’                  | ‘HUMILIATIVE’          |
|----------------|---------------|-----------------------------|------------------------|
| <i>koh-</i>    | locative verb | <i>ket-</i>                 |                        |
| <i>alu</i>     | walk          | <i>ket-, mahliel</i>        | <i>patoh</i>           |
| <i>dou-</i>    | climb         | <i>ket-, paleke</i>         | (+ DIRECTIONAL SUFFIX) |
| <i>mwohndi</i> | sit           | <i>ket-, mwoalehdi</i>      |                        |
| <i>wah-</i>    | carry         | <i>ketikih-, limeh-</i>     |                        |
| <i>ese</i>     | know          | <i>mwahngih</i>             | <i>patoh + wan</i>     |
| <i>nda</i>     | say           | <i>mahsanih, poangoakih</i> |                        |

Fleming (2015) illustrates that context-specific lexical avoidance is tightly correlated with the

<sup>7</sup>The second person honorific pronouns in Pohnpeian are revealing. Although *komwi* is likely derived from either the second person dual (*kumwa*) or the second plural (*kumwail*), the royal honorific is transparently the same as the third plural pronoun *ihr*, a form which is also used as a general honorific pronoun in third person reference. Notably, then, within the highest honorific pronoun paradigm there is a neutralization of the distinction between second and third person marking. Addressee honorification in Pohnpeian is achieved precisely by symbolically negating the status of the indexical target as addressee at the plane of denotational indexicality (i.e. deixis). Though I do not pursue the possibility here, note that pragmatically driven neutralization of second person marking may motivate recipient targeting precisely because honorific indexing along the S-A axis is blocked.

development of many-to-one morphological correspondences across register repertoires. These Pohnpeian humiliative data are consonant with that finding; the usage of these semantically washed-out humiliatives is keyed to interactional context (i.e. they are recipient-focal).

In terms of our functional typology of honorific registers, what is most interesting about Pohnpeian is the consistent finding that ‘exaltive’ and ‘humiliative’ forms are employed exclusively, or nearly exclusively, in the co-presence of their honorific targets. At first blush, then, this would appear to be a pattern that parallels the use of speech levels in Javanese (cf. ‘speech styles’ in Korean). Looking at examples, however, it is clear that these honorifics still have functional affinities to the Oceanic pattern. Even if their use is keyed to contexts where the royal targets picked out through their usage are co-present, exaltives are still functioning as referent focal indexicals. Exaltives are specifically and differentially employed in referring to the actions of chiefs. There is some question about whether exaltives are employed outside of the co-presence of royals. Keating’s compendious studies do not give any examples of such a usage (but see discussion of the use of exaltives in radio broadcasts in note 6). At least at the time of Garvin and Riesenbergs’s (1952, p. 203) work, use of exaltives for the highest rank (i.e. ‘royal honorifics’) was ‘mandatory in speaking also of the two highest titles even in their absence’. From both Garvin and Riesenbergs’s study and Keating’s monograph on the subject, we get a picture wherein exaltives are used in reference to co-present referents and potentially also in reference to highest ranking individuals outside of their presence.

The humiliatives, however, are a different matter. These forms appear only to be employed in the co-presence of chiefs (Keating p.c.; but see Rehg 1981, p. 366). That is, humiliatives are exclusively used in the co-presence of individuals for whom exaltives should be used in reference. Referentially, these forms appear to be used in a residual manner. That is, exaltives are used in referring to actions of chiefs, and humiliatives are used for denoting these actions elsewhere (even with inanimate subjects!). (‘Humiliative empty stems are used in speaking of others—including the speaker—in the presence of optionally higher, mandatorily the highest, titles’, Garvin and Riesenbergs 1952, p. 206.) This gives the humiliative set of honorifics functional particularities that distinguish them from other Oceanic honorific registers (but see discussion of Tetun, below). In the case of the humiliatives, at least, the identity of a certain social category of recipient is a default (or first-order) presupposition of the use of tokens of the form. Here, recipient-focus seems to have been grammaticalized into the register.

## 6.2 Self-reference and humiliatives

Humiliatives are a special kind of honorific expression which signals deference through, typically, self-lowering. Humiliatives seem typically to be referentially centered and, more specifically, to be limited to speaker-reference or linked extensions, like reference to close kin of speaker. Though they are used to debase or otherwise metaphorically lower the referent, they are different than simply pejorative or insulting terms in that their use is employed as an act of deference towards an individual other than the referent associated with the humiliative expression. In the examples that will concern us here, humiliatives are employed to show deference to some discourse recipient (i.e. addressee or bystander).<sup>8</sup>

Paradigmatically, humiliatives fill a structural position which is underdeveloped in honorific

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<sup>8</sup>R-R focused honorifics are often treated as humiliatives (or ‘humilifics’) in the literature on Japanese and Korean honorification. This reading reflects folk metapragmatic terminologies. In Japanese non-subject honorifics are called *kenjigoo* or ‘humble’ forms; in Javanese R-R honorifics are called *krama andhap* or ‘humble *krama*’. Here my emphasis is somewhat different, I am discussing cases where indexical origo is referentially specified (typically [S=R]-A focused forms like humiliative first person pronouns).

language–honorific marking is typically suspended in first-person reference. Self-reference with honorifics is typically avoided, not just in the languages in our sample but cross-linguistically. In some cases this avoidance of self-reference is notionally extended to include sociologically relevant units of which speaker is an emblematic member (e.g. kinship units, caste groups, etc.). The common treatment of Japanese honorifics as involving an in-group/out-group distinction can be seen as a notional extension of avoidance of honorifics in self-reference (Agha, 2007, p. 329).

Complementing the avoidance of honorifics in self-reference we see the privileged elaboration of humiliative expressions in form classes whose tokens are prototypically employed for self-reference. Humiliatives seem most often to be grammaticalized in first person referring expressions. Likely this is because the first person stands, among the true person categories, in symmetrical opposition to the second person, the category differentially extended for reference to addressee. If the most common category for honorific expression cross-linguistically is the second person pronoun, the most common category for humiliatives is the first person pronoun.

(6) *Honorific polarity and person categories*

|                                                                                                             |                                                                                                           |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| First person pronoun<br>[Speaker = Referent <sub>origo</sub> ] – Addressee <sub>target</sub><br>HUMILIATIVE | Second person pronoun<br>Speaker <sub>origo</sub> – [Addressee = Referent <sub>target</sub> ]<br>EXALTIVE |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|

In sum, it is the indexical referential types whose denotational content specifically makes appeal to the interactional roles that are the origo and target of non-referential indexical functions—speaker and addressee—which are most often the loci of status-raising and status-lowering honorification. The semantic derogation of referent is typically quite transparent; Ishiyama (2010, p. 23-24) offers data from Achenese, Burmese, Japanese, Khmer, Malay, Thai, and Vietnamese as examples of ‘Asian languages where first person forms come from humble nouns such as “servant/slave” and second person forms from respectful nouns such as “master/king”’.

Viewed within this lens, humiliatives in Pohnpeian appear to be rather anomalous. Firstly, it is notable that in Pohnpeian, though there are honorific second person pronouns, there are no humiliative first person pronouns (Keating 1997, p. 249; cf. Tokelauan for ‘self-deprecating’ first person pronouns in an Oceanic language, Hooper 1996, p. 14). But if their path of grammaticalization is one that does not emerge through a paradigmatic contrast between first and second person pronouns, how should we understand the diachrony of Pohnpeian humiliatives?

### 6.3 The diachronic development of Pohnpeian honorific registers

Although recipient effects can be discerned in a number of descriptions of Oceanic honorification, Pohnpeian (and Pingelapese) are of particular interest because of the way in which recipient-focus becomes grammaticalized into the system. Our historical reconstruction assumes that these systems were, historically, also primarily based on referent focus. The exaltive vocabulary likely emerged first, and functioned more or less independently of recipient-focal functions. The rare recipient-focal humiliative system was a secondary development. A number of considerations suggest the historical priority of exaltives.

(i.) The form types affected: The linguistic form-types which humiliatives substitute for (i.e. the set of verbal predicates and possessive classifiers) all also have exaltive forms. But not all of the form-types with exaltive substitutes (e.g. body part terms, select adjectives and verbs) share humiliative counterparts. In other words, the form types with humiliative variants are a subset of the set of form types which have exaltive variants. This suggests that the development of humiliatives has followed the lead of the exaltive paradigms, not vice versa. At the same time, the

form types in question are those canonically affected in referent-focal honorification, not recipient-focal honorification (Agha, 2007, Table 7.5).

(7) *Suggested diachronic development of Pohnpeian humiliatives*

| EXALTIVES                      | HUMILIATIVES                   | TIME           |
|--------------------------------|--------------------------------|----------------|
| Speaker-Referent               |                                | t <sub>0</sub> |
| ↓                              |                                |                |
| Speaker-[Referent = Recipient] |                                | t <sub>1</sub> |
| →                              | [Speaker = Referent]-Recipient | t <sub>2</sub> |
|                                | ↓                              |                |
|                                | [Speaker + Referent]-Recipient | t <sub>3</sub> |
|                                | ↓                              |                |
|                                | Speaker-Recipient              | t <sub>4</sub> |

(ii.) Comparative markedness: Pohnpeian recipient-focal humiliatives are marked in both broadly typological terms and in the narrower frame of Oceanic honorification. Lexical humiliatives are rare cross-linguistically, and as we have seen, inasmuch as they form part of honorific registers they typically occur in form types differentially employed in speaker-reference (e.g. would-be first person pronouns in southeast Asian languages). At the same time, though speaker-referent honorifics are well represented in other Oceanic languages, these other languages lack recipient-focal honorifics and humiliatives.

Like other lexical honorific registers in Oceania, the Pohnpeian system was likely a Speaker-Referent honorific repertoire that only later became keyed to chiefly contexts (see t<sub>0</sub> > t<sub>1</sub> in (7)). Whether categorically or merely probabilistically linked to the presence of chiefs, this pattern of usage would have served as the basis for the development of humiliatives in polar opposition to the exaltive paradigm, perhaps first only in speaker-reference (t<sub>2</sub>). That is, just as there is a calibration of the form-classes affected in exaltive and humiliative repertoires (i.e. possessive classifiers, verbs) so too is there a mirroring of indexical focus types between the two paradigms (i.e. ‘exaltive’ S-[R=Rec] focus : ‘humiliative’ [S=R]-Rec focus). Given the connection between humiliatives and speaker-reference elsewhere, it is likely that such a stage preceded the generalization of humiliatives to refer to all individuals of non-chiefly rank in the co-presence of chiefs (t<sub>3</sub>). Keating’s data suggest that contemporary usage involves a further modification of the pattern. Here there are examples of humiliatives being used in a truly residual manner; for instance the intransitive humiliative verb of motion, *patoh*, is used to refer to the movement of an ice box (Keating, 2000, p. 309). This suggests the possibility that the complex triadic indexical focus of humiliatives at t<sub>3</sub> (cf. Agha’s 2007, p. 329 ‘conjoined categorial focus’) is reanalyzed as a dyadic Speaker-Recipient honorific employed residually in all non-chiefly reference in chiefly contexts.

### 6.4 Pingelapese addressees

Further evidence for the grammaticalization of recipientship within the honorific systems of Micronesia comes from the neighboring language to Pohnpeian, Pingelapese. At face value, Pingelapese is a counter-example to the broader Oceanic pattern. Hattori describes honorific vocabulary as addressee-focal: ‘[M]y older language consultants reported that the polite vocabulary, *loakaeiah wahu* “language of respect”, is used to address high title holders and elders. Women should use it with their brothers, the elders say...’ (Hattori, 2012, p. 42). The word-lists and a further comment (‘Other polite expressions are simply created by adding the polite second person singular possessive suffix *-mwi* (e.g. *aewe* “mouth” > *aewae-mwi* “your mouth, polite”’), Hattori 2012, p. 42) make

clear that honorific variants are employed only in addressee-reference (i.e. S-[R=A]). Just as with Pohnpeian, recipienthood is functionally incorporated into the structure of the CL.

### 6.5 Tetun *lia na'ini*

Another Austronesian language with a significant set of lexical humiliatives is Tetun (West Timor). The honorific register of Tetun is called *lia na'ini* 'noble language'. Though it is found in eastern Indonesia, this register has some similarities with the Oceanic pattern. Van Klinken (1999, p. 7) writes that the register is employed 'on formal and ritual occasions, including the formal telling of origin myths, preaching of sermons and discourses in formal meetings'. But *lia na'ini* is not exclusively employed as an oratorical style. Citing Tom Therik's dissertation, van Klinken writes that the 'noble language' 'is also appropriately used in daily conversations with people of noble rank', but that the social domain of individuals conversant with the register is limited to those, like ritual specialists, who are in close contact with nobles. Tetun has interesting parallels with Pohnpeian. Here, as well, we have a referent-focal register which is employed only in the co-presence of the social groups targeted by 'exaltive' forms. Unfortunately, the description in van Klinken is short, and I have not been able to consult Therik's writings on the subject. We would like to know whether humiliatives are only used in speaker reference or in reference to all non-nobles. Whatever the case may be, it is notable that the expansion of a humiliative vocabulary is, as with Pohnpeian, correlated with an honorific usage keyed to contexts where targets of honorification are discourse recipients.

### 6.6 Javanese courtly language *basa kedhaton*

Javanese speech level usage at the royal courts of Yogyakarta and Surakarta offers another revealing comparative case to that of Pohnpeian (Errington, 1982, p. 90-91). The 'palace language' (*basa kedhaton* at Yogyakarta, *basa bagongan* at Surakarta) was characterized by the suppression of Speaker-Referent honorifics (i.e. by the absence of *krama inggil* forms) in acts of reference to anyone other than the king. Note then that here, too, non-honorific reference is an index of the presence of a royal recipient. In both the case of Javanese courtly language and that of Tetun and Pohnpeian humiliatives, reference to non-royals moves 'down' a level from that which is employed in non-courtly contexts.

## 7 Conclusion

This paper seeks to make three different contributions to three different audiences. First, it offers an, admittedly, incomplete typology of the functional organization of honorific registers. That is, it is concerned with the attested ways in which honorifics, as relational social indexicals, specify the individuals whose relative statuses are inferable from the use of honorific tokens. To formulate this typology requires thinking about how speech participant roles are integrated into the type-level pragmatics of honorifics (cf. Comrie, 1976; Corbett, 2012). To do this I have tried to develop Agha's (1993a) analytic of INDEXICAL FOCUS. It is my hope that this theoretical and typological framework will be useful for those interested in the subjects of SOCIAL DEIXIS (after Levinson, 1983) and CONVENTIONAL IMPLICATURE (after Potts, 2005), even if it is not couched in the same theoretical apparatus. Sections 3 and 4 will probably be of most interest for scholars in those traditions.

Second, for linguistic anthropologists, it is my hope that the typological framework offers a comparativist counter-point to the now dominant particularist narrative whose shibboleth is LANGUAGE

IDEOLOGY. The typology presented here illustrates real differences and similarities across cases of honorific language. These differences and similarities should be taken seriously; once placed within such an etic framework, the parallels between, for instance, Polynesian, Micronesian, and Malagasy chiefly registers cannot be dissolved by particularist rhetorics of incommensurability. Though it may not be à la mode to admit it, these parallel honorific formations do seem to be non-arbitrarily related to social structures (pace Irvine, 1992). To be sure, sociocultural structures, if one may still speak of them, are always themselves mediated by cultural ideologies. But the same can be said in reverse. Linguistic and cultural ideologies are not divorced from social infrastructures. I hope that this case study supports the argument that we should not privilege ideology over structure—or, what is worse, dissolve structure into ideology.

Thirdly, for Austronesianists, the goals of this paper are admittedly more humble. The central empirical claim—that there is a marked contrast between Indonesian and Polynesian honorific languages—has been a widely understood fact since Tregear (1895). Nevertheless, I hope that the comparison of these honorific registers in terms of functional types might be helpful for those working on particular languages, and help us to think through intermediary cases. I feel bad for not having been able to integrate scholarship written in Dutch and Indonesian that treats eastern Indonesian honorific registers (in particular in and around Halmahera). That is certainly a lacuna of this paper. The Tetun case is notable for how divergent it would appear to be from other Indonesian honorific registers like those found in Javanese, Balinese, Madurese, Sasak, and Sundanese. Taken together more work needs to be done on honorific language in eastern Indonesia. For Oceanic languages, it is the Solomons and Vanuatu that have been most overlooked (see Section 2). Closer studies of honorification in both of these regions are desiderata.

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# Distinguishing nouns and verbs: Against nominalism for Tagalog\*

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## 1 Introduction

It has been pointed out (see Himmelmann, 2008; Kaufman, 2009, and references therein) that Tagalog (Austronesian) exhibits a striking flexibility in the kinds of constructions that appear in predicate and argument positions. Notably, for the purposes of this paper, apparent nouns and apparent verbs exhibit this flexibility, as Kaufman (2009) shows with the following pair of examples. We find that both *aso* ‘dog’ and *nag-ingay* ‘made noise’ can appear in either sentence-initial predicate position or in argument position (marked by the determiner *ang*).<sup>1</sup>

- (1) a. Nag-ingay ang aso.  
PFV.AV-noise NOM dog  
‘The dog made noise.’  
b. Aso ang nag-ingay.  
dog NOM PFV.AV-noise  
‘The one that made noise was a dog.’

Some scholars take the flexibility exemplified above as evidence for the lack of a syntactic distinction between nouns and verbs. Kaufman (2009) takes this position and further argues that many aspects of Tagalog syntax that have been the subject of much debate in the literature can be straightforwardly accounted for under this view. Such aspects include Tagalog’s well-known extraction restriction, its so-called ‘voice system’, and its case marking patterns, to name a few.

This paper presents evidence showing that, despite the apparent flexibility of Tagalog nouns and verbs shown in (1), asymmetrical behavior between the two categories is still detectable, specifically in contexts where nominal functional morphology (e.g. determiners, plural markers, etc.) is absent. Conversely, this asymmetry is neutralized when said morphology is present. I argue that this pattern of asymmetry and neutralization is best understood as neutralization of an initial difference in syntactic category, since the aforementioned neutralization occurs specifically in the presence of a variety of nominal functional elements. In other words, I claim that the commonly reported nominal properties of verbal constructions in Tagalog can be attributed to some process of nominalization, loosely construed, such as relativization. Therefore, to find differences between nouns and verbs in this language, we must turn our attention to constructions where no nominalization has occurred.

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<sup>1</sup>The following abbreviations are used in this paper: {1/2/3}{s/P} = {1st/2nd/3rd} Person {Singular/Plural}, AGT.NMLZ = Agent Nominalizer, AIA = Ability and Involuntary Action (see Schachter and Otnes, 1972, Ch. 5.13), AV = Agent Voice, CV = Conveyance Voice, FUT = Future (Contemplative) Aspect, GEN = Genitive, IMPF = Imperfective Aspect, LK = Linker, LOC.NMLZ = Locative Nominalizer, LV = Locative Voice, NEG = Negation, NOM = Nominative, OBL = Oblique, PFV = Perfective Aspect, PL = Plural Marker, PV = Patient Voice, RED = Reduplication, THM.NMLZ = Theme Nominalizer.

Examples from other authors have been edited where necessary to be consistent with the glossing conventions used in this paper.



- b. B<in>ili-Ø ng bata **ang tela** sa palengke para sa nanay.  
 <PFV>buy-PV GEN child NOM cloth OBL market for OBL Mother  
 ‘The child bought *the cloth* at the market for Mother.’ Patient Voice
- c. B<in>ilh-**an** ng bata ng tela **ang palengke** para sa nanay.  
 <PFV>buy-LV GEN child GEN cloth NOM market for OBL Mother  
 ‘The child bought cloth *at the market* for Mother.’ Locative Voice
- d. I-b<in>ili ng bata ng tela sa palengke **ang nanay**.  
 CV-<PFV>buy GEN child GEN cloth OBL market NOM Mother  
 ‘The child bought cloth at the market *for Mother*.’ Conveyance Voice

In (2a), *ang*-marking appears on the agent, and the verb is marked with an agent voice (AV) infix <um>. In (2b), the patient is *ang*-marked, so the verb bears the patient voice (PV) suffix *-in/-Ø*.<sup>5</sup> Tagalog’s voice system is unique from other (non-Austronesian) voice alternations, such as the active-passive alternation in English, in that it extends beyond the core arguments.<sup>6</sup> The paradigm above gives locative voice (LV, suffix *-an*; e.g. locations and goals) in (2c), and conveyance voice (CV, prefix *i-*; e.g. benefactors) in (2d).

The voice system is also involved in a restriction on A'-extraction. Broadly speaking, only *ang*-marked DPs may be the target of processes like relativization, *wh*-question formation, topicalization, and clefting. The examples below show this restriction active in relativization. We see in (3) that relativization of the agent requires the verb to be in agent voice, and in (4) that theme/patient relativization requires patient voice. Note that for the grammatical examples, headed and headless relatives are possible.<sup>7</sup>

- (3) a. (**bata**=ng) b<um>ili ng tela  
 child=LK <AV.PFV>buy GEN cloth  
 ‘{child/one} who bought cloth’
- b. ?? **bata**=ng b<in>ili-Ø **ang tela**  
 child=LK <PFV>buy-PV NOM cloth  
 ‘child who bought cloth’<sup>8</sup>
- (4) a. \* **tela**=ng b<um>ili **ang bata**  
 cloth=LK <AV.PFV>buy NOM child  
 Intended: ‘cloth that the child bought’
- b. (**tela**=ng) b<in>ili-Ø ng bata  
 cloth=LK <PFV>buy-PV NOM child  
 ‘{cloth/one} that the child bought’

<sup>5</sup>The patient voice suffix *-in* is null in the presence of the infix <in>, which appears in perfective and imperfective aspects.

<sup>6</sup>As such, the term *voice* is used pretheoretically in this paper, and the parallel to voice alternations such as active-passive is made for the purpose of exposition. As with its phrase structure, many analyses have been proposed for the verbal morphology of Tagalog. Examples include *wh*- or Case-agreement (as with Pearson 2005 for Malagasy and Rackowski and Richards 2005), flavors of *v*<sup>o</sup> (Aldridge, 2004), and, as will be discussed in this paper, participant nominal morphology (Kaufman, 2009).

<sup>7</sup>Headed relative clauses have the Tagalog linker (glossed LK) in between the head and the relative clause. This linker appears consistently in modification contexts, but also has a complementizer-like function, appearing in various embedding constructions.

<sup>8</sup>Some speakers (including myself) do not judge agent extractions out of non-agent voices to be totally ungrammatical. (3b) is not as well-formed as (3a), but it is significantly better than the ungrammatical (4a). These judgements might be more typical of younger or university-age speakers (Nozomi Tanaka, p.c.).

The Tagalog voice system, argument marking patterns, and extraction restriction are some of the major points that scholars take into account in their analyses of this language. These analyses have so far been varied to the extent that there is no general consensus in the literature (see e.g. Aldridge 2004; Guilfoyle et al. 1992; Kroeger 1993; Rackowski and Richards 2005 for some sense of the variability among analyses). Kaufman's (2009) analysis of Tagalog also endeavors to capture these facts, but uses a different approach from the majority. He argues that the facts shown above can be most straightforwardly understood under an analysis where verbs are not a distinct syntactic category from nouns. Evidence and motivation for this claim comes not only from historical reconstructions of the voice morphemes as nominalizers in Proto-Austronesian (Ross, 2009; Starosta et al., 1982), but also from synchronically attested behavior in this language, which I discuss here.

## 2.2 Motivations for nominalism

There is good reason to suspect that nouns and verbs are actually part of a single category in Tagalog. These elements exhibit significant overlaps in their behavior, most saliently in their distribution and morphological potential. First, nominal and verbal constituents may both appear in prototypically verbal positions, like as predicates. Notice that we find no overt material (e.g. a copula) that might help distinguish the two categories in this position.

- (5) **T<um>akbo** ang pusa.  
 <PFV.AV>run NOM cat  
 'The cat *ran*.'
- (6) **Kaibigan ni Gina** si Bong.  
 friend GEN Gina NOM Bong  
 'Bong is *Gina's friend*.'

Second, these same constructions may also appear in prototypically nominal positions, like as the semantic head of a DP marked by the determiner *ang*. These DPs may in turn appear in argument positions as shown in (7)-(8). Notice again that no overt material (e.g. relativizing morphology) distinguishes between the two types of objects, mirroring the picture we see in predicate position.

- (7) Pusa **ang t<um>akbo**.  
 cat NOM <PFV.AV>run  
 'The one that *ran* is a cat.'
- (8) Nagtu~turo **ang kaibigan ni Gina**.  
 IMPF.AV~teach NOM friend GEN Gina  
 '*Gina's friend* is teaching.'

One difference that can be identified between the noun-like and the verb-like examples above is the presence or absence of morphology marking voice and aspect. However, the distinction is less clear than the examples above suggest. In addition to the distributional overlap, we find a morphological overlap as well. Putatively verbal lexical items may appear bare (9)-(10) while putatively nominal ones may appear with voice and aspect morphology (11)-(12).<sup>9</sup> The distribution of these furthermore mirrors the data we have seen so far: both voice-marked nominal constructions and bare verbal constructions may appear in either predicate position or marked by *ang*.

<sup>9</sup>There is some intuition by which (some classes of) bare verbal roots are marked constructions. See Himmelmann 2008 for a more detailed discussion of their behavior, also arguing in favor of a nominalist analysis for this language. Also note that we observe particular semantic effects with bare verbal roots and voice-marked nouns. Bare verbal roots often take on eventive interpretations, while voice-marked nouns take on argument structure that might not

(9) *Bare verbs in predicate position*

- a. **Takbo** na ito para sa kanya.  
run now this.NOM for OBL 3S.OBL  
'This (pace) is already *a run* for him (even though it might be slow).'
- b. **Sulat ni Sarah** ito.  
write GEN Sarah this.NOM  
'This is *Sarah's { writing / letter }*.'

(10) *Bare verbs in argument position*

- a. Mabilis **ang takbo niya**.  
fast NOM run 3S.GEN  
'*Her running* is fast.'
- b. Na-hanap ko **ang sulat ni Fe**.  
PFV.AIA-find 1S.GEN NOM write GEN Fe  
'I found *Fe's letter*.'

(11) *Voice marked nouns in predicate position*

- a. **K<in>aibigan ni Gina** ang bata.  
<PFV>friend.PV GEN Gina NOM child  
'*Gina befriended* the child.'
- b. **Magdo~doktor** si Julian.  
FUT.AV~doctor NOM Julian  
'Julian *will { become / see } a doctor*.'

(12) *Voice marked nouns in argument position*

- a. H<in>abol ng bata **ang k<in>aibigan ni Gina**.  
<PFV>chase.PV GEN child NOM <PFV>friend.PV GEN Gina  
'The child chased *the one Gina befriended*.'
- b. K<in>ausap ko **ang magdo~doktor**.  
<PFV>speak.with 1S.GEN NOM FUT.AV~doctor  
'I talked to *the one who will { become / see } a doctor*.'

I have only given a brief overview of the Tagalog facts here, but I hope to have shown that typical tests used to distinguish between nouns and verbs fail to identify the relevant categories in Tagalog. Instead, it appears that a single class of syntactic objects in this language shows behavior that is both nominal (appearing morphologically bare or in argument position) and verbal (bearing 'verbal' morphology, appearing in predicate position). Consequently, one might be led to think that there is good basis for a nominalist analysis of Tagalog, arguing that nouns and verbs in Tagalog should be grouped into a single syntactic category. In other words, a perceived distinction between nouns and verbs in Tagalog simply stems from analogy with languages that do make a distinction or from some other factor such as eventivity.

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necessarily be detectable in or predictable from their bare forms. In particular, note the ambiguity in (11b) and (12b). One might take this idiosyncratic behavior to indicate the presence of a light verb or verbalizer as opposed to morphology that simply picks out particular argument-structural positions, as Kaufman (2009) argues is the case for Tagalog voice morphology (Lisa Travis, p.c.).

### 2.3 Theoretical advantages of nominalism

Kaufman (2009) argues that the nominalist analysis goes further than describing the distribution of the relevant types of constructions in Tagalog. For him, other details of Tagalog syntax, which have so far resisted consensus in analysis, can be made sense of under this view. Specifically, two major details of Tagalog syntax naturally fall out from the assumption that verb phrases in Tagalog are actually nominal. These are the voice marking patterns and A-bar extraction restrictions.

The nominalist analysis views the Tagalog voice morphemes as thematic nominalizers, akin to *-er* and *-ee* in English. Kaufman finds basis for this claim in historical reconstructions of the voice morphemes as nominalizers in Proto-Austronesian (Starosta et al., 1982; Ross, 2009). He further argues that the synchronically observable productivity and flexibility of the voice is parallel to the behavior of English *-ee* as discussed by Barker (1998), who points out that forms like *amputee* do not necessarily refer to entities that would appear as a syntactic argument to their roots. That is, *amputee* must refer to a person even though the object of *amputate* must be some appendage.

The same behavior is attested in the Tagalog voice system. Kaufman (2009, p. 7) observes that ‘any Tagalog lexical root can take any voice so long as the conceptual representation of the root provides for the relevant participant’. For example, a canonically transitive root like *kain* ‘eat’ may appear not only in AV and PV forms as expected, but LV and CV form as well. Examples are given below for AV and CV (see also (2) for a more complete paradigm with *bili* ‘buy’). Notice that while the AV morpheme targets a syntactic argument of *kain* ‘eat’ (i.e. its agent), the CV morpheme targets more peripheral information (i.e. some kind of benefactor or reason).

- (13) a. **K<um>ain ang bata** ng isda (para sa nanay).  
 <AV.PFV>eat NOM child GEN fish for OBL Mother  
 ‘The child ate fish (for Mother).’ Agent Voice
- b. **I-k<in>ain** ng bata ng isda **ang nanay**.  
 CV-<PFV>buy GEN child GEN fish NOM Mother  
 ‘The child ate fish fish for Mother.’ Conveyance Voice

To account for the voice marking behavior of Tagalog, other authors have proposed systems involving different applicative heads and ‘flavors’ of *v*. In particular, such analyses tend to treat the locative and conveyance voice constructions as involving applicatives. However, Kaufman (in prep) points out that such analyses are problematic, partially because the proposed applicatives for Tagalog in these analyses would be strange from a crosslinguistic perspective. For example, he notes that these proposed applicative morphemes do not obviously interact with transitivity (Aldridge, 2004) or are null and assign non-typical case values to their objects (Rackowski and Richards, 2005).

Kaufman’s (2009) particular view of the Tagalog voice system has two consequences for its phrase structure. First, apparent headless relatives like the ones in (14) are not in fact headless relatives. Instead of analyzing them structurally as full clauses (with an argument gap) contained within a DP, such constructions are treated as basic nominalizations with no internal verbal or clausal structure. The intuition then is that the second set of translations below (in double brackets) better matches the structure of the original Tagalog.

- (14) a. **b<um>ili** ng tela  
 <PFV.AV>buy GEN cloth  
 ‘one that bought cloth’ [[‘buyer of cloth’]]



in Section 2.2 – they appear equally productively in both argument and predicate positions. I refer to these three constructions as bare nominals, voice phrases, and derived nominals.<sup>12</sup>

The overall rationale behind this particular partitioning is to consider constructions in various derivational states. One of Kaufman’s (2009) central claims is that Tagalog simply does not have the category of verb. Stated differently, he maintains that at no point is there any verbal structure (e.g. a *vP*/*VP* layer) in the derivation of any Tagalog DP; they are nominal throughout.<sup>13</sup> What we will see in the next section is that this claim does not hold. Voice phrases pattern separately from (sometimes minimally different) bare and derived nominals in a way that I will argue is best explained by syntactic category. This behavior is especially striking given the fact that there is heterogeneity within these classes of constructions.

While I will devote some discussion to the issue of how the constructions below might be derived, I will ultimately not make any strong claims regarding this. That is, I will for the most part ignore details like internal structure and focus instead on the behavior exhibited by these constructions as entire units. The general argument is thus that some subset of these constructions must be verbal at the relevant derivational step, and the some of the nominal properties we observe are due to further syntactic operations, like relativization.

### 3.1 Bare nominals

The first class considered is the most morphologically simple one, consisting of morphologically bare words. Examples can be found corresponding to prototypical noun denotations, such as *baboy* ‘pig’, shown in predicate (16a) and argument (16b) positions below. As an aid to the reader, the heads of these constructions will be indicated with double underlines for the rest of the paper.

- (16) a. Baboy iyan.  
pig that.NOM  
‘That’s a pig.’
- b. K<in>ain ng baboy ang kanin.  
<PFV>eat.PV GEN pig NOM rice  
‘The pig ate the rice.’

We also find examples that appear more verbal in the sense that they are typically marked for voice and aspect, and their meanings appear more closely related to verbs in English. These can also appear in both argument and predicate positions. The examples below show *luto* ‘cook’.

- (17) a. Luto ni Ging ang adobo=ng iyan.  
cook GEN Ging NOM adobo=LK that.NOM  
‘That adobo is Ging’s cooking.’
- b. K<in>ain ko ang luto ni Ging.  
<PFV>eat.PV 1S.GEN NOM cook GEN Ging  
‘I ate Ging’s cooking.’

<sup>12</sup>In the oral presentation of this paper at BLS 42, these three constructions were referred to as bare roots, headless relatives, and morphological nominalizations, respectively.

<sup>13</sup>To be more precise, Kaufman (2009) argues that most of what we might think of as verbal is actually nominal. The constructions introduced in this section fall under this nominal umbrella. However, implicit in his argument is the possibility that there are still instances of true verbs in the language. This seems to be the case with the imperative forms from Batangas Tagalog that he discusses (p. 24–26), and might also be the right way to think about other types of constructions, like the recent perfective, under this analysis.

Note that different analyses might argue for different derivations between different subsets of the bare nominals. For Kaufman for example, the ‘nominal’ example in (16) and the ‘verbal’ one in (17) would have more or less identical structures. That is, his analysis assigns structures of roughly the same complexity to these examples. Alternatively, we might imagine a situation where some subset of this class is formed by a zero derivation process, resulting in potentially more complex structure that is not overtly realized. Going forward, I will largely ignore the internal structure of the constructions under consideration and focus more on their external distribution and behavior, as mentioned previously.<sup>14</sup>

### 3.2 Voice phrases

The second class I define consists of constructions that bear voice morphology. As shown in the earlier examples in Section 2, this class includes constructions that have both apparently nominal and apparently verbal roots. I will refer to these as voice phrases, indicated with wavy underlining.

As with bare nominals, voice phrases can appear both in predicate and argument positions. When in predicate position, they may appear without additional functional elements (e.g. determiners, etc.), creating the prototypical Tagalog verb-initial sentence. On the other hand, in argument position, they are most readily interpreted as headless relatives. The difference in behavior between voice phrases in predicate versus argument position will be crucial for the discussion later on. When disambiguation is required, I use the term ‘bare voice phrase’ to refer to those that are not marked with additional morphology, and ‘headless relative’ to refer to those with nominal functional elements, as exemplified by those in argument position.

- (18) a. [H<in>abol ng bata]<sub>Pred</sub> [ang nag-doktor]<sub>Arg</sub>.  
 <PFV>chase.PV GEN child NOM PFV.AV-doctor  
 ‘The child chased the one who {saw / became} a doctor.’
- b. [Nag-doktor]<sub>Pred</sub> [ang h<in>abol ng bata]<sub>Arg</sub>.  
 PFV.AV-doctor NOM <PFV>chase.PV GEN child  
 ‘The one that the child chased {saw / became} a doctor.’

The examples above are marked for aspect in addition to voice, but constructions without aspect can also be found. These constructions have a similar distribution to tenseless clauses in other languages like English. Below are some examples of these aspectless voice phrases appearing as embedded predicates in ECM-like constructions.

- (19) a. Gusto niya=ng [habul-in ng bata]<sub>Pred</sub> [ang nag-doktor]<sub>Arg</sub>.  
 want 3S.GEN=LK chase-PV GEN child NOM PFV.AV-doctor  
 ‘He wants the child to chase the one who {saw / became} a doctor.’

<sup>14</sup>It should be noted that this morphologically defined class is more heterogeneous than it might appear from the data presented so far. In particular, I am setting aside a group of lexical items that take on a stative (verbal) meaning and obligatorily appear bare. The example below shows *alam* ‘know’. For a discussion of some of the behavior of these constructions, see Richards 2009b.

- (i) **Alam ko** na um-alis si Juan.  
 know 1S.GEN LK PFV.AV-leave NOM Juan  
 ‘{I know / My knowledge is} that Juan left.’
- (ii) S<in>abi ko ang **alam ko**.  
 <PFV>say.PV 1S.GEN NOM know 1S.GEN  
 ‘I said {what I know / my knowledge}.’

- b. Gusto niya=ng [mag-doktor]<sub>Pred</sub> [ang h<in>abol ng bata]<sub>Arg</sub>.  
 want 3S.GEN=LK AV-doctor NOM <PFV>chase.PV GEN child  
 ‘He wants the one who the child chased to {see / become} a doctor.’

Like the aspect-marked examples, aspectless voice phrases appear in (embedded) predicate positions, and show the same patterns in terms of argument marking. Compare the aspect-marked sentences in (18) to the aspectless embeddings in (19). In both (a) examples, the patient *nag-doktor* is *ang*-marked, matching the PV morphology of the predicate voice phrase, and in both (b) examples, the agent *hinabol ng bata* is *ang*-marked, matching AV on the predicate voice phrase. On the other hand, these constructions generally cannot appear in argument positions or as matrix predicates.<sup>15</sup> These aspectless voice phrases are relevant specifically in Section 4.3.

We will ultimately see that this class of constructions behaves differently from the other two in a particular way: while bare voice phrases do show different behavior, headless relatives do not. I will ultimately argue that bare voice phrases are verbal, and the nominal properties we observe are found with headless relatives, which are the result of a nominalization process, tentatively relativization, applying to bare voice phrases, contra Kaufman’s (2009) claims.

### 3.3 Derived nominals

The third and final class considered consists of constructions appearing with morphemes which I analyze as the true thematic nominalization morphemes in Tagalog (i.e. analogous to English *-er* and *-ee*). These will be marked with dashed underlining. Constructions with three such morphemes will be relevant in this paper. First is an agent nominalizer *taga-* in (20), which describes a person who has been given the responsibility to perform some action.<sup>16</sup>

- (20) a. Taga-bantay ng tindahan si Junjun.  
 AGT.NMLZ-guard GEN store NOM Junjun  
 ‘Junjun is the guard for the store.’
- b. Na-galit si Nene sa taga-bantay.  
 PFV.AIA-anger.PV NOM Nene OBL AGT.NMLZ-guard  
 ‘Nene got angry at the guard.’

Second is the patient nominalizer *-in* in (21), which is more semantically neutral than *taga-* in the sense that it simply picks out the patient of the particular root it attaches to without adding more semantic content.

<sup>15</sup>A notable exception is with imperatives and related constructions:

- (iii) Mag-doktor kayo.  
 AV-doctor 2P.NOM  
 ‘(You) {See / Be} a doctor.’
- (iv) Kayo ang mag-doktor.  
 2P.NOM NOM AV-doctor  
 ‘(YOU) {see / be} a doctor.’

<sup>16</sup>Another prefix, *maN-RED* or *mag-RED*, also forms agent nominalizations such as *manu~nulat* ‘writer/author’ from *sulat* ‘write’. These differ from the *taga-* forms in that they do not carry the meaning of assigned responsibility, but tentative evidence shows that they exhibit the same behavior with respect to the asymmetry-neutralization pattern to be discussed in Section 4.

- (21) a. **Gawa-in** ni Chit ang mag-bantay ng paninda sa tindahan.  
 do-THM.NMLZ GEN Chit NOM AV-guard GEN wares OBL store  
 ‘Chit’s job is to keep an eye on the wares in the store.’
- b. Hindi na-tapos ang **gawa-in** ni Chit.  
 NEG PFV.AIA-finish.PV NOM do-THM.NMLZ GEN Chit  
 ‘Chit’s task did not get finished.’

Third is the locative nominalizer *-an* in (22), which picks out locations where an events take place.

- (22) a. **Lagay-an** ng asin ang kahon na iyan.  
 put-LOC.NMLZ GEN salt NOM box LK that  
 ‘That box is a salt container.’
- b. B<um>ili si Pepe ng **lagay-an** ng asin.  
 <PFV.AV>buy NOM Pepe GEN put-LOC.NMLZ GEN salt  
 ‘Pepe bought a salt container.’

It is worth pointing out here that the surface forms of the theme and locative nominalizers are identical to the patient voice *-in* and locative voice *-an* morphemes respectively. The difference lies in the kinds of effects we find on the root. The nominalizers preserve the form of the root, while the voice morphemes can trigger deletion. Stress placement is also different between nominalized and voice forms of the same root.

The table in (23) illustrates the behavior of roots bearing final stress with *gawâ* /ga'waʔ/ ‘do’. Voice morphemes trigger deletion of the final two segments, and final stress is assigned to the whole construction. Nominalizers do not trigger deletion, and stress is maintained on the final syllable of the root.<sup>17</sup> Penultimately stressed roots behave slightly differently, but are not shown due to space constraints.

| (23)            | <i>gawâ</i> /ga'waʔ/ ‘do’ | Patient ( <i>-in</i> )                | Locative ( <i>-an</i> )              |
|-----------------|---------------------------|---------------------------------------|--------------------------------------|
| VOICE PHRASE    |                           | <u>gawín</u> /ga'win/                 | <u>gawán</u> /ga'wan/                |
| DERIVED NOMINAL |                           | <u>gawáin</u> /ga'waʔin/ (‘activity’) | <u>gawáan</u> /ga'waʔan/ (‘factory’) |

The similarity of derived nominals to the voice-marked forms provides an interesting comparison, especially in light of Kaufman’s claims regarding the nature of the voice morphemes. We will see that these constructions pattern differently from voice phrases despite being minimally different from them. Instead, they behave like bare nominals for the relevant tests, suggesting that it is this class of constructions that constitute the true participant nominalizations in Tagalog.

## 4 Asymmetry and neutralization

I now take a closer look at the three kinds of constructions outlined previously and see how they behave in various environments. I show that voice phrases consistently pattern differently from bare and derived nominals. I argue that this difference in behavior is rooted in syntactic category, as it is consistently neutralized in the presence of functional material from the extended nominal projection.

Such a difference in behavior is unexpected under a nominalist account such as Kaufman (2009), where verbal constructions are in fact inherently nominal (i.e. were never verbal at any point of the

<sup>17</sup>I follow the conventions for diacritics in Komisyon sa Wikang Filipino (2014, Sec. 10). Acute accents mark stressed vowels (á) and circumflex accents mark stressed vowels preceding final glottal stops (â).

derivation). On the other hand, we can readily understand this difference under the verbal view, where any nominal properties exhibited by verbal constructions are simply due to their appearance in larger nominal structures.

#### 4.1 Coordination

Let us first consider the fairly basic test of coordination. The intuition behind this test is that coordination should only be possible with objects that are sufficiently similar to each other. Concretely defining the exact nature of what can be considered ‘sufficiently similar’ with regards to coordination is outside the scope of this paper. However, it should be pointed out that similarity in syntactic category is not strictly necessary for the well-formedness of coordination structures, as shown below for English and Tagalog.

(24) His father was [well known to the police]<sub>AdjP</sub> and [a devout catholic]<sub>NP</sub>.  
(Gazdar et al., 1985)

(25) [ Matanda ] at [ wala na=ng ngipin ] si Lola.  
old and NEG.exist already=LK tooth NOM grandma  
‘Grandma is old and has no teeth anymore.’

The non-central nature of syntactic category might appear to make coordination unsuitable for achieving the main objective of this paper. I maintain, however, that the approach taken in this section bypasses this potential problem. I first show that bare and derived nominals can be coordinated with each other, while bare voice phrases cannot be coordinated with either of the initial two. This difference suggests that voice phrases differ from both types of nominals on some property relevant to coordination, whatever this property may be. I then show that the difference in behavior becomes neutralized in the presence of functional elements from the extended nominal projection. This gives us evidence that the property responsible for the different behavior of voice phrases is indeed syntactic category.

The examples below show baseline coordination structures where both conjuncts belong to the same construction type, and so are in some sense maximally similar.

- (26) a. Guro at makata si Jennifer.  
teacher and poet NOM Jennifer  
‘Jennifer is a teacher and poet.’ Bare nominals
- b. Nagtu~turo at nagsu~sulat si Jennifer.  
IMPF.AV~teach and IMPF.AV~write NOM Jennifer  
‘Jennifer teaches and writes.’ Voice phrases
- c. Taga-luto at taga-laba si Jennifer.  
AGT.NMLZ-cook and AGT.NMLZ-laundry NOM Jennifer  
‘Jennifer is a cook and a launderer/clothes-washer.’ Derived nominals

Now compare the examples above to the behavior we see in (27) below, featuring coordination between members of two of the three different construction types.

- (27) a. Gwardya at taga-luto si Pepe.  
guard and AGT.NMLZ-cook NOM Pepe  
‘Pepe is a security guard and a cook.’ Bare Nominal + Derived Nominal

- b. \*Gwardya at naglu~luto si Pepe.  
guard and IMPF.AV~cook NOM Pepe  
'Pepe is a security guard and cooks/is cooking.' Bare Nominal + Voice Phrase
- c. \*Nagba~bantay at taga-luto si Pepe.  
IMPF.AV~guard and AGT.NMLZ-cook NOM Pepe  
'Pepe guards/is guarding and is a cook.' Voice Phrase + Derived Nominal

Bare and derived nominals are well-formed when coordinated with each other, as shown in (27a). In contrast, (27b)-(27c) are ungrammatical and have a bare voice phrase coordinated with one of the other two construction types. In particular, notice that (27a) and (27b) differ only in the morphology that appears on the root *luto* 'cook', suggesting that the ultimate cause of this difference in grammaticality must be tied to this difference in morphology, not the particular lexical roots chosen. These examples show us that for coordination, bare and derived nominals pattern together to the exclusion of bare voice phrases.

The difference we see between voice phrases and the two nominals is neutralized when both conjuncts are marked with functional material from the extended nominal projection. The examples below feature the determiner *ang* and the plural morpheme *mga*.<sup>18</sup>

- (28) a. **Mga** gwardya at **mga** taga-luto sila.  
PL guard and PL AGT.NMLZ-cook 3P.NOM  
'They are security guards and cooks.' (cf. 27a)
- b. **Mga** gwardya at **mga** naglu~luto sila.  
PL guard and PL IMPF.AV~cook 3P.NOM  
'They are security guards and ones who cook.' (cf. 27b)
- c. **Mga** nagba~bantay at **mga** taga-luto sila.  
PL IMPF.AV~guard ang PL AGT.NMLZ-cook 3P.NOM  
'They are cooks and ones who guard.' (cf. 27c)
- (29) a. Si Pepe **ang** gwardya at **ang** taga-luto.  
NOM Pepe NOM guard and NOM AGT.NMLZ-cook  
'The security guard and the cook is Pepe.' (cf. 27a)
- b. Si Pepe **ang** gwardya at **ang** naglu~luto.  
NOM Pepe NOM guard and NOM IMPF.AV~cook  
'The security guard and the one who cooks is Pepe.'<sup>19</sup> (cf. 27b)
- c. Si Pepe **ang** nagba~bantay at **ang** taga-luto.  
NOM Pepe NOM IMPF.AV~guard and NOM AGT.NMLZ-cook  
'The one who guards and the cook is Pepe.' (cf. 27c)

The examples in (28) and (29) differ minimally from (27). This minimal difference is most clear in (28), where *mga* marks the same coordinated constituents and the subject is plural to match the plural marking on the predicate. The difference is similarly minimal with (29), where *ang* marks both conjuncts. The reversed relative order of subject and predicate in these examples is a general behavior of sentences where both subject and predicate are *ang*-marked. In such constructions, the

<sup>18</sup>*Mga* is pronounced [ma'ŋa], and is the other irregularly spelled Tagalog word, alongside *ng*.

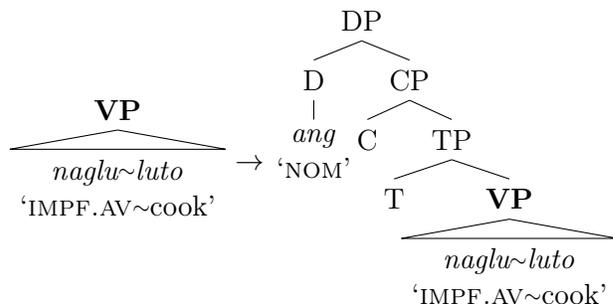
<sup>19</sup>Some speakers judge this sentence and the next one as ungrammatical, although this seems to be linked to the availability of a progressive interpretation (in addition to the intended habitual one) with imperfective morphology. Event structure thus seems to be one property that coordination is sensitive to.

more ‘referential’ of the two *ang*-marked constituents obligatorily precedes the less referential one. We can thus firmly tie the neutralization of the initial contrast found in (27) to the addition of *ang* and *mga*.

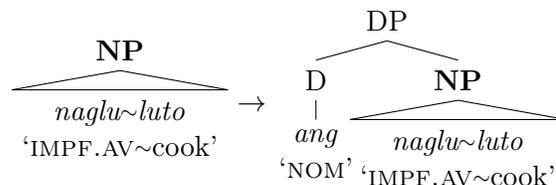
The data above can be summarized as follows. Bare and derived nominals differ from bare voice phrases on some Property *X*, causing the coordination incompatibility in (27). However, there is some Property *Y* on *ang* and *mga* that neutralizes *X*, resulting in compatibility with respect to coordination between all three construction types. The nominalist and verbal views differ on how they handle this pattern.

For the verbal view, which argues for a noun-verb distinction in Tagalog, Property *X* is syntactic category and Property *Y* is the fact that *ang* and *mga* signal the existence of DP structure. Under this view, voice phrases are verbal constructions in the absence of any nominal functional morphology, but undergo relativization when embedded in a larger DP structure. This is roughly sketched in (30) below. Compare this to the structure according to Kaufman (2009) in (31).

(30) *Sketch of the verbal analysis*



(31) *Sketch of the nominalist analysis*



Ungrammatical coordination can then be understood as instances of VP-like objects coordinating with NP- or DP-like objects, while neutralization would be due to both objects being contained in DPs. Note here that we are led to the notion of syntactic category not by any particular assumption made regarding coordination, but by the fact that neutralization is triggered by nominal elements like *ang* and *mga*.

A nominalist analysis like Kaufman (2009) on the other hand must appeal to other properties satisfying the above descriptions of *X* and *Y* since this view would maintain that all three construction types share a category. Property *X* explaining the grammaticality contrasts in (27) might not be difficult to find. Distinctions in nominal aspect (e.g. mass-count) or event structure seem the most promising. The difficulty lies in finding a Property *Y* that is not only shared between *ang* and *mga* but also neutralizes *X*. The best that a nominalist analysis can do seems to be to propose separate explanations for (28)-(29). This approach would seem to miss a larger generalization, however, as we see in further sections that at least one other lexical item also causes this neutralization.<sup>20</sup>

I have thus provided initial evidence that verbs as a syntactic category do exist in Tagalog via a pattern of asymmetry and neutralization that we find in coordination. First, I showed that bare voice

<sup>20</sup>Specifically, we will see examples of neutralization triggered by *isa* ‘one’, which was not considered here because coordination is independently strange with two instances of *isa*. Compare the grammatical (27a) with the following example.

- (v) ? **Isa=ng guro** at **isa=ng makata** si Jennifer.  
 one=LK teacher and one=LK poet      NOM Jennifer  
 ‘Jennifer is a teacher and poet.’

phrases behave differently from bare and derived nominals. Second, I showed that this difference in behavior is neutralized when the aforementioned constructions appear marked with the determiner *ang* or the plural marker *mga*. I argued that a noun-verb distinction is most straightforwardly able to capture the pattern of ungrammaticality in (27) and subsequent neutralization in (28)-(29) because the neutralization is triggered by elements found in the extended nominal projection. In the next few subsections, I will show other contexts where this asymmetry and neutralization occurs in addition to one other trigger for the neutralization. The goal is to show that this pattern is general, and that a noun-verb distinction is best able to capture this general behavior.

## 4.2 Question-answer pairs

Question-answer congruence is another context in which we find different behaviors between the three construction types of concern. In many cases of *wh*-questions, we expect congruence between the question and the response. In English for example, there is congruence between *wh*-words and the corresponding phrases in the response – *what* generally corresponds to DPs and *where* to PPs.

(32) Q: *What* is he eating?

A: (He is eating) *Some fish*.

(33) Q: *Where* did she find the book?

A: (She found the book) *Under the couch*.

Similar behavior can be found in Tagalog, shown in the examples below. A *wh*-word and its corresponding answer must match to be felicitous. In Tagalog, argument *wh*-questions like (34) involve cleft structures, where the nominative *wh*-word appears as a predicate and an *ang*-marked headless relative appears in subject position. These questions require DPs as answers. On the other hand, oblique *wh*-questions like (35) involve regular *wh*-movement and require oblique-marked responses.<sup>21</sup> Mismatches are judged as infelicitous, especially when answers are fragments (boldface).

(34) Q: **Sino** ang b<in>igy-an niya ng susi?  
 who.NOM NOM <PFV>give-LV 3S.GEN GEN key  
 ‘Who did he give *a* key to?’ → ‘The one he gave a key to is who?’

A: **Si Rica** (ang b<in>igy-an niya ng susi).  
 NOM Rica NOM <PFV>give-LV 3S.GEN GEN key  
 ‘Rica (is who he gave *a* key to).’

(35) Q: **Kanino** niya b<in>igay ang susi?  
 who.OBL 3S.GEN <PFV>give.PV NOM key  
 ‘Who did she give *the* key to?’

A: **Kay Rica** (niya b<in>igay ang susi).  
 OBL Rica 3S.GEN <PFV>give.PV NOM key  
 ‘(It was) to Rica (that she gave *the* key).’

Congruence is also relevant on a larger clausal and information-structural level, with voice marking playing a role. In (36), the *wh*-element and the answer match, but the voice morphology on the two verbs does not. The verb in the question is in PV form, forcing the the theme *susi* ‘key’

<sup>21</sup>See Aldridge (2002) for a general analysis of *wh*-question formation in Tagalog.

to be definite, while the verb in the answer is in AV form, so the theme must be indefinite. Thus, the question-answer pair is infelicitous. A similar intuition holds for answering (34) with (35) and vice versa.<sup>22</sup>

- (36) Q: Kanino niya **b<in>igay** ang susi?  
 who.OBL 3S.GEN <PFV>give.PV NOM key  
 ‘Who did she give *the* key to?’
- A: # Kay Rica siya **nag-bigay** ng susi.  
 OBL Rica 3S.NOM PFV.AV-give GEN key  
 ‘(It was) to Rica (that she gave *a* key).’

This kind of congruence is useful in determining the structure and identity of predicate phrases in Tagalog. Recall that one of the facts of Tagalog that lends itself to a nominalist analysis is its lack of an overt copula.<sup>23</sup> This results in identical surface behavior between putatively verbal and putatively nominal (more generally non-verbal) predicates. For a nominalist analysis, this would be evidence for the lack of a noun-verb distinction. Under the assumption that a copula must license non-verbal constituents in predicate position (see Baker (2003) and references within), we might take the consistent lack of a copula in Tagalog as evidence that no such licensing is necessary in this language.

Recall also that Kaufman (2009) takes this a step further and argues that all clauses in Tagalog are inherently copular. That is, not only is there no distinction in category between nouns and verbs, there is also no difference in structure between clauses with nominal and verbal predicates in the same way we might expect there to be a difference in English. Thus, Kaufman’s analysis of Tagalog would predict identical behavior between the three construction classes, while the verbal analysis allows for potential mismatches. The latter behavior is what we find, as shown in the examples below in (37)-(38). In these examples, I have also included free translations that reflect the intuition behind Kaufman’s analysis in an effort to highlight the predictions it makes (again, in double brackets).

- (37) Q: **Ano** ang kina~kain ni Kim?  
 what.NOM NOM IMPF~eat.PV GEN Kim  
 ‘What is Kim eating?’  
 [[‘Kim’s eaten-thing is what?’]]
- (38) a. A: **Luto ni Harvey** ang kina~kain ni Kim.  
 cook GEN Harvey NOM IMPF~eat.PV GEN Kim  
 ‘Kim is eating Harvey’s cooking.’ Bare Nominal  
 [[‘Kim’s eaten-thing is Harvey’s cooking.’]]
- b. A: **Lutu-in ni Harvey** ang kina~kain ni Kim.  
 cook-THM.NMLZ GEN Harvey NOM IMPF~eat.PV GEN Kim  
 ‘Kim is eating Harvey’s cuisine.’ Derived Nominal  
 [[‘Kim’s eaten-thing is Harvey’s cuisine.’]]

<sup>22</sup>See Kroeger (1993, p. 62–65) for some discussion of question-answer congruence in Tagalog focusing particularly on information structure and its role in determining possible answers to questions.

<sup>23</sup>This is the case at least in matrix contexts. See Richards (2009b), which argues fairly convincingly that Tagalog’s copula is simply silent and not absent. Data relating fairly closely to this issue is also given in Section 4.3, although not much direct discussion is given about the copula for reasons of space.

- c. # A: **Ni-luto** ni Harvey ang kina~kain ni Kim.  
 PFV-cook.PV GEN Harvey NOM IMPF~eat.PV GEN Kim  
 ‘Harvey cooked what Kim is eating.’ Voice Phrase  
 [‘Kim’s eaten-thing is Harvey’s cooked-thing.’]

The data above shows that both bare and derived nominals in (38a)-(38b) are good in responses to a question asking *ano* ‘what’. On the other hand, a similar answer containing a bare voice phrase (38c) is infelicitous. Speakers’ intuitions regarding answers like (38c) are that they somehow do not answer or otherwise ignore the corresponding question. These intuitions line up with the respective non-bracketed English translations, and suggest that there is something in the information structure of these sentences that does not match up with the respective questions. With fragment answers (boldface), bare and derived nominals remain felicitous, but the voice phrases are even more infelicitous than their full clause counterparts.

The verbal analysis has two possible explanations available for this behavior. First, we have recourse to the different categories of the predicates – *ano* ‘what.NOM’ ought to correspond to a nominal phrase in the response, so the infelicitousness of (38c) might be due to its predicate being verbal. Second, we might also expect clauses with verbal predicates to be structurally different from those with nominal predicates. For example, if nominal predicates in Tagalog do in fact require a copula, we would expect the question in (37) to have it and the response in (38c) to not.

On the other hand, these facts are not immediately predicted by Kaufman’s nominalist analysis. First, note that properties of the larger structure of these answers cannot explain the difference, as Kaufman treats them all identically as copular clauses (reflected in the bracketed translations). Given that he would also analyze the predicates in (38) as nominal constructions, Kaufman would have to appeal to some property (likely semantic) of the predicates (boldface) in (38) in order to derive the difference in judgements. This would be problematic, since we observe the same neutralization behavior from Section 4.1.

Like we saw in Section 4.1, the contrast in between voice phrases and bare and derived nominals shown in (38) is neutralized when these constructions appear in clearly nominal contexts. The examples below show another set of answers for the question in (37), repeated as (39). Note that all the responses in (40) are felicitous (as full clauses or as fragment answers), despite being minimally different from (38) in terms of the presence of *ang*, *mga*, or *isa*.<sup>24</sup>

- (39) Q: **Ano** ang kina~kain ni Kim?  
 what.NOM NOM IMPF~eat.PV GEN Kim  
 ‘What is Kim eating?’  
 [‘Kim’s eaten-thing is what?’]
- (40) a. A: { **Ang** / **Mga** / **Isa=ng** } **luto** ni Harvey ang kina~kain ni Kim.  
 NOM PL one=LK cook GEN Harvey NOM IMPF~eat.PV GEN Kim  
 ‘What Kim is eating is Harvey’s cooking.’ (cf. 38a)  
 [‘Kim’s eaten-thing is Harvey’s cooking.’]

<sup>24</sup>The difference in meaning caused by the choice of nominal element is subtle, so in the interest of space, I simply give rough translations into English. (40c) should give a general sense of what goes on with the other two.

- b. A: { **Ang** / **Mga** / **Isa=ng** } lutu-in            **ni Harvey** ang kina~kain  
           NOM PL        one=LK    cook-THM.NMLZ GEN Harvey    NOM IMPF~eat.PV  
 ni Kim.  
 GEN Kim  
 ‘What Kim is eating is Harvey’s cuisine.’ (cf. 38b)  
 [‘Kim’s eaten-thing is Harvey’s cuisine.’]
- c. A: { **Ang** / **Mga** / **Isa=ng** } ni-luto            **ni Harvey** ang kina~kain    ni  
           NOM PL        one=LK    PFV-cook.PV GEN Harvey    NOM IMPF~eat.PV GEN  
 Kim.  
 Kim  
 ‘What Kim is eating {is what / are ones that / is one that} Harvey cooked.’  
 [‘Kim’s eaten-thing is Harvey’s cooked-thing.’] (cf. 38c)

The verbal view again has a ready explanation for these facts in the way it views bare voice phrases and headless relatives. The assumption that *ang* is a determiner brings with it the expectation of indicating nominal structure. For the bare and derived nominals, the addition of *ang* is simply the addition of a determiner to an already nominal structure (i.e. an NP or a DP). For the voice phrase, I take the presence of *ang* to indicate a change from a verbal constituent to a nominal one via relativization, resulting in a headless relative clause. The predicates in (40) are thus uniformly nominal overall regardless of their internal structure, and the original difference in felicitousness is eliminated.

Kaufman’s analysis runs into the same difficulty that we saw in Section 4.1 with explaining the contrast neutralization caused by the addition of *ang*, *mga*, and now *isa*. It is not obvious how to straightforwardly capture the fact that all three of these morphemes trigger the same neutralization with a property other than syntactic category.

In summary, I have provided in this section further evidence in support of a noun-verb distinction in Tagalog by showing another environment in which the same neutralization pattern first discussed in Section 4.1 can be found. We saw that bare and derived nominals are grammatical as the predicate of a response to a question asking *what*, while bare voice phrases are not. We further saw that placing these three constructions in clearly nominal structure neutralizes this asymmetric behavior, making them uniformly grammatical as the predicates of said answers. The two environments discussed so far deal with syntactic category as diagnosed by parallelism of some kind. In the next section, I present evidence for clear structural differences between nominal and verbal constituents, showing that the neutralization pattern that should now be familiar can be found in this context as well.

### 4.3 Embedded infinitives

Continuing the general strategy of finding environments that distinguish between the three different construction types, we turn to a test that Richards (2009b) provides. Certain constructions in Tagalog embed clause-like objects whose verbs bear voice marking but not aspect marking.<sup>25</sup> I pretheoretically refer to these forms as infinitives. Initial examples are given below with the matrix verb *ayaw* ‘don’t want’.<sup>26</sup>

<sup>25</sup>Alternatively, the verb forms in (41b) and (42b) can be viewed as bearing some dependent value of aspect, in the sense that this value of aspect is not found in independent clauses, outside of a few examples, like imperatives.

<sup>26</sup>(41b) and (42b) are optional control constructions. The embedded agent (*si Mark* or *ni Miriam*) can be omitted to produce a control reading. For reasons of space, I will focus on constructions with overt embedded agents. Potentially significant details about the control constructions will be provided in footnotes.

- (41) a. **Nagba~basa** si Mark ng libro.  
 IMPF.AV~read NOM Mark GEN book  
 ‘Mark is reading books.’
- b. Ayaw niya=ng **mag-basa** si Mark ng libro.  
 NEG.want 3S.GEN=LK AV-read NOM Mark GEN book  
 ‘She doesn’t want Mark to read books.’
- (42) a. **K<in>ain** ni Miriam ang manok.  
 <PFV>eat.PV GEN Miriam NOM chicken  
 ‘Miriam ate the chicken.’
- b. Ayaw niya=ng **kain-in** ni Miriam ang manok.  
 NEG.want 3S.GEN=LK eat-PV GEN Miriam NOM chicken  
 ‘He doesn’t want Miriam to eat the chicken.’

Richards (2009b) notes that clauses with other, putatively non-verbal types of predicates can also be embedded in these contexts. The major difference that non-verbally predicated embeddings show is that they obligatorily appear with the lexical item *maging*, which is ungrammatical with verbally predicated embeddings, as shown in (45).<sup>27</sup>

- (43) a. Guro si Fe.  
 teacher NOM Fe  
 ‘Fe is a teacher.’
- b. Ayoko=ng **\*(maging)** guro si Fe.  
 I.NEG.want=LK AV.be teacher NOM Fe  
 ‘I don’t want Fe to be a teacher.’<sup>28</sup>
- (44) a. Payat si Jun.  
 thin NOM Jun  
 ‘Jun is thin.’
- b. Ayoko=ng **\*(maging)** payat si Jun.  
 I.NEG.want=LK AV.be thin NOM Jun  
 ‘I don’t want Jun to be thin.’
- (45) Ayoko=ng **\*(maging)** mag-basa ng libro si Vilma.  
 I.NEG.want=LK AV.be AV-read GEN book NOM Vilma  
 ‘I don’t want Vilma to read books.’<sup>29</sup>

Building on this initial picture from Richards (2009b), I show in what follows that the behavior of *maging*<sup>30</sup> follows the same pattern of asymmetry and neutralization presented in the previous

<sup>27</sup>Note that the optional agent/subject gap is also found with non-verbally predicated embeddings.

<sup>28</sup>*Ayoko* is a contraction of *ayaw ko* ‘NEG.want 1S.GEN’.

<sup>29</sup>A potential alternative explanation for this might be the fact that there are two infinitival verbs in this construction. This does not seem to be the issue here, as replacing *mag-basa* with an aspect-marked form (*nag-basa*, *nagba~basa*, or *magba~basa*) does not alleviate the ungrammaticality.

<sup>30</sup>See Richards (2009b) for an analysis of *maging* as the overt infinitival form of the Tagalog copula whose form in matrix contexts is  $\emptyset$ . I follow Richards in glossing *maging* as ‘be’, but the discussion in this section should be agnostic to specific analyses of this element. It also bears pointing out that *maging* is often translated, especially in isolation, as English *become*. Richards ties this  $\emptyset$ ~*maging* alternation to a broader stative–inchoative alternation in the language. As with the control constructions, other potentially significant but tangential datapoints are given in footnotes for reasons of space.

two sections. I then point to other evidence from this environment that supports a view where relativization is the cause for the nominal behavior of some voice phrases (i.e. the headless relatives).

First, I extend Richards (2009b) by showing that derived nominals behave like bare nominals and not voice phrases. This is shown in the pairs of examples below (46)-(47). Notice that each pair differs only in the morphology marking the embedded predicate head and the subsequent grammaticality of *maging*. Like with bare nominals (43b), *maging* is obligatory with embedded derived nominals (46b), (47b).

- (46) a. Gusto ko=ng      **(\*maging)** mag-luto ng gulay si Martin.  
 want 1S.GEN=LK AV.be AV-cook GEN vegetable NOM Martin  
 ‘I want Martin to cook vegetables.’
- b. Gusto ko=ng      **\*maging)** taga-luto ng gulay si Martin.  
 want 1S.GEN=LK AV.be AGT.NMLZ-cook GEN vegetable NOM Martin  
 ‘I want Martin to be a vegetable cook.’
- (47) a. Gusto ko=ng      **(\*maging)** lagy-án ni Fe ng pera ang kaho=ng ito.  
 want 1S.GEN=LK AV.be put-LV GEN Fe GEN money NOM box=LK this  
 ‘I want Fe to put money in this box.’
- b. Gusto ko=ng      **\*maging)** lagáy-an ni Fe ng pera ang kaho=ng  
 want 1S.GEN=LK AV.be put-LOC.NMLZ GEN Fe GEN money NOM box=LK  
 ito.  
 this  
 ‘I want this box to be Fe’s money container.’

We also find neutralization under a clearly nominal context, similar to the previous two sections. When these embedded predicates are marked with *isa* ‘one’, *maging* becomes uniformly required across the three construction types. Compare (48)-(49) to (46)-(47). An example with a bare nominal (50) is also provided for completeness.<sup>31</sup>

- (48) a. Gusto ko=ng      **\*maging) isa=ng** naglu~luto ng gulay si Martin.  
 want 1S.GEN=LK AV.be one=LK IMPF.AV~cook GEN vegetable NOM Martin  
 ‘I want Martin to be one who cooks vegetables.’ (cf. 46a)
- b. Gusto ko=ng      **\*maging) isa=ng** taga-luto ng gulay si Martin.  
 want 1S.GEN=LK AV.be one=LK AGT.NMLZ-cook GEN vegetable NOM Martin  
 ‘I want Martin to be a vegetable cook.’ (cf. 46b)

<sup>31</sup>*Isa* ‘one’ is the only neutralizer available in this environment. Determiners mark DP arguments, not embedded predicates, of infinitive embedding verbs like *gusto* ‘want’. Compare (43b) to (vi) below. It is also generally strange to mark such predicates as plural with *mga*, even if the relevant other parts of the sentence match in number. This time, compare (43b) to (vii).

- (vi) Ayoko na ng doktor.  
 NEG.want.1S.GEN now GEN doctor  
 ‘I don’t want a doctor anymore.’
- (vii) Ayaw na nila=ng maging (??mga) doktor.  
 NEG.want now 3P.GEN=LK AV.be PL doctor  
 ‘They don’t want to be doctors anymore.’

- (49) a. Gusto ko=ng      **\*(maging) isa=ng nila~lagy-án** ni Fe ng pera ang  
 want 1S.GEN=LK AV.be one=LK IMPF~put-LV GEN Fe GEN money NOM  
 kaho=ng ito.  
 box=LK this  
 ‘I want this box to be something that Fe puts money in.’ (cf. 47a)
- b. Gusto ko=ng      **\*(maging) isa=ng lagáy-an** ni Fe ng pera ang  
 want 1S.GEN=LK AV.be one=LK put-LOC.NMLZ GEN Fe GEN money NOM  
 kaho=ng ito.  
 box=LK this  
 ‘I want this box to be a money container of Fe’s.’ (cf. 47b)
- (50) Gusto ko=ng      **\*(maging) isa=ng doktor** si Grace.  
 want 1S.GEN=LK AV.be one=LK doctor NOM Grace  
 ‘I want Grace to be a doctor.’

Aside from neutralization, the addition of *isa* ‘one’ triggers another change in embedded voice phrases that I argue supports a view where they become nominal via relativization. Whereas aspect cannot appear on the embedded voice phrases in (46a), (47a) without *isa*, it must appear on the ones in (48a), (49a), where *isa* is present. Under a view where relativization has taken place in the latter pair, it would be reasonable to expect the relativized structure to contain a something resembling a full clause. There would then be some sense in which this predicate is no longer the direct complement of the matrix verb, and must therefore bear aspectual marking of its own.<sup>32, 33</sup>

In comparison, this data is problematic for a nominalist analysis like Kaufman’s (2009). First, we see the problematic asymmetry and neutralization pattern from the previous two sections. As previously argued, it is hard to see how a nominalist analysis can account for this pattern in a general way. The data presented in this section introduces yet another environment where this occurs, compounding on the difficulty for a nominalist view. Additionally, other aspects of the

<sup>32</sup>There is at least one further difference, relating to optional control, between voice phrase embeddings with and without *isa*. Compare the examples below with the root *lagay* ‘put’. For the bare voice phrase in (47a), repeated as (viii), the controlled gap corresponds to the embedded agent DP, not the *ang*-marked DP. For the headless relative in (49a), repeated as (ix), the gap corresponds to the *ang*-marked DP. Omitting this DP grammatical but results in a pragmatically strange reading. On the other hand, omitting the embedded agent in (ix) simply results in an implicit agent reading.

- (viii) Gusto ko=ng      lagy-án (ni Fe) ng pera      **\*(ang kaho=ng ito)**.  
 want 1S.GEN=LK put-LV GEN Fe GEN money NOM box=LK this  
 ‘I want (Fe) to put money \*(in this box).’
- (ix) Gusto ko=ng      maging isa=ng nila~lagy-án (ni Fe) ng pera (ang kaho=ng ito).  
 want 1S.GEN=LK AV.be one=LK IMPF~put-LV GEN Fe GEN money NOM box=LK this  
 ‘I want (this box) to be something that money is put in (by Fe).’

<sup>33</sup>While not addressed directly here, analyzing *maging* as a copula (as in Richards (2009b)) also assigns it verbal status. This then predicts that it should pattern like the voice phrases in this section. This is what we find. Compare to (46b) the grammatical, albeit slightly redundant, sentence below, where *isa* marks the entire embedded constituent, including *maging*. The original *maging* (italics) appears with aspect marking, and another obligatory *maging* (boldface) surfaces.

- (x) Gusto ko=ng      **\*(maging)** isa=ng *maging* taga-luto      ng gulay si Martin.  
 want 1S.GEN=LK AV.be one=LK FUT.AV.be AGT.NMLZ-cook GEN vegetable NOM Martin  
 ‘I want Martin to be someone who will become a vegetable cook.’

data in this section are also mysterious, at least for Kaufman's (2009) analysis. Specifically, it remains to be explained under this account why voice phrases (but not the nominals) must appear in some reduced form when embedded by certain verbs. Also mysterious is how the non-reduced form should resurface in the presence of *isa*; there is no obvious reason why simply adding a numeral to an already nominal object should cause that object to require aspectual morphology.

## 5 Conclusion

In this paper, I have argued for the existence of a noun-verb distinction in Tagalog, arguing against the nominalist position taken by a number of scholars such as Starosta et al. (1982), Himmelmann (2008), and Kaufman (2009). Fairly strong evidence can be found to support a nominalist analysis of Tagalog, and as Kaufman (2009) argues, many aspects of Tagalog syntax that have been the subject of continued debate in the literature fall out readily under such a view. I argued, however, that the foundational assumption of this approach, that Tagalog does not distinguish syntactically between nouns and verbs, can be shown to be false.

I showed that a noun-verb distinction must exist in this language by looking at a pattern of asymmetry and neutralization. One class of constructions, the (bare) voice phrases, was shown to exhibit different behavior from two other construction classes, the bare and derived nominals, in three different environments: coordination, question-answer pairs, and infinitival embeddings. This asymmetry in behavior was concurrently shown to become neutralized when the aforementioned constructions were marked by the determiner *ang*, the plural morpheme *mga*, and the numeral *isa* 'one'. I argued that this pattern of asymmetry and neutralization could be most readily (if not only) understood as having to do with syntactic category. In particular, the elements that trigger this neutralization most saliently have in common their identity as material from the extended nominal projection; it is unclear whether or not some other property shared among these elements can be found that can also explain the observed neutralization behavior.

Finally, there are in my mind two major points about the approach taken in this paper that bear pointing out. First, it avoided typical tests for determining syntactic category, such as the possibility of tense/aspect marking. This avoidance was taken partially out of necessity; as we have seen, some of these tests yield inconclusive results. However, this avoidance was also done in consideration of the fact that the bases for some of these tests are not necessarily universally accepted in the literature. For example, Starosta et al. (1982) argue for Tagalog that 'the use of the presence of "tense, aspect, or voice" to exclude a nominal interpretation is circular, since that is what we are trying to decide in the first place'. The central piece of the asymmetry and neutralization is the shared nominal nature of *ang*, *mga*, and *isa*, which I suspect is fairly widely accepted, at least among those who argue for the nominalist view. In other words, the goal was to base the central argument on solid common ground.

The second major point is the decision to only observe the behavior of the relevant constructions in predicate positions. The main argument of the paper was that verbal constructions become nominalized when appearing within clearly nominal structures. Thus, argument positions are exactly the wrong place to look for noun-verb asymmetries because of the fact that arguments in Tagalog *must* be marked with determiners. As such, it was necessary to look at predicate positions to find any asymmetries that exist, as the relevant constructions may appear in this position crucially without any of the aforementioned nominal morphology. I believe that this detail is partially to blame for the perception that Tagalog is more compatible with the nominalist hypothesis than I have shown it to be.

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# Denominal location and locatum verbs in Kavalan\*

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## 1 Introduction

The present paper investigates the morphology, syntax, and semantics of denominal locative verbs in Kavalan, an Austronesian language in Taiwan. Clark and Clark (1979) classify denominal locative verbs into two types. A location verb denotes a location where its direct object is moved to (e.g. *to cage a bird*), whereas a locatum verb denotes a theme that is moved to a location expressed by its direct object (e.g. *to saddle a horse*). Locative verbs such as *to cage*, *to shelve*, *to saddle*, and *to butter* can be roughly paraphrased as ‘to put X in/on Y’. Other locative verbs describe the opposite relation and can be roughly paraphrased as ‘to remove X from Y’. For instance, *quarry* in *to quarry the marble* is a location verb meaning ‘to remove/extract the marble from a quarry’; *pit* in *to pit the cherries* is a locatum verb meaning ‘to remove the pit from the cherries’. Locative verbs meaning ‘to put X in/on Y’ are termed ornative verbs, whereas those that depict a removal scenario are termed privative verbs (Buck, 1993). More English examples of location, locatum, ornative, and privative verbs are listed in (1).

- (1) *English location and locatum verbs (examples from Buck 1993, p. 140)*

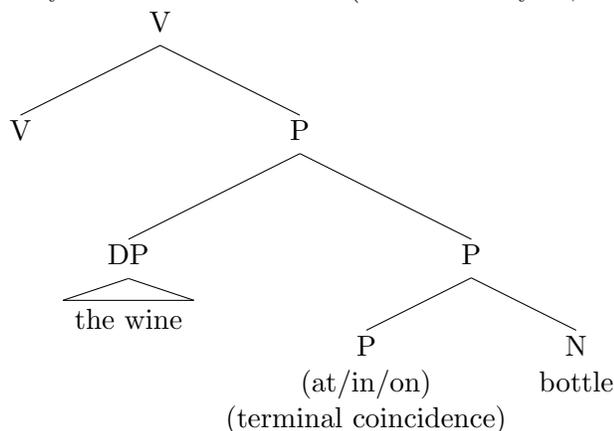
|           | Location             | Locatum             |
|-----------|----------------------|---------------------|
| Ornative  | to BAG the groceries | to SUGAR the tea    |
|           | to SHELVE the books  | to GREASE the pan   |
|           | to BOTTLE the wine   | to BUTTER the bread |
|           | to DOCK the boat     | to LABEL the jars   |
| Privative | to MINE the gold     | to PIT the cherries |
|           | to QUARRY the marble | to SKIN the rabbit  |

There is still no consensus on the structure of denominal locative verbs. The theoretical analyses of location and locatum verbs revolve around the issue of whether these verbs are grammatically indistinguishable or distinct from each other. Acedo-Matellán and Real-Puigdollers (2015), Hale and Keyser (1993, 2002), and Labelle (2000) analyze location and locatum verbs as two distinct classes of verbs. On Hale and Keyser’s (1993; 2002) analysis, their L-syntactic representations are identical in structure with a P projection below V, as shown in (2). Both are derived through ‘conflation’ (or incorporation) of N to (phonologically covert) P and V. The crucial difference lies in the nature of their P heads. The P head of a location verb is identified as P of terminal coincidence, which roughly corresponds to such English prepositions as *at*, *in*, or *on*. In contrast, the P head of a locatum verb is P of central coincidence, which is comparable to the preposition *with* in English.

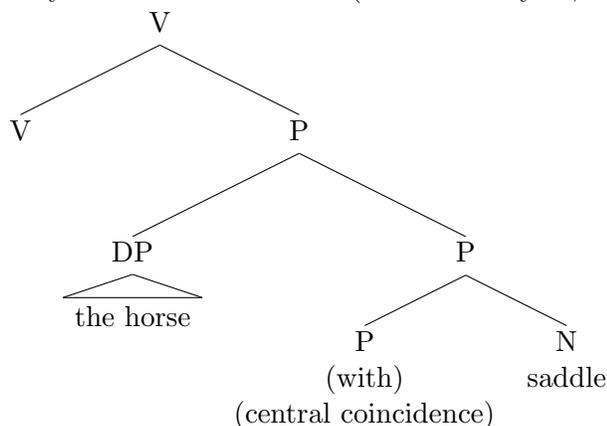
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- (2) a. L-syntax of location verbs (Hale and Keyser, 1993, 2002)



- b. L-syntax of locatum verbs (Hale and Keyser, 1993, 2002)



Labelle's (2000) semantic analysis posits a similar contrast between location and locatum verbs, as shown in (3).

- (3) Semantic representations of location and locatum verbs (Labelle, 2000)

- a. location verb: CAUSE (x, [INCH (AT **location** (y))])  
 b. locatum verb: CAUSE (x, [INCH (WITH **locatum** (y))])

However, Mateu (2001) and Harley (2005) argue that there is no grammatically-encoded distinction between location and locatum verbs. On their analysis, the two types of locative verbs are grammatically indistinguishable and both are derived from the same structure with a P head that denotes a terminal coincidence relation. Their argument is based on the empirical observation that the telicity of both types of verbs is contingent on the boundedness of their incorporated root. A locative verb is telic (e.g. *to shelve*), if its root is bounded (e.g.  $\sqrt{\text{SHELF}}$ ); a locative verb is atelic, (e.g. *to butter*), if its root is unbounded, (e.g.  $\sqrt{\text{BUTTER}}$ ). Any supposed differences between the two types of locative verbs should be attributed to external encyclopedic knowledge instead of grammar.

Theoretical research on the structures of location and locatum verbs has been limited to a small subset of Indo-European languages so far, especially English (Hale and Keyser, 1993, 2002), Catalan (Acedo-Matellán and Real-Puigdollers, 2015; Mateu, 2001), and French (Labelle, 2000). The present paper extends this line of research to Kavalan, an Austronesian language in Taiwan, and aims to scrutinize the two opposing theoretical proposals against the morphology, syntax, and semantics of denominal locative verbs in this language. It will be argued that the two types of

locative verbs are derived from two distinct structures. They exhibit not only morphosyntactic but also semantic differences.

Section 2 will give a brief introduction to the clause structure of Kavalan. Section 3 will discuss the morphosyntactic differences between denominal location and locatum verbs in this language. Their semantic differences will be delineated in Section 4. Section 5 will then explore how to account for the differences theoretically. Section 6 concludes the study.

## 2 A sketch of the Kavalan language

Kavalan is an Austronesian language in eastern Taiwan and belongs to the East Formosan subgroup of the language family (Blust, 2008; Li, 2004). Most Kavalan people currently live in Hsinshe Village, Hualien County and Changyuan Village, Taitung County. According to the census conducted by the Council of Indigenous Peoples, Executive Yuan, Taiwan, in October 2015, the Kavalan population is 1,401.<sup>1</sup> Nevertheless, owing to the adaptation of most Kavalan descendants to the dominant languages in Taiwan, (i.e. Mandarin Chinese and Taiwanese Southern Min) the actual number of fluent Kavalan speakers is estimated to be less than 100 (Hsieh and Huang, 2007). The Kavalan data for analysis in the present paper all belong to the Hsinshe variety and were collected during my fieldwork in Taiwan in the summers of 2014 and 2015. Unless otherwise indicated, the Kavalan examples presented here are elicited data from my fieldwork notes.

The basic word order of Kavalan is verb- or predicate-initial. The case-marking system follows the ergative-absolutive pattern (Liao, 2004). Verbs, but not non-verbal predicates, feature the Philippine-type voice system, which ‘promotes’ or ‘advances’ different thematic arguments to the absolutive subject position.<sup>2</sup> In an agent voice (AV) sentence with a semantically transitive verb, the highest DP argument, usually an agent or experiencer, receives absolutive case, while the theme or patient is marked with oblique case. The linear order between the absolutive DP and the oblique DP in an AV clause is not fixed. In an AV sentence with an intransitive verb (e.g. an unergative or unaccusative verb), the only DP argument receives absolutive case instead of oblique case. This pattern is illustrated in (4).<sup>3</sup> Note that (4b) is an anti-passive construction despite the presence of a theme argument (Liao, 2004). In a patient voice (PV) sentence, the agent receives ergative case and must immediately follow the verb, while the theme or patient is ‘promoted’ to the absolutive subject position and usually occurs at the end of the clause. The PV pattern is exemplified in (5).

- (4) **Agent Voice:** *m-*; *mu-*; *<m>*; *∅-*  
 [AV-verb (OBL-patient/theme) ABS-agent/experiencer]
- a.    *maynep* [*ya sunis-ku*]  
       AV.sleep ABS child-1SG.GEN  
       ‘My child is sleeping.’
- b.    *t<m>anuz=ti* [*tu wasu*] [*ya tuliq a yau*]  
       <AV>chase=PFV OBL dog    ABS wasp LNK that  
       ‘That wasp chased a dog.’

<sup>1</sup><http://www.apc.gov.tw/portal/index.html>

<sup>2</sup>The absolutive subject is, in fact, more akin to a topic. For more detailed discussion on its properties as opposed to the oblique object in terms of definiteness and discourse functions, readers are referred to Huang and Tanangkingsing (2011), Liao (2004), and Lin (2016).

<sup>3</sup>Glossing conventions in this paper follow the Leipzig Glossing Rules. Additional glossing conventions are as follows: AV=agent voice; EXIST=existential; NCM=non-common noun marker; NHUM=non-human; PV=patient voice.

- (5) **Patient Voice:** *-an*  
 [verb-PV ERG-agent/experiencer ABS-patient/theme]  
 tanuz-an-na=ti [na tuliq a yau] [ya wasu 'nay]  
 chase-PV-3ERG=PFV ERG wasp LNK that ABS dog that  
 'That wasp chased that dog.'

### 3 Kavalan location and locatum verbs: Morphosyntactic differences

Location and locatum verbs in English are derived from nouns through conversion. On Hale and Keyser's (1993; 2002) L-syntactic approach, the P heads of both types of verbs in English must be phonetically null, although two different P heads are posited. Denominal location and locatum verbs in Catalan and French do not differ morphologically either, as illustrated in (6) and (7). Some location and locatum verbs in these languages are derived from nouns through conversion as in (7a) and (7c), while others take the same preposition-like prefix *em-/en-* as in (6a), (6b), (7b), and (7d). There is no correlation between conversion or affixation with either type of locative verb.

- (6) Catalan (Acedo-Matellán and Real-Puigdollers, 2015)
- a. En Jan ha em-botellat l'aigua.  
 Jan has in-bottle.ed the=water
  - b. L'Elna ha en-sellat el cavall.  
 Elna has in-saddle.ed the horse
- (7) French (Labelle, 2000)
- a. On remise les échelles (dans cette salle).  
 one [[shed]-s] (=puts away) the ladders in this room
  - b. Jean em-poche l'argent.  
 Jean em-pockets the=money
  - c. Eva cadenasasse les grilles.  
 Eva [[padlock]-s] the gate
  - d. Eva em-paille des chaises.  
 Eva em-straw the chairs

In contrast, denominal location and locatum verbs in Kavalan do exhibit overt morphological differences. They take distinct prefixes. In fact, their sub-classes based on the distinction between ornative and partitive verbs are morphologically marked as well.

- (8) *Prefixes of Kavalan location and locatum verbs*

|           | Location       | Locatum    |
|-----------|----------------|------------|
| Ornative  | <i>pi-</i>     | <i>pu-</i> |
| Privative | ? <sup>4</sup> | <i>su-</i> |

An ornative location verb is derived via *pi-* prefixation, as illustrated in (9); an ornative locatum verb takes *pu-*, as illustrated in (10); a privative locatum verb is prefixed with *su-*, as illustrated in (11). These prefixes are all obligatory.

<sup>4</sup>The prefixes in (8) cannot be further decomposed into *p-*, *s-*, *i-*, and *u-*, as *si-* is not used to derive a privative location verb. The prefix *si-* means 'wear' when it is attached to a noun (e.g. *si-qubu* 'wear-hat', *si-qudus* 'wear-clothes', and *si-itus* 'wear-necklace').

- (9) Ornative location verbs
- a. pi-beRasku-an-ku ya z anum  
PI-bottle-PV-1SG.ERG ABS water  
'I bottled the water.'
  - b. \*beRasku-an-ku ya z anum  
bottle-PV-1SG.ERG ABS water
  - c. pi-subuq-an-na ni imuy ya kelisiw-ku  
PI-backpack-PV-3ERG ERG Imuy ABS money-1SG.GEN  
'Imuy put my money in a backpack.'
  - d. \*subuq-an-na ni imuy ya kelisiw-ku  
backpack-PV-3ERG ERG Imuy ABS money-1SG.GEN
- (10) Ornative locatum verbs
- a. pu-waneng-an-ku ya z anum  
PU-sugar-PV-1SG.ERG ABS water  
'I sugared the water.'
  - b. \*waneng-an-ku ya z anum  
sugar-PV-1SG.ERG ABS water
  - c. pu-mian-an-ku ya baut  
PU-salt-PV-1SG.ERG ABS fish  
'I salted the fish.'
  - d. \*mian-an-ku ya baut  
salt-PV-1SG.ERG ABS fish
- (11) Privative locatum verbs
- a. su-lisli-an-ku ya baut  
SU-scale-PV-1SG.ERG ABS fish  
'I scaled the fish.'
  - b. \*lisli-an-ku ya baut  
scale-PV-1SG.ERG ABS fish
  - c. su-lubung-an-ku ya taquq  
SU-skin-PV-1SG.ERG ABS chicken  
'I skinned the chicken.'
  - d. \*lubung-an-ku ya taquq  
skin-PV-1SG.ERG ABS chicken

Moreover, as illustrated by the contrast between (12a) and (12b), a *pi*-marked location verb is ungrammatical without the patient voice (PV) marker. It cannot be  $\emptyset$ -marked for agent voice (AV). In contrast, ornative and privative locatum verbs are grammatical in either AV form ( $\emptyset$ -marked) or PV form (*-an*). The examples are given in (13). The contrast between location and locatum verbs in voice marking suggests that the location prefix, *pi-*, by itself does not derive a verb from a noun, whereas the locatum prefixes, *pu-* and *su-*, function as genuine verb-creating affixes. How to account for this difference in voice marking will be explored in Section 5.

- (12) a. pi-subuq-an-ku ya kelisiw  
PI-backpack-PV-1SG.ERG ABS money  
'I put the money in a backpack.'

- b. \*pi-subuq=iku tu kelisiw  
 PI-backpack=1SG.ABS OBL money  
 ‘I put money in a backpack.’
- (13) a. pu-waneng-an-ku ya zanum  
 PU-sugar-PV-1SG.ERG ABS water  
 ‘I sugar the water.’
- b. pu-waneng=iku tu zanum  
 PU-sugar=1SG.ABS OBL water  
 ‘I sugar water.’
- c. su-lisli-an-ku ya baut  
 SU-scale-PV-1SG.ERG ABS fish  
 ‘I scale the fish.’
- d. su-lisli=iku tu baut  
 SU-scale=1SG.ABS OBL fish  
 ‘I scale fish.’

## 4 Kavalan location and locatum verbs: Semantic differences

Kavalan location and locatum verbs also differ in their aspectual properties. A location verb is inherently telic and non-durative, whereas the telicity and durativity of a locatum verb are contingent on the boundedness of its nominal root. Section 4.1 and Section 4.2 will discuss these two Aktionsart properties. The third semantic difference concerns the integration of the theme with the location. Details and evidence will be presented in Section 4.3.

### 4.1 Aktionsart: Telicity

Acedo-Matellán and Real-Puigdollers (2015) investigated the aspectual properties of locative verbs in Catalan and found that a location verb is inherently telic regardless of the boundedness of the incorporated root. As illustrated in (14a), a location verb is compatible with a time-frame adverbial. If it co-occurs with a durative adverbial, the adverbial must be construed as a temporal modifier of a result state or a sequence of identical events (SIE, MacDonald 2008) instead of a single event or process. For example, *durant un minut* in (14b) can modify the final state of the bird (i.e. being caged) but not the entire single event. The sentence can also receive an SIE interpretation where the agent kept repeating the same action for one minute.

- (14) Catalan (Acedo-Matellán and Real-Puigdollers, 2015; Mateu, 2001)
- a. Ell en-gabià el seu ocell preferit en u minut.  
 he in-cage.ed the his bird favorite in one minute
- b. Ell en-gabià el seu ocell preferit durant un minut.  
 he in-cage.ed the his bird favorite for one minute  
 (result state interpretation or SIE interpretation; no single event interpretation)
- c. Els pirates en-terraren el tresor durant tres dies.  
 the pirates in-earth.ed the treasure for three days  
 (result state interpretation or SIE interpretation; no single event interpretation)

In contrast, a Catalan locatum verb can be either telic or atelic. Its telicity corresponds to the boundedness of its nominal root. For example, *fabrinà* ‘flour’ is unbounded and thus the derived locatum verb is atelic. A co-occurring durative adverbial can be construed as a temporal modifier of the entire process, as illustrated in (15a). A locatum verb derived from a bounded noun is telic and compatible with a time-frame adverbial, as illustrated in (15b).

- (15) Catalan (Acedo-Matellán and Real-Puigdollers, 2015)
- a. En Joan en-farinà el pastís durant deu segons.  
Joan in-flour.ed the cake for ten seconds  
(process, single-event interpretation)
  - b. La Jana en-vinagrà els cogombres en cinc minuts (amb vinagre de poma).  
Jana in-vinegar.ed the cucumbers in five minutes with vinegar of apple

There is no designated morpheme for either durative or time-frame adverbials in Kavalan. A temporal adverbial is invariably marked by *-an*. Whether it is interpreted as a durative or time-frame adverbial is conditioned by the semantics of the co-occurring verb phrase. This is illustrated in (16).

- (16) a. u-zusa duki-an s<m>aqay ti-utay  
NHUM-two hour-AN <AV>walk NCM-Utay  
‘Utay walks for two hours.’
- b. u-zusa duki-an niz-an-na=ti ni utay m-liyam ya sudad  
NHUM-two hour-AN all-PV-3ERG=PFV ERG Utay AV-read ABS book  
‘Utay read all the books in two hours.’

When a temporal adverbial co-occurs with a Kavalan location verb, it can be interpreted as a time-frame adverbial, as illustrated in (17a). It can receive a durative reading only when it modifies the result state instead of the entire event. For instance, *u-zusa dedan-an* in (17b) can be interpreted as ‘for two days’, as it depicts the temporal duration of the final state of the theme (i.e. being in the backpack for two days). The sentence cannot receive a process or single-event interpretation. Just like a Catalan location verb, a Kavalan location verb is inherently telic.

- (17) a. u-zusa pun-an pi-subuq-an-na ni imuy ya kelisiw  
NHUM-two minute-AN PI-backpack-PV-3ERG ERG Imuy ABS money  
‘Imuy put the money in the backpack in two minutes.’
- b. u-zusa dedan-an pi-subuq-an-na ni imuy ya kelisiw  
NHUM-two day-AN PI-backpack-PV-3ERG ERG Imuy ABS money  
result state interpretation: ‘Imuy put the money in the backpack and it’s been there for two days.’

In contrast, a Kavalan locatum verb is not necessarily telic or atelic. A temporal adverbial that co-occurs with a locatum verb can receive either a time-frame or durative interpretation. The examples in (18) are for illustration.

- (18) a. u-zusa pun-an pu-waneng-an-ku ya z anum  
NHUM-two minute-AN PU-sugar-PV-1SG.ERG ABS water  
‘I have been adding sugar to the water for two minutes.’
- b. u-zusa pun-an su-lisli-an-ku ya baut  
NHUM-two minute-AN SU-sugar-PV-1SG.ERG ABS water  
‘I scaled the fish in two minutes.’

As with English degree achievements like *lengthen* and *widen* illustrated in (19) (Hay, Kennedy, and Levin, 1999), the telicity of a Kavalan locatum verb is contingent on contextual factors, especially whether the degree of change that the location noun undergoes is bounded or unbounded. In (18a), there is no upper limit on the degree of sweetness and thus the locatum verb derived from *waneng* ‘sugar’ is atelic. In (18b), by contrast, the number of scales on one single fish is limited and thus the locatum verb derived from *lislis* ‘scale’ is telic, unless the theme refers to an indefinite number of fish.

- (19) Hay, Kennedy, and Levin (1999, p. 127)
- a. Kim is lengthening the rope.  $\Rightarrow$  Kim has lengthened the rope.
  - b. Kim is straightening the rope.  $\nRightarrow$  Kim has straightened the rope.
  - c. The soup cooled for/in an hour.

## 4.2 Aktionsart: Durative

The second semantic difference between Kavalan location and locatum verbs is whether they must be durative or not. The diagnostic I will use is the existential marker *yau*. When it precedes a verb, it is ambiguous between two readings. It can mark polarity emphasis or indicate progressive aspect (Sung, Sung, and Yeh, 2006).

- (20) a. *yau q<m>an tu esi na babuy ti-utay*  
 EXIST <AV>eat OBL meat GEN pig NCM-Utay  
 ‘Utay DOES eat pork.’ or ‘Utay is eating pork.’
- b. *yau talin-an-na ni utay ya qinpan*  
 EXIST move-PV-3ERG ERG Utay ABS bed  
 ‘Utay DOES move the bed.’ or ‘Utay is moving the bed.’

When *yau* precedes a location verb, only the emphatic reading is available, as exemplified in (21). However, it is ambiguous between the emphatic and progressive interpretations when it precedes a locatum verb, as exemplified in (22). The contrast suggests that a location verb is inherently non-durative, whereas a locatum verb can be either durative or non-durative.

- (21) a. *yau pi-subuq-an-na ni imuy ya kelisiw*  
 EXIST PI-backpack-PV-3ERG ERG Imuy ABS money  
 ‘Imuy DID put the money in the backpack.’
- b. *yau pi-tati-an-na ni buya ya kanas*  
 EXIST PI-outside-PV-3ERG ERG Buya ABS basket  
 ‘Buya DID put the basket outside.’
- (22) a. *yau pu-suRna-an-ku ya z anum*  
 EXIST PU-ice-PV-1SG.ERG ABS water  
 ‘I DID put ice cubes in the water.’ or ‘I am/was adding ice cubes to the water.’
- b. *yau su-lislis-an-ku ya baut*  
 EXIST SU-scale-PV-1SG.ERG ABS fish  
 ‘I DID scale the fish.’ or ‘I am/was scaling the fish.’

### 4.3 Theme and location: Integration or independence

Another interpretive difference between location and locatum verbs concerns the integration of the theme with the location (Buck, 1993). A location verb in English depicts a locative relation. The theme and location still remain independent and do not form one unit. However, as pointed out by Buck (1993), although a locatum verb in English can be paraphrased as ‘put X in/on Y’, it does not simply encode a locative relation. Instead, it describes a scenario where the theme is integrated into the location as its descriptive or characteristic property. For instance, the phrase *to sugar the tea* as in (23a) not only expresses ‘to add sugar to the tea’ but also implies that the property of sugar (i.e. sweetness) becomes a descriptive property of the tea. The phrase *to sugar the cup* as in (23d) is unacceptable, as the action of putting sugar in a cup lacks this additional meaning regarding the integration of the theme with the location. Likewise, the appropriate use of a privative locatum verb presupposes that the location and theme used to be one integrated unit. The unacceptability of (24e) can be attributed to the lack of this additional meaning. Groceries are not an essential or descriptive property of a bag and thus it is impossible to use *grocery* as a privative locatum verb.

- (23) Ornative locatum verbs (Buck, 1993, p. 143-144, 151)
- a. Dave sugared the tea.
  - b. Dave spiced the food.
  - c. Dave hemmed the garment.
  - d. \*He sugared the cup. (intended meaning: to put sugar in the cup)
  - e. Bill beaded the string. (cf. Bill strung the beads.)
  - f. to string the guitar (cf. to string the beads)
- (24) Privative locatum verbs (Buck, 1993, p. 145-149)
- a. to scale the fish
  - b. to peel the apple
  - c. to pit the cherry
  - d. to milk the cow
  - e. \*to grocery a bag (intended meaning: to remove groceries from a bag)

The same interpretive contrast between location and locatum verbs can be observed in Kavalan as well. A Kavalan location verb describes a purely locative relation where the theme and location remain independent and do not form one unit, whereas a Kavalan locatum verb depicts a scenario where the theme is integrated into the location as its descriptive or characteristic property. The interpretive contrast between (25a) and (25b) or between (25c) and (25d) offers the first piece of empirical evidence. Both (25a) and (25b) describe a locative relation between the feathers and backpack. However, only the use of a locatum verb derived through *pu-* prefixation as in (25b) implies that the feathers are placed on the backpack as an ornament. That is, the theme becomes a descriptive property of the location. A location verb derived through *pi-* prefixation lacks this additional meaning.

- (25) a. pi-subuq-an-ku                      ya panuz  
 PI-backpack-PV-1SG.ERG ABS feather  
 ‘I put the feathers in a backpack.’
- b. pu-panuz-an-ku                      ya subuq  
 PU-feather-PV-1SG.ERG ABS backpack

- ‘I put feathers on the backpack (as an ornament).’ (‘I decorated the backpack with feathers.’)
- c. pi-subuq-an-na          ni    imuy ya    kelisiw  
 PI-backpack-PV-3ERG ERG Imuy ABS money  
 ‘Imuy put the money in a backpack.’
- d. pu-kelisiw=iku          tu    subuq  
 PU-money=1SG.ABS OBL backpack  
 ‘I put coins on a backpack (as an ornament).’ (‘I decorated a backpack with coins.’)

The following examples further corroborate this analysis. Both (26a) and (26c) contain a location verb prefixed with *pi-*. In principle, it should be possible to depict the same locative relation expressed by these two sentences with a locatum verb prefixed with *pu-*. This is, however, not true. The examples in (26b) and (26d) are ungrammatical. The use of a locatum verb implies that the theme is integrated into the location as its descriptive or characteristic property. The unacceptability of (26b) and (26d) can be attributed to the lack of this additional meaning. Based on our encyclopedic knowledge, in an unmarked context, when a cup is placed on a table, the two objects still remain independent and do not become an integrated unit; if we put salt in a cup, the two entities are not fused in the sense that the cup does not become salty.

- (26) a. pi-takan-an-ku          ya    awa’  
 PI-table-PV-1SG.ERG ABS cup  
 ‘I put the cup on a table.’
- b. \*pu-awa’-an-ku          ya    takan  
 PU-cup-PV-1SG.ERG ABS table  
 Intended: ‘I put a cup on the table.’
- c. pi-awa’-an-ku          ya    mian  
 PI-cup-PV-1SG.ERG ABS salt  
 ‘I put the salt in a cup.’
- d. \*pu-mian=iku          tu    awa’  
 PU-salt=1SG.ABS OBL cup  
 Intended: ‘I put salt in a cup.’

Likewise, the use of Kavalan privative locatum verbs prefixed with *su-* presupposes that the location and theme used to be one integrated unit. Compare (27a) with (27b). Bones are an essential part of fish and thus it is possible to use *tines* ‘bone’ as a privative locatum verb in (27a). In contrast, imagine a scenario where you put bones in a cup while eating fish and afterwards you remove them from the cup. You cannot express this by using *tines* ‘bone’ as a privative locatum verb prefixed with *su-*, as shown by the ungrammaticality of (27b). This is because bones cannot be construed as a characteristic property of a cup.

- (27) a. su-tines-an-ku          ya    baut  
 SU-bone-PV-1SG.ERG ABS fish  
 ‘I boned the fish.’
- b. \*su-tines-an-ku          ya    awa’  
 SU-bone-PV-1SG.ERG ABS cup  
 Intended: ‘I removed bones from the cup.’

#### 4.4 Summary

Previous sub-sections have shown that Kavalan location and locatum verbs exhibit both morphosyntactic and semantic differences. Not only do they take distinct affixes but they also differ in the grammaticality of their AV forms. Location verbs are inherently telic and nondurative, while the telicity and durativity of locatum verbs are conditioned by the boundeness of their root or other contextual factors. Finally, the use of locatum verbs implies that the theme is integrated into the location as its descriptive or characteristic property, whereas location verbs lack this additional meaning. More examples of denominal locative verbs are listed in (28). Section 5 will propose a syntactic account to explain these properties of location and locatum verbs.

(28) *Kavalan location and locatum verbs: Examples and differences*

|                   | <b>Location</b>                                                                                                                                                                                                                                                                                                                                     | <b>Locatum</b>                                                                                                                                                                                                                       |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ornative</b>   | <b><i>pi-X Y: put Y in/on X</i></b><br>pi-tati ‘outside’<br>pi-teRaq ‘inside’<br>pi-ngayaw ‘front’<br>pi-tuRuz ‘back’<br>pi-teqeb ‘backyard’<br>pi-kanas ‘basket’<br>pi-teqiyaR ‘shoulder’<br>pi-subuq ‘backpack’<br>pi-beRasku ‘bottle’<br>pi-takan ‘table’<br>pi-qRawa ‘cage’<br>pi-kungkung ‘bucket’<br>pi-punku ‘dustpan’<br>pi-insung ‘mortar’ | <b><i>pu-X Y: put X in/on Y</i></b><br>pu-mian ‘salt’<br>pu-suRna ‘ice’<br>pu-waneng ‘sugar’<br>pu-zanum ‘water’<br>pu-pa:n ‘bait’<br>pu-lawa ‘cloth’<br>pu-panuz ‘leather’<br>pu-laten ‘bead’                                       |
| <b>Privative</b>  | ?                                                                                                                                                                                                                                                                                                                                                   | <b><i>su-X Y: remove X from Y</i></b><br>su-lisli ‘scale’<br>su-tines ‘bone’<br>su-lubung ‘skin’<br>su-panus ‘fur’                                                                                                                   |
| <b>Properties</b> | 1. PV form only ( <i>-an</i> )<br>2. telic, non-durative<br><br>3. a locative relation<br>(The theme and location remain independent.)                                                                                                                                                                                                              | 1. either AV ( $\emptyset$ ) or PV ( <i>-an</i> )<br>2. telic or atelic, durative or non-durative<br>3. not simply a locative relation<br>(The theme is integrated into the location as its descriptive or characteristic property.) |

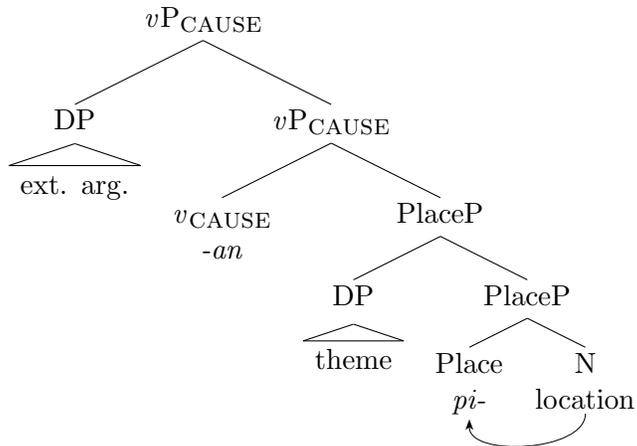
## 5 Functional structures of location and locatum verbs

The differences between Kavalan location and locatum verbs suggest that the two types of locative verbs are structurally distinct. The different affixes they take are overt morphological evidence for Hale and Keyser’s (1993; 2002) analysis, which posits distinct P heads for them. The following two sub-sections will elaborate on their structural differences.

## 5.1 Location verbs

A Kavalan location verb is derived via the incorporation of a location noun to a Place head and  $v_{\text{CAUSE}}$ , as represented in (29). Its obligatory telic and locative interpretation can be attributed to the Place component in its structure, which constitutes its end-point and establishes its boundedness. The Place head  $pi-$ , however, only specifies a locative relation. The contrast between (12a) and (12b) shows that a location verb must take both  $pi-$  and  $-an$ . This indicates that  $pi-$  does not function as a verb-creating head  $v$ .

(29) Functional structure of Kavalan location verbs



What assigns the external argument and turns a location noun into a verb is the PV marker,  $-an$ . Lin (2015) shows that the PV marker  $-an$  can turn an unaccusative verb into a transitive verb. As indicated by the ungrammaticality of (30b), *sabiqbiq* ‘boil’ cannot be used as a transitive verb with an external argument in an agent voice construction. It can co-occur with an external argument only when it is suffixed with  $-an$ , as exemplified in (30c). Transitive interrogative verbs with an external argument are also derived through  $-an$  suffixation, as illustrated in (31) (Lin, 2012, 2015). Adopting Harley’s (2009) classification of  $v$  heads, Lin (2015) thus argues that the PV marker  $-an$  should be analyzed as  $v_{\text{CAUSE}}$ , which contains the features of [+dynamic], [+change of state], [+cause]. The ungrammaticality of the AV form of a denominal location verb can be attributed to the obligatory  $v_{\text{CAUSE}}$  head in its structure.

- (30) a. *sabiqbiq=ti ya z anum*  
 boil=PFV ABS water  
 ‘The water has boiled.’
- b. \**sabiqbiq=ti=iku tu z anum*  
 boil=PFV=1SG.ABS OBL water  
 Intended: ‘I boiled water.’
- c. *sabiqbiq-an-ku=ti ya z anum*  
 boil-PV-1SG.ERG=PFV ABS water  
 ‘I boiled the water.’
- (31) a. *tanian-an-su ya kelisiw-su?*  
 where-PV-2SG.ERG ABS money-2SG.GEN  
 ‘Where do you put your money?’
- b. \**tanian=isu tu kelisiw-su?*  
 where=2SG.ABS OBL money-2SG.GEN

(Lin, 2015, p. 267)

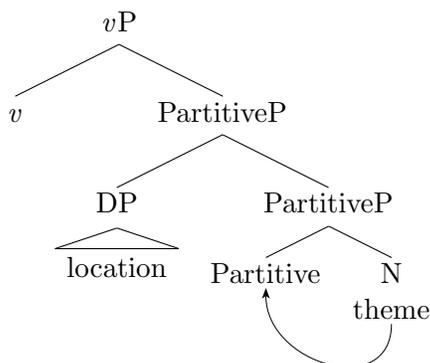
Intended: ‘Where do you put your money?’

(Lin, 2015, p. 274)

## 5.2 Locatum verbs

As discussed in Section 4.1, the telicity of a Kavalan locatum verb is contingent on contextual factors, especially whether the degree of change that the location noun undergoes is bounded or unbounded. This suggests that its derivation involves the incorporation of the theme noun into a non-locative P head that does not influence the telicity of the derived verb. Following Acedo-Matellán and Real-Puigdollers’s (2015) analysis of Catalan, I call this P head Partitive. The structure of a Kavalan locatum verb is represented in (32).

(32) Functional structure of Kavalan locatum verbs



While a Kavalan location verb strictly denotes a locative event due to the Place head, the Partitive head of a locatum verb induces a connotation where the theme and the location are integrated as a unit. Moreover, as the locatum prefix *pu-* by itself can turn a noun into a verb without any overt voice affixes, it should not be identified as the Partitive head only. Within the framework of Nanosyntax, a morpheme does not necessarily correspond to one single terminal, but can be the spell-out of syntactic sub-trees (Starke, 2009). Due to its dual function as both a verb-creating head and a locatum prefix, *pu-* should be construed as the spell-out of a syntactic sub-tree that contains both *v* and Partitive. Any voice marker on a *pu-*marked locatum verb should be analyzed as an additional *v* or Voice head above the functional structure in (32).

## 6 Conclusion

Kavalan denominal location and locatum verbs exhibit different morphosyntactic and semantic properties. Denominal locative verbs do not constitute a homogeneous class. First of all, location and locatum verbs take distinct affixes. Within the latter class, ornative and privative verbs are also morphologically distinguished. Secondly, a *pi-*marked location verb must take the PV marker *-an*, whereas there is no such voice restriction on a locatum verb. This contrast suggests that the location prefix *pi-* does not function as a verb-creating *v* head, but the locatum prefixes *pu-* and *su-* do. Thirdly, while a location verb is inherently telic and non-durative, the telicity and durativity of a locatum verb is conditioned by the boundedness of the incorporated root or nonsyntactic contextual factors. Finally, a location verb denotes a purely locative relation, whereas a locatum verb depicts a scenario where the theme is integrated into the location as its descriptive or characteristic property. These morphosyntactic and interpretive differences suggest that the derivations of location and locatum verbs involve distinct functional projections. The functional structure of a location verb contains a Place head and a *v*<sub>CAUSE</sub> head, while that of a locatum verb contains a Partitive head and an underspecified *v* head.

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# Malagasy *maha* at the crossroads of voice, causation, and modality\*

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## 1 The puzzle

Since the pioneering work of Bhatt (1999), actuality entailments (AEs) have been associated with the perfective uses of modals (Hacquard, 2006, 2009; Homer, 2011). The examples from French below show that when the ability modal is in the imperfective, as in (1a), the successful completion of the action can be negated. If the modal appears in the perfective aspect, however, successful completion is entailed, thus the infelicity of (1b).

- (1) a. Jean pouvait soulever un frigo, mais il ne l'a pas soulevé.  
Jean could-IMPF lift a fridge, but he not it has not lifted
- b. Jean a pu soulever un frigo, # mais il ne l'a pas soulevé.  
Jean has could(PFV) lift a fridge, but he not it has not lifted  
'Jean could lift a fridge, but he didn't lift it.'

More recently, however, Martin and Schäfer (2012) argue that non-agentive causative verbs in German and French also create AEs. In (2b), where the external argument of *enseigner* 'teach' is non-agentive, we see an infelicity similar to that in (1b).

- (2) a. Pierre lui enseignera le russe, mais elle ne l'apprendra pas.  
'Pierre will teach her Russian, but she won't learn it.'
- b. Ce voyage lui enseignera le russe, # mais elle ne l'apprendra pas.  
'This trip will teach her Russian, but she won't learn it.'

In the context of the literature on AEs, we consider the Malagasy voice prefix *maha-*. Malagasy does not have a rich aspectual system like French, so the contrast in (1) is hard to reproduce in this language. However, Malagasy has an elaborate voice system that it exploits to draw the kind of distinctions in (2). We argue that different voice markers reflect a grammaticalized distinction between agentive and non-agentive causers, which plays a role in the licensing of AEs.

Rajaona (1972) was the first to demonstrate that what we call AEs arise with verbs in Malagasy prefixed with *maha-* in the past tense (3a), not in the present (3b), or with verbs that carry certain other voice markers (3c).

- (3) a. # Nahasambotra alika io zaza io nefa faingana loatra ilay alika ka tsy azony.  
PST.AHA.catch dog DEM child DEM but fast too DEF dog C NEG do.3  
'This child was able to catch a dog but it was too fast, so it didn't get caught by him.'
- b. Mahasambotra alika io zaza io nefa faingana loatra ity alika ity ka tsy  
AHA.catch dog DEM child DEM but fast too DEM dog DEM C NEG  
azony.  
do.3  
'This child is able to catch a dog but this dog is too fast so it isn't caught by him.'

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- c. Nisambotra alika io zaza io nefa faingana loatra ilay alika ka tsy azony.  
 PST.AT.catch dog DEM child DEM but fast too DEF dog C NEG do.3  
 ‘This child caught a dog but it was too fast, so it didn’t get caught by him.’

Examples like (3a) pattern with French ability modals in the perfective (1b) and with non-agentive causative verbs (2b). At first sight, the contrast between (3a) and (3c) seems to reside purely in the distinction between what is called actor topic voice (AT) and *maha-*. But when we take a closer look, we observe that the inference arises when *maha-* verbs appear in the past tense (3a), but not in the present tense (3b). This provides a strong indication that *maha-* by itself is not sufficient to trigger an AE, but an interaction between *maha-* and tense is also at stake.

We cannot explain the problem away by arguing that the inference in (3a) is just an implicature. Homer (2011) claims that the AE in (1) qualifies as a bona fide entailment, because it satisfies the presupposition triggered by *too* in the consequent of a conditional, as illustrated in (4).

- (4) Si Jean a pu soulever un frigo, Marie<sub>[F]</sub> aussi en a soulevé un.  
 if Jean has could(PFV) lift a fridge, Marie too of-it has lifted one.  
 ‘If Jean could lift a fridge, Marie could do so as well.’  
*Presupposition*: someone other than Marie lifted a fridge.

Presupposition triggers like *too* are notorious for resisting accommodation, and scalar implicatures do not arise in downward entailing environments. So the felicity of (4) with focus on Marie supports the status of the AE as a (semantic) entailment over a (pragmatic) implicature.

We can apply the same test in Malagasy. The actuality of verbs with *maha-* can satisfy the presupposition triggered by *koa* ‘too’ in the continuation, as illustrated in (5).

- (5) Raha nahabata vato mavestra Rabe dia nambata koa Rasoa<sub>[F]</sub>.  
 if PST.AHA.lift rock heavy Rabe C PST.AT.lift too Rasoa  
 ‘If Rabe was able to lift a heavy rock then Rasoa lifted one too.’  
*Presupposition*: someone other than Rasoa lifted a rock.

Thus the interpretation that Rabe was successful and did indeed lift a heavy rock is not an implicature, but is in fact entailed.

We set aside here any discussion of so-called non-culminating accomplishments (see Koenig and Muansuwan 2001; Bar-el, Davis, and Matthewson 2005). Although earlier analyses of *maha-* in the literature have pursued an aspectual explanation of the pattern in (3), we claim that *maha-* does not encode lexical aspect, and therefore does not encode culmination (we refer the reader to Paul, Ralalaoherivony, and de Swart 2015 for detailed arguments). Rather, we argue in this paper that the different voice markers in Malagasy reflect a grammaticalized distinction between agentive and non-agentive causers, which plays a role in the licensing of AEs. We begin in Section 2 with a brief overview of the literature on AEs and then provide an introduction to the Malagasy voice system in Section 3. In Section 4, we present our analysis, where we show that the combination of a non-agentive causer with a circumstantial modal base gives rise to AEs. Supporting data from Tagalog are discussed in Section 5 and Section 6 concludes.

## 2 Theoretical background

### 2.1 Early observations on actuality entailments

As mentioned above, Bhatt (1999) noted the appearance of actuality entailments in French, Hindi, and Greek with perfective uses of modals.

- (6) a. Jean pouvait soulever un frigo, mais il ne l'a pas soulevé.  
 Jean could-IMPF lift a fridge, but he not it has not lifted
- b. Jean a pu soulever un frigo, # mais il ne l'a pas soulevé.  
 Jean has could(PFV) lift a fridge, but he not it has not lifted  
 'Jean could lift a fridge, but he didn't lift it.'

In her survey of AEs, Hacquard (2014) concludes that they arise with specific types of modals (ability), in a specific aspect (perfective). Lexical category also plays a role: modal verbs but not nouns like *ability* give rise to AEs. As we discuss in the following sections, the first two parts of Hacquard's claim have been called into question.

## 2.2 The role of perfective and prospective aspect

Despite Hacquard's assertions, recent work casts doubt on the role of perfective aspect in licensing AEs. In particular, Mari and Martin (2007) and Homer (2011) show that perfective aspect is not a sufficient condition for AEs to arise with modals. Adding certain adverbial modifiers, as in (7), removes the AE.

- (7) À plusieurs reprises, Olga a pu soulever le frigo, mais ne l'a pas  
 on several occasions Olga has could(PFV) lift the fridge, but not it has not  
 fait.  
 lifted  
 'On several occasions, Olga could lift the fridge, but didn't do it.'

Matthewson (2012), on the other hand, takes the opposite approach. She argues that it is not perfective aspect that licenses AEs, but prospective aspect that blocks it. Prospective aspect locates the event in some future time interval with respect to the temporal perspective, and is responsible for the future orientation often associated with root modals (Condoravdi, 2001). Further evidence comes from the Gitksan modal *da'akhlxw*, which obligatorily co-occurs with the prospective marker *dim* (Matthewson, 2012). Crucially, such utterances lack actuality entailments, as illustrated in (8).

- (8) **da'akhlxw**-'y **dim** hahla'alsd-'y k'yoots, ii ap nee=dii wil='y  
**CIRC.POSS-1SG.II PROSP** work.1SG.II yesterday and EMPH NEG=CONTR be-1SG.II  
 'I was able to work yesterday, but I didn't.'

All in all, we see good reasons to loosen up the relation between perfectivity and AEs, and consider the possibility of future orientation playing a role in blocking AEs.

## 2.3 Sublexical modality

Along similar lines, Martin and Schäfer (2012) question the restriction of AEs to modal verbs, and open up the debate to sublexical modality. They observe that 'defeasible causative' verbs (Oehrle, 1976) display AEs when the subject is an inanimate non-agentive causer, as shown in the French example (9b), while no AE arises with an animate agent, as seen in (9a).

- (9) a. Pierre lui enseignera le russe, mais elle ne l'apprendra pas.  
 'Pierre will teach her Russian, but she won't learn it.'
- b. Ce voyage lui enseignera le russe, # mais elle ne l'apprendra pas.  
 'This trip will teach her Russian, but she won't learn it.'

Earlier analyses of Malagasy have identified two readings of *maha-*, and one of them is labeled the ‘causative’ interpretation (see Section 4 below), so it is worth diving a bit deeper into Martin and Schäfer’s analysis to see how we can exploit their insights for Malagasy.

To account for the pattern in (9), and its counterparts in German, Martin and Schäfer (2012) assign defeasible causative verbs a bi-eventive structure, where modality is present at the sublexical level (Koenig and Davis, 2001). To illustrate their analysis, let us consider the lexical semantics of a verb like *teach*, as shown below.

$$(10) \quad [{}_{VP} \textit{teach} y]: \\ \lambda y.\lambda e[\mathbf{teach}(e) \wedge \mathbf{theme}(y) \wedge \Box_{\rho}\exists e'[\mathbf{cause}(e,e') \wedge \mathbf{learn}(e') \wedge \mathbf{theme}(y,e')]]]$$

In words: the verb *teach* introduces a bi-eventive structure whereby the event  $e$  of teaching causes an event  $e'$  of learning. The theme of  $e$  is linked to the thematic argument of  $e'$ . The causal relation is under the scope of a necessity modal operator  $\Box$  with a modal base  $\rho$ , so what is taught is necessarily learned.

The value of  $\rho$  is underspecified in the lexicon, and Martin and Schäfer (2012) relate differences in implicative readings to different modal bases associated with the modal operator. The modal base is determined by the external argument: when the external argument is an agent, the modal base is energetic but when the external argument is a non-agentive causer, there is a circumstantial modal base.

$$(11) \quad \text{a.} \quad \forall e\forall y\forall x[[\mathbf{teach}(\rho,e,y) \wedge \mathbf{agent}(e,x)] \rightarrow \rho \text{ is energetic}] \\ \text{b.} \quad \forall e\forall y\forall x[[\mathbf{teach}(\rho,e,y) \wedge \mathbf{causer}(e,x)] \rightarrow \rho \text{ is circumstantial}]$$

A circumstantial modal base concerns what is possible or necessary given a particular set of circumstances, and is found in different instances of root modality (von Stechow, 2006). Energetic modality is concerned with acts that include an inherent goal or situations that include an inherent result. Performance of the act entails the fulfillment of their goal or result in all situations that are accessible in the modal base (Koenig and Davis, 2001). For an actuality entailment to go through, it is then crucial whether the real world is included in the modal base or not. For instance, both *give* and *offer* encode that the agent performed the act that causes transfer of possession, that is, s/he did more than just ‘try’ to do something. But performance of the act does not guarantee that possession is successfully transferred: acceptance by the beneficiary only goes through within the modal base. The circumstantial modal base associated with *give* ensures that there is transfer of possession, because the actual world of evaluation is always accessible. However, the selected worlds in an energetic modal base are worlds in which the actions or situations denoted by the verb achieve the goals that motivate those actions, or the inherent consequences that result from the occurrence of the situation. Since the world of evaluation is not necessarily included in the energetic modal base associated with *offer*, the result does not have to be reached in the actual world.

Under this analysis, the difference in modal base drives the presence or absence of the AE. With an energetic modal base, the configuration in (11a) triggers a result implicature under which the learning is achieved when the teacher successfully reaches her goals. This implicature is cancelled when the actual world is not included in the energetic modal base. With a circumstantial modal base, the world of evaluation cannot be filtered out, and it is thus necessarily quantified over by the necessity operator. This gives rise to the result implication in (11b).

The claim that the circumstantial modal base gives rise to AEs connects to earlier observations in the literature that root modals trigger AEs, but epistemic modals do not (Hacquard, 2006, 2014), so Martin and Schäfer’s approach is broadening the debate on AEs, but is not necessarily incompatible with it. There is also a connection with aspect, as shown by Piñón (2014), who points out that defeasible causative verbs with agents behave like activities or accomplishments, while the

same verbs with non-agentive causers are states (or achievements if interpreted inchoatively). As mentioned above, we argued in earlier work (Paul, Ralalaoherivony, and de Swart, 2015) that *maha*-verbs are not achievements, and so we will not pursue this possible aspectual reinterpretation of Martin and Schäfer’s account for Malagasy.

## 2.4 Intermediate conclusion

In sum, the early literature focused on perfective aspect and modal verbs licensing AEs, but more recent proposals have pointed to the relevance of future orientation, with prospective aspect blocking AEs, and have broadened the empirical domain to verbs exemplifying sublexical modality, where we find similar contrasts to those pointed out between root ability readings and circumstantial modals. It is in this context that we consider Malagasy, where AEs emerge in the absence of a rich aspectual system, and with *maha*-, which is not a modal verb. We therefore now turn to some key background on Malagasy.

## 3 Background on the Malagasy voice system

Malagasy is an Austronesian language spoken in Madagascar; the unmarked word order is VOS. We follow most syntactic work on Malagasy and assume that there is a major constituent made up of the verb and its internal arguments; the clause-final subject appears to the right of this constituent. Pearson (2005) refers to the former as PredP, while Keenan (2008) calls it P1. Pearson takes the external DP to be in an A’ position, where it binds a variable in the PredP. Keenan does not rely on movement or empty operators, but takes P1 to denote a property that applies to the sister DP. We do not commit ourselves to a particular syntax of Malagasy voice, but focus on its compositional semantics, so we remain close to Keenan for that reason. However, we will use the term PredP from Pearson as a simpler descriptive term. As illustrated in (12), Malagasy has a rich system of verbal voice morphology that (simplifying somewhat) indicates the semantic role of the subject (sometimes called the topic or trigger).

- (12) a. Actor Topic (AT) – Subject is agent  
 [PredP Nanapaka ity hazo ity tamin’ ny antsy] i Sahondra.  
 PST.AT.cut this tree this PST.P DET knife DET Sahondra  
 ‘Sahondra cut this tree with the knife.’
- b. Theme Topic (TT) – Subject is theme  
 [PredP Notapahin’ i Sahondra tamin’ ny antsy] ity hazo ity.  
 PST.TT.cut DET Sahondra PST.P DET knife this tree this  
 ‘Sahondra cut this tree with the knife.’
- c. Circumstantial Topic (CT) – Subject has some other role  
 [PredP Nanapahan’ i Sahondra ity hazo ity] ny antsy.  
 PST.CT.cut DET Sahondra this tree this DET knife  
 ‘Sahondra cut this tree with the knife.’

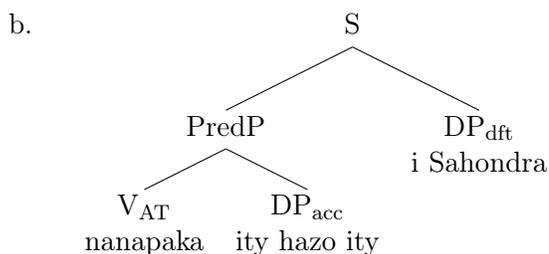
Voice morphology and case marking strongly interact in Keenan’s approach.<sup>1</sup> The sister to PredP is always in the default case. Moreover, Keenan posits an important distinction between verb forms that have genitive case and verbs that do not. When the DP associated with the Agent role appears

<sup>1</sup>For Pearson (2005), voice is A-bar agreement with the case of the moved DP.

with default case, we find the AT voice morphology, and all other arguments (if any) are marked with accusative case or by prepositions; no DP bears genitive case (the verb is [-gen]). When the DP associated with the Agent role does not appear as the sister to PredP, it bears genitive case (the verb is [+gen]). Different voice morphemes can appear on the verb, depending on which argument bears default case and is the sister to PredP. With TT it is the DP that is interpreted as the theme, with CT it is a DP that bears some oblique role (goal, benefactive, instrument, location, cause, etc.). Case and voice morphology drive the syntax-semantics interface. We illustrate Keenan’s approach below.

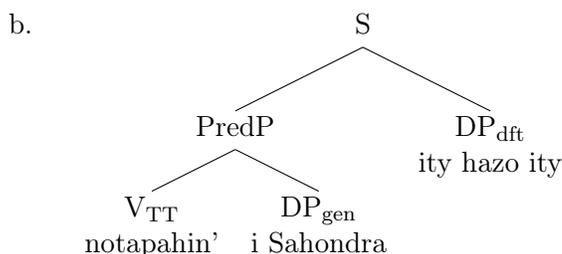
An eventive verb root like *tapaka* ‘cut’ denotes a two place-relation between a ‘cutter’ and a ‘cuttee’. When the verb is marked with AT, it first combines with its theme argument (marked with accusative case) to create PredP, and then the agent argument (marked with default case), which appears as the sister to PredP. We provide a simplified syntactic representation in (13b) below.

- (13) a. Nanapaka ity hazo ity i Sahondra.  
 PST.AT.cut this tree this DET Sahondra  
 ‘Sahondra cut this tree.’



When the verb is marked with TT, it first combines with its agent argument (marked with genitive case), then with other internal argument DPs and adjuncts (if any), and finally the theme argument (marked with default case), which appears as the sister to PredP.

- (14) a. Notapahin’ i Sahondra ity hazo ity.  
 PST.TT.cut DET Sahondra this tree this  
 ‘This tree was cut by Sahondra.’



The structural differences are reflected in the compositional semantics. The semantics of an AT marked transitive verb  $V$  relating an agent to a theme treats the agent as the highest argument, whereas the same verb marked with TT treats the theme as the highest argument. More precisely:

$$(15) \quad \llbracket \text{AT}(V) \rrbracket (y)(x) = \text{True iff} \\
\langle x, y \rangle \in \mathbf{V} \wedge \text{Theme}(y, \mathbf{V}) \wedge \text{Agent}(x, \mathbf{V}) \quad \text{where } \mathbf{V} = \llbracket V \rrbracket$$

$$(16) \quad \llbracket \text{TT}(V) \rrbracket (x)(y) = \text{True iff} \\
\langle x, y \rangle \in \mathbf{V} \wedge \text{Agent}(x, \mathbf{V}) \wedge \text{Theme}(y, \mathbf{V}) \quad \text{where } \mathbf{V} = \llbracket V \rrbracket$$

The AT and TT marked verbs combine with their arguments in different orders, and the semantics in (15) and (16) analyzes them as denoting inverse relations. This is of course reminiscent of

active and passive voice in languages like English. However, the Malagasy voice system is much more engrained in the grammar, because it also plays a role in other syntactic phenomena such as relative clause formation and binding, as shown by Keenan (1976). Also, the Malagasy voice system is much richer, and we refer to Keenan (2008), who shows how the CT voice marker alternates with PPs that specify thematic roles such as Goal, Instrument, Location, and Time.

We follow Keenan’s morphology-syntax-semantics interface for Malagasy voice. But Keenan is not concerned with the lexical semantics of the verb, and he doesn’t provide an analysis of *maha*-. In order to extend this system to *maha*-verbs, we need the bi-eventive structure defined by Davis and Koenig and used by Martin and Schäfer. We go one step further than Martin and Schäfer in that we introduce designated variables  $e$  for events and  $s$  for states. This is necessary to account for the combination of *maha*- with eventive and stative roots in Section 4.3.

Verbs in Malagasy are built from roots by adding voice morphology and therefore the core of any verb is the root. We propose the bi-eventive structure in (17) as the lexical semantics of the eventive root *tapaka* ‘cut’.<sup>2</sup>

$$(17) \quad [v \text{ cut}]: \quad \lambda x \lambda y \lambda e [\text{Cut}(e) \wedge \text{Cutter}(x,e) \wedge \text{Cuttee}(y,e) \wedge \Box_{\rho} \exists s [\text{Be-cut}(s) \wedge \text{Cause}(e,s) \wedge \text{Theme}(y,s)]]$$

In words: eventive roots like *tapaka* ‘cut’ introduce an event and a resulting state. The lexical semantics of the root provides the descriptive content of the event (in this case we are dealing with a cutting event) as well as that of the consequent state that is caused by the event (in this case the state of the theme of the cutting event being cut). The argument  $y$  involved in the cutting event is identified as the theme of the result state.

What we see when we combine the lexical semantics of the eventive root in (17) with the semantics of the voice markers in (15) and (16) is that AT and TT help us to identify the cutter as the agent and the cuttee as the theme of the event  $e$  of cutting. We obtain the following semantics for the PredPs in (18a) and (18b).

$$(18) \quad \begin{array}{l} \text{a.} \quad [_{\text{PredP}} \text{ AT.cut the tree with a knife}]: \\ \quad \lambda e \lambda x \exists z \lambda y [\text{Cut}(e) \wedge \text{Agent}(x,e) \wedge \text{Tree}(y) \wedge \text{Theme}(y,e) \wedge \text{Knife}(z) \wedge \text{Instrument}(z,e) \\ \quad \wedge \Box_{\rho} \exists s [\text{Be-cut}(s) \wedge \text{Cause}(e,s) \wedge \text{Theme}(y,s)]] \\ \text{b.} \quad [_{\text{PredP}} \text{ TT.cut Sahondra with a knife}]: \\ \quad \lambda e \lambda y \exists z [\text{Cut}(e) \wedge x = \text{Sahondra} \wedge \text{Agent}(x,e) \wedge \text{Theme}(y,e) \wedge \text{Knife}(z) \wedge \text{Instrument}(z,e) \\ \quad \wedge \Box_{\rho} \exists s [\text{Be-cut}(s) \wedge \text{Cause}(e,s) \wedge \text{Theme}(y,s)]] \end{array}$$

Following Keenan (2008), we assume that the PP in (12a) and (12b) specifies the thematic role of the knife as an Instrument. Application of the AT and TT marked PredP to the DP in default case, and the interpretation of past tense leads to the semantics of the clauses in (19a) and (19b).

$$(19) \quad \begin{array}{l} \text{a.} \quad [_{\text{S}} [_{\text{PredP}} \text{ AT.cut the tree with a knife}] [_{\text{DP}} \text{ Sahondra}_{\text{dff}}]: \\ \quad \exists e \exists z \lambda y [\text{Cut}(e) \wedge x = \text{Sahondra} \wedge \text{Agent}(x,e) \wedge \text{Tree}(y) \wedge \text{Theme}(y,e) \wedge \text{Knife}(z) \wedge \\ \quad \text{Instrument}(z,e) \wedge e \subseteq r \wedge r < \text{now} \wedge \Box_{\rho} \exists s [\text{Be-cut}(s) \wedge \text{Cause}(e,s) \wedge \text{Theme}(y,s)]] \\ \text{b.} \quad [_{\text{S}} [_{\text{PredP}} \text{ TT.cut Sahondra with a knife}] [_{\text{DP}} \text{ the tree}_{\text{dff}}]: \\ \quad \exists e \exists z \lambda y [\text{Cut}(e) \wedge x = \text{Sahondra} \wedge \text{Agent}(x,e) \wedge \text{Tree}(y) \wedge \text{Theme}(y,e) \wedge \text{Knife}(z) \wedge \\ \quad \text{Instrument}(z,e) \wedge e \subseteq r \wedge r < \text{now} \wedge \Box_{\rho} \exists s [\text{Be-cut}(s) \wedge \text{Cause}(e,s) \wedge \text{Theme}(y,s)]] \end{array}$$

The past tense introduces a reference point  $r$  preceding the speech time *now*. In the absence of aspectual marking, we take the past tense to be aspectually transparent, and it simply passes on

<sup>2</sup>To simplify our representations, we label *tapaka* with ‘V’, but most roots are either adjectives or nouns; a small handful are verbs.

the eventive/stative nature of the root to the semantics. Because *tapaka* ‘cut’ is an eventive root, we take it to denote an event. In line with standard views on lexical and grammatical aspect, we take events to be included in  $r$  ( $e \subseteq r$ ). In the end, the examples in (12) are not crucially different in their final representation: all sentences denote a past event of cutting that involves an Agent, a Theme and an oblique argument, and a causal relation between the cutting of the tree and the tree being cut. But the situational core is built up differently.

In (19a) and (19b), the event  $e$  of cutting is anchored to the time axis by means of tense. But whether the resulting state  $s$  of the tree being cut is true in the world of evaluation depends on the modal base  $\rho$  associated with necessity operator  $\Box$ . With Martin and Schäfer, we assume that the modal base associated with eventive roots remains underspecified in the lexicon. In German and French, the external argument is responsible for the specification of  $\rho$  (cf. (11) above). We claim that in Malagasy, the voice marker assumes this responsibility. We take the agentive causer (*Sahondra* in (12)) in AT, TT and CT voice to associate an energetic modal base with the eventive root. The result of the tree being cut is thus necessarily reached upon completion of the event, but the set of worlds in which the result comes true is restricted to the set of worlds in which the agent reaches her goals. In an energetic modal base, the real world may or may not be included in the set of worlds quantified over. We thus account for the fact that, although there is no lack of culmination associated with the examples in (12), there are no actuality entailments with AT, TT and CT. In the next section, we show how a difference in modal base triggered by *maha-* constitutes one of the ingredients of the AE in Malagasy.

## 4 *Maha-* introduces a non-agentive causer

### 4.1 The challenges raised by *maha-*

Recall that our goal is to account for AEs with *maha-* verbs in the past tense (20a), and rule out AEs with *maha-* in the present tense (20b), or past tense with other voices (20c)-(20d).

- (20) a. # *Nahasambootra alika io zaza io nefa faingana loatra ilay alika ka tsy azony.*  
 PST.AHA.catch dog DEM child DEM but fast too DEF dog C NEG do.3  
 ‘This child was able to catch a dog but it was too fast, so it didn’t get caught by him.’
- b. *Mahasambootra alika io zaza io nefa faingana loatra ity alika ity ka tsy azony.*  
 AHA.catch dog DEM child DEM but fast too DEM dog DEM C NEG do.3  
 ‘This child is able to catch a dog but this dog is too fast so it isn’t caught by him.’
- c. *Nisambootra alika io zaza io nefa faingana loatra ilay alika ka tsy azony.*  
 PST.AT.catch dog DEM child DEM but fast too DEF dog C NEG do.3  
 ‘This child caught a dog but it was too fast, so it didn’t get caught by him.’
- d. *Nosamborin’ io zaza io ilay alika nefa faingana loatra ilay alika ka tsy azony.*  
 PST.TT.catch DEM child DEM DEF dog but fast too DEF dog C NEG do.3  
 ‘This child caught the dog but it was too fast, so it didn’t get caught by him.’

So far, we have dealt with the AT and TT verbs in (20c) and (20d). In Section 3, we argued that they do not trigger AEs, because an energetic modal base is involved. The aim of this section is to explain why AEs arise with *maha-* verbs in the past tense (20a), but not the present tense (20b).

In order to do so, we must proceed in two steps, because it has been noted in the literature on Malagasy that *maha*- verbs appear to allow two distinct interpretations, abilitive and causative, as in the examples below (adapted from Phillips (1996, 2000)).

- (21) a. Mahaongotra fantsika amin' ny tanana Rabe.  
 AHA.pull-out nail with DET hand Rabe  
 'Rabe can pull out nails with his hands.'
- b. Mahafinaritra an' i Soa Rabe.  
 AHA.happy ACC DET Soa Rabe  
 'Rabe makes Soa happy.'

As argued by Phillips (1996, 2000), eventive roots such as *sambotra* 'catch' in (20a) and (20b), and *ongotra* 'action of pulling out' in (21a) give rise to abilitive readings, but when *maha*- combines with a stative root such as *finaritra* 'happy' in (21b) the interpretation is causative. We work out the semantics of *maha*- with eventive roots in Section 4.2, and extend the analysis to stative roots in Section 4.3.

What the two readings have in common is that Rabe is not treated like an agent, the way we have seen this for AT, TT and CT voice markers, so we treat the abilitive and causative interpretations in (21) as the outcome of a singular underlying semantics of *maha*-. Independent evidence in favor of the non-agentive interpretation of the argument external to the PredP in examples like (21a) and (21b) comes from the incompatibility of *maha*- with agent-oriented adverbs (Phillips, 1996, 2000; Travis, 2010). We illustrate this in the contrast between (22a) where the main verb *nameno* 'fill' is AT and (22b) with *mahafeno*.

- (22) a. Nanao fanahy iniana nameno tavoahangy Rakoto.  
 PST.AT.do spirit TT.do-on-purpose PST.AT.fill bottle Rakoto  
 'Rakoto deliberately filled bottles.'
- b. # Nanao fanahy iniana nahafeno tavoahangy Rakoto.  
 PST.AT.do spirit PST.TT.do-on-purpose PST.AHA.fill bottle Rakoto  
 'Rakoto was deliberately able to fill bottles.'

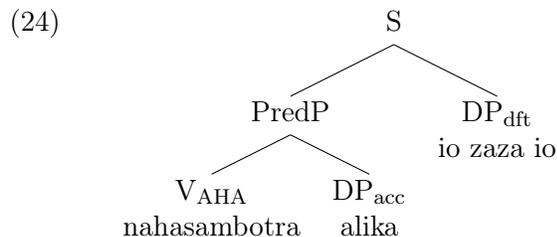
Verbs with AT morphology, such as *nameno* 'fill' are compatible with adverbials such as *nanao fanahy iniana* 'deliberately', while *maha*- verbs, such as *nahafeno* 'fill' are not. With these observations in place, we turn now to our analysis.

## 4.2 The syntax-semantics interface *maha*- with eventive roots

We take our starting point in the lexicon-syntax-semantics interface developed in Section 3, and begin with the lexical semantics of the root *sambotra* 'catch'. The bi-eventive structure we propose in (23) mirrors the lexical semantics of *tapaka* 'cut' in (17).

- (23) [v catch]:  $\lambda x \lambda y \lambda e$  [Catch(e)  $\wedge$  Catcher(x,e)  $\wedge$  Catchee(y,e)  $\wedge$   $\square_{\rho} \exists s$  [Be-caught(s)  $\wedge$  Cause(e,s)  $\wedge$  Theme(y,s)]]

Verbs with *maha*- head a PredP that contains all the internal arguments of the root, just like other voice markers do. This leads to the syntactic structure (24) for the first clause of (20a) (we refer the reader to Travis 2016, for a more detailed syntactic analysis).



In line with the observations made with respect to (2) and (22), we take the core contribution of *maha-* to be the identification of the ‘catcher’ as a non-agentive causer. (25) is the adapted version of Keenan’s (2008) analysis of voice to *maha-*.

$$(25) \quad \llbracket \text{maha-(V)} \rrbracket (y)(x) = \text{True iff} \\
 \langle x, y \rangle \in \mathbf{V} \wedge \text{Theme}(y, \mathbf{V}) \wedge \text{Causer}(x, \mathbf{V}) \quad \text{where } \mathbf{V} = \llbracket \text{V} \rrbracket$$

Verbs with *maha-* head a PredP that contains all the internal arguments of the root. The application of (25) to the syntactic structure in (24) results in the semantics in (26).

$$(26) \quad [\text{PredP } \text{maha-catch the dog}_{\text{acc}}]: \\
 \lambda x \lambda y \lambda e [\text{Catch}(e) \wedge \text{Catcher}(x, e) \wedge \text{Causer}(x) \wedge \text{Dog}(y) \wedge \text{Catchee}(y, e) \wedge \text{Theme}(y, e) \wedge \\
 \Box_{\rho} \exists s [\text{Be-caught}(s) \wedge \text{Cause}(e, s) \wedge \text{Theme}(y, s)]]$$

In line with Martin and Schäfer (2012), we take the non-agentive causative nature of *maha-* to support the selection of a circumstantial modal base as the value of  $\rho$ . This explains the potential of AE with this voice marker. We are careful to specify this as a potential, because root modals also come with a circumstantial modal base, and we know from the analyses discussed in Section 2 above that they give rise to AEs in particular temporal/aspectual configurations, but not in others. We see this in Malagasy as well, with the contrast between past tense (20a) and present tense (20b). So we need to zoom into the next step of the derivation, namely the combination with the subject, and with tense.

Combining the PredP in (26) with its DP sister, and interpretation of past tense results in the semantics for the clause in (27).

$$(27) \quad [_{\text{S}} [\text{PredP } \text{maha-catch the dog}_{\text{acc}}] [_{\text{DP}} \text{this child}_{\text{dft}}]]: \\
 \exists e \lambda x \lambda y [\text{Catch}(e) \wedge \text{Catcher}(x, e) \wedge \text{Child}(x) \wedge \text{Causer}(x, e) \wedge \text{Dog}(y) \wedge \text{Catchee}(y, e) \wedge \\
 \text{Theme}(y, e) \wedge e \subseteq r \wedge r < \text{now} \wedge \Box_{\rho} \exists s [\text{Be-caught}(s) \wedge \text{Cause}(e, s) \wedge \text{Theme}(y, s)]]$$

In languages with a perfective/imperfective contrast in the past tense (Hindi, French), the perfective past is required to obtain an AE (but see Section 5 for a discussion of Tagalog). Malagasy is not a grammatical aspect language, but of course it does establish a distinction between stative and eventive roots, so we have lexical aspect (sometimes called *Aktionsart* or situational class). The fact that we are dealing with an eventive root implies that we have a configuration in which  $e$  is included in the reference time (see Section 3). Past tense is aspectually neutral, and just contributes the location of  $r$  before now. We take the  $e \subseteq r$  configuration to be responsible for lack of a future temporal orientation: the orientation time  $r$  is stated to precede the *now* ( $r < \text{now}$ ), and if  $e$  is included in  $r$ , the whole event not only precedes the *now*, but doesn’t look forward beyond  $r$ . The combination of a circumstantial modal base, the aspectual information  $e \subseteq r$ , and past time reference  $r < \text{now}$  is sufficient to trigger the actuality entailment in (20a): we are dealing with a completed event  $e$  in the past, no prospective aspect, and the circumstantial modal base implies that the causal result of  $e$  is true in the real world.

Martin and Schäfer link the distinction between agentive and non-agentive causers to animacy. Indeed, the agent of (2a) is animate, and the non-agentive cause in (2b) is inanimate. The animacy

distinction is not strict in German and French, but it is a strong tendency. The felicity of animate/human DPs external to the *maha*- marked PredP in (20a) and (20b) shows that animacy does not play a role in Malagasy, and the distinction between agentive/non-agentive causers is purely driven by the voice system. The fact that *maha*- imposes a non-agentive role on the highest argument of an eventive root seems to be responsible for the abilitive reading of the external argument in configurations like (21a).

We can use the insights about combination of tense and modality to explain why no AE arises with the present tense in (20b). Unlike the past tense, the present tense is not aspectually neutral. Comrie (1976) drew the typological generalization that (simple) present tenses are never perfective, but always imperfective. We try to avoid the perfective/imperfective terminology here, because Malagasy does not have formal grammatical aspect markers. Rather, we build on Matthewson’s (2012) distinction between prospective and non-prospective aspect. More specifically, we take aspectually unmarked (simple) present tenses to have a future orientation by default. As pointed out by Matthewson, a prospective temporal orientation blocks the AE, while lack of a prospective orientation brings out the AE. The future orientation of the simple present then explains why no AE arises in (20b).

Summing up, we propose an analysis of Malagasy in which the contrast between (20a) and (20c)-(20d) is derived as a consequence of the difference in sublexical modality. While *maha*- comes with a circumstantial modal base, the AT and TT voice markers trigger an energetic modal base, which does not necessarily include the real world. Energetic modality is prospective, but circumstantial modality is not (Martin and Schäfer, 2012). Thus no AEs are predicted to arise with AT and TT. The future orientation of the simple present blocks the AE in (20b), but the simple past is aspectually neutral, so with eventive roots, there is no future orientation, and thus nothing blocks the AE in (20a). We conclude that AEs in Malagasy arise out of the combination of sublexical modality (energetic vs. circumstantial modal base), lexical aspect (events are included in their reference time) and tense (past tense, unlike present tense, is aspectually neutral).

### 4.3 Stative roots

In the preceding section, we considered an eventive root, *sambotra* ‘catch’. Many roots in Malagasy, however, are stative and describe a result state, e.g. *finaritra* ‘happy’; **happy**(*e*). It is not plausible to attribute a bi-eventive structure to such roots. Without the bi-eventive structure, however, *maha*- cannot apply to such a root, because there is no agentive causer that it can reinterpret as non-agentive. We suggest that these cases involve coercion: the stative root is reinterpreted in terms of a bi-eventive structure in which the state described by the root constitutes the descriptive content of the state *s*, the result of an underspecified causing event *e*. Note that we have also enriched the argument structure, so after coercion we are dealing with a transitive root.

$$(28) \quad [{}_V C_{se}(\text{happy})]: \\ \lambda x \lambda y \lambda e [\text{Theme}(y,e) \wedge \Box_{\rho} \exists s [\text{Happy}(s) \wedge \text{Cause}(e,s) \wedge \text{Theme}(y,s)]]$$

After coercion, *maha*- can apply to the root, identifying the *x* variable as the causer:

$$(29) \quad [{}_{\text{PredP}} \text{maha-}C_{se}(\text{Soa}_{\text{acc}} \text{happy})]: \\ \lambda x \lambda e [\text{Causer}(x,e) \wedge y=\text{Soa} \wedge \text{Theme}(y,e) \wedge \Box_{\rho} \exists s [\text{Happy}(s) \wedge \text{Cause}(e,s) \wedge \text{Theme}(y,s)]]$$

Adding Rabe as the sister of the PredP spells out who is the non-agentive causer:

$$(30) \quad [{}_{\text{TP}} [{}_{\text{PredP}} \text{maha-}C_{se}(\text{Soa}_{\text{acc}} \text{happy})] [{}_{\text{DP}} \text{Rabe}_{\text{dft}}]]: \\ \lambda e [x=\text{Rabe} \wedge \text{Causer}(x,e) \wedge y=\text{Soa} \wedge \text{Theme}(y,e) \wedge \Box_{\rho} \exists s [\text{Happy}(s) \wedge \text{Cause}(e,s) \wedge \text{Theme}(y,s)]]$$

Here the external argument (*Rabe*) is interpreted as causing the result state (*Soa being happy*). The basic interpretation of *maha-* as imposing a non-agentive role on the external argument strongly brings out the causative reading with stative roots. With this interpretation in mind, we look at the range of readings of *maha-* in the following section.

#### 4.4 The range of interpretations *maha-* can have

In the literature on *maha-* there is a long-standing debate about whether or not this voice marker is ambiguous between an abilitive and a causative interpretation (Rajaona, 1972; Dez, 1980; Phillips, 1996, 2000). We repeat the relevant examples in (31), where (31a) illustrates the abilitive reading and (31b) illustrates the causative reading.

- (31) a. Mahaongotra fantsika amin' ny tanana Rabe.  
 AHA.pull-out nail with DET hand Rabe  
 'Rabe can pull out nails with his hands.'
- b. Mahafinaritra an' i Soa Rabe.  
 AHA.happy ACC DET Soa Rabe  
 'Rabe makes Soa happy.'

The analysis in this paper accounts for the two readings. The abilitive reading emerges in configurations where the combination of the eventive root with any of the AT, TT and CT voice markers would lead to an agentive interpretation of the highest argument, in line with the expected thematic grid of the root, yet *maha-* imposes a non-agentive interpretation. With stative roots such as *finaritra* 'happy' in (31b), coercion results in an interpretation where the external argument causes the result state, hence the saliency of the causative reading. The unified semantics we propose in (25) above covers both, so we agree with Dez (1980) and Phillips (1996, 2000) that there is one *maha-*.

In fact, there are other non-agentive readings possible with *maha-*: certain utterances have an 'accidentally' reading, as shown in (32).

- (32) a. Nahasotro poizina izy  
 PST.AHA.drink poison 3  
 'He drank poison.'
- b. Nahatelina moka aho  
 PST.AHA.swallow mosquito 1SG  
 'I swallowed a mosquito.'
- c. Nahapetraka teo ambony tsilo i Soa  
 PST.AHA.sit PST.LOC on thorn DET Soa  
 'Soa sat on a thorn.'

What unifies the interpretations associated with *maha-* is non-agentivity. Independent evidence for the absence of agentivity comes from the incompatibility of *maha-* with agent-oriented adverbs, as mentioned above. We leave a complete discussion of these readings for future research, but we note that a similar range of interpretations arise with the St'át'imcets circumstantial modal (Davis, Matthewson, and Rullmann, 2009).

## 5 Tagalog

Before concluding, we provide independent support for our analysis from a related language, Tagalog. As described by Dell (1983/1984) and Kroeger (1993), Tagalog has an 'ability involuntary action'

(AIA) voice (Schachter and Otanes, 1972, p. 330-333) that is associated with AEs. In (33) below, the successful completion of the action is asserted – just as we have seen with *maha-* in Malagasy.

- (33) Nakunan ni Ben ng litrato si Luisa  
 AIA-PF-take GEN Ben GEN picture NOM Luisa  
 ‘Ben managed to take a picture of Luisa.’  
 ‘Ben involuntarily took a picture of Luisa.’

Moreover, as discussed in detail by Dell, the end result comes about because of circumstances often beyond the agent’s control, as indicated by the translations. On the other hand, non-AIA voices (Dell calls these ‘neutral’) implicate the successful completion of the action, but do not entail it – like AT, TT and CT voices in Malagasy. The neutral voice is illustrated in the first clause of (34).

- (34) Itinulak ni Ben ang bato pero hindi niya naitulak dahil napakabigat  
 N-PF-push GEN Ben NOM rock but NEG 3GEN AIA.PF-push because very-heavy  
 niyon  
 GEN-that  
 ‘Ben pushed the rock, but he could not make it move, because it was so heavy.’  
 (lit.) ‘Ben pushed the rock, but he couldn’t push it because it was so heavy.’

Unlike Malagasy, however, Tagalog has a rich system of aspect: imperfective, perfective and contemplated. When imperfective aspect combines with AIA forms, an AE is still present. When prospective aspect combines with AIA, however, the AE disappears (Dell, 1983/1984).

- (35) a. Nagpunta sana si Ben kahapon, kung  
 come would NOM Ben yesterday if  
 ‘Ben would have come yesterday, if...’  
 b. makakapunta siya  
 AIA-CTP-come NOM-he  
 ‘... he had been able to.’  
 c. # nakakapunta siya  
 AIA-IMPF-come NOM-he

The first clause in (35a) implies that Ben did not come. The continuation in (35c) with AIA and imperfective aspect asserts that he did come, giving rise to infelicity. With contemplated aspect, as in (35b), there is no such assertion and the result is felicitous.

We suggest that in Tagalog neutral voice is like AT, TT and CT and involves an energetic modal base. The AIA morphology introduces a circumstantial modal base, parallel to *maha-*. Following the description in Schachter and Otanes 1972, perfective and imperfective aspects in Tagalog indicate that the event has begun. Contemplated aspect, however, indicates that the event has not begun. We therefore propose that contemplated aspect has a prospective temporal orientation (Matthewson, 2012), blocking the AE in examples such as (35b), much like present tense in Malagasy. Thus Tagalog provides further support for dissociating AEs from perfective aspect, as AEs in this language arise with both perfective and imperfective aspect.

## 6 Conclusion

In this paper, we have provided arguments from Malagasy confirming that actuality entailments are not limited to modal verbs and to perfective aspect. We drew on work by Martin and Schäfer

(2012) to argue that while modality plays a role, it can be sublexical. Moreover, the role of aspect depends on contrasts in a language. What appears to be crucial for AEs is the notion of a non-agentive causer that triggers a circumstantial modal base. This connection between the agentivity of the external argument and an energetic modal base is the subject of much discussion in the recent literature, and there are relevant connections to explore with aspect, in particular non-culminating events (e.g. Demirdache and Martin, 2015). We hope to explore this connection in more detail in future research.

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# The what and where of Out of Control morphemes in Tagalog and Malagasy\*

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## 1 Introduction

In this paper, I examine a set of morphemes in Tagalog and Malagasy (two Austronesian languages) with the goal of determining what function these morphemes serve and, closer to my own research, where they appear along the syntactic spine. I begin by introducing non-culminating accomplishments in Tagalog and Malagasy, and then the morphemes that are added to verbs to ensure an actuality entailment. In the following section I give an overview of additional meanings that accompany these morphemes and compare these meanings to the Out of Control meanings of the circumstantial modal morpheme in St'át'imcets (Davis et al., 2009). Having determined the WHAT of these morphemes, I turn to the WHERE and give arguments that the morphemes in Tagalog and Malagasy must be generated within the argument structure domain of the verb as (a) they are in complementary distribution with the lexical causative morpheme and (b) they both affect and reflect the placement of arguments. I conclude by speculating on the connection between these morphemes and sublexical modality (Koenig and Davis, 2001), raising questions about how much of the semantics of a lexical item might be expected to be realized as a morphologically complex form encoded in multiple heads in the syntax.

## 2 Tagalog and Malagasy (Austronesian)

Both Tagalog and Malagasy are languages with non-culminating accomplishments.<sup>1</sup> In both languages, when the verb is in what I will call the Neutral form, following Dell (1983), there is an implicature that the events described have reached their natural endpoint. We will see, however, that these endpoints are defeasible.

### 2.1 Non-culminating accomplishments

In the sentence in (1) below, the root  $\sqrt{\text{PUNTA}}$  'go' is used twice. Once in a Neutral (N) form (1a), and once in the Ability/Involuntary Action (AIA) form (1b).<sup>2</sup> The Neutral form has the implicature but not the entailment of the natural endpoint while the AIA form has the entailment, accounting for why the complex sentence is not a contradiction. Only the entailed endpoint in (1b) is negated. The `gray` marks the form of the verb (Actor Topic: AT) and the Topic of the clause (*si Pedro*) (data adapted from Dell (1983, p. 180)).<sup>3</sup>

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<sup>1</sup>There are many other languages that have non-culminating accomplishments, such as Burmese (Kato, 2014), Japanese (McClure, 1994; Uesaka, 1996), Karachay-Balkar (Tatevosov, 2008), Mandarin (Tai, 1984), and Thai (Koenig and Muansuwan, 2000).

<sup>2</sup>We will see in Section 3 why these forms are labelled AIA.

<sup>3</sup>There is considerable disagreement about the status of the *ang/si* marked DP in Tagalog and the sentence final DP in Malagasy, the possibilities being a Topic (e.g. Pearson (2005)), an A-subject (e.g. Guilfoyle et al. (1992)), an

- (1) Root:  $\sqrt{\text{PUNTA}}$  ‘go’
- a. **Pumunta** sa Maynila **si** **Pedro** ...  
 N-**AT**.PERF-go DAT Manila NOM Pedro ...  
 ‘Pedro went to Manila...’
- b. pero nalgaw siya, kaya hindi siya **nakapunta**  
 but get.lost NOM.3SG hence not NOM.3SG AIA.AT.PERF.go  
 ‘...but got lost and didn’t get there.’

Accomplishments are non-culminating in both the Actor Topic (AT) construction where the verb is in the AT form and Agent is *ang/si* marked as in (1a) above, and the Theme Topic (TT) construction where the verb is in the TT form and the Theme is *ang/si* marked as in (2a) below.

- (2) Root:  $\sqrt{\text{ITULAK}}$  ‘move’
- a. **Itinulak** ni Ben **ang** **bato** ...  
 N.**TT**.PERF.push GEN Ben NOM rock ...  
 ‘Ben pushed the rock ...’
- b. ...pero hindi niya **naitulak**, dahil napakabigat niyon  
 ...but NEG 3SG.GEN AIA.TT.PERF.push, because very-heavy GEN.DEM  
 ‘...but he could not make it move because it was so heavy.’

Malagasy verbs in their Neutral form also encode non-culminating accomplishments. Below we look at three constructions, all using the root  $\sqrt{\text{VORY}}$  ‘get together’– the AT transitive (3), the TT (4), and the AT unaccusative (5).<sup>4</sup> Recall that there is an implicature that the natural endpoint has been reached, but there is no entailment.

- (3) a. namory ny ankizy **ny** **mpampianatra**  
 PST-**AT**.CAUSE-meet DET children DET teacher  
 ‘The teacher gathered the children together.’ n+an+ $\sqrt{\text{VORY}}$
- b. ...nefa tsy nanana fotoana izy  
 ...but NEG PST-AT.have time 3P  
 ‘...but s/he didn’t have time.’ n+i+ $\sqrt{\text{VORY}}$
- (4) a. Novorin’ny mpampianatra **ny** **ankizy**  
 PST-meet.**TT**.GEN’DET teacher DET children  
 ‘The children were gathered by the teacher.’ no  $\sqrt{\text{VORY}}$  +N
- b. ...nefa tsy nanana fotoana izy  
 ‘...but s/he didn’t have time.’
- (5) a. Nivory **ny** **olona**  
 PST-**AT**.INCH-meet DET people  
 ‘The people met.’ n+i+ $\sqrt{\text{VORY}}$

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A’-subject (Travis, 2006), or an absolutive DP (e.g. Aldridge (2012)). I will call this DP a Topic, matching the AT and TT labelling of the relevant morphemes. This choice should not affect the argumentation here.

<sup>4</sup>It may seem strange to call the unaccusative an Actor Topic form since the Topic is, in fact, a Theme. The morphological structure, however, is similar enough to the transitive (or unergative) constructions to warrant having the same label. In these constructions, it is always the highest argument in the theta-hierarchy which is the Topic, which would be the Theme with an unaccusative verb.

- b. ?... nefa tsy nanana fotoana izy  
 ‘...but they didn’t have time.’

The unaccusative form appears to be not as easy to cancel as the others, but we will see a contrast when compared to the forms below which contain telic morphology. We have seen these telic morphemes used in the examples already given for Tagalog above where the negative of the AIA form of the verb did not create a contradiction when juxtaposed with the Neutral form of the verb. We look at these AIA construction more closely in the next section.

## 2.2 Telicity morphemes

In both Tagalog and Malagasy a different set of morphemes can be added to the roots creating constructions with actuality entailments. With these morphemes, the endpoint is no longer defeasible. In Tagalog, the relevant morpheme is *aka-* for the AT construction and *a-* for the TT construction. We have seen examples of these constructions in both AT (1) and TT (2) forms above. A further contrastive pair is given below with the AT form.

- (6) a. Nagtunaw ako ng tsokolate pero hindi ko ito natapos  
 N-AT-melt 1SG.NOM ACC chocolate but NEG 1SG.GEN it COMPL-AT-finish  
 ‘I melted the chocolate but I wasn’t able to finish.’ n+pag+√TUNAW
- b. Nakatunaw ako ng tsokolate # pero hindi ko ito natapos  
 AIA-AT-melt 1SG.NOM ACC chocolate but NEG 1SG.GEN it COMPL-AT-finish  
 ‘I melted the chocolate but I wasn’t able to finish.’ n+aka+√TUNAW

In (6a), the endpoint has been successfully cancelled, while in (6b), the endpoint is entailed and therefore not defeasible.

In Malagasy, there are three different telic morphemes – *aha-* for AT transitive, *voa-* for TT, and *tafa-* for AT unaccusative.<sup>5</sup> We can compare each of the constructions below to their Neutral counterparts. This is important particularly for the unaccusative construction which was not easily cancelled in (5) but is clearly not defeasible in (9).

- (7) a. nahavory ny ankizy ny mpampianatra  
 PST-AT.AHA-meet DET children DET teacher  
 ‘The teacher gathered the children together.’ n+aha+√VORY
- b. #... nefa tsy nanana fotoana izy  
 ...but NEG PST-AT.have time 3P  
 ‘...but s/he didn’t have time.’
- (8) a. Voavorin’ny mpampianatra ny ankizy  
 VOA-meet-TT.GEN’DET teacher DET children  
 ‘The children were gathered by the teacher.’<sup>6</sup> voa+√VORY+N
- b. #... nefa tsy nanana fotoana izy  
 ‘...but s/he didn’t have time.’
- (9) a. tafavory ny olona  
 AT.TAFA-INCH-meet DET people  
 ‘The people met.’ tafa+√VORY

<sup>5</sup>See Phillips (2000) for more detail on a uniform analysis of *aha-*.

<sup>6</sup>TT is often translated as a passive in the literature pointing to the confusion over the status of the Subject/Topic.

- b. # ... nefa tsy nanana fotoana izy  
'...but they didn't have time.'

We have seen that Tagalog and Malagasy both have non-culminating accomplishments which have an implicature but not an entailment of completion. Both languages also have a set of morphemes which add the entailment meaning. We will see in the sections below that (i) these derived culminating accomplishments introduce a set of meanings that are not found in accomplishments in languages like English, and (ii) that this set of meanings is found outside of Austronesian, in the Out of Control construction in St'át'imcets, a Salish language.

### 3 What is this morphology?

We begin by outlining some perhaps surprising semantic effects of adding what I have been calling telic morphemes in both Tagalog and Malagasy. What becomes clear immediately is that telic accomplishments in these two languages are quite different from the accomplishments of languages such as English.

#### 3.1 Tagalog

In the Tagalog example below, we see first a verb in the Neutral form (10a) followed by a verb in the AIA form (10b). Given the two translations of the AIA (Ability/Involuntary Action) form, we can now see where the AIA label for these morphemes comes from (data adapted from Dell 1983, p. 177). Unlike in English (or other languages with culminating accomplishments), forms that entail the endpoint of an event bring with them extra meanings in Tagalog.

- (10) a. **Kinunan** ni Ben ng litrato si Luisa  
N.PERF-take GEN Ben GEN picture NOM Luisa  
'Ben took a picture of Luisa.'
- b. **Nakunan** ni Ben ng litrato si Luisa  
AIA.PERF-take GEN Ben GEN picture NOM Luisa  
(i) 'Ben managed to take a picture of Luisa.'  
(ii) 'Ben involuntarily took a picture of Luisa.'

Dell (1983) explores this issue in detail and explains that in these languages, one may either assert the Maneuver part of an event or the Result.

One uses a **Neutral form** when one intends to assert that a certain Maneuver took place, but one wants to remain noncommittal as to whether it did actually bring about the intended Result; on the other hand, one uses an **AIA form** when the main business at hand is to assert that a Result, intended or not, was actually achieved. (emphasis mine: LT)

The difference of what is salient in each type of construction becomes very clear in examples such as the one in (11) below. In (11a) what is surprising is the manner in which the action occurred (i.e. the Maneuver). In (11b), what is surprising is that the Result was achieved.

- (11) Maneuver and Result (Dell, 1983)
- a. nagtataka akong sinakal ni Pedro si Ben (imbes na saksakin)  
 surprised NOM.1SG N-PERF-strangle GEN Pedro NOM Ben (instead of stab)  
 ‘I am surprised that Pedro strangled Ben (rather than stabbed him).’
- b. nagtataka akong nasakal ni Pedro si Ben; akala ko hindi  
 surprised NOM.1SG AIA-PERF-strangle GEN Pedro NOM Ben belief GEN.1SG NEG  
 niya kaya  
 GEN.3SG able  
 ‘I am surprised that Pedro strangled Ben; I didn’t think he could do it.’

### 3.2 Malagasy

Malagasy, perhaps not surprisingly given the genetic proximity to Tagalog, shows similar effects of adding telic morphemes. Below we see examples of *voa-* and *tafa-* which have the same ability/involuntary semantic overlays as the AIA morphemes of Tagalog.

- (12) a. Tsy voabatako ity entana ity  
 NEG TT.VOA-lift-1SG.GEN this suitcase this  
 ‘I cannot lift this suitcase.’ ABILITY
- b. Tafiditra tao an-tanana ny fahavalo  
 AT.TAFA-enter PST-in at-city DET enemy  
 ‘The enemy was able to enter the city.’ ABILITY
- c. Tafapetraka aho nahare ilay vaovao  
 AT.TAFA-sit 1SG PST-AHA-hear that news  
 ‘I sat in spite of myself on hearing the news.’ INVOLUNTARY

These extra meanings have been discussed, in particular in relation to the morpheme in the inchoative construction. Keenan and Polinsky (2001) discuss the unexpected or unintended nature of the event.<sup>7</sup>

*tafa-* passives emphasize that the **resultant state** was in some way **unexpected**. Sometimes the implication is ‘**unintended**’, as though the action happened by itself without outside agency (in such cases it is not natural to use an Agent phrase); sometimes it is that the Agent was not expected to be able to bring about the result, in which case an Agent phrase is natural and the sense is that the Agent managed to bring about the result. (emphasis mine: LT)

Dez (1980, p. 83) describes the event as being accidental.

*Parfois le forme en /tafa/ peut exprimer un fait accidentel, survenu extérieurement à la volonté du véritable agent.* ‘Sometimes the form with *tafa-* can express an **accidental event**, happening without the will of the true agent.’ (translation and emphasis mine: LT)

<sup>7</sup>The *tafa-* forms have traditionally been labelled passives, but it is clear that they are the telic counterpart of the unaccusative construction. One reason that they have been misinterpreted as passives is the surprising but only occasional appearance of an external argument in these constructions. This external argument is referred to by Keenan and Polinsky, and will be discussed in Section 4.2 below.

While these meanings appear to be more salient with *tafa-*, it is important to note that these extra meanings also occur with the AT form of *aha-*. In the example below, we get both the ability and the involuntary action interpretation of the morphemes (data from Baholisoa Ralalaoherivony via Ileana Paul).

- (13) **Nahahinana** karoty Rasoa.  
 PST-AHA-eat carrots Rasoa  
 ‘Rasoa was able to eat carrots.’  
 ‘Rasoa managed to eat carrots.’  
 ‘Rasoa ate carrots involuntarily/in spite of herself.’

Having seen that Tagalog and Malagasy (a) have non-culminating accomplishments, (b) morphemes that add telic entailments to the non-culminating roots, and (c) add a set of other meanings when these morphemes are added, we can raise the question of whether there are other languages with these characteristics. My interest in this paper is to focus on the set of other meanings. Below we will see that St’át’imcets has the properties (a) and (c), but without having property (b).

### 3.3 St’át’imcets (Salish)

Davis et al. (2009) investigate a particular circumfix in St’át’imcets, a Salish language, that has a set of meanings very similar to the meanings of the resultative constructions in Tagalog and Malagasy outlined above. They analyze this morphology as encoding circumstantial modality. I do not give their arguments in detail here, but simply introduce enough of their data to show the similarity with Tagalog and Malagasy, and then I will simply accept their conclusions for **what** these morphemes encode and turn to the question of **where** these morphemes appear.

We begin, however, in noting that St’át’imcets also has non-culminating accomplishments, as shown in the example below (see Bar-el (2005) and Bar-el et al. (2005) for more discussion of these issues in both St’át’imcets and Skwxwú7mesh).

- (14) máys-en-lhkan ti q’láxan-a, t’u7 cw7ay t’u7 kw-s tsúkw-s-an  
 fix-TR-1SG.SU DET fence-DET but NEG just DET-NOM finish-CAU-1SG.ERG  
 ‘I fixed a fence, but I didn’t finish.’

When the circumfix *ka...a* is added to these forms, however, other meanings appear as exemplified below. As the labels indicate, these meanings are very close to the range of meanings that we have already encountered in the resultative constructions of Tagalog and Malagasy.

- (15) a. wá7=lhkahl=t’u7 ka-nás-a ekw7úna Sát’=a snímulh  
 IMPF=1PL.SUBJ=ADD KA-go-A right.over.there Lillooet=EXIS us  
 ‘We can go to Lillooet by ourselves.’ ‘be able to’
- b. ka-gwél-s=kan-a  
 CIRC-burn-CAUS=1SG.SUBJ-CIRC  
 ‘I managed to get it lit.’ ‘manage to’
- c. ka-lhéxw-a ta=n-sqáx7=a  
 KA-appear-A 1SG.POSS-dog=EXIS  
 ‘My dog appeared suddenly.’ ‘suddenly’
- d. ka-kwís-ts=kan-a  
 KA-fall-CAUS=1SG.SUBJ-A  
 ‘I accidentally dropped it.’ ‘accidentally’

- e. ka-cátq-a ta=t'ánam'ten=a  
 KA-rice-A DET=moon=EXIS  
 'The moon rose.' 'non-controllable'

Davis et al. (2009) analyze this circumfix as a circumstantial modal, and divide the range of meanings into two types – ability (existential) and no-choice (universal).

- |      |    |                      |                                  |
|------|----|----------------------|----------------------------------|
| (16) | a. | able to              | (ability) EXISTENTIAL            |
|      | b. | <del>manage to</del> | <del>(ability) EXISTENTIAL</del> |
|      | c. | suddenly             | (no choice) UNIVERSAL            |
|      | d. | accidentally         | (no choice) UNIVERSAL            |
|      | e. | non-controllable     | (no choice) UNIVERSAL            |

A first pass at the meanings include the meaning of *manage to* which entails an endpoint, unlike *able to*. However, there are examples, such as the one below, where there was no entailed result.

- (17) qwenúxw=kan i=nátcw=as                      ka-tsunam'-cal=lhkán-a=ka,                      t'u7  
 sick=1SG.SUBJ when.PAST=day=3CONJ CIRC-teach-ACT=1SG.SUBJ-CIRC=IRR but  
 cw7áoy=t'u7  
 NEG=ADD  
 'I was sick yesterday. I could have taught, but I didn't.'

Davis et al.'s conclusion is, then, that St'át'incets has morphology which adds these circumstantial modal meanings without adding an entailed endpoint. This is interesting here as this distinguishes St'át'incets from Tagalog and Malagasy. Any account of these morphemes cannot inextricably link the meaning of telicity with the AIA meanings.

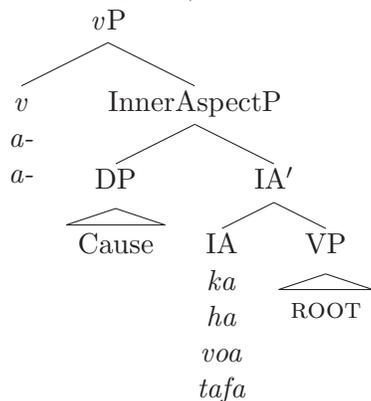
From this work on St'át'incets, I adopt the conclusion that this set of meanings signals the existence of a circumstantial modal and will use the term Out of Control (OOC) morphology. What then becomes interesting is where the OOC morphology appears in the tree. I will be assuming the framework of Distributed Morphology (Halle et al., 1993), where morphemes appear as bundles of features in syntactic heads. Complex words, then, are created by head movement through these heads. Given these two assumptions, we should be able to determine through the morphological details of these forms where in the syntactic tree these heads appear. It is this issue that I turn to now.

## 4 Where is this morphology?

In this section I argue that the OOC morphology in Tagalog and Malagasy appears within the argument domain of the verb, more specifically, within *vP*. I will start by giving a simple complementary distribution argument from both languages, then an argument from argument structure effects in Malagasy, and then will conclude with a more complex morphological argument from Tagalog.

As a starting point, I present an analysis I proposed for these morphemes in Travis (2010). My conclusion at the end of this paper will be quite similar to this analysis, differing mainly in the function, and perhaps label, of the morpheme. Given that these morphemes have been most closely tied to telicity in the Austronesian literature (they are often referred to as result morphemes), it is not surprising that I assumed that they marked telicity, and for this reason I placed the morphemes in Inner Aspect where telicity (situation aspect) is encoded (see Travis (2010) for details).

(18) Inner Aspect (and Inner Cause) (Travis, 2005a,b, 2010)



For some reasons that I do not have space to go into here, but for one reason which will become clear in the discussion in Section 4.3, I separate the Malagasy AT telic morpheme *aha* and its Tagalog cognate *aka*, into two morphemes *a-* and *ha-/ka-*, where *a-* is realized in *v* and *ha-/ka-* in Inner Aspect.<sup>8</sup> A further feature of this tree that I will argue for, first suggested by the Malagasy data and then confirmed by the Tagalog data, is the position of the external argument. In Travis (2010), I argued that this positioning of the external argument explained the AIA aspect of the construction (i.e. the extra unexpected meanings). The proposal was the voluntary agents appeared in Spec, *vP*, while non-agentive agents and causes appeared in Spec, InnerAspect. Again, the account that I am leading up to in this paper will not be far from my previous proposal. What is new to the picture and what raises questions that are addressed below as well as questions that I set aside for future research is the primary function of this morpheme, that of modality.

#### 4.1 Complementary distribution: Tagalog and Malagasy

The first argument that OOC morphemes are generated within the *vP* comes from the fact that, in both Tagalog and Malagasy, these morphemes do not co-occur with morphemes that arguably are generated in *v*.

First we can see that both languages encode the unaccusative(inchoative)/transitive(lexical causative) alternation morphologically. In Malagasy, the lexical causative morpheme is *an-* and in Tagalog it is *pag*.<sup>9</sup>

(19) TAGALOG:  $\emptyset$  vs. *pag-*

| <u>Unaccusative</u> |                | <u>Lexical Causative</u> |                      |
|---------------------|----------------|--------------------------|----------------------|
| tumba               | X fall down    | <u>pag</u> tumba         | Y knock X down       |
| sabog               | X explode      | <u>pag</u> sabog         | Y scatter X          |
| luwas               | X go into city | <u>pag</u> luwas         | Y take X to the city |

<sup>8</sup>I will refer to the morphemes being in these head positions, but in fact that is shorthand for saying that the bundle of features that are eventually spelled out as these morphemes are in these head positions.

<sup>9</sup>As with most lexical causative morphemes, there is some lexical variation, especially in roots that do not participate in this alternation. I will, however, assume that in the default case, the lexical causative morphemes, and, in fact, all *vs* that introduce an Agent, are *an-* in Malagasy and *pag-* in Tagalog.

- (20) MALAGASY: *i-* vs. *an-*
- |                     |               |                     |                 |
|---------------------|---------------|---------------------|-----------------|
| m̄i <u>h</u> isatra | X move slowly | ma <u>n</u> isatra  | Y move X slowly |
| m̄i <u>l</u> ahatra | X be in order | ma <u>n</u> dahatra | Y arrange X     |
| m̄i <u>l</u> ona    | X soak        | ma <u>n</u> dona    | Y soak X        |
| m̄i <u>s</u> itrika | X hide        | ma <u>n</u> itrika  | Y hide X        |
| m̄i <u>f</u> atra   | X be measured | ma <u>m</u> atra    | Y measure X     |

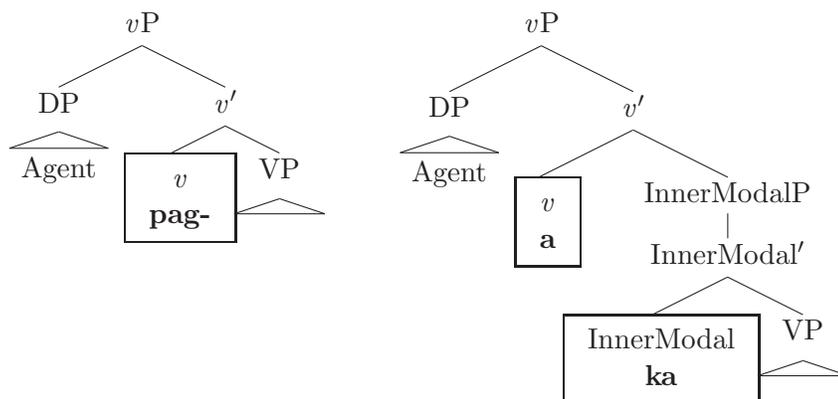
We can see in the tables below that the lexical causative morphemes in both languages, as well as the unaccusative morpheme in Malagasy, are in complementary distribution with the OOC morphemes.

- (21) OOC morphemes **replace** *v* in Tagalog and Malagasy

| Tagalog         | NEUTRAL          | OOC               |
|-----------------|------------------|-------------------|
| AT              | <i>pag-</i> ROOT | <i>aka-</i> ROOT  |
| TT              | ROOT- <i>in</i>  | <i>a-</i> ROOT    |
| Malagasy        | NEUTRAL          | OOC               |
| AT TRANSITIVE   | <i>an-</i> ROOT  | <i>aha-</i> ROOT  |
| TT              | ROOT- <i>n</i>   | <i>voa-</i> ROOT  |
| AT UNACCUSATIVE | <i>i-</i> ROOT   | <i>tafa-</i> ROOT |

Using the type of syntactic representation of the morphemes proposed in Travis (2010) would account for this complementary distribution. The OOC morphemes either appear in *v* (for *aka-* and *aha-*) replacing the lexical causative morphemes, or below *v* (for the TT forms and the unaccusative in Malagasy), creating a structure that is incompatible with the lexical causative head.

- (22) Tagalog: Lexical causative morphemes vs. OOC morphemes<sup>10</sup>



<sup>10</sup>Later I will argue that the Agent in Spec, *vP* in the OOC tree will in fact be an Involuntary Agent (IAgent) merged in the Spec, ModalP along the lines we saw in the tree in (18).



- (26) **Mahatsara** ny trano Rabe.  
 PRES.AT-AHA-good DET house Rabe  
 ‘Rabe makes the house beautiful.’

There is an even more surprising case where an OOC morpheme can add an argument, and this is in the case of unaccusatives. Not surprisingly, unaccusative constructions have neither overt nor implicit Agents. In (27) below, a Neutral unaccusative construction, there is no implicit Agent (unlike in (4) above, the TT form of the verb, where like English passives, the Agent would be implicit even if it were not phonologically present).

- (27) Nivory ny ankizy  
 PST.AT-I-meet DET children  
 ‘The children got together (met).’

The two examples in (28) below represent two attempts at trying to realize an Agent. In one case, I simply put an extra DP in the clause. In the other, I create an N-bonded structure (a term from Keenan (2000)) where the highest non-topic argument is attached to the verb (see (8) for an example of N-bonding). Neither attempt is successful.

- (28) a. \*Nivory **ny mpampianatra** ny ankizy  
 PST.AT-I-meet DET teachers DET children  
 an attempt at: ‘The teachers managed to gather the children.’  
 b. \*Nivorin’**ny mpampianatra** ny ankizy  
 PST.AT-I-meet’DET teachers DET children  
 an attempt at: ‘The teachers managed to gather the children.’

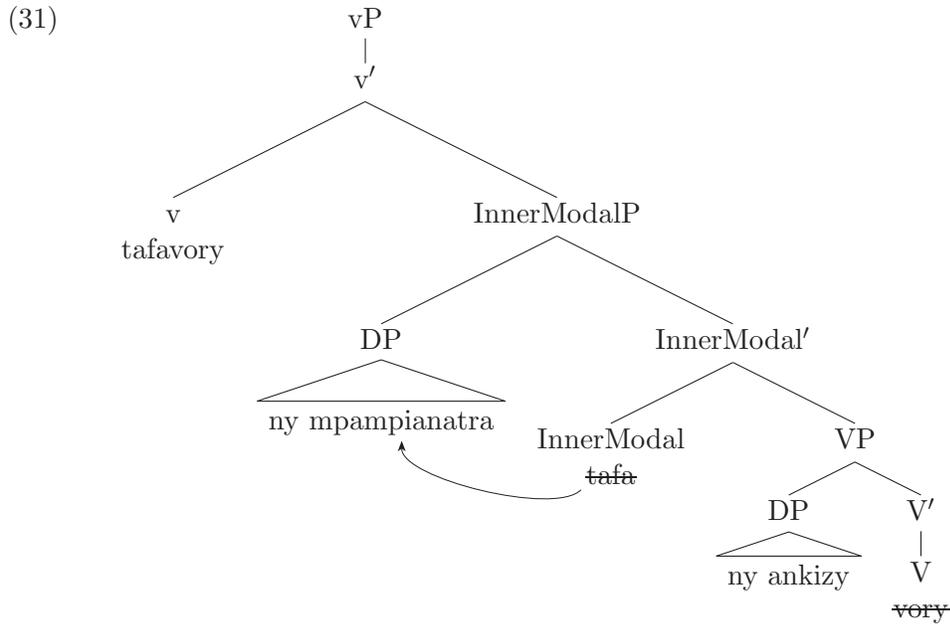
While what we have seen so far is not surprising, we will see a very different result in OOC unaccusative constructions. Below we have the OOC construction that we saw earlier. Again, not surprisingly there is no implicit agent.

- (29) Tafavory ny ankizy  
 AT.TAFA-meet DET children  
 ‘The children managed to get together (meet).’

Unexpectedly, however, an external argument (involuntary agent/cause) may be added.

- (30) Tafavory **ny mpampianatra** ny ankizy  
 AT.TAFA-meet DET teachers DET children  
 ‘The teachers managed to get the children together (gather the children).’

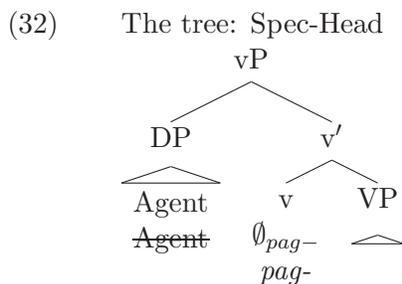
Again it appears, as in the *aha*- case we saw in (25) above, the OOC morpheme in Inner Aspect is able to introduce an argument into the structure.



Having seen how these OOC morphemes can introduce arguments in Malagasy, we will now see how the realization of OOC morpheme in Tagalog is sensitive to the positioning of the argument that it has introduced.

### 4.3 Morpheme deletion: Tagalog

In this section I will argue that the two morphemes that we have seen for Tagalog, *aka-* and *a-* are in fact always a set of two morphemes, *a+ka-* where *ka-* is only realized in certain contexts. I begin by arguing that the lexical causative *pag-* that we saw in (19) goes unpronounced when the argument that it introduces is in situ. This is shown schematically in the tree below, and the relevant data is given in (33). The main point is that when the Theme is Topic, the Agent is in situ. And when the Agent is in-situ (marked in gray), the *pag-* in *v* is not pronounced (see Travis (2000, 2010)).



(33) Tagalog voice (adapted from Schachter and Otnes (1972, p. 494))

- a. Mag-aalis      ang babae ng bigas sa sako.  
 RED.AT-take.out NOM woman ACC rice OBL sack  
 ‘The woman will take some rice out of a/the sack.’

**pag-alis**

- b. Aalisin ng babae ang bigas sa sako.  
 RED.TT-take.out GEN woman NOM rice OBL sack

‘A/the woman will take **the rice** out of a/the sack.’

$\emptyset$  *pag-*alis

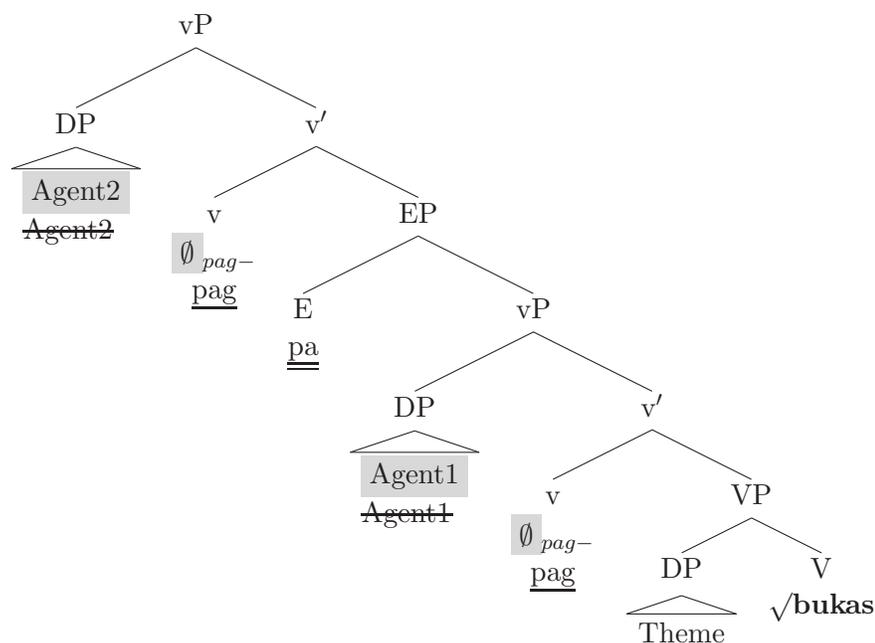
This apparent restriction has the flavour of the Doubly Filled Voice Filter of Sportiche (1998), where material cannot appear simultaneously in both the head and the Spec of a projection, forcing a head to not be realized when the Spec position is filled.

- (34) DOUBLY FILLED VOICE FILTER (Sportiche, 1998, p. 273)  
 \*<sub>[HP XP [ H ... ]]</sub>

where H is a functional head licensing some property P  
 and both XP and H overtly encode P.

This process applies not only with lexical causatives but also with productive causatives.<sup>13</sup> We start by determining what predictions the Doubly Filled Voice Filter would have for the instantiation of the causative morpheme *pag-* as shown in (35) below. Notice that there is an extra morpheme *pa* in the E(vent) head of EP. This morpheme and projection will just be assumed,<sup>14</sup> but since the two *pag-*s appear on either side of another morpheme *pa-* we can know whether we have the productive causative *pag-* (to the left of *pa-*) or the lexical causative *pag-* (to the right of *pa-*)

- (35) *pag-*deletion in productive causatives<sup>15</sup>



In the productive causative of a lexical causative, we might expect to find both the lexical causative *pag-* and the productive causative *pag-*, but at any given time, one finds at most one *pag-*.

<sup>13</sup>I have developed this generalization from data in Schachter and Otones (1972), but it may be that the facts are changing. In particular, I have been told that both *pag*s may also delete in (36b). I leave this for future study.

<sup>14</sup>See Travis (2010) for more on this.

<sup>15</sup>Any InnerModal positions have been left out to save space.

Looking at the tree in (35), we can see that this is predicted since there will never be a construction when both Agents are Topics. We predict that when the top Agent is Topic, we get the form *pag-pa-∅-ROOT*. When the lower Agent is Topic, we expect to get the form *∅-pa-pag-ROOT*. Finally, when the lower Theme is the Topic, we expect to get *∅-pa-∅-ROOT*. The data below confirm this prediction.

(36) *pag-* deletion in Tagalog (in situ Agents in gray)

- a. Nagpabukas **ako** kay **Pedro** ng kahon  
 PST.PAG-PA-open 1SG.NOM OBL Pedro ACC box  
 ‘I had Pedro open a box/boxes.’ pag-pa-∅<sub>pag-</sub>√*bukas*
- b. Pinapagbukas **ko** **si Pedro** ng kahon  
 PST-PA-PAG-open 1SG.GEN NOM Pedro ACC box  
 ‘I had Pedro open a box/boxes.’ ∅<sub>pag-</sub>pa-pag-√*bukas*
- c. Pinabuksan **ko** kay **Pedro** **ang kahon**  
 PST-PA-open-T2T 1SG.GEN KAY Pedro ACC box  
 ‘I had Pedro open a box/boxes.’ ∅<sub>pag-</sub>pa-∅<sub>pag-</sub>√*bukas*

Now we turn to the different realizations of the OOC morphemes in Tagalog and see how the alternation between *aka-* and *a-* can also be explained through the Doubly Filled Voice Filter, and in outlining this explanation, we will find more arguments for the low placement of the OOC morphemes.

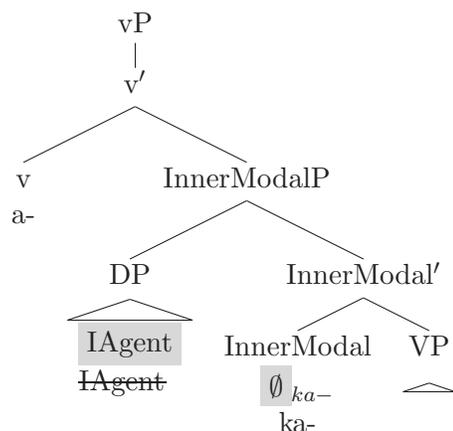
An example with the two forms of the OOC morphemes is given below, with *aka-* form appearing in the AT construction and the *a-* form appearing in the TT construction. This means that the *ka-* deletes when the external argument (involuntary agent) is in-situ (marked in gray).

(37) *ka-*deletion in Tagalog

- a. Nakatunaw ako ng tsokolate.  
 AIA-AT-melt 1SG.NOM ACC chocolate  
 ‘I (managed to/was able to, etc) melt the chocolate.’
- b. Natunaw **ko** ang tsokolate  
 AIA-TT-melt 1SG.GEN NOM chocolate  
 ‘I (managed to/was able to, etc) melt the chocolate.’

In line with the argumentation for *pag-* deletion above, we might expect the *ka-* to delete if it is the head that introduces the involuntary agent. This is, in fact, what was proposed in the tree for Malagasy in (31) to explain why the morpheme in Inner Modal could introduce an argument, an Involuntary Agent (IAgent).

## (38) Inner Modal in Tagalog



## 4.4 A return to St'át'imcets

We return to St'át'imcets now to determine where the OOC morphemes appear in this language. While more work needs to be done to fully understand their position, we can make some preliminary observations. Repeating an example from above, we can note that the prefix part of the circumfix, *ka-*, appears directly attached to the root, while the *-a* suffix is separated from the root by a causative suffix and a subject agreement marker.

- (39) **ka-kwís-ts=kan-a**  
 KA-fall-CAUS=1SG.SUBJ-A  
 'I accidentally dropped it.'

The direct attachment of the prefix to the root, in fact, appears to be the case more generally. In Eijk (1997), there is only one example of an apparent prefix occurring between *ka-* and the root. This prefix, however, is glossed as part of the lexical entry of the verb (*n-q's-ank* 'laugh').

- (40) xw7az kw=en-s-ka-n-q's-án'k=a  
 not that=my-fact-KA-laugh=A  
 'I did not burst out laughing.'

While the prefix can be argued to be within *vP*, the suffix appears to be quite high in the structure, following the causative suffix and subject agreement. The positioning with respect to the subject agreement is not a problem since further data shows that subject agreement is an enclitic.<sup>16</sup> This clitic will shift its position depending on the construction as the data below show.

- (41) a. ka-7áts'x-s=**kan**-a  
 CIRC-see-CAUS=1SG.SUBJ-CIRC  
 'I could see it/I caught sight of it.'
- b. plán=**lhkan** ka-7áts'x-s-a  
 already=1SG.SUBJ CIRC-see-caus-CIRC  
 'I could already see it/I already caught sight of it.'

<sup>16</sup>I thank Henry Davis for his help on this issue. Mistakes remain mine.

The suffix remains higher than the causative, however, and this needs to be explained. I leave this for further research, but it is already interesting that the St’át’imcets OOC is realized by a circumfix so perhaps only the prefix is within the *v*P.

We have seen several arguments that the OOC morphemes in Malagasy and Tagalog appear low in the structure, within the *v*P, below the external argument. The argument that these morphemes introduce is, in fact, in a lower position than that of voluntary agents, the former being in Spec, InnerModalP and the latter in Spec, *v*P. Now we turn back to issues of semantics and the topic of sublexical modality.

## 5 Sublexical modality

Having seen that morphemes that express modal meanings appear within the argument structure domain of the clause raises questions. One question is how something with a modal meaning may combine with a VP which does not express a full proposition. I am not equipped to tackle this question and leave it to semanticists. But further, there is an interesting link to a body of literature on sublexical modality that deserves more investigation. Here I give just a preliminary look and leave a more complete understanding of the implications for future work.

Koenig and Davis (2001) discuss the appropriate tools for representing verbal meaning and propose that two elements are required – the situational core component (‘relationships between participants’) and the sublexical modality component (‘which evaluates these relations at various world and time indices’). Evidence that they give for needing sublexical modality comes from pairs such as *give* and *promise* which have the same situational core component but given that *give* has the entailment of transfer of possession while *promise* does not, the entailment must be restricted to certain circumstances. The table below gives some of their classifications.

(42) From Koenig and Davis (2001)

| Semantic Field | Neutral         | negative      | irrealis<br>deontic | irrealis<br>energetic | inchoative     | inchoative/neg |
|----------------|-----------------|---------------|---------------------|-----------------------|----------------|----------------|
| possession     | <i>have</i>     | <i>lack</i>   | <i>need</i>         |                       | <i>receive</i> | <i>lose</i>    |
| perception     | <i>perceive</i> | <i>miss</i>   | <i>overlook</i>     |                       | <i>notice</i>  |                |
| cause poss     | <i>give</i>     | <i>deny</i>   | <i>promise</i>      | <i>send</i>           |                |                |
| carry out act  | <i>manage</i>   | <i>fail</i>   | <i>neglect</i>      | <i>try</i>            |                |                |
| cause x to act | <i>force</i>    | <i>forbid</i> | <i>require</i>      | <i>urge</i>           |                |                |

It would be interesting to examine the meanings that arise with OOC morphemes in the context of the research on sublexical modality. By placing modal material within the argument structure domain of the clause, we are in fact creating an appropriate structure for sublexical modality. It is clear, though, that not every semantic notion should be given syntactic realization. There has been a history of representing semantics in syntactic form (e.g. Generative Semantics) and a history of resisting the overuse of syntax to represent purely semantic concepts. While *kill* is not equivalent to *cause to die*, the productive causative, as shown in Fodor (1970), we have nevertheless seen a *v* head introduced as a lexical causative due to morphological realizations in a variety of languages. It may be that cross-linguistic comparisons of OOC morphemes and morphemes with other modal meanings will help us better understand sublexical modality and which parts of sublexical modality are encoded in syntactic structure.

## 6 Conclusion and next steps

I have argued here that a set of resultative morphemes in Tagalog and Malagasy are, given their semantic similarity to OOC morphemes in St'át'imcets, best analyzed as circumstantial modals. These modals, however, appear to be generated within *v*P, as they (i) replace lexical causative morphology, (ii) add external arguments (involuntary agents) to roots that otherwise have no external arguments, and (iii) may have their phonetic realization dependent on the phonetic realization of the arguments that they introduce. Given that they are modals generated within the lexical domain of clause structure, they have an obvious connection to sublexical modality. Further careful analysis of verb types within these languages along with cross-linguistic comparisons could bring us a better understanding of the role of syntax in the representation of the semantic components of sublexical modality.

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# The absolutive *ia* particle in Samoan\*

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## 1 Introduction

Samoan is an ergative-marking, non-tonal Polynesian language in which ergative case is marked segmentally, but absolutive case has been said to be unmarked. However, Yu (2011, 2016) showed that in fact, absolutive case is marked by a high edge tone (H-) realized at the right edge of the word preceding the absolutive argument. The evidence for this came from phonetic and phonological analysis of intonational patterns in the spoken utterances of a systematically varied set of syntactic structures.

In this paper we show that an absolutive argument is also optionally marked with a preceding segmental particle, *ia*. This particle has been mentioned in passing in a few places in the literature (Mosel and Hovdhaugen 1992, p. 51, example 143; Vonen 1988, p. 38-39), but to our knowledge, no more than brief anecdotal descriptions of its distribution exist. Using the same set of syntactic structures as in Yu (2016), we show that *ia* is licit before absolutes, but not before ergatives or obliques. We also show that where an absolutive H- appears, *ia* is also licit, and where an absolutive H- does not appear, *ia* is illicit. That is, the distributions of absolutive H- and *ia* coincide.<sup>1</sup>

The distribution of *ia* sheds light on two mysteries about the Samoan absolutive H-. First, there are other H- tones that systematically appear in Samoan elsewhere than before absolutive arguments: an H- also always appears between a fronted argument and the predicate and before the connective in conjunctive and disjunctive coordination. The relation between all these different H-s is unclear. However, *ia* is not licit before these other H-s: *ia* is restricted to appearing before absolutive H-s. This suggests that the grammatical sources of H-s in Samoan are not unified. The coincidence of the appearance of the absolutive H- and the licitness of *ia* also offers a possible avenue for explanation of how there could be a tonal case marker in Samoan when case markers are otherwise segmental. We hypothesize that the diachronic origin of the absolutive high may come from leftward tonal reassociation of the pitch accent on absolutive *ia*, upon deletion of the segmental material of *ia*.

The remainder of this introductory section provides background information on Samoan phonology and syntax relevant to the present discussion. Section 2 reports on elicitations, materials and methods. Section 3 summarizes the distribution of *ia* and H-. Section 4 sketches a possible diachronic origin of the absolutive H- from the segmental elision of *ia* and the tonal reassociation of its pitch accent with the immediately preceding mora. Section 5 concludes.

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<sup>1</sup>But unlike the distribution of absolutive H-, the distribution of *ia* seems to be sensitive to information structure, see Section 3.1.

## 1.1 Language background

Samoa is an Austronesian language from the Independent State of Samoa and the (U.S.) Territory of American Samoa, with about 413,000 speakers in all countries (Lewis et al., 2014). It is in the Polynesian family in the Samoic-Outlier branch (Pawley, 1966, 1967), which has a number of ergative-marking languages, including Samoan.

## 1.2 Segmental phonology and word stress

The phoneme inventory of Samoan consists of the consonants /p, t, (k), ʔ, f, v, s, (h), m, n, ŋ, l, ɻ/ and the vowels /i, e, a, o, u/ and their lengthened counterparts, e.g. /i:/ (Zuraw et al., 2014).

All Samoan examples in this paper are given using IPA symbols and appear in square brackets when in-line in the text. In-line in the text, we occasionally use Samoan orthography (always italicized), where [ŋ] is written as *g* and [ʔ] as ‘.

The inventory of phonotactically licit syllable shapes in Samoan is limited to those in which every consonant is followed by a vowel: monomoraic [(C)V], and bimoraic [(C)V:] and [(C)VV]. The basic footing pattern, as observed in monomorphemes, consists of a moraic trochee at the right edge of the word (Zuraw et al., 2014). Primary stress is on the final vowel if it is long, and otherwise on the penultimate vowel.

## 1.3 Word order and case-marking

Samoa has default VSO word order, although there can be substantial variability in word order (Ochs, 1982) (e.g. VOS, SVO, OVS are all licit); the interaction of word order choice with discourse structure is also quite variable between speakers. Samoan marks ergative case on the subject of a verb-initial transitive sentence with the preposition [e], as in (1a).<sup>2</sup> Absolutive case on the direct object of a transitive sentence and the subject of an intransitive sentence, such as (1b), has been said to be unmarked (Chung 1978, p. 54-56; Ochs 1982, p. 649; Collins 2014, p. 94), but Yu (2011, 2016) showed that it is preceded by a H- and in this paper, we show that it can be preceded by the particle *ia*. The intransitive sentence (1b) also illustrates the prepositional element [i] as a marker of oblique case. This preposition marks stative agents (see Chung, 1978, p. 29), indirect objects, locatives, temporal expressions, sources, and goals (Mosel and Hovdhaugen, 1992, p. 144). Before pronouns and proper names, *iā* [ja:] rather than [i] marks oblique case.

### (1) Case-marking in transitive and intransitive sentences<sup>3</sup>

#### a. Transitive sentence

na lalaja \*(e) le malini H- (ia) le mamanu.  
 PAST weave ERG DET marine ABS (ABS) DET design

‘The marine wove the design.’

#### b. Intransitive sentence

na ŋalue H- (ia) le malini (i le mamanu).  
 PAST work ABS (ABS) DET marine OBL DET design

‘The marine worked (on the design).’

<sup>2</sup>All sentences are from elicitations with our primary consultants, and in sections where noted, from other consultants as well.

<sup>3</sup>For brevity, the morpheme *le* is glossed as DET, a determiner marking specificity on singular nouns. An exception is (9), where a detailed gloss is of relevance.

Case marking can be optional. The segmental ergative case marker *e* is rarely used in *tautala leaga* (Mosel and Hovdhaugen, 1992, p. 9).<sup>4</sup> Ochs (1982) found that the frequency of use of the ergative case marker *e* is quite variable across social contexts.

While *ia* does not seem to make an appearance in Churchward's (1951) Samoan grammar, a few sources in the literature remark that absolutive arguments are preceded by the particle *ia* (Mosel and Hovdhaugen 1992, p. 51, example 143; Vonen 1988, p. 38-39). Mosel and Hovdhaugen (1992) state:

The noun phrases are subclassified according to their case marking. Syntactically, the most relevant types of noun phrases are: presentative noun phrases... absolutive noun phrases, which are either unmarked or marked by the preposition *ia* (Hovdhaugen 1987:154f., Vonen 1988:38f.), ergative noun phrases marked by the preposition *e*... (p. 51)

The absolutive preposition *ia* is always optional. It is mostly used before proper names of persons and is seldom used in literary texts. (p. 143)

Vonen (1988, p. 38-39) states that (bracketed material added by us):

The absolutive marker [ia] is much less used in Samoan than in Tokelauan. In Samoan, it is always optional and when used, it mostly occurs in the same position as [Tokelauan] *ia*. [Samoan] *ia*, however, can be followed by an article.<sup>5</sup> See Hovdhaugen (1987:154-155).

Hovdhaugen (1987, p. 154-155) has an entry on *ia* (*ia*<sup>4</sup>) which states:

*ia*<sup>4</sup>: (prebasic modifier) optionally indicates the subject of a sentence, often with an emphatic function. *Fo'i mai loa ia 'Olo i Sāmoa* "Olo returned immediately here to Samoa"; *'Ua fānau ia Lau* "Lau has given birth"; *E iai ia teine ia a to'aluā* "There were those two girls"; *Fa'alogo mai i Pulotu ia Saveasi'uleo i le ōi atu a Tai'i* "In Pulotu Saveasi'uleo heard the moaning of Tai'i"; *'Ua sau ia le tagata Fiti* "The man from Fiji came"; *'Ua leva ona fai 'āiga ia le Tuiuea ma le tuafafine o tama* "The Tuiuea and the sister of the boys had for a long time lived together". In existing descriptions of Samoan, there is no analysis which covers the function of *ia*<sup>4</sup> in our texts. Milner (1966:81) has a prebasic particle *ia* "which has the effect of bringing into relief the operative word or words in an utterance. In verbal constructions, it may be used before either the subject or the object." In Moyle (1981:17) we find the following interesting observation: "Following a pause in the narration, usually as a memory lapse, 'o followed by a noun or proper name may become *ia*." In our texts, there are a few examples which may be explained in the way Moyle does and especially important are some cases of self-correction by the narrator: *Ma le tuafafine o tama, ia Sina* "And the sister of the boys, Sina"; *Sā lē malie ia le tamā ma fa'apea* "The father was not pleased and said";

<sup>4</sup>Samoan is well-known for having two distinct registers: *tautaula lelei* 'good language'—used in literary contexts and Westernized institutional contexts like in church and school, as well as with foreigners, and *tautaula leaga* 'bad language'—used in traditional ceremonies and meetings, as well as between family members and between friends (Shore 1977, 1980; Duranti 1981, p. 165-168; Ochs 1988, p. 196; Duranti 1990, p. 4-5; Mosel and Hovdhaugen 1992, p. 7-11). One of the most striking contrasts between the two registers is in the segmental phonology: /t/ and /k/ → /k/ and /n/ and /ŋ/ → /ŋ/ from *tautaula lelei* to *tautala leaga*.

<sup>5</sup>For Hovdhaugen (1987) and Vonen (1988, p. 43), articles mark specificity, partitivity and number. We are unsure what is meant by 'prebasic modifier'. The category seems to include articles (Mosel and Hovdhaugen, 1992, p. 27).

*Sā lagona e le sau'ai ā le, ia le manogi atu a Feti'iti'ioleola* “The ogre sensed the smell of Feti'iti'ioleola”; *Ona fai atu lea ia Pulotu, ona fai atu lea 'o Pulotu* “Then Pulotu said, then Pulotu said”. But Moyle’s description covers only a few of our examples and the restriction to subject-marking clearly differs from Milner’s description.

In contrast to the *ia*’s in Milner’s Samoan dictionary (reprinted edition: Milner 1993, p. 81) and Moyle (1981), Hovdhaugen’s *ia*<sup>4</sup> is restricted to appearing before subjects and doesn’t just occur in contexts of speech repair or hesitation after pauses, and all the example sentences in Hovdhaugen (1987, p. 154-155) place *ia*<sup>4</sup> only before absolutes. Only one of the other *ia*’s listed by Hovdhaugen (1987, p. 155) is also listed as appearing before DPs, which he glosses as ‘the . . . in question, those just spoken about’. It’s unclear from the entry whether or not this *ia* is also restricted to preceding absolute arguments.

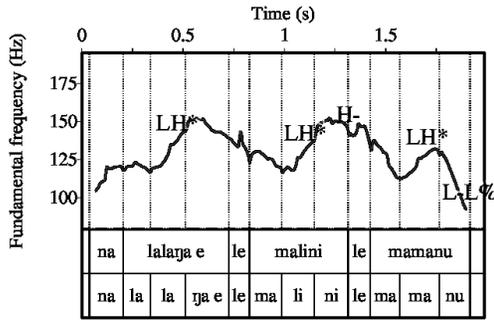
With absolute *ia* in Samoan having been so little studied, its morphosyntax is currently poorly understood. Hovdhaugen (1987, p. 154) states that *ia*<sup>4</sup> precedes only the (absolute) subject, often with an ‘emphatic’ function. But with our consultants we found that there was no clear-cut restriction on the licitness of absolute *ia* as a function of discourse structure when we manipulated contexts for informational and contrastive focus. In addition, the utterances of *ia* we elicited were not in the context of disfluencies or hesitations—they occurred in fluent utterances and were not obligatorily preceded or followed by a pause. It is possible that usage of *ia* has shifted considerably over time. While our consultants were all familiar with absolute *ia*, they never volunteered it and their metalinguistic intuitions about its usage were incredibly variable (see Section 3.1).

#### 1.4 Overview of intonational system

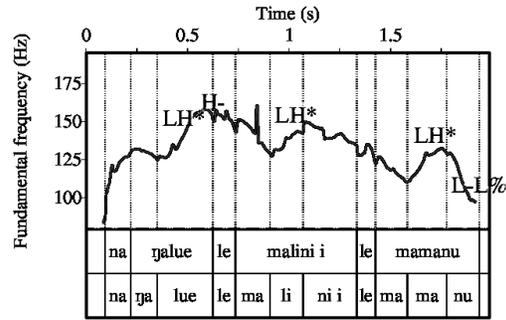
Knowledge of the distribution of sentence-medial high edge tones in Samoan is helpful for comparison with the distribution of *ia*. Basic intonational patterns in Samoan have been described in Orfitelli and Yu (2009), Yu (2011), and Calhoun (2015). The figures in (2) compare the fundamental frequency (f<sub>0</sub>, the acoustic correlate of pitch) contours for the transitive sentence in (1a) versus the intransitive sentence in (1b). Each primary stress is tonally marked with a rising pitch accent annotated as LH\*. The pitch accent realizations seen here are representative. The low target ‘L’ typically appears to be aligned to the beginning of the stressed mora. The high ‘H’ peak of the pitch accent is reached in the syllable following the stressed syllable it’s associated with. This phenomenon of PEAK DELAY is observed cross-linguistically (Silverman and Pierrehumbert, 1990; Xu, 1999, 2001; Myers, 2003). A high edge tone, H-, occurs in both declaratives, though in different locations. The f<sub>0</sub> contour over a word can be seen to continue to rise and stay high in the syllable following the stressed syllable when an H- is present at the end of the word. The end of the declaratives fall to a low boundary tone, annotated as L-L%.

- (2) F0 contours for the basic VS(O) declaratives in (1a) and (1b). Pitch accent rises (LH\*) occur over primary stressed syllables. An H- occurs before the absolutive object in (a) and before the absolutive subject in (b).

a. Transitive declarative



b. Intransitive declarative

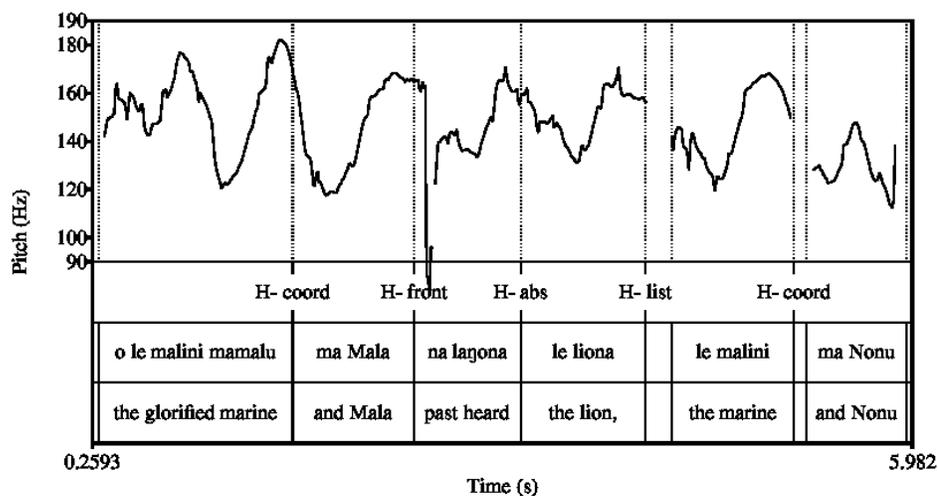


### 1.4.1 Sentence-medial high edge tones

There are multiple sentence medial high edge-aligned tones in Samoan. We introduce most of them here in (4), which shows the f0 contour for (3). This includes the H- that always appears in coordination, preceding the conjunction [ma] (glossed as CONJ), the H- that always appears between a fronted non-pronominal DP argument and the predicate (glossed as FRONT), the absolutive H-, and the H- that always delineates members of a list (glossed as LIST). There is one other H- that appears sporadically that we haven't shown here, which is the H- introduced at the end of prosodic phrases, whose presence depends on the speaker's choice of prosodic phrasing and hesitations. In this particular utterance, there is a lot of lengthening where H-'s occur in (4), though curiously not before the absolutive. The precipitous dip in the f0 contour immediately after the fronted DP is due to glottalization preceding [na]. The gaps in the transcription indicate silences, which also end with some glottalization.

- (3) ʔo le malini mamalu H- ma Mala H- na laʔona H- le liona, H-  
 TOPIC DET marine glorified CONJ CONJ Mala FRONT PAST hear ABS DET lion LIST  
 le manini H- ma Nonu.  
 DET fish CONJ CONJ Nonu  
 'The glorified marine and Mala heard the lion, the fish, and Nonu.'

- (4) An f<sub>0</sub> contour demonstrating most of the H-'s in Samoan. The gaps in the annotation indicate silence. While the f<sub>0</sub> contour for both coordination highs in this utterance appear to fall slightly after peaking, we don't find the fall at all perceptually salient—it may appear due to a drop in subglottal pressure.



## 2 Materials and methods

All data referred to in this paper were elicited and recorded from our consultants' speech. Information about the consultants is given in Section 2.1. Information about elicitation procedures is provided in Section 2.2, and the methods used for phonetic and phonological analysis of the data are explicated in Section 2.4.

### 2.1 Consultants

Data were collected in a Samoan community in the Los Angeles area in sessions in 2014-2015 with one main consultant, aged 19 when the first author started working with him in 2007. He was born and raised in Upolu and had moved to the Los Angeles area in 2003.<sup>6</sup> Data were also elicited and recorded in Auckland, New Zealand in July 2015 from three additional female speakers. Our primary consultant in Auckland was 48 and had grown up in Apia and moved to New Zealand from there in 2009; another was aged 19 and had grown up in Savai'i and been in New Zealand since age 10, and the last was aged 23 and had grown up in Savai'i and moved to New Zealand in 2008. All of them spoke primarily Samoan in daily life and were literate in Samoan, but also spoke English fluently. English was used as the contact language.

The data described in this paper was elicited in *tautala lelei*, except for the 23-year-old, who requested working with us in *tautala leaga* because she was not used to *tautala lelei*.

<sup>6</sup>The work here all concerns Samoan as spoken in Samoa, and not Samoan spoken in American Samoa. Mosel and Hovdhaugen (1992, p. 8) wrote: 'Today we find a very marked difference in intonation between the two variants [from Samoa versus American Samoa]'.

## 2.2 Elicitation procedures

Elicitation sessions with the primary consultants involved developing and/or checking words and sentences to be recorded and recording sessions, while sessions with secondary consultants were based on materials checked with the primary consultants and focused more on recording sessions. In sessions involving the development of stimuli, the consultant was asked to help construct Samoan sentences either from some starting scenario or from an English sentence, to judge whether Samoan sentences from the literature or constructed by the author were licit, and to provide alternative ways to construct sentences, if any. During recording sessions, elicitation items were presented individually written on slides on a computer screen, and they were elicited in randomized order. The consultant was asked to read each sentence twice. For the consultant from Los Angeles, no systematic discourse context was provided for recording sessions: sentences were elicited ‘out of the blue’ unless pronouns or pro-drop was present, in which case a context was provided with a referent. For all other consultants, explicit discourse contexts were constructed using question-answer pairs and scenarios.

## 2.3 Recordings

All recordings were made directly to a computer through a head-mounted microphone (Shure SM10A), whose signal ran through a Shure X2u pre-amplifier and A-D device; recordings in Auckland were made to a Marantz PMD661 MKII. All recordings were made in a quiet room at a sampling rate of 22,050 Hz with 16-bit precision.

## 2.4 Analysis

All sound files were segmented and annotated using Praat (Boersma and Weenink, 2012). Each sentence was segmented by word and syllable and transcribed intonationally. See Yu (2016) for details on: (a) analysis of the pitch contours, done using Praat’s autocorrelation algorithm as implemented in VoiceSauce v1.19 (Shue et al., 2011), and (b) statistical analysis done with R (R Core Team, 2014).

## 3 The distribution of *ia*

Yu (2011, 2016) used phonetic data to show that an H- always precedes the absolutive argument in a variety of syntactic structures. The set of syntactic structures included intransitive, transitive and ditransitive sentence frames, with varying word orders. A variety of absolutive arguments were tested, including singular and plural, specific and non-specific nominals, as well as pronouns and nominalized verb phrases.

Here, we show that in this same set of syntactic structures, *ia* tracks the absolutive argument as well. That is, THE DISTRIBUTION OF H- AND *ia* COINCIDE TO PRECEDE THE ABSOLUTIVE ARGUMENT. Only representative examples of each syntactic structure in Yu (2016) are shown here due to lack of space; for a complete list of sentences, see Yu (2016). We begin this section with a description of our consultants’ metalinguistic intuitions about the distribution of *ia* (Section 3.1). We then show that restrictions on the position of *ia* and H- pattern with restrictions on the position of the ergative and the oblique (both segmental) case markers in Samoan (Section 3.2-Section 3.4). Finally, we show that the H- co-occurring with *ia* is distinguished from other, non-absolutive high tones (Section 3.4.2).

### 3.1 Consultants' metalinguistic intuitions about *ia*

All consultants needed prompting to consider using absolutive *ia*, but expressed awareness of a distinction between absolutive *ia* and *ia* used in hesitation and filled pauses. Their metalinguistic intuitions about when they would use absolutive *ia* were varied. Our primary consultant in Los Angeles expressed no sense of restriction on its usage 'out of the blue'. Our primary consultant and the 19-year-old in Auckland found it licit under most discourse conditions, whether the absolutive argument was under broad focus or contrastive focus, or whether was given or new (see Yu (2016) for details of discourse contexts). The primary Auckland consultant did express a sense that she would use *ia* for 'emphasis' and preferred to put a pause before *ia* and then pronounce *ia* with high amplitude and pitch, but also found it licit to pronounce *ia* highly reduced and co-articulated with the preceding phonetic material. There were some sporadic question-answer pairs where both consultants did not find *ia* licit, but we could find no systematic pattern to them. The 23-year-old could only recall being taught about where *ia* was licit in grammar exercises in school, but otherwise said she did not use *ia*. She had a systematic restriction on *ia*: she found it illicit before common nouns—this is consistent with Mosel and Hovdhaugen's (1992) note that *ia* is mostly used before proper names (Section 1.3).

In summary, usage of absolutive *ia* in contemporary Samoan appears to be greatly in flux, but consultants still had systematic intuitions about where it was licit and where it was not. In the rest of this section, we explicate the syntactic distribution of *ia* for our consultants.

### 3.2 Basic transitive and intransitive sentences

From work with our primary consultant in Los Angeles, we found that in transitive sentences, *ia* may precede the absolutive argument, but not the ergative argument, and an H- always precedes the absolutive argument. This distribution is summarized in (5).

- (5) Distribution of absolutive *ia* and H- in transitive sentences
- a. V [*e* S] [H- (*ia*) O]
  - b. V [H- (*ia*) O] [*e* S]

This can be seen from manipulating word order in transitive sentences, as exemplified in the sentence pair in (6). VSO order is given in (6a) and VOS order in (6b). In VSO order, the first argument takes ergative case; in VOS order, it takes absolutive case.

- (6) a. na tatala-(ina) [*e* le tama] [H- (*ia*) le faitotoʔa]  
 PAST open-(INA) ERG DET boy ABS (ABS) DET door  
 'The boy opened the door.'
- b. na tatala-(ina) [H- (*ia*) le faitotoʔa] [*e* le tama]  
 past open-(INA) ABS (ABS) DET door ERG DET boy  
 'The boy opened the door.'

In intransitive sentences, we found that *ia* may precede the absolutive subject, but not the oblique PP, and an H- always precedes the absolutive subject. This distribution is summarized in (7).

- (7) Distribution of absolutive *ia* and H- in intransitive sentences
- a. V [H- *ia* S] ([*i* DP])
  - b. V ([*i* DP]) [H- *ia* S]

Evidence comes from comparing VSO transitive sentences to VSX intransitive sentences (*X* denotes an oblique argument), as exemplified in the sentence pair in (8). An H- appears and *ia* is licit before the subject only in intransitive (8a); no H- appears before the subject, nor is *ia* licit before the subject in transitive (8b). Moreover, in VSX and VXS intransitive sentences, *ia* is only licit before the subject and not before oblique PPs.

- (8) a. na manoji [H- (ia) le manu] [i le maile] i le afafi.  
 PAST smelly ABS (ABS) DET bird OBL DET dog OBL DET evening  
 ‘The bird was smelly to the dog in the evening.’  
 b. na lajona [e le manu] [H- (ia) le maile] i le afafi.  
 PAST hear ERG DET bird ABS (ABS) DET dog OBL DET evening  
 ‘The bird heard the dog in the evening.’

In summary, absolutive *ia* and H- track the absolutive argument of simple transitives and intransitives, regardless of word order.

### 3.3 The distribution of absolutive *ia* is insensitive to properties of nominals

Thus far, we have only presented distributional data for absolutive *ia* and the absolutive H- with specific and common nominal phrases that are singular or plural, such as *le manu* ‘the bird’ or *manu* ‘the birds’. What about other types of nominal phrases? As a case in point, Niuean case-marks common and proper nouns/pronouns differently (Massam, 2001). In this section, we provide data on the distribution of *ia* and the H- in a variety of nominal phrases from Mosel and Hovdhaugen (1992, Ch. 6). To preview: whether an absolutive nominal phrase is specific or non-specific, proper or common (Section 3.3.1), pronominal (Section 3.3.2), or a nominalization (Section 3.3.3), *ia* is licit before it, and an H- precedes it.

#### 3.3.1 Specificity

In work with our Auckland consultants, we found that the absolutive high appears and *ia* is licit before both specific and non specific nominals, regardless of whether they are singular or plural. (9) illustrates these four conditions on the object nominal *meleni*. For elicitation details and sentence contexts, see Yu (2016).

- (9) e leʔi momoli e Manoji H- (ia) {le / ∅ / se /  
 PRES NEG bring ERG Manoji ABS (ABS) SPEC.SG / SPEC.PL / NON.SPEC.SG /  
 ni} meleni i le fale.  
 NON.SPEC.PL melon OBL SPEC.SG home  
 ‘Manoji didn’t bring {the melon/the melons/any melon/any melons} home yet.’

Whether the absolutive nominal is singular or plural, specific or non-specific, does not affect the distribution of *ia*/H-.

#### 3.3.2 Pronouns and proper names

The sentences in (10), elicited from the primary consultant in Los Angeles, show that absolutive *ia* is licit before postverbal pronouns<sup>7</sup> (which are free-standing) and that postverbal pronouns must be preceded by an absolutive H-. The pronoun used here *ma:ʔua* is a regular dual form, translated as ‘we/us two’.

<sup>7</sup>Before preverbal, clitic pronouns, we have found that *ia* is not licit and that H- is not realized, see Section 3.4.1.

(10) H- precedes a postverbal absolutive pronoun: transitive and intransitive sentences

a. na laɣona e Mamanu H- (ia) ma:ʔua  
 PAST hear ERG Mamanu ABS (ABS) 1.DU.EXC

‘Mamanu heard us two.’

b. na manoŋi H- (ia) ma:ʔua i le liona  
 PAST smelly ABS (ABS) 1.DU.EXC OBL DET lion

‘We two stank to the lion.’

Sentence (11), elicited with the Auckland consultants in manipulations of specificity, shows that *ia* is licit preceding an absolutive proper name and that it is preceded by an absolutive H-.

(11) e leʔi ŋalue H- (ia) Melani i ni mamananu i le fale.  
 PRES NEG work ABS (ABS) Melani OBL NON.SPEC.PL design OBL DET house

‘Melani didn’t work on any designs yet at home.’

### 3.3.3 Nominalizations

The data in this section, elicited from the primary consultant in Los Angeles, show that *ia* and H- precede absolutive derived nominals and that *ia* and H- occur on absolutive arguments within derived nominals, regardless of whether the derived nominal itself is absolutive or not. (We elicited the same pattern of data with other sentences with our primary Auckland consultant under broad focus on polarity, e.g. ‘Did X? No, it is not the case that X’.)

First, *ia* is licit and an H- appears before an absolutive nominalized verb (e.g. before *le lalaŋa* in (12a)), but *ia* is illicit and no H- appears before the same nominalized verb when it is oblique in (12b). Though not shown, the contrast extends to other absolutive and oblique nominalization pairs.

(12) a. Absolutive nominalization: Preceded by absolutive *ia* and H-

e {faʔa-le:-lelei / leaŋa} H- (ia) [le lalaŋa mamananu a malini]<sub>abs</sub> i le  
 PRES {do-NEG-good / bad} ABS (ABS) DET weave design GEN marine OBL DET  
 afaifi

afternoon

‘The marine’s weaving of the design is not good.’ (faʔa-le:-lelei: poorly done, leaŋa: superstition) (based on Mosel and Hovdhaugen (1992, p. 545, example 13.100))

b. Oblique nominalization: Not preceded by absolutive *ia* and H-

e matamata H- (ia) le malini [i le lalaŋa o le mamananu]<sub>obl</sub> i  
 PRES watch ABS (ABS) DET marine OBL DET weave GEN DET design OBL

le fale

DET house

‘The marine watches the weaving of the design at home.’

Note that in (12b), *ia* and H- do precede the matrix absolutive argument *le malini*.

Second, the distribution of *ia* and H- also tracks absolutive arguments internal to nominalizations, regardless of whether the nominalization itself is absolutive, in (13a), or oblique, in (13b).

- (13) a. Absolutive *ia* and H- within an absolutive nominalization  
 e iloa-atu e le malini H- (ia) [le momoli-ina e le liona H- (ia)  
 PRES spot ERG DET marine ABS (ABS) DET deliver-INA ERG DET lion ABS (ABS)  
 le manini]<sub>abs</sub> i le ala.  
 DET fish OBL DET street  
 ‘The marine spots the delivering of the fish by the lion in the street.’
- b. Absolutive *ia* and H- within an oblique nominalization  
 na faʔalopololo H- (ia) le malini [i le momoli-ina e le liona H-  
 PAST listen ABS (ABS) DET marine DET OBL deliver-INA ERG DET lion ABS  
 (ia) le manini]<sub>obl</sub> i le ala.  
 (ABS) DET fish OBL DET street  
 ‘The marine listened to the delivering of the fish by the lion in the street.’

Nominalizations with a transitive predicate may maintain an ergative-absolutive alignment, as in the pair in (13a)-(13b). Alternatively, the alienable genitive marker *a* is used to mark the agent, as in (14a), or the inalienable genitive marker *o* is used to mark the theme, as in (14b). See Collins (2014, to appear) for a description and analysis of nominalizations in Samoan.

- (14) a. e {faʔa-le-lelei / leaʔa} H- (ia) [le lalaʔa mamananu a malini] i le  
 PRES {do-NEG-good / bad} ABS (ABS) DET weave design GEN marine OBL DET  
 afiafi  
 afternoon  
 ‘The marine’s weaving of the design is not good’ (faʔa-le-lelei: poorly done, leaʔa:  
 superstition) (based on Mosel and Hovdhaugen 1992, p. 545, example 13.100)
- b. e iloa-atu e le malini H- (ia) [le momoli-ina o le malala]<sub>abs</sub> i le  
 PRES spot DET ERG marine ABS (ABS) DET deliver-INA gen DET charcoal obl the  
 ala  
 street  
 ‘The marine spots the delivering of the charcoal in the street.’

Checking whether absolutive *ia* is licit on the potentially absolutive argument *mamananu* in (14a) was not part of the elicitation plan, but absolutive H- is not detected there. The lack of *ia* and H- is consistent with a pseudo-incorporation analysis of *mamananu*, where bare NPs are genuinely unmarked, see Section 3.4.2. In summary, *ia* is licit and an H- appears before nominalized predicates that are absolutive subjects or objects. Within a nominalization, arguments that receive genitive case are not preceded by an H-, but arguments that may be preceded by *ia* do.

### 3.4 Where *ia* is illicit

Thus far, we have shown that *ia* is licit before absolutive arguments in a variety of syntactic environments. We have also shown that *ia* is not licit before ergative arguments, oblique PPs, or genitive arguments.

In this section, we show other systematic patterns where *ia* is illicit. First, we show cases where *ia* is illicit, but additionally, other case markers are also illicit (Section 3.4.1). Second, we show that *ia* is not licit before all bare NPs: for example, *ia* is illicit before pseudo-incorporated objects and Mosel and Hovdhaugen’s (1992, p. 88, example 300) *isu mamafa* noun-verb compounds (Section 3.4.2). Finally, we show *ia* is licit only in a subset of cases where H-’s appear, namely before

absolutive arguments, but not in coordination nor between fronted arguments and the predicate (Section 3.5).

### 3.4.1 *ia* is illicit where other case markers are also illicit

**Case marking cannot occur in fronted arguments.** Although case in non verb-initial sentences is not yet well-understood, fronted arguments, which are preceded by ‘*o*’, cannot instead, or additionally, be preceded by ergative *e*, absolutive *ia*, or oblique *i*, as exemplified in the transitive and intransitive sentences in (15), (cf. 1).<sup>8</sup>

- (15) No case marking in non verb-initial word order
- a. ʔo \*e le malini H- \*ia na lalaja le mamanu.  
 TOPIC ERG DET marine front \*IA PAST weave DET design  
 ‘The marine wove the design.’
- b. ʔo \*ia le malini H- \*ia na ɲalue (i le mamanu).  
 TOPIC ABS DET marine front \*IA PAST work (OBL DET design)  
 ‘The marine worked on the design.’
- c. ʔo \*i le mamanu H- \*ia na ɲalue H- (ia) le malini  
 TOPIC OBL DET design front \*IA PAST work ABS (ABS) DET marine  
 ‘It was the design that the marine worked on.’

In some instances, pronouns can occur as clitics preceding the verb. As seen in (16a), with a transitive predicate, the ergative pronoun cannot be marked with the ergative marker *e*. For the sake of completeness, we show that it cannot be marked with absolutive *ia* either. Similarly, in (16b), with an intransitive predicate, the absolutive pronoun cannot be marked with absolutive *ia*. See Section 3.3.2 for examples suggesting that freestanding, non-cliticized pronouns can be overtly case marked.

- (16) a. No case marking on preverbal pronominal clitic [ma:]  
 na {\*e / \*ia} ma: {lalaja-ina / lalaja:} H- (ia) mamanu  
 ‘We two wove the designs.’
- b. No case marking on preverbal pronominal clitic [ma:]  
 na \*ia ma: manoji i le liona  
 ‘We two stank to the lion.’

In summary, neither absolutive *ia* nor H-, nor other (segmental) case markers are licensed on fronted arguments or preverbal clitic pronouns. This data was confirmed with all consultants.

**Focus sensitive *na‘o*.** Calhoun (2014) first noticed that an H- does not co-occur with absolutive arguments under *na‘o* ‘only’.<sup>9</sup> We found, additionally, from our Auckland consultants, that no case morphemes can co-occur with *na‘o*, whether the H- or segmental, in (17). These examples show *na‘o* combining with nominals bearing different cases. Case markers are shown to be ungrammatical in positions preceding and following *na‘o*.

<sup>8</sup>In the examples in (15), the H- indicated marks the right edge of the fronted argument. This tone is not the absolutive H- that co-occurs with *ia*. See Section 3.5.

<sup>9</sup>For a semantic analysis of *na‘o* and related material, see Hohaus and Howell (2015).

- (17) Case marking cannot co-occur with *na'o*
- a. *Na'o* in ABS subject. Context: Were Melina and Melani bad to the lion?  
 na leaŋa \*H- \*ia naʔo \*H- \*ia Melina i le liona.  
 PAST bad ABS ABS only ABS ABS Melina OBL DET.SPEC lion  
 'Only Melina was bad to the lion.'
- b. *Na'o* in ABS object. Context: Did Melina hear the lion and the bird?  
 na laŋona e Melina \*H- \*ia naʔo \*H- \*ia le liona.  
 PAST hear ERG Melina \*ABS \*ABS only \*ABS \*ABS DET.SPEC lion  
 'Melina heard only the lion.'
- c. *Na'o* in ERG subject. Context: Did Melina and Melani hear the lion?  
 na laŋona \*e naʔo \*e Melina H- (ia) le liona.  
 PAST hear \*ERG only \*ERG Melina ABS (ABS) DET.SPEC lion  
 'Only Melina heard the lion.'
- d. *Na'o* in OBL PP. Context: Was Melina bad to the lion and the bird?  
 na leaŋa H- (ia) Melina \*i naʔo \*i le liona.  
 PAST bad ABS (ABS) Melina \*OBL only \*OBL DET.SPEC lion  
 'Melina was bad to only the lion.'

The same is true if the argument under *na'o* is fronted (e.g. in *na'o le liona na lagona e Melina.*, the fronted counterpart of (17b)).

### 3.4.2 *ia* is not licit before all bare NPs

Up to this point, one could hypothesize that *ia* is licit and an H- appears before any bare NP, i.e. any segmentally unmarked NP. This hypothesis is consistent with the distribution of H- and *ia* for weather verb sentences (Mosel and Hovdhaugen, 1992, p. 107): an H- occurs and *ia* is licit before the bare NP, as shown in (18), checked with the Los Angeles consultant.

- (18) a. na {timu / vevela} H- (ia) Apia  
 PAST {rain / hot} ABS (ABS) Apia  
 'It rained in Apia / It was hot in Apia.'
- b. na {timu / vevela} H- (ia) le Aso Sā  
 PAST {rain / hot} ABS (ABS) DET day sacred  
 'It rained on Sunday / It was hot on Sunday.'

However, there are cases where H- does not appear and *ia* is illicit before bare NPs. First, an H- does not appear and *ia* is illicit before pseudo-incorporated objects (checked with both primary consultants and the 19-year-old in Auckland). This distribution is consistent with Massam's (2001) syntactic analysis of pseudo-incorporation for Niuean: though unmarked, the pseudo-incorporated object does not check absolutive case.

- (19) An example of pseudo-incorporation
- a. V-S-O-Adv transitive without PNI, ABS-marked specific singular/plural object  
 na fufulu leaŋa e Manoŋi H- (ia) meleni i le ala  
 PAST wash bad ERG Manogi ABS (ABS) melon OBL DET street  
 'Manogi washed the bad melons in the street.'

- b. V-O-Adv-S with PNI, unmarked object, ABS-marked subject  
 na fufulu \*ia meleni leaʔa H- (ia) Manoʔi i le ala  
 PAST wash \*ABS melon bad ABS (ABS) Manogi OBL DET street  
 ‘Manogi melon-washed badly in the street.’

Second, an H- does not appear and *ia* is illicit before Mosel and Hovdhaugen’s (1992, p. 88, example 300) *isu mamafa* compounds, in which a verb modifies a noun (checked with our primary consultant in Auckland).

- (20) a. e \*ia isu mamafa H- (ia) le malini  
 PRES/GENR \*ABS nose heavy ABS (ABS) DET.SPEC marine  
 ‘The marine has a cold (lit. a heavy nose).’  
 (see Mosel and Hovdhaugen, 1992, p. 88, example 4.97)
- b. e \*ia manava leaʔa H- (ia) le malini  
 PRES/GENR \*ABS stomach bad ABS (ABS) DET.SPEC marine  
 ‘The marine has a bad stomach.’

### 3.5 *ia* cannot co-occur with all sentence-medial high edge tones

Having shown that *ia* is not licit before just any bare NP, we show here that *ia* is not licit before all sentence-medial high edge tones, in data checked with all consultants but the 23-year-old. In Section 1.4, we stated that H-’s occur systematically not only before absolutive arguments, but also in coordination, and between fronted arguments and the predicate. However, while *ia* is licit where absolutive H-’s appear, it is illicit where H-’s appear after fronted arguments, as well as in coordination. We already showed in (15) that *ia* is illicit between fronted arguments and the predicate.

In the coordinations in (21), *ia* is illicit both before and after the conjunct [ma] whether the coordinated arguments are ergative or absolutive.<sup>10</sup> However, as described in Section 1.4.1, a H- nevertheless appears before the conjunct. The same distributional facts for *ia* and the H- are true if the coordinated arguments are common nouns, or if the coordination is a disjunction with *po’o* ‘or’.

- (21) Coordination
- a. na ʔalue H- (ia) Ioane \*ia H- ma \*ia Sina i le mamanu  
 PAST work ABS (ABS) John \*ABS CONJ CONJ \*ABS Sina OBL DET design  
 ‘John and Sina worked on the design.’
- b. na lalaʔa e Ioane \*ia H- ma \*ia Sina H- (ia) le mamanu  
 PAST weave ERG John \*ABS CONJ CONJ \*ABS Sina ABS (ABS) DET design  
 ‘John and Sina wove the design.’

## 4 Discussion

In the previous sections, we have shown that absolutive arguments in Samoan are optionally preceded by the segmental case marker *ia*, which consistently co-occurs with H-. This dual absolutive marking is observed generally, and is insensitive to the syntactic nature (subject of intransitive, object of transitive predicates, proper names, pronouns, and nominalized verbs) and certain semantic

<sup>10</sup>Vonen (1988, p. 39) notes that absolutive *ia* is illicit after the conjunction *ma*, too.

properties (specificity and number) of the marked nominal. Restrictions are observed in environments where bare NPs are independently expected not to be case marked (pseudo-incorporation) or where ergative and oblique case marking are also banned. This distribution strongly suggests that *ia* and H- are both absolutive case markers in Samoan, although the use of *ia* as an absolutive case marker in contemporary Samoan seems to be infrequent while the appearance of the absolutive H- appears to be exceptionless. In the remainder of this section, we sketch out a possible connection between absolutive *ia* and H-.

#### 4.1 *ia* as the tonal source of the absolutive H-

All the non-absolutive case markers in Samoan are segmental; so are TAM morphemes; so are—to the best of our current knowledge—all other inflectional morphemes in Samoan (other than coordination, which is segmentally as well as tonally marked). Why then, is a single inflectional morpheme in Samoan tonal, if the rest are segmental? We hypothesize that the origin of the absolutive H- is the pitch accent on the particle *ia*. In Samoan stress assignment, FOOTBINARITY requires that a foot must contain exactly two moras, and this is an undominated constraint (Zuraw et al., 2014, p. 280). Thus, absolutive *ia* forms a proper footing domain, and it receives initial stress since Samoan stress assignment also requires that a foot have stress on its initial mora (RHYTHMTYPE=TROCHEE is undominated). In contrast, all other case markers are monomoraic—ergative *i*, oblique *i* or genitive *a* and *o*—and thus form subminimal feet and are unstressed. As the only stressed case morpheme, absolutive *ia* doubly marks absolutive case: segmentally via the string [ia], and tonally with the LH\* rising pitch accent on *ia*. We know of no work on change over time in the frequency of or context for the use of absolutive *ia*. All that is apparent is that it is always optional in contemporary Samoan. However, if absolutive *ia* was frequently used but then became reduced or dropped over time, perhaps just the tonal event became sufficient as the absolutive case marker. Perhaps at one point, the frequency of usage of absolutive *ia* was like the variable frequency in the usage of ergative case marking (Section 1.3), before the overall frequency of absolutive *ia* became very low in all spoken language contexts.

The process of segmental deletion and tonal re-linking that would be involved in this proposed origin of the absolutive H- is typical of tonal behavior in natural language. A characteristic property of tone is its stability: even if the segmental material hosting a tone deletes, a tone will remain and be re-associated to remaining segmental material (Yip 2002, p. 67; Hyman 2011, p. 210). We illustrate the process in (22), using *manu* as an example of the word immediately preceding absolutive *ia*. The re-association of the tone on *ia* to the adjacent mora to the left is what would be expected in tonal reassociation: a tone that remains when its segmental host is elided will always dock to an adjacent tone-bearing unit (Hyman and Schuh, 2015).

But why dock onto the adjacent mora to the left rather than the right? There are a couple reasons we can speculate about, which coincide with principles proposed by Hyman and Tadadjeu (1976, p. 62) to play a role in determining whether a floating tone docks to the left or the right. One has to do with syllabic structure and Samoan phonotactics, and the other has to do with the shape of the f0 contour introduced by docking the tone. The source tone is associated to the initial vowel [i] in *ia*. To the left of *ia* is always a vowel, since Samoan phonotactics forbids word-final consonants. To the right of *ia* could be a word-initial consonant or a vowel, and this segment would also be further away from the initial [i] vowel in *ia* than the vowel to the left of *ia*. Docking to the left thus would allow ‘easier access to a syllabic segment’ that could bear tone (Hyman and Tadadjeu, 1976), and would be consistent with an idea mentioned in Clements and Ford (1979, fn. 18) that ‘a tone that has been “set afloat” reassociates to the nearest neighboring vowel (that is, one not separated from the deleted vowel by a consonant), regardless of direction’. In addition,

by docking to the left, the orphaned tone can be realized as a high upstepped from the high tone of the preceding pitch accent, as a continuation of the rising  $f_0$  contour from the pitch accent, and edge tones are often upstepped from preceding tones (Pierrehumbert and Hirschberg 1990, p. 177-178; Truckenbrodt 2007). In contrast, the orphaned tone docking to the mora to the right might necessitate a sudden drop to hit the low target for the upcoming stressed mora, and either maintenance of a high  $f_0$  from the preceding primary stress, or a dip in the  $f_0$  contour between the previous pitch accent and the absolute high tone. In short, the  $f_0$  contour created by docking the tone to the left rather than the right produces no new inflection points in the  $f_0$  contour, while docking to the right would certainly create new inflection points: in this sense, docking to the right produces a more ‘natural’ contour which, loosely speaking, might also take less articulatory effort (Hyman and Tadadjeu, 1976).

- (22) Proposal: segmental deletion and tonal reassociation of pitch accent on absolutive *ia* as the source of the absolutive H-



There is precedent for this kind of process for case morphemes. One classic example comes from the genitive (associative) construction in Grassfields Bantu languages. We’ll use Bamileke-Dschang and Bamileke-Medumba (Niger-Congo, Cameroon) as exemplars (Voorhoeve, 1971; Tadadjeu, 1974; Hyman, 1985; Bird and Stegen, 1993; Bird, 1999; Hyman, 2004).<sup>11</sup> In Bamileke-Dschang, a possessive ‘ $N_1$  of  $N_2$ ’ is constructed as a noun-noun sequence, where the possessed comes first and the possessee comes second, with the associative marker in between. The associative marker depends on the class of  $N_1$  and is /é/ or /è/ for all but one noun class (Hyman, 1985, p. 2). However, Hyman (1985, fn. 4) remarks that the associative marker /é/ or /è/ ‘usually drops out in running speech, though it is possible for it to be heard in slower pronunciations;’ the other (/á/) is also (less frequently) elided or assimilated—for instance, /sónj è sónj/ ‘bird of bird’ may be realized as /sónj ‘sónj/ (assimilation, with H tone spread from the first [sónj]) or /sónj ‘sónj/ (deletion), where the orphaned genitive L is the source of the downstep. Thus, Bamileke-Dschang provides an example where a genitive tonal morpheme has its source in the frequent deletion/assimilation of the genitive case marker in running speech. This is a synchronic alternation between tone as an arbitrary co-exponent of genitive case along with the segment [e] (i.e. as /é/ or /è/), and tone as the sole exponent of genitive case (a L or H tone depending on noun class).<sup>12</sup> Note the parallels with Samoan: segmental deletion of case markers is typical in some speech contexts, namely, in *tautala leaga*, and absolutive *ia* is always optional. When absolutive *ia* is present, tone—via a LH\* pitch accent—is a co-exponent of absolutive case, along with [ia]. When *ia* is segmentally deleted, the H is the sole exponent of absolutive case.

Bamileke-Medumba provides a diachronic example where a genitive tonal morpheme is likely to be a tone left behind after historical segmental deletion of the proto-Bantu connective. In this language, a ‘ $N_1$  of  $N_2$ ’ construction is formed simply as  $N_1 N_2$ . For instance, given [jú] ‘thing’ and

<sup>11</sup> Another synchronic example comes from Mongsen Ao (Tibeto-Burman, India), which has an agentive case marker [nə] that carries an underlying mid tone like other case markers in the language (Coupe, 2008, p. 64-65). However, unlike the other case markers, the segmental material in [nə] can be elided, leaving agentive case to be solely marked by tone. This segmental deletion of [nə] can happen when it is preceded by the 1SG pronoun [ni], which has a L tone, leaving the M tone on the deleted [nə] to be associated to [ni]. The tonal reassociation results in a LM rising tone on [ni], the only contour tone in the language.

<sup>12</sup> This terminology for tonal exponence comes from Hyman (2013, p. 18).

[mén] ‘child’, ‘thing of child’ is constructed as the string [jú <sup>!!</sup>mén], where <sup>!!</sup> indicates a double-downstep. Voorhoeve (1971, p. 52) analyzes both nouns as having both a floating L prefix and a final floating L stem tone, and for there to be a floating H genitive morpheme in between the nouns. Voorhoeve (1971, p. 52) remarks that his analysis is diachronically well-supported: every posited floating tone can be traced to being a tone orphaned after segmental deletion. As shown in (23), the floating L prefix can be traced to the segmentally deleted proto-Bantu noun prefix *kì*; the final floating L stem tone to deletion in the originally disyllabic noun stem, and the genitive morpheme H tone to the proto-Bantu connective, which can be L or H depending on noun class. Samoan might move towards a situation like in Bamileke Medumba, if the absolutive *ia* eventually disappears completely.

- (23) Vowel deletion and tonal reassociation of orphaned tones as source of the genitive tonal morpheme and other floating tones in Grassfields Bantu (Hyman, 2004, example 23)

|                               |                      |
|-------------------------------|----------------------|
| a. Proto-Bantu reconstruction | b. Bamileke-Medumba  |
| *kì - jùmà + kí-á + mù - jáná | jú <sup>!!</sup> mén |
| L - H L + H + L - H L         | L H L H L H L        |
| ‘thing of child’              | ‘thing of child’     |

Currently though, the exponence of the Samoan absolutive is closer to the situation of synchronic alternation in Bamileke Dschang, although further work remains for us to examine whether or not the H- and *ia* are in complementary distribution currently. Preliminary evidence suggests that the H- and *ia* may co-occur, so an account for contemporary Samoan might instead be that there are multiple ways for absolutive case to be spelled out, where one exponent of absolutive case lacks some of the features present in another. It will be difficult to further explore this since the use of absolutive *ia* in contemporary Samoan appears to be very much in flux.

## 5 Conclusion

In this paper we have presented empirical data on the distribution of the absolutive particle *ia*, which has only been mentioned in passing in the literature. The data shows that absolutive arguments in Samoan are optionally preceded by the segmental case marker *ia*, which consistently co-occurs with H-. This dual absolutive marking is observed generally, and is insensitive to the syntactic nature (subject of intransitive, object of transitive predicates, proper names, pronouns, and nominalized verbs) and certain semantic properties (specificity and number) of the marked nominal. Restrictions are observed in environments where bare NPs are independently expected not to be case marked (pseudo-incorporation) or where ergative and oblique case marking are also banned. This distribution strongly suggests that *ia* and H- are both absolutive case markers in Samoan, although the use of *ia* as an absolutive case marker in contemporary Samoan seems to be infrequent, even near-moribund, while the appearance of the H- as an absolutive case marker is robust, possibly exceptionless.

The systematic syntactic distribution of absolutive *ia* also clarifies the source of the absolutive H-. Absolutive *ia* is licit before absolutive H-'s, but not H-s that occur in coordination and fronting. This suggests that the source of the absolutive H- is distinct from that of the other H- tones. Furthermore, *ia* itself may be the diachronic source for the absolutive H-, a lone tonal morpheme in a sea of segmental morphemes. We have hypothesized that the diachronic origin of the absolutive high may come from leftward tonal reassociation of the pitch accent on absolutive *ia*, upon deletion of the segmental material of *ia*. We are currently exploring if there is further evidence for this hypothesis

from older Samoan narratives and studying relatives of *ia* and the exponence of absolutive case in languages related to Samoan.

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