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FOREWORD

The two volumes presented here represent 35 of the talks and posters presented at the 43rd Annual Meeting of the Berkeley Linguistics Society, held in Berkeley, California from February 3-5, 2017. The conference included a General Session, a Special Session on Language Contact, a Parasession on Languages of the Americas, and an Undergraduate Poster Session. Papers presented in the General Session, Special Session, and Parasession are contained in Volume 1 and are grouped by the session in which the paper was presented. Short papers and digital copies of posters presented at the Undergraduate Poster Session are presented in Volume 2.

The 43rd Annual Meeting of the Berkeley Linguistics Society was organized by the second-year graduate students of the Department of Linguistics at the University of California, Berkeley: Margaret Cychosz, Dmetri Hayes, Tyler Lau, Julia Nee, and Emily Remirez. The papers in this volume were edited for style by members of the Executive Committee.

The BLS43 Executive Committee
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GENERAL SESSION

Ergative Patterns in Jê languages

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1 Introduction

The nine extant Jê languages are spoken in a big extension of Brazil, from the tropical forests east of the Amazon river to the southernmost provinces of the country. Ergativity has long been considered a trait of the Jê family, and as such it has received a great deal of attention. Linguistic descriptions and theoretical analyses of Jê languages are still rare, especially so for a language family its size. The languages in the Macro-Jê extended family suffer from a chronic lack of presence in the linguistic literature when compared to other families with an equivalent size. However, in the last decade there has been a small surge of linguistic work focused on the description and analysis of Jê languages, so that as of they are reasonably well known in terms of at least the grammar of agreement and case, although Macro-Jê is still a definitely understudied family.

This paper examines the morphosyntax of ergative case across Jê. I describe the overt manifestation of case in the family and put forward a cross-linguistic comparative analysis. Oblique cases are not covered. Although the discussion will be particularly focused on the Northern Jê branch, my goal is to also provide a complete overview of the entire family regarding the grammatical subsystem of case.

I start by reviewing case marking in Southern Jê languages, and I continue with Central Jê, especially Xavante, working my way up to a description of Northern Jê languages. The paper concludes with some remarks about the implications for Jê diachrony of the patterns described here.

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[*]The Panará and Mẽbêngôkre data presented here were collected by myself in various trips to the field between 2011 and 2016, unless indicated otherwise. Abbreviations used in example sources: el = elicitation, fb = social network chats, obs = participant observation, txt = recorded or written texts. Examples cited from secondary sources are left untouched in the transcribed line, and are minimally adapted in the glosses for the sake of cohesiveness. I want to thank first and foremost the Panará community, especially my regular informants. I also thank the audiences of BLS 43 and SAL 2 at UC, Berkeley, as well as Myriam Lapierre, Charlotte Lindenbergh, Line Mikkelsen and Rafael Nonato for their discussion. All errors are my own.

Abbreviations used in interlinearized glosses: 1 = first person, 2 = second person, 3 = third person, ABS = absolutive, ACC = accusative, ACT = active, AUG = augmentative, AUX = auxiliary, CNJ = conjunction, CONC = concatenation, DAT = dative, DEF = definite, DEM = demonstrative, DIM = diminutive, DIR = directional, EMPH = emphasis, ERG = ergative, EXPL = expletive, FACT = factual, FOC = focus, FUT = future, GNR = generic, HON = honorific, HTO = heterophoric, IMP = imperative, INCL = inclusive, INDF = indefinite, INS = instrumental, IRR = irrealis, ITER = iterative, LG = long form, LOC = locative, NEG = negative, NF = non finite, NFUT = non future, NOM = nominative, PL = plural, PRF = perfect, PRN = pronoun, PROSP = prospective, REAL = realis, SG = singular, SH = short form, STV = stative, TOP = topic.

2 The exponence of ergative case

2.1 Southern Jê

The Southern branch of the Jê family is composed of two extant languages, Xokleng and Kaingang, and an extinct language, Ingain († early 20th century) (Rodrigues 1999; Van der Voort & Ribeiro 2010).

Main clauses are largely verb final in Southern Jê. Although there are a few elements that can occur in the postverbal position, these are very restricted. In Xokleng, they are limited to what Urban (1985) calls POSTVERBAL PREDICATING PARTICLES, which encode aspect, and first and second person pronominal forms that appear between the verb and the aspectual particle when non-focus, as in 1.

(1) a. tẽ nũ mũ (Urban 1985)
go.ACT 1SG.NOM ACT
'I went.'

b. tẽ mã mũ
go.ACT 2SG.NOM ACT
'You went.'

c. ti pɛ̃nũ nũ mũ
3SG shoot 1SG.NOM ACT
'I shot him.'

Noun phrases are marked for case in a pattern that correlates with the postverbal aspectual markers present in the clause. Active clauses present an active form of the verb, and the case marking pattern is nominative-accusative. Stative clauses present a stative form of the verb that correlates with an ergative-absolutive case marking on the arguments.

In active intransitive clauses, illustrated in 2, the single argument of the verb, be it pronominal or a lexical noun phrase, is marked by a morpheme that agrees with it in person features (*nũ* 1.NOM, *mã* 2.NOM, *wũ* 3.NOM). In active transitive clauses, illustrated in 3, the same nominative morpheme marks the external argument of the verb, with the exeption of non-focus first and second person pronouns, which appear in the postverbal position, as in 1.

(2) a. tã **wũ** tɨ mũ (Urban 1985)
3SG 3SG.NOM die.ACT ACT
'He died.'

b. kɔ̃ñŋəŋ hã **wũ** tẽ mũ
man FOC 3SG.NOM go-ACT ACT
'It was the man who went.'

c. tẽ nũ mũ
go.ACT 1SG.NOM ACT
'I went.'

(3) a. tã **wũ** ti pɛnũ mũ (Urban 1985)
3SG 3SG.NOM 3SG shoot ACT

‘He shot him.’

b. ɛ̃ñ hã **nũ** ti pɛnũ mũ
1SG FOC 1SG.NOM 3SG shoot ACT
‘It was I who shot him.’

The nominative marker consistently never appears on the internal object of a transitive clause. As mentioned above, first and second person appear as pronominal enclitics when the noun phrase is not focused, as in 2c. When the first or second person nominative noun phrase is focused, the nominative marker behaves like the third person *wũ* marker, as in 3b).

Contrary to the case marking pattern in active clauses, stative intransitive clauses lack both the nominative pronominal paradigm and the nominative mark on their single argument, as in 4. The same pronominal paradigm that cross-references internal arguments of active transitive verbs is used with all arguments in stative clauses. Furthermore, stative transitive clauses present a different marker *tɔ̃* that canonically marks only the external argument, as in 5, while the internal argument appears in the same bare unmarked form as the intransitive argument. Xokleng *tɔ̃* thus presents an ergative pattern in active clauses.

(4) a. ti tẽŋ wã. (Urban 1985)
3SG go.STV STV
‘He went.’

b. ti hã tel wã.
3SG FOC die.STV STV
‘It was he who died.’

(5) a. ti **tɔ̃** ti pɛnũ wã. (Urban 1985)
3SG ERG 3SG shoot STV
‘He shot him.’

b. a hã **tɔ̃** ti pɛnũ wã.
2SG FOC ERG 3SG shoot STV
‘It was you who shot him.’

The system of verbal forms and case allomorphy described for Xokleng is very similar to what is observed in Kaingang (Wiesemann 1972). In both languages, embedded clauses behave like Xokleng clauses with stative aspect (Urban 1985: p. 179), in that they always present the “stative” form of the verb and the case marking follows an ergative pattern, as in 6.

(6) a. [ti tawi kũ] mã ti weŋ tɛ̃ (Urban 1985)
3SG arrive.SG.STV CNJ 2SG.NOM 3SG see.ACT IMP
‘When he arrives, you are going to see him.’

b. [ɛ̃ tɔ̃ uyol tãñ kɔlkũ] tã tawiŋ tɛ̃
coref. ERG tapir kill after 3SG.NOM arrive IMP
‘After he kills the tapir, he is going to arrive.’

Furthermore, in stative clauses absolutive arguments acquire the ergative mark *tɔ̃* when displaced from their canonical preverbal position, as in 7.

(7) a. ãmɛ̃n lɔ ti tɛ̃ŋ wã (Urban 1985)
path along 3SG go.STV STV
'He went along the path.'

b. ti **tɔ̃** ãmɛ̃n lɔ tɛ̃ŋ wã
3SG ERG path along go.STV STV
'He went along the path.'

To summarize, in Southern Jê languages active main clauses present an active form of the verb and their arguments are marked on an accusative alignment. Stative main clauses present a stative form of the verb, and the marking on arguments is ergative. Subordinate clauses consistently present the same ergative properties of stative clauses. Parallel to that, the system of verbal number agreement is aligned on an ergative pattern.

2.2 Central Jê

The Central branch of the Jê family is composed of two extant languages, Xavante and Xerente, and two extinct languages, Akroá († mid-19th century) and Xakriabá († 1864) (Rodrigues 1999; Van der Voort & Ribeiro 2010). The inclusion of Akroá among the central languages has been disputed, but a recent comparative study of all four Central Jê languages (Carvalho & Damulakis 2015) has shown that Akroá should not be classified with the Timbira dialects in the Northern branch, as had been suggested (Monserrat 1994).

The structure of Central Jê sentences is similar to Southern Jê, with a quite strict verb final order and a series of bound pronominal forms that cliticize on the verb. On these morphemes, second and third person show some synchretism, which Estevam (2011) glosses as HTO, heterophoric, maintained here.

As described by Estevam, there is no case marking morphology on lexical noun phrases in Xavante. The only morphological manifestation of case is in the choice of pronominal paradigms. In 8, the same first person pronoun cross-references the single argument of intransitive verbs and the external argument of transitive verbs, in a nominative pattern. A second paradigm cross-references the internal argument of transitive verbs and postpositional objects.

(8) a. Wa wi. (Estevam 2011)
1NOM arrive
'I have arrived.'

b. Wa za ti= ö.
1NOM PROSP 3ACC take
'I will take it.'

c. Ni?wa za duré ĩĩ= zadawa?ru.
PRN.INDF PROSP also 1SG.ABS insult
'Someone might also insult me.'

d. Ta barana ma da= hudu, misi hã ma aj= wajrĩ.
3 at.night PRF 3GNR.ABS flee one EMPH PRF 3.ABS stay
'Those ones escaped during the night, only one stayed.'

In contrast to the previous examples, in aorist, negative, imperative, and dependent clauses a different case marking pattern emerges. The verb appears in a non-finite form (Estevam 2009, 2011) and the case marking is not the nominative-accusative seen above, but rather a different pronominal system is used for the external argument of a transitive verb, as in 9. Instead of the nominative paradigm to which first person *wa* belongs, we find an absolutive paradigm (first person *ĩĩ̃*) that cross-references the single argument of intransitive verbs, seen in 9a, and the internal argument of transitive verbs. A different paradigm of personal pronouns is used for the external argument of transitive verbs.

(9) (Estevam 2009)

a. Ĩĩ̃= ñĩb?rui õ di.
1SG.ABS be.upset NEG EXPL
'I'm not annoyed.'

b. (*Wa) ĩĩ̃= nhipi õ di.
1 1SG.ABS cook.NF NEG AUX
'I did not cook.'

c. Te ĩĩ̃= ma ti= nha [ĩhi (*wa) **te** wapa-ri da].
HTO 1SG DAT 3SG say old.man 1 ERG listen-NF translative
'He tells me to listen to the old man.'

In these non-finite contexts, besides the absolutive and nominative forms presented above there is a morpheme *te*, analysed as an auxiliary by Estevam (2011)

> Auxiliary *te* is necessary to mark the subject, the aorist form and the non-finite form of a transitive verb in independent clauses that are negative, imperative and affirmative in aorist aspect, and also in dependent clauses, in which the verb's finiteness falls on the auxiliary.[*] (Estevam 2009: p. 5)

This morpheme appears to mark ergative arguments in a function similar to Xokleng ergative *tõ̃*. It is not clear whether this ergative morpheme can mark lexical noun phrases other than pronouns.

(10) a. Ni?wa **te** ?ru-zani mono õ di. (Estevam 2011)
PRN.INDF ERG retreat-rage ITER NEG EXPL
'I don't get angry with anyone.'

b. Warĩ na ∅ **te** ãma sõrẽme õ di.
tobacco INS 1SG ERG 3.preverb refuse NEG EXPL
'I haven't refused the tobacco.'

Even though the global picture is less clear for Central Jê languages than it was for Southern Jê, the same broad tendencies appear to hold. Verbs present two forms, finite and non-finite, that are strictly correlated with a different alignment of case marking as well as certain clausal environments: Main clauses for the accusatively-aligned finite form; aorist, negative, imperative and dependent clauses for the ergatively-aligned non-finite form.

[*] My translation. I consequently adapt the gloss of this morpheme to ERG in the examples.

2.3 Northern Jê

The Northern branch is the largest in the whole Jê family, comprising five extant languages: Apinayé, Kĩsêdjê, Mẽbêngôkre, Panará and Timbira. As we have already seen in the other two branches of the family, Northern Jê languages present a strong correlation between the alignment of case marking and the presence of long or short forms of verbs as predicate heads, the sole exception being Panará.

2.3.1 Apinayé, Kĩsêdjê, Mẽbêngôkre and Timbira

This section describes the case marking patterns of Mẽbêngôkre, which in this respect is representative of Apinayé, Kĩsêdjê, Mẽbêngôkre and Timbira. Differences are noted when due. In all four languages, in the presence of a short form verb the single argument in intransitive clauses is marked with nominative case, illustrated in 11a. Transitive clauses also have their external argument marked with nominative case, and their internal argument with accusative case, as in 11b.

(11) a. Ba keke.
1SG.NOM laugh.SH
'I laugh.' (el)

b. Ba a= pumu.
1SG.NOM 2SG.ACC see.SH
'I see you.' (el)

Turning now to dependent clauses, they deviate in two ways from the snapshot presented for main clauses. First, verbs in subordinate clauses appear in their long form. Second, the case marking pattern in dependent clauses is ergative. The single argument of intransitive verbs is co-referred with an absolutive clitic, close in form to the accusative paradigm, and the internal argument of transtivie verbs is exponed with the same absolutive paradigm. The external argument, however, is not marked with a nominative pronoun, but with a different pronoun paradigm that, therefore, corresponds to an ergative paradigm. This is illustrated in 12, where a-b are dependent versions of the main clause examples in 11.

(12) a. [I= keket] kêt.
1SG.ABS laugh.LG NEG
'I don't laugh.' (el)

b. [Ije a= pumuj] kêt.
1SG.ERG 2SG.ABS see.LG NEG
'I don't see you.' (el)

The postverbal *kêt* is in fact a predicate that takes the negated clause as its complement (Salanova 2007: p. 58), which explains the similar case marking observed in a more transparently subordinate clause like those in 13a. Other clause-selecting predicates that present the same behaviour as *kêt* are prospective aspect markers *ỳrỳ*, *kadjy* and *mã*; manner modifiers *mex* "good" and *pyro* "ready," and aspectual *rã'ã* "still" (Salanova 2017.

(13) a. Ba [kute tep janhĩnh] pumũ.
1SG.NOM 3SG.ERG fish fishing.LG see.SH
'I saw him catch fish.' (el)

b. I mã [aje tep krẽn] prãm. (Reis Silva 2001: p. 74)
1SG.ACC DAT 2SG.ERG fish eat.LG want
'I want you to eat fish.'

So far, what we observe in Mẽbêngôkre is that clause type, namely whether the the syntactic environment is a main clause or a dependent clause, is correlated with both case marking alignment and verb form. Main clauses contain short verb forms and have nominative–accusative case marking, while dependent clauses contain long verb forms and have ergative–absolutive case marking. In the rest of this section we will see that the cause-and-effect relation proves to be between verb form and case marking alignment. Whereas Mẽbêngôkre presents instances of long verb forms in main clauses, there are no occurrences of ergative case marking in short verb form clauses. As Salanova (2007) argues, nounness is the source of all the ergative constructions in Mẽbêngôkre. Furthermore, non-verbal predicates headed by nouns or adjectives pattern like long form verbs with an ergative case marking.

The presence of verbs in the long form in main clauses is very restricted, but not ruled out: They can occur in main clauses that also lack the postverbal predicates presented above, such as negative *kêt*. Main clauses with long form verbs are described as having a very specific meaning associated with them, namely 'resultatives for verbs that involve a change of state; existential perfects; habituals or generics for verbs that denote plural activities' (Salanova 2017). The following example illustrates that, besides dependent clauses, main clauses can also appear with a long form verb and, when they do, they also show ergative case marking, as seen in 14b.

(14) a. Krwỳj jã nẽ ∅ mop krẽ. (Salanova 2007: p. 105)
parakeet DEM NFUT 3SG.NOM malanga eat.SH
'This parakeet ate the malanga.'

b. Krwỳj jã nẽ **kute** mop krẽn.
parakeet DEM NFUT 3SG.ERG malanga eat.LG
'This parakeet has eaten malanga (once in his life).'

In contrast, short verb forms are ungrammatical in dependent clauses, as in 15, regardless of the case marking on the arguments. Only long verbs, with the corresponding ergative case marking, are grammatical in dependent environments.

(15) a. *[Ba tep krẽ] kêt.
1SG.NOM fish eat.SH NEG
'I didn't eat fish.' (el)

b. *[Ije tep krẽ] kêt.
1SG.ERG fish eat.SH NEG
'I didn't eat fish.' (el)

c. [Ije tep krẽn] kêt.
1SG.ERG fish eat.LG NEG

'I didn't eat fish.' (el)

The patterns of case marking alignment in Mẽbêngôkre are also observed in the other Northern Jê languages Apinayé, Kĩsêdjê and Timbira. Unlike the purely pronominal case marking of ergative in Mẽbêngôkre and Apinayé, in Kĩsêdjê the single argument of intransitive verbs and the internal argument of transitive verbs share a pronominal paradigm, and when cross-referenced by lexical noun phrases these appear morphologically unmarked, as in 16-17. The external argument of transitive verbs appears with ergative case morphology. Ergative case is indexed by a dedicated paradigm of strong pronouns, and marked by a morpheme *re* on non-pronominal noun phrases, as in 17. Nominative and accusative pronouns are outright ungrammatical in embedded environments.

(16) a. ∅ Wa [a= thẽm] mũ. (Nonato 2014)
FUT 1SG.NOM 2SG.ABS go.NF see
'I will see him go.'

b. *∅ Wa [**ka**= thẽm] mũ.
FUT 1SG.NOM 2SG.NOM go.NF see
Intended: 'I will see him go.'

(17) a. ∅ Ka [ire ∅= khuru] mũ. (Nonato 2014)
FUT 2SG.NOM 1SG.ERG 3SG.ABS eat.NF see
'You are going to see me eat it.'

b. *∅ Ka [**wa** **khu**= khu(ru)] mũ.
FUT 2SG.NOM 1SG.NOM 3SG.ACC eat.NF see
Intended: 'You are going to see me eat it.'

In Timbira we also observe ergative case marking strictly in a clause where the verb appears in the non-finite long form. Single arguments of transitive verbs and internal arguments of transitive verbs pattern together in being cross-referenced with an absolutive pronominal clitic paradigm, and as lexical noun phrases they appear in a morphologically unmarked form. External arguments of transitive verbs are marked with an ergative morpheme *tɛ*. In Timbira, the ergative morpheme marks lexical noun phrases as well as pronouns, illustrated in 18.

(18) a. i= tʃwər (Alves 2010)
1SG.ABS bathe.NF
'I bathed.'

b. a= wrək
2SG.ABS descend.NF
'You descended.'

c. kahãj **tɛ** iʔ= pən.
woman ERG 3SG carry.NF
'The woman carried him.'

d. ta **tɛ** kuhɨ pĩr. (Alves 2004)
rain ERG fire extinguish.NF
'The rain extinguished the fire.'

Although clause type appears to indeed be closely related to the case marking alignment of arguments in the four Northern Jê languages Mẽbêngôkre, Apinayé, Kĩsêdjê and Timbira, the true correlation is that the arguments of long form verbs are marked for case in an ergative pattern. In the clausal domain of a long verb, there is a pronominal paradigm exclusive to the external arguments of transitive verbs, and a different paradigm shared by internal arguments of transitive verbs and by the single argument of intransitive verbs. Since long verb forms can be analyzed as nominal and nominalizations are required for a clause to be selected as dependent of another predicate, the result is that dependent clauses systematically appear with an ergative case marking alignment.

2.3.2 Panará

Panará is a Northern Jê language that shows a substantial freedom of constituent order in both main and subordinate clauses. Phrases that index participants are very often omitted from the clause. Finite verbs present a rich series of morphemes, ordered sequentially in a preverbal position. The internal structure of the verb complex is given in table 1.

Position	Slot	Function
Proclitic	1	mood
	2	ergative, nominative
	3	reciprocal, reflexive
	4	iterative, direction
	5	postposition
	6	absolutive, accusative dual number
	7	noun, classifier, dative
Verb	8	one or more, in a serial construction
Suffix	9	aspect

Table 1: The Panará verb complex.

The first slot in the verb complex template corresponds to modal clitics, the full paradigm of which is given on table 1.

	Realis	Irrealis	Conditional
Intransitive	jy=	ka=	tu/ta=
Transitive	∅	ka=	ta=

Table 2: Panará modal clitics.

In Panará, participants are manifested in the clause by noun phrases or postpositional phrases, and by a series of morphemes in the verb complex. In intransitive clauses, the single argument appears in a bare unmarked form. In transitive clauses, NPs corresponding to internal arguments also appear in an unmarked form, while NPs that correspond to external arguments appear with a *hẽ* ergative mark, as in 19.

(19) a. Pôka jy= tẽ.
Pôka INTR fall
'Pôka fell down.' (el)

b. Poka **hẽ** ti= pyri kaneta.
Pôka ERG 3SG.ERG catch pen
'Pôka took the pen.' (el)

The bound pronouns that appear as proclitics on the predicate head present an alignment split. In realis, conditional and imperative clauses they mirror the ergative alignment of case marking on NPs, as illustrated in 20-22.

(20) a. **Ka** [jy= **a**= tẽ]. REALIS
2SG INTR 2ABS fall
'You fell down.' (el)

b. **Ka hẽ** [**ka**= ra= sisy-ri] inkjẽ.
2SG ERG 2ERG 1ABS hit-PRF 1SG
'You hit me.' (el)

(21) [Ta= **ra**= tẽ tapja Japão tã] pju uwy. CONDITIONAL
COND 1SG.ABS leave maybe Japan ALL price large
'If I travelled to Japan it would be expensive.' (el)

(22) a. **A**= sãn. IMPERATIVE
2SG.ABS stand
'Stand up.' (el)

b. [**Ka**= pyri] sã okjyantê.
2SG.ERG catch NEG pen
'Dont take the pen.' (el)

In irrealis[†] clauses, as in 23, case marking on argument NPs follows the ergative pattern exhibited elsewhere in the language, but the clitics in the verb complex align in a nominative-accusative pattern: there is a nominative paradigm that doubles both the single argument of intransitive verbs and the external argument of transitive verbs, while the absolutive paradigm is restricted to indexing the internal argument of transitive verbs and effectively becomes an accusative.

(23) a. **Mãra** [ka= **ti**= kre] kooma krekjã amã. IRREALIS MOOD
3SG IRR 3SG.NOM sing now night INES
"He is going to sing tonight."

b. Pykooma **mãra hẽ** [ka= **ti**= a= sisy-ri] ka.
morning 3SG ERG IRR 3SG.NOM 2ABS hit-PRF 2SG
"Tomorrow he will hit you."

[†]The category so far identified as mood (Bardagil 2015; Dourado 2001, 2002) does not behave like a prototypical realis/irrealis split, but it does not align well with a future/non-future system either. At this point, I remain agnostic as to what finite category is really active in Panará clauses, and I will continue to use the realis/irrealis label used in the literature so far.

Panará case marking is thus uniformly ergative, with a morphologically marked ergative external argument in transitives and unmarked absolutive internal arguments in both transitive and intransitive clauses, as shown in table 3.

	Marking on arguments	**Marking on verbs**
Realis, etc.	ergative	ergative
Irrealis	ergative	accusative

Table 3: Panará case marking.

The ergative case morpheme shows some allomorphy. There is a synchretic ergative form of number suffixes *-ra* DU and *-mẽra* PLR that has an ergative allomorph; rather than **-mẽra hẽ* what we find is *-mẽrân*:

(24) a. Swankjara-mẽra jy= ra= pôô.
ancient-PL INTR 3PL.ABS arrive
'The ancients arrived.' (el)

b. Swankjara-mẽrân nê= pari ikjyti.
ancient-PL.ERG 3PL.ERG kill tapir
'The ancients killed tapirs.' (el)

In coordinated DPs, the ergative *hẽ* attaches only at the end of the last term, in an unbalanced coordination construction:

(25) Perankô mẽ Mĩkre hẽ ti= mẽ= kre kwy.
Perankô and Mĩkre ERG 3SG.ERG DU cook manioc
'Perankô and Mĩkre cooked manioc.' (el)

Ergative case is morphologically marked on all NPs. Even though an alignment split is present, it is not a split in the case marking morphology on noun phrases. The split is limited to the cross-reference morphology on the verb and seems to have been reduced to a morphological templatic requirement of irrealis. Panará thus presents itself as an especially robustly ergative language within the Jê family.

3 The rise and fall of Jê ergative morphology

The pattern of case marking in Panará is strikingly different from the rest of Northern Jê languages, in which ergative case alignment is present exclusively in nominal environments. The contexts that license ergative case across the Jê family (essentialy the domain of a nominal predicate) does not correspod to the pattern of case marking that Panará exhibits. Long forms have been grammaticalized into a perfective suffix that bears no effect on the clause type or the case marking alignment .

3.1 The sentence

Alongside the nominal restriction on ergatives, Jê languages (minus Panará) also present a strong clausal template that correlates with the case marking on nominals. 26 sketches the configuration of Jê clauses. From right to left, we find the

verb in its strictly final position preceded by bound pronominal clitics, corresponding to absolutive and accusative pronouns across the family. To the left of this small verb complex is a preverbal area with its own internal configuration: a position for strong pronouns (nominative or ergative), a position for tense, aspect and mood elements and, on the left extreme of the clause, the position for emphatic pronouns, which surface with case morphology.

(26)

preverbal area	verb complex
emphatic pronoun | TAM | NOM, ERG	clitic | verb

The Jê clausal configuration is mirrored in the Panará verb complex, sketched in 27, which mirrors it in the order of its elements.

(27)

preverbal area	verb complex	postverbal area
(NP)	[TAM | NOM, ERG | … | ABS | verb]	(NP)

Also a verb-final domain, the Panará verb complex presents absolutive clitics immediately to the left of the verb, preceded by a series of elements (incorporated postpositions, directionals, reflexives, among others), in turn preceded by the ergative and nominative clitics, to the left of which are also TAM morphemes, namely the modal clitics. Beyond that position there is a preverbal area, paired with a postverbal area also outside of the scope of the verb package, where noun phrases appear and in which they are more often than not pro-dropped. In Panará, NPs appear to correspond to the most removed position in the Jê clausal template, the emphatic position where noun phrases always surface case-marked.

(28) a. [Ba nẽ ba a= pumũ]. MẼBÊNGÔKRE
1SG.NOM NFUT 1SG.NOM 2SG.ACC see
'I saw you.'

b. (Ĩkjẽ hẽ) [rê= k= anpũ] (ka). PANARÁ
1SG ERG 1SG.ERG 2SG.ABS see 2SG
'I saw you.'

In Panará the pre- and postverbal positions are not assigned to either one of the arguments, as can be seen in 28b. Although not every single logical order of S, O and V is attested, we do encounter verb-initial, verb-medial and verb-final configurations very often in both collected texts and during participant observation. The postverbal position is not a dedicated one, it appears to be a default position for argument DPs, if anything. As for the preverbal position, it is clearly not associated with any specific argument. It is more likely sensitive to discourse structure and information packaging. See Bardagil (2017) for an extended discussion.

3.2 The distribution of ergative exponents

The various exponents of ergative case in Jê languages are quite diverse. They can be grouped in four clusters of exponence, namely the presence of a dedicated ergative pronoun, the presence of a morpheme marking ergative arguments, the

ordering of the positions that license ergative and accusative with respect to the predicate head, and the presence of a split in the case marking of noun phrases. These patterns are summarized for all Jê languages in table 4.

	Pronoun	Morpheme	Order	Case split
Kaingang	✗	✓	✓	✓
Xokleng	✗	✓	✓	✓
Xavante	✓	✓	✓	✓
Xerente	✓	✓	✓	✓
Mẽbêngôkre	✓	✗	✓	✓
Apinayẽ	✓	✗	✓	✓
Kĩsêdjê	✓	✓	✓	✓
Timbira	✗	✓	✓	✓
Panará	✗	✓	✗	✗

Table 4: Exponence of ergative case.

As discussed in the preceding section, Panará is the only Jê language that marks all noun phrases for ergative case uniformly, regardless of clause type and verb form. It is also the only language that does not order the surface positions of participants according to their case. Whereas in the rest of the family the immediately preverbal position is shared by absolutive or accusative lexical noun phrases and the absolutive or accusative pronouns, the distribution of lexical and pronominal noun phrases in the clause does not follow from their case marking.

Ergative case morphology presents an interesting distribution. Two languages that stand out particularly: Mẽbêngôkre and Apinayé. Both languages have dedicated ergative pronominal paradigms and lack an ergative morpheme that marks lexical noun phrases for case. This contrasts with the general pattern of marking every noun phrase with an ergative morpheme, observed in the Southern, Central and Northern branches.

From a diachronic perspective, the availability of an ergative morpheme is so widespread that it appears to have been a trait of the family. Dedicated ergative pronouns seem to have developed for both the Central and Northern branches. In the Northern branch, Panará and Timbira both lost again the ergative pronoun[‡] and Mẽbêngôkre and Apinayé lost the ergative-marking morpheme. Figure 1 illustrates this.

[‡]The Panará first person pronoun /iŋkjẽ/ appears to be a reanalyzed ergative pronoun, as its form follows the /i + Ce/ template observed elsewhere in the family.

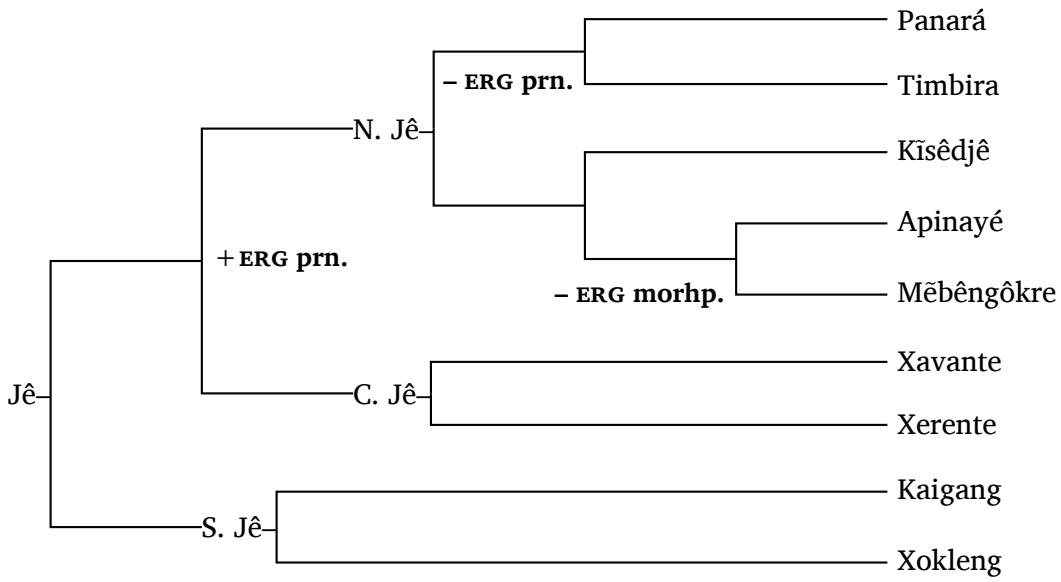

Figure 1: Distribution of ergative case morphology in the Jê family.

These patterns group together Mẽbêngôkre and Apinayé, on the one hand, and Panará and Timbira on the other, which is consistent with independent phonological evidence that suggests grouping these languages together within the Northern branch (Lapierre et al. 2016). It is worth mentioning that not only Jê but all of Macro Jê phylogeny and taxonomy require substantial revision. As Van der Voort & Ribeiro (2010) point out, the membership of several languages to the Macro Jê stock has been put forward in anecdotal fashion, not as hypotheses backed by data.

4 Conclusion

The limited scope of this paper does not permit an in-depth discussion of the mechanisms that derive case marking in the Jê family. It is however remarkable that, to the extent that the Jê family is often cited as a family of ergative languages, various different patterns of case marking are present.

Besides the alternation between ergative case being exponed via pronominal paradigm and via ergative morpheme, the most solid pattern in the family is the fact that ergative case is exclusively linked to non-finite nominal predicates, an instance of UBIQUITOUS ERGATIVITY (Queixalós 2013) attested in the world's languages(Alexiadou 2001). Ongoing research on the syntactic factors that derive a type of ergative case in Panará independent of nominal predicates should throw some light on the emergence of case marking alignments in the Jê family.

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Turkish onset-cluster repair: an ultrasound study

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1 Introduction

Vowel insertion occurs in Turkish to repair both illicit complex codas and complex onsets. Complex codas that violate sonority sequencing occur in Arabic loanwords, such as /sabr/ 'patience.' These clusters are repaired by inserting a high vowel (1):

(1) Coda-repairing vowel insertion in Turkish

a.	/sɑ**br**/	[sɑbɯr]	'patience'
b.	/dʒe**br**/	[dʒebir]	'algebra'
c.	/ø**mr**/	[ømyr]	'life'

The inserted vowel participates in vowel harmony, taking its backness and rounding from the preceding vowel (Clements & Sezer 1982). Like underlyingly present vowels, the inserted vowel is stressed when it occurs in the final syllable. Since the Turkish coda-repairing vowel participates in the phonological processes of stress-assignment and vowel harmony, we can conclude that it is inserted during phonology – coda-repair is EPENTHESIS.

Complex onsets in Turkish are also repaired by inserting a high vowel (2):

(2) Onset-repairing vowel insertion in Turkish

a.	/**pr**ens/	[pirens]	'prince'
b.	/**pr**ova/	[purova]	'test'
c.	/**br**anda/	[bɯranda][1]	'canvas'
d.	/**bl**uʒin/	[bɯluʒin] ~ [bʏlyʒin]	'blue jeans'

Superficially, onset repair appears to be the same process as coda cluster repair, only in mirror image. Previous research (Yavaş 1980, Clements & Sezer 1982, Kaun 1999, Yıldız 2010) characterizes both the onset- and coda-repairing vowels as epenthetic and harmonizing with the nearest root vowel. However, a closer look reveals real differences. The coda-repairing vowel is obligatory in speech and writing, while the onset-repairing vowel is optional in speech and absent in writing. Moreover, vowel-harmony is obligatory for the coda-repairing vowel, but

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[1]The remainder of this paper employs Turkish orthography, in which /ɯ/ is represented by the 'dotless i': ı.

variable and consonant-dependent for the onset-repairing vowel (Clements & Sezer 1982). These differences suggest that these two insertion processes are driven by different mechanisms: epenthesis for coda-repair, but INTRUSION for onset-repair. Intrusion, in contrast to epenthesis, occurs post-phonologically, at the level of articulation (Hall 2006). Consequently, intrusive vowels do not participate in phonology, and differ systematically from phonologically present vowels. Intrusive vowels are an acoustic percept resulting from gestural timing relations between consonants. Their presence is often optional or variable.

This paper argues that the Turkish onset-repairing vowel is intrusive, not epenthetic. Evidence comes from an ultrasound production experiment. Acoustic results indicates that onset-repairing vowel insertion is gradient and optional in Turkish, and that the inserted vowel is not a target for either backness or rounding harmony. Gesturally, underlying clusters produced with and without insertion turn out to be similar, despite their acoustic and perceptual differences, whereas perceptually similar inserted and underlying vowels display differing gestures. The specific gestural differences are consistent with the hypothesis that the inserted vowel lacks its own gestural target. These facts support an interpretation of Turkish onset-repair as a gestural, non-phonological phenomenon. This finding is significant for our understanding of Turkish syllable structure and vowel harmony, particularly since it conflicts with previous generalizations that were based on impressionistic data. This project also provides a methological contribution through its use of ultrasound to probe a phonological question (à la Davidson & Stone 2003).

The paper is organized as follows: Section 2 describes the expected differences – particularly gestural differences – between intrusive and underlying vowels. Section 3 describes the ultrasound experiment designed to look for these differences between the onset-repairing vowel and underlying vowels. Results are presented in Section 4. Section 5 concludes.

2 Expected characteristics of intrusive vs. epenthetic vowels

Under a traditional division of phonology and phonetics, the phonological grammar cares about epenthesis, but is oblivious to intrusion. In the input to phonology, epenthetic vowels are absent; but in the output of phonology, epenthetic and underlying vowels are indistinguishable. The segments in the output of phonology map onto gestural targets (C, v, and r), whether v is epenthetic or underlying. The gestures produce an acoustic result, which the listener perceives

transparently as [Cvr].

Intrusion, on the other hand, creates an opaque relationship between the phonological output and the acoustic output. This occurs when the output of phonology remains [Cr] (no epenthesis), which in turn maps onto a series of two consonantal gestures. Depending on the exact timing relations of how those gestures are produced, the listener may perceive an intrusive vowel that was not present in the output of the speaker's phonology. Table 1 schematizes the stages between phonological input and perceptual output for underlying, epenthetic, and intrusive vowels.

Table 1: /Cr/ vs. [Cvr]

	Input to phonology	Output of phonology	Perceptual result
Underlying vowel	/Cvr/	[Cvr]	Cvr
Epenthetic vowel	/Cr/		
Intrusive vowel		[Cr]	

Figure 1

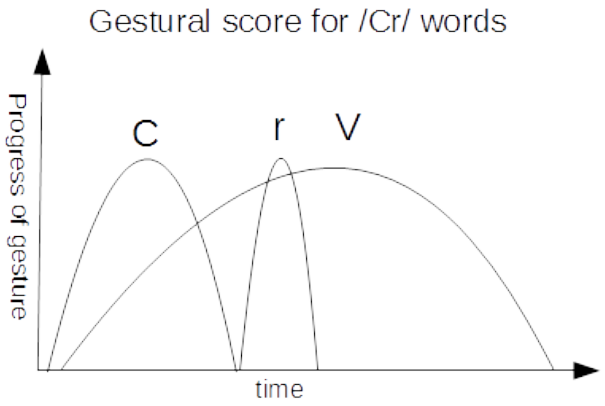
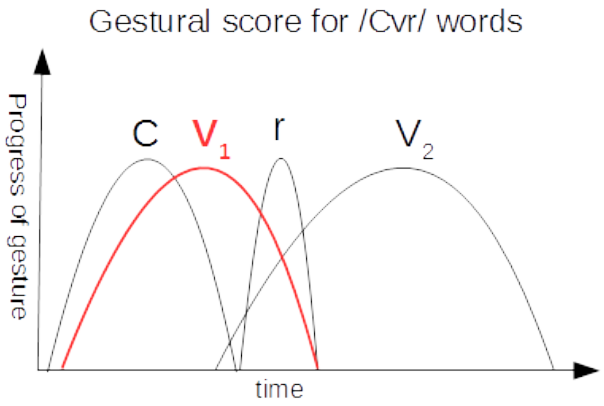


Figure 2



Since an intrusive vowel has no target, its tongue position will reflect the transition between the preceding consonant and the following vowel. Two gestures are involved, and their relative timing is schematized in Figure 1. In contrast, when the phonology yields [Cvr], there are three gestures, as shown in Figure 2. The underlying vowel V_1 is shaped by its own gestural target, not just its context. Thus, intrusive vowels are expected to differ gesturally from underlying vowels in ways that reflect the coarticulatory pressures of the preceding and following consonants and vowel, whose gestures overlap (Alfonso & Baer 1982, Öhman 1966). Note that the expected

gestural differences between perceptually-similar intrusive and underlying vowels vary, based on the relationship between the articulatory demands of V_1 and V_2.

Epenthetic and intrusive vowels might also differ in durational measures. In intrusion, the timing relation between the C and r gestures in a /Cr/ cluster is expected to vary over a smooth continuum between a close coordination that sounds like an insertionless cluster, and a more 'pulled apart' coordination that sounds like an inserted vowel. This timing relation should be reflected in the duration of the C_r interval, creating a monomodal distribution of C_r durations. With optional, categorical epenthesis, on the other hand, a bimodal distribution is expected, with one peak representing longer durations where epenthesis applied, and another peak representing short durations where epenthesis did not apply.

Finally, epenthetic and intrusive vowels are expected to pattern differently with respect to harmony. An epenthetic vowel should categorically participate (if harmony is root-governed, as suggested in Baković 2000) or fail to participate (if harmony is left-to-right, as traditionally argued (e.g. Underhill 1986)) in phonological vowel harmony. But an intrusive vowel can never be a target for phonological harmony, only for coarticulatory apparent harmony. Consequently, intrusive vowels might appear to participate in harmony in a gradient and variable fashion.

3 Method

To determine whether onset-repairing vowels in Turkish behave more like intrusive vowels, or more like epenthetic vowels, I conducted a fully factorial, 2 by 3 by 3 by 2 production experiment with six participants. The primary factor manipulated is the underlying structure of the target word: beginning with an onset cluster /Cr/, or beginning with a /Cvr/ sequence. To ensure that the findings extend across all consonant and vowel places, and investigate claims of vowel harmony in the inserted vowel, three stop consonants (/b/, /d/, /g/) and three vowels (/i/, /a/, /o/) were included. The final factor manipulated was the familiarity of the target word – either a real, familiar word, or a completely unfamiliar nonce word. This was to check that insertion is a fully productive process.

3.1 Materials

A list of real and nonce /Cr/ and /Cvr/ words was constructed (Table 2). Since multiple vowels

are attested as candidates for insertion before /i/ (both [i] and [ɪ]) and /o/ (both [u] and [ɪ]), there are two possible output [CVr] pronunciations for most input /Cr/ words, resulting in minimal triplets. I refer to minimal triplets and minimal pairs collectively as minimal sets. Within each minimal set, we controlled for: stress placement, the number of syllables, and the major place of articulation of C_2. Stimuli are presented in Table 2, where: '-' indicates a morpheme boundary, '.' marks a syllable boundary, and '*' indicates a word is being used as a /Cvr/ match for both the real and nonce /Cr/ words of that C-V condition. Numbers next to real /Cr/ words are familiarity ratings on a five point scale, where 5 is most familiar, obtained from three native speakers of Turkish.

Table 2: Stimuli

C_1	V_2	Experimental		Control	
		Real /Cr/ *word (familiarity) 'gloss'*	Nonce /Cr/	V1 = <ɪ>	V1 ≠ <ɪ>
b	/i/	**bri.fin**g (4) 'briefing'	bri.mi.ti	bɪ.ri.pis	**bi.ri.m-in** 'unit.your' bi.ri.bis
	/a/	**bran.ş-ı** (4.33) 'subject.ACC'	brat.çi.ten	bɪ.ran.cɪ*	
	/o/	**bro.şü**r (4.67) 'brochure'	bro.jör.le	bɪ.ro.jün*	bu.ro.çüp*
d	/i/	**drip.l**ing (1) 'dribbling'	drip.li.ke	dɪ.rib.le*	**di.rim.-l**er 'life.PL' di.rib.rit
	/a/	**dra.m**a (4) 'drama' *or* **dra.m**-a (3.7) 'drama.DAT'	dra.fa	dɪ.rap*	--
	/o/	bo**r.drom** (4) 'payroll.my'	lor.dro.pur	ga**r.dɪ.rop** 'wardrobe'	şor.du.rom nor.du.rof*
g	/i/	**grip** (5) 'influenza'	gri.vi	gɪ.rif*	**gi.rim** 'penetration' gi.riv
	/a/	**gram** (5) 'gram'	gra.bɪ	gɪ.rap*	--
	/o/	**gro.s-**u (2.67) 'gross.ACC'	gro.dol	gɪ.ron*	gu.rot*

Seventeen fillers were also included, primarily loanwords from English or French. Target words were presented in the carrier sentence in (3), which includes slots for two target words (X and Y). The sentence was designed to elicit contrastive focus on the target words.

(3) Bana X deme, bana Y de.
me.DAT X say.NEG, me.DAT Y say.
'Don't say X to me, say Y to me.'

To control for any effect of position within the sentence, half the repetitions employed an X-Y order, and the other half employed a Y-X order.

3.2 Participants

Seven native speakers of Turkish (4 female: S1[2],4,5,7) were recruited from the UC Santa Cruz community. Speaker 3 is bilingual in French and Turkish. The remaining speakers all studied English in school during adolescence, but lived in Turkey, using Turkish as their primary language at home and work, until age 18 or later, with the exception of one year spent in New Jersey for S6 (age 4-5). Participants were paid $20 for their time.

3.3 Data collection procedure

A consent form was provided in English. A language background questionnaire and experimental instructions were provided in Turkish. Participants were told that the purpose of the experiment was to study the way Turkish speakers' mouths and tongues move as they pronounce words.

Participants wore an Articulate Instruments Ultrasound Stabilization Headset (Wrench 2008) to stabilize the ultrasound probe. Recordings were made in a sound-attentuated booth using a shotgun microphone with a USB pre-amplifier connected to the ultrasound machine (Terason T3000 ultrasound system with a model 8MC3 probe). Subjects were asked to practice reading the instructions to get comfortable speaking with all the equipment, and were instructed to start the sentence over if they felt they had made a mistake. The experimenter also intervened when disfluencies or errors were noticed. Participants were requested to speak carefully and enunciate clearly, as if they were announcers on TRT (Turkish Radio and Television), whose broadcasters' careful articulation is famous in Turkey.

Stimuli were presented to participants on a laptop screen, with the target words already embedded in the carrier sentences. One sentence was visible at a time. Participants read through a list of 27 sentences (each containing up to two target words) five times. Within the list, all

[2]S1's data are not discussed further because she participated in a pilot version of the experiment in which words began with /p t k/ and there were no fillers.

sentences were randomized together. After each reading of the sentence-list, participants were offered the chance to take a break. At the end of the experiment, participants filled out a debriefing form with questions provided in Turkish as well as English. Responses indicated that participants understood the overall nature of the experiment (a linguistic investigation of the movements of the tongue) but not its specific purpose.

3.4 Data processing procedure

Acoustic annotation of the v_1 interval was conducted in Praat (Boersma & Weenink 2015) using TextGrids. The left edge of the v_1 interval was marked from the beginning of the C_1 release burst, identified by a dramatic increase in amplitude. The right edge of the v_1 interval was identified by the decrease in amplitude accompanying the onset of /r/.

One repetition of "drama" from S4 was not captured due to a recording error. Also, S2's ultrasound data was discarded due to poor image quality (a result of individual anatomical features). As mentioned above, the condition C=/d/ and V2=/o/ was also excluded from the analysis because the word-medial position of the cluster was a confound.

For the gestural analysis, I used a Python script to select the ultrasound frames best corresponding to beginning (onset), middle (midpoint) and end (offset) of the v_1 interval. This interval is quite short (generally 30-60 ms), so sometimes only one or two frames were captured. Tongue tracings were made in Edgetrak (Li et al. 2005), and SSANOVAs (see Davidson 2006) were fitted for each Cv_1rV_2 combination, within subject. Since no significant acoustic differences were found between real and nonce words, the nonce/real distinction was collapsed.

4 Results

This section describes the distribution of durations; the rate of insertion and quality of the inserted vowels; and the gestural comparison of inserted and underlying vowels.

4.1 Distribution of durations

To determine whether insertion in Turkish onset clusters is a categorical or a gradient process, we looked at the duration of the interval between the release of the consonant and the beginning of the /r/ closure (the C_r interval). Density plots were made using R (R Core Team 2013) and the *density.compar*e function in the *sm* package (Bowman & Azzalini 2014). All correctly recorded

tokens were plotted, including acoustically ambiguous tokens. In the following plots, the distribution of the duration of underlying vowels is also included for comparison.

The density plots show that underlying clusters, like underlying vowels, have monomodal distributions. This indicates that insertion is a gradient process, not a categorical one. However, the plot showing cluster data from all subjects (Figure 4) has a slight "hump" around 10ms, suggesting incipient bimodality. This goes away when S3, a bilingual, is excluded (Figure 3).

Figure 3: Duration distributions (all subjects)

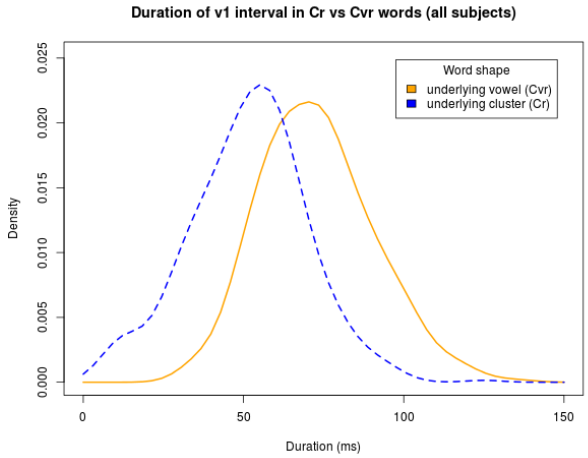
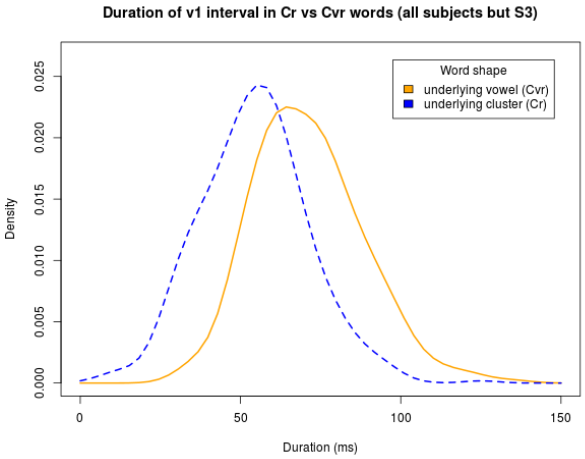


Figure 4: Duration distribution (excluding S3)



Both Figure 4 and Figure 3 show that the C_r interval is shorter in underlying clusters than in underlying Cvr- words – the Cr distribution's peak occurs about 20ms to the left of the Cvr distribution's peak. That is, on average, the C_r is shorter in the underlying clusters than in the underlyingly Cvr words. This is predicted if there is no phonological epenthesis, and consequently no gestural target or timing slot between C and r in the underlying clusters.

4.2 Rate of insertion and quality of inserted vowels

To determine when insertion had occurred and what the quality of the inserted vowel was, we solicited perceptual judgements of /Cr/ word from nine phonetically-trained graduate students in the linguistics program at UC Santa Cruz. Judgements were collected in a SuperLab 4.5 experiment conducted in a sound-attenuated booth[3]. Coders were asked to decide whether each production of a consonant cluster contained an inserted schwa[4], /i/, /u/, other vowel, or no vowel

[3]For three tokens, participants provided judgments in a separate session outside of the laboratory setting, because the files included in the experiment contained errors.

[4]Schwa was included as a response option in place of [ɪ] for two reasons: first, because the coders were English

(faithful production with no insertion). These response options were selected on the basis of previous studies of onset repair.

Participants reported that coding the inserted vowels was surprisingly difficult. This was probably due to the short duration of the vowels (50-70 ms), and the fact that participants were not Turkish speakers. The difficulty of the task was reflected in the low degree of agreement among annotators, with all 9 participants agreeing for only 17 tokens (3.5% of the data). Interannotator reliability was fair (Fleiss' kappa = 0.228, Krippendorf's alpha = 0.228). However, this is still much better agreement than chance, considering that 5 responses were available.

Since interannotator agreeement was so low, the remainder of the analysis excludes tokens that were coded with less than 90% confidence. Confidence was calculated according to the formula in (4), derived from Bayes' theorem.

(4) Confidence = P(sV = V | R)
where R = set of responses, V = actual vowel, sV = vowel selected by all participants together ('mode'), and throughout the probability calculations, sV is used as an approximation for V.

When confidence was above 90% (74% of the dataset), the token was coded as containing the mode of the nine coders' responses, with the exception that tokens perceived to contain inserted [u] before unrounded vowels were re-coded as containing [ɪ]. This was because rounding of v_1 before an unrounded V_2 was entirely unprecedented in previous literature, and English speakers are known to be very unreliable at distinguishing rounded and unrounded back vowels (Lisker 1989). Tokens for which confidence was below 90% or for which the majority response was "other" were excluded from analysis, with the exception of tokens for which coders were divided between [u] and [ɪ] responses.

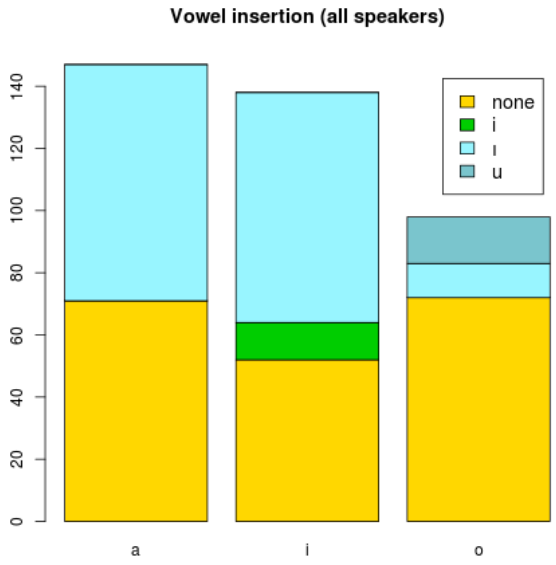
Among /Cr/ tokens coded with >90% confidence, inserted vowels were perceived about half the time (157 / 352 Cr tokens = 44.6%), and most of the inserted vowels were perceived as schwa or <ɪ>[5] (108/157 = 68.8%). Consistent with previous studies and the corpus results, schwa

speakers who have schwa but not /ɪ/ as a phoneme, and second, because Hall (2006) characterizes of the quality of intrusive vowels cross-linguistically as "either schwa, a copy of a nearby vowel or influenced by the place of the surrounding consonants."

[5]Inserted vowels are transcribed between angle brackets, and underlying vowels between square brackets: <i> refers to an inserted vowel perceived as /i/, and [i] refers to the surface form of an underlying /i/.

was found inserted before any main vowel, but inserted <i> only occurred before main vowel /i/.

Figure 5: Insertion rate/quality for all speakers



Palatal harmony (insertion of <i> before /i/, shown in green) and rounding harmony (insertion of <u> before /o/, shown in darker blue) very rarely obtain. These results conflict strikingly with previous reports of regressive harmony in onset repair.

4.3 Gestural results

We now turn to the gestural analysis. In the following discussion, I refer to a Cv_1rV_2 combination as a WORDTYPE. In this experiment, there were 15 potential wordtypes, of which nine were produced with insertion enough times to create an SSANOVA for at least one speaker. Only results for the midpoint are reported; generally, onsets and offsets look quite similar.

4.3.1 /b/ conditions

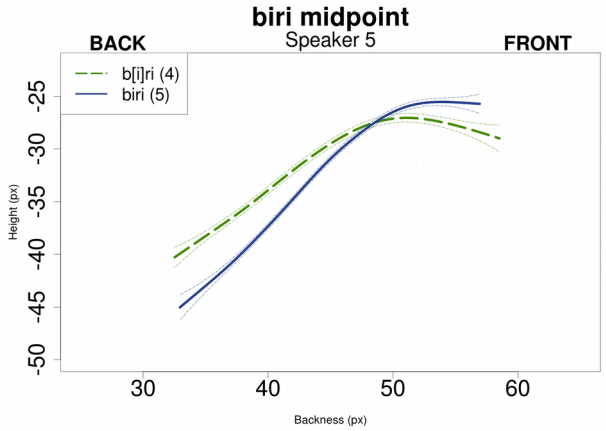
As a labial consonant, /b/ does not have an impact on tongue gestures, so the gestural effect of the following vowel should be particularly clear in the /b/ conditions. Table 3 recapitulates the /b/ conditions in which enough insertion occurred for an analysis for at least one speaker. Cells representing unexpected and unattested wordtypes are greyed out.

Table 3: /b/ conditions with analyses

inserted v	***b_ri***	***b_ra***	***b_ro***
<i>	S5		
<ɪ>	S7	–	–
<u>			S4

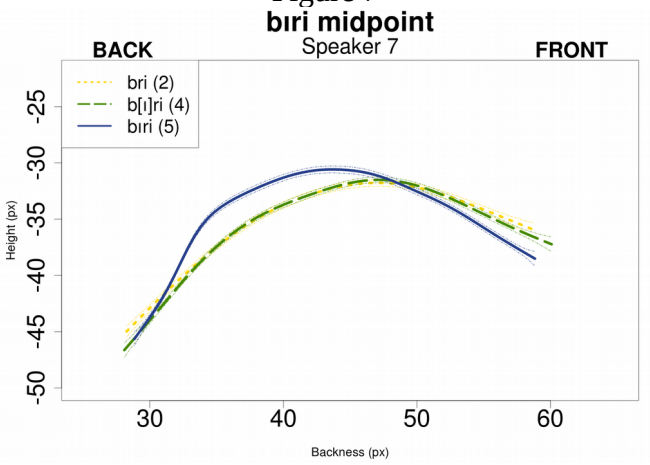
[biri]. For this wordtype, gestural results come from S5 (Figure 6). In the inserted vowel, the tongue is lower and backer compared to its position in the underlying /i/. The underlying /i/ has already attained its [+high, +front] target, but during production of the intrusive <i>, the tongue is still approaching the target associated with the following /i/. Fronting and raising only begin at the release of the consonant (Alfonso & Baer 1982), so the tongue is unlikely to attain the gestural target for the following /i/ during <i> in the C_r interval.

Figure 6



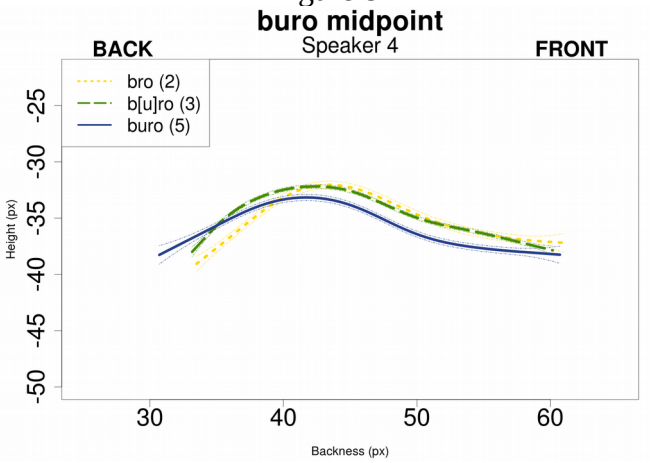
[bɪri]. Gestural results in this condition come from S7 (Figure 7), and show the tongue being lower and fronter in the /bri/ words (with and without insertion) than in /bɪri/. The intrusive hypothesis predicts this: the tongue is preparing to produce the following vowel /i/ during the b_r interval, but is unlikely to attain the /i/ target before /r/, because fronting and raising only begin at the release of the consonant /b/, the onset of the v_1 interval (Alfonso & Baer 1982). In contrast, in /bɪri/ words with an underlying vowel, the tongue needs to achieve a [+high, +back] target for the underlying /ɪ/ during the C_r interval. Therefore, tongue position should be fronter and lower in intrusive [ɪ] than in underlying [ɪ]. These predictions are borne out.

Figure 7



[buro]. Figure 8 shows the SSANOVAs for S4, the only subject who produced enough [b<u>ro] tokens for an analysis. The tongue is higher and fronter in underlying /br/ words produced with and without a cluster than in words with an underlying /u/. Thus, the inserted vowel is articulated in the same way as the cluster, but quite differently from the underlying vowel. This is evidence that the inserted vowel is intrusive.

Figure 8



When /bro/ is produced as [b<u>ro], intrusive <u>'s tongue position might be expected to reflect anticipatory coarticulation for the following mid vowel /o/. This lowering should begin at the offset of the preceding consonant (Alfonso & Baer 1982) – i.e. the beginnging of the b_r interval. The underlying [u] in /buro/, on the other hand, has a [+high] target to hit during the b_r

interval. This predicts an intrusive <u> will be lower than the underlying [u] – the opposite of S4's data.

Instead, it appears that S4 may be coordinating lowering the offset of /r/, rather than the offset of /b/. This would mean that no lowering would be apparent during the b_r interval. Instead, the tongue could still appear high, following the jaw closure necessary to produce /b/. The underlying /u/, on the other hand, would require a lower tongue position, because even a high vowel requires relatively unobstructed airflow.

Summing up, in all the /b/ conditions, there are significant gestural differences between inserted and underlying vowels. Meanwhile, inserted vowels and insertionless clusters do not differ significantly. This is evidence that onset-cluster repair is a matter of timing and intrusion, not the phonological addition of a gestural target.

4.3.2 /d/ conditions

In /d/ conditions, the preceding /d/ is expected to have a weak fronting effect on both underlying vowel and intrusive vowels, due to tongue coupling. Consequently, gestural differences between intrusive and underlying vowels will be less clear in /d/ conditions than in the /b/ conditions, where the labial consonant does not directly affect tongue position and so coarticulation with the following vowel is expected to begin earlier. Wordtypes with data are presented in Table 4.

Table 4: /d/ conditions with analyses

inserted v	***d_ri***	***d_ra***
<i>	–	
<ɪ>	S4, S7	S4, S5, S7
<u>		

[dɪri]. When /dri/ is pronounced with an intrusive <ɪ>, the tongue's position will be determined by the transition between [+front] /d/ and [+front] /i/. Fronting in preparation for /i/ will begin at the /d/'s release (or potentially at the /r/'s release), so the tongue is unlikely to achieve /i/'s [+front] target during the C_r interval. For underlying /ɪ/, the tongue needs to hit a [+back] target during the C_r interval. This predicts a fronter tongue body in the inserted vowels than in the underlying vowels.

There is gestural data from S4 and S7 for this condition. In accordance with the prediction

that fronting in <ɪ> begins when /d/ is released, in S4's data (Figure 9), the tongue is significantly fronter in the inserted vowels. In S7's data (Figure 10), the three tongue contours for [dr], [d<ɪ>r] and /dɪr/ all overlap – suprisingly, given that [dr] and /dɪr/ are so different perceptually. The dip in S7's tongue in the inserted vowels probably represents the onset of the articulation of /r/. These results are consistent with the intrusive hypothesis, since the inserted vowels appear more coarticulated with /i/ (for S4) and with /r/ (S7) than the underlying vowels do.

Figure 9

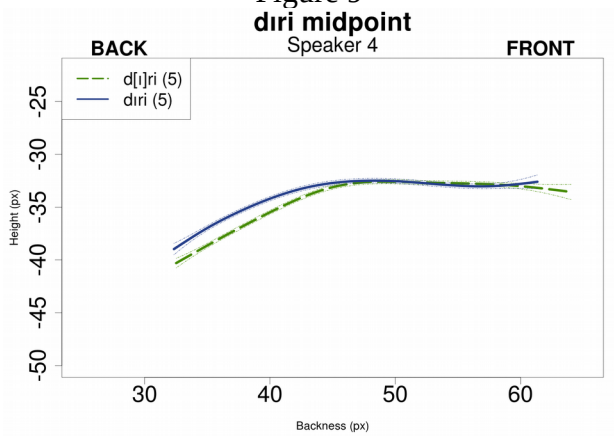
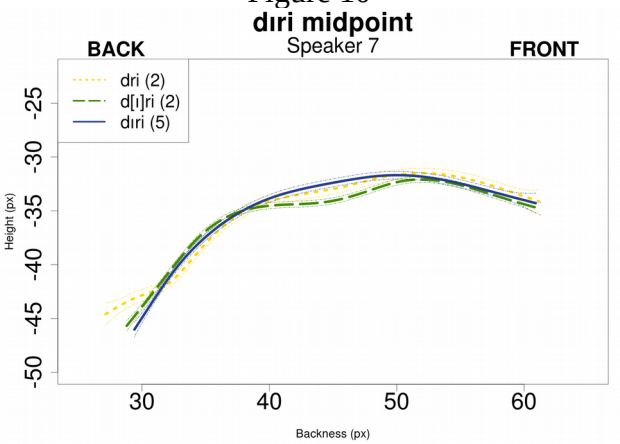


Figure 10



[dɪra]. When /dra/ is produced as [d<ɪ>ra], if the <ɪ> is intrusive, then it reflects the transition between /d/ and the following low vowel /a/. Due to the influence of /a/, we expect the targetless <ɪ> to have a lower tongue body than the underlying /ɪ/ with its [+high] target. This prediction is borne out in the SSANOVAs for S4 (Figure 11) and S5 (Figure 12), where inserted vowels and insertionless clusters are lower than underlying vowels. But for S7 (Figure 13), there are no significant differences between clusters, inserted vowels, and underlying vowels. Perhaps this speaker reduces the underlying /ɪ/ in this context, or produces it at the very low end of its articulatory range.

To sum up, in the /d/ conditions, S4 and S5's gestural results display the anticipatory coarticulation we predicted, while S7's gestural results instead show that it is possible for clusters and underlying vowels to have the same gestural trajectory, despite their differing acoustics.

Figure 11

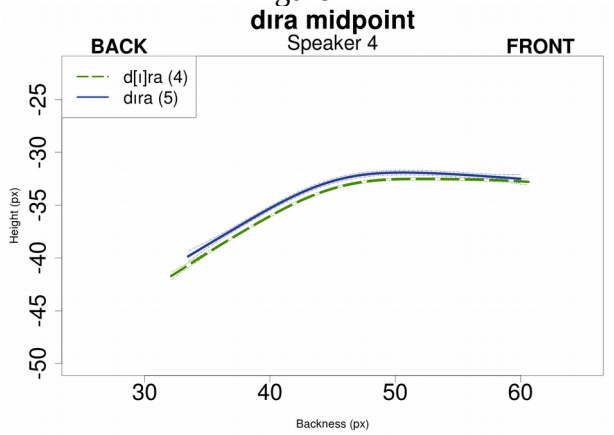


Figure 12

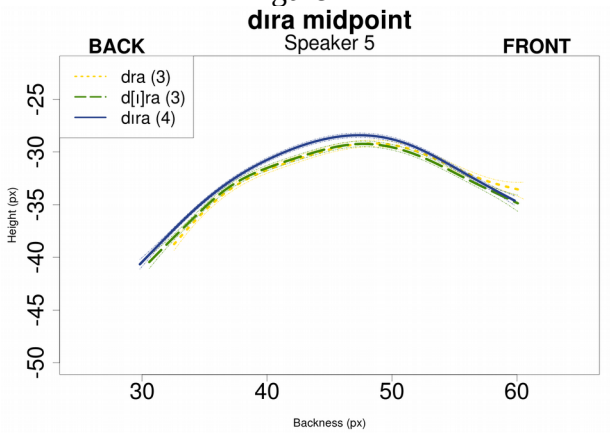
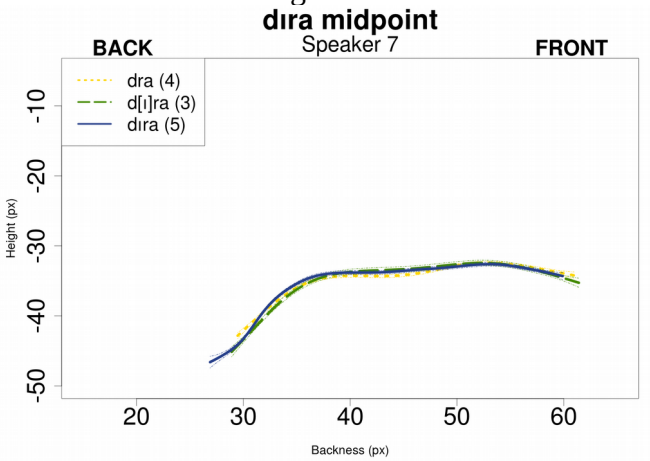


Figure 13



4.3.3 /g/ conditions

As a velar consonant, /g/ can be expected to contribute backing and/or raising to an adjacent vowel (Padgett 2011); this occurs, for example, in intrusive vowels in Maxakalí (Gudschinsky et al. 1970, Clements 1991, cited in Padgett 2011). However, as is common cross-linguistically, Turkish velar consonants tend to palatalize in the context of an adjacent front vowel — that is, the place of the vowel dominates the place of a velar consonant (Göksel & Kerslake 2005).

Table 5: /g/ conditions with analyses

inserted v	***g_ri***	***g_ra***	***g_ro***
<i>	–		
<ɪ>	S5, S7	S4, S5, S6, S7	S4, S6
<u>			S3, S4, S6

[gɪri]. When /gri/ is produced as [g<ɪ>ri], during the intrusive <ɪ>, the tongue is moving forward in preparation for /i/. This fronting could even begin during articulation of /g/, resulting in a palatalized /g/: fronting only begins at the release in /pVp/ sequences (Alfonso & Baer 1982), but could plausibly begin earlier with dorsal consonants than labial consonants. In underlying /ɪ/, the [+back] target of underlying /ɪ/ separates /g/ from /i/, so /g/ would not palatalize (Göksel & Kerslake 2005), and fronting even during the C_r interval will be limited. Therefore, the intrusive <ɪ> is predicted to be fronter and higher than underlying /ɪ/. The difference in backness between underlying and inserted [ɪ] in this context should be clearer here after /g/ than it is after /d/, since /d/ has a confounding fronting effect.

The prediction that the inserted vowel will be fronter is borne out clearly for S6 (Figure 15). But for S4 (Figure 14), S5 (Figure 16) and S7 (Figure 17), there does not seem to be any difference in articulation between inserted and underlying vowels. This may reflect a lack of gestural differences between even the insertionless clusters and underlying vowels, as seen in some of the /d/ conditions above.

Figure 14

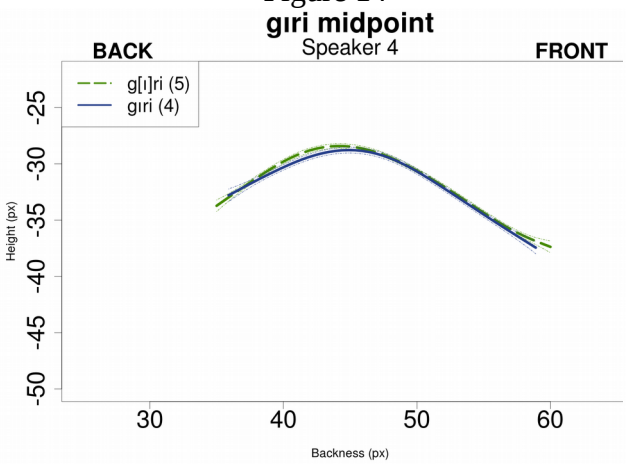


Figure 15

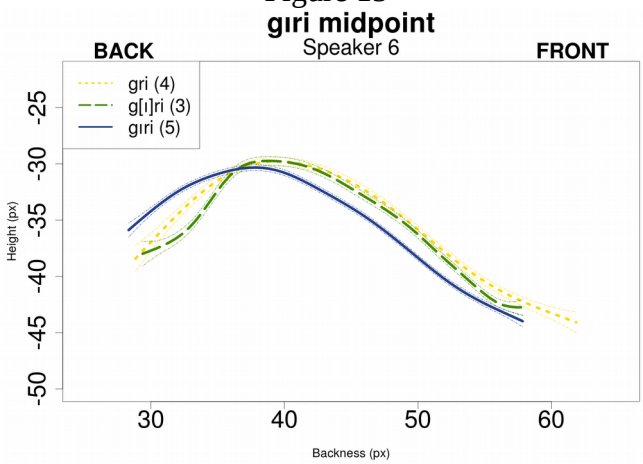


Figure 16

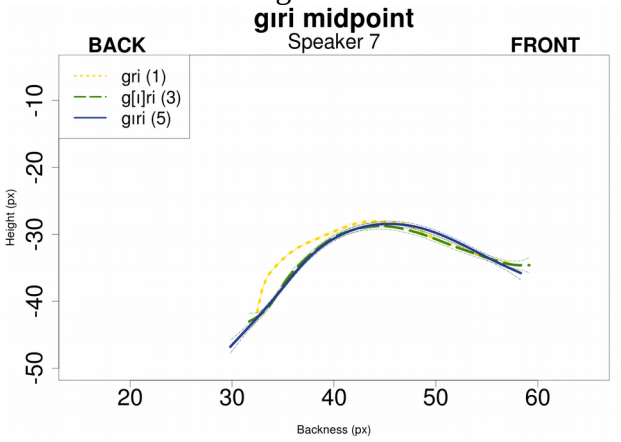
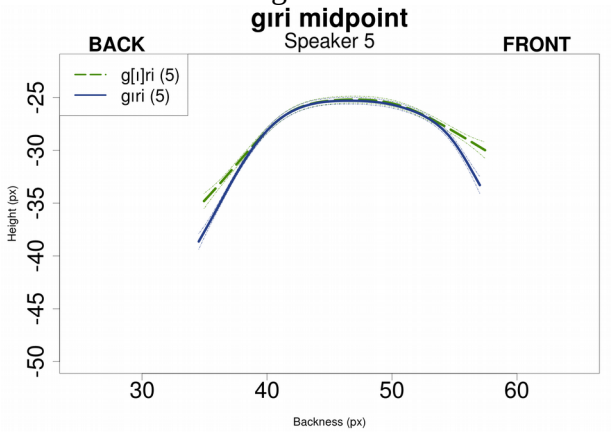


Figure 17



[gıra]. When /gra/ is produced as [g<ɪ>ra], the tongue begins lowering in anticipation of the following low vowel /a/ at the onset of the syllable (/g/). At the same time, /g/ tends to have a raising effect on adjacent vowels, which may counteract the lowering of /a/. Meanwhile, in /gıra/ words with an underlying /ɪ/, both the raising from /g/ and the [+high] target of /ɪ/ will block this lowering.

Figure 18

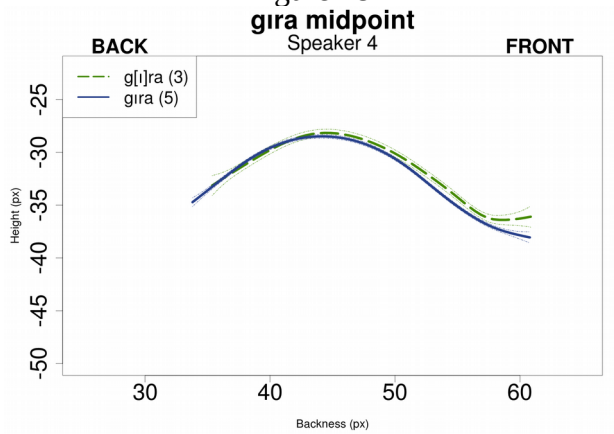
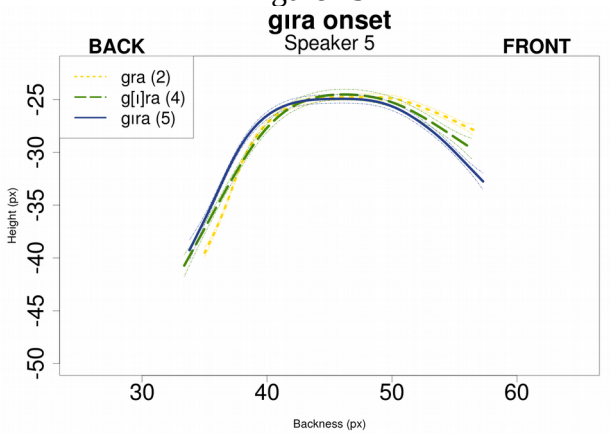


Figure 19



Gestural data in this condition comes from S4 (Figure 18), S5[6] (Figure 19), S6 (Figure 20) and S7 (Figure 21). The primary gestural difference is that the underlying vowel appears backer and perhaps higher, particularly in the dorsum. This suggests that /a/ has a centralizing as well as

[6]The onset is included instead of the midpoint for this speaker/condition because of technical problems related to the smoothing factor in the SSANOVA for the midpoint.

a lowering effect. This counteracts /g/'s raising and backing effect in the intrusive vowels, while in the underlying vowels, the [+high, +back] targets of /g/ and /ɪ/ resist /a/'s influence. The difference is especially clear for S6 (Figure 20).

Figure 20

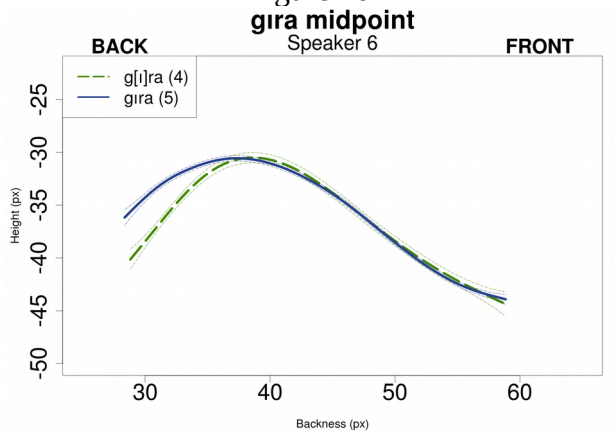
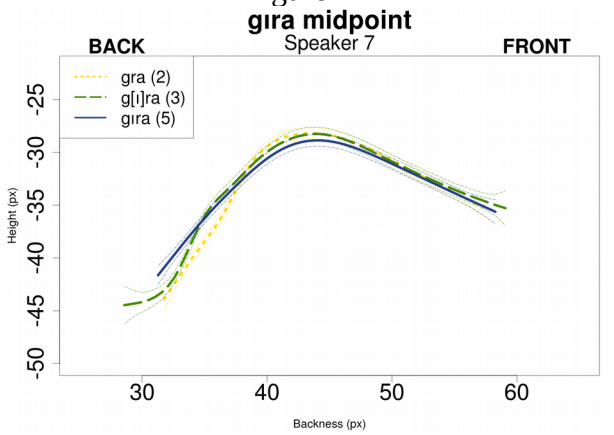


Figure 21



[gɪro]. When /gro/ is produced as [gɪro], the intrusive <ɪ> is likewise expected to have a lower tongue position than the underlying /ɪ/ from /gɪro/, due to the lowering effect of the following /o/. Underlying /ɪ/ has a [+high] target which will make it more resistant to lowering.

Figure 22

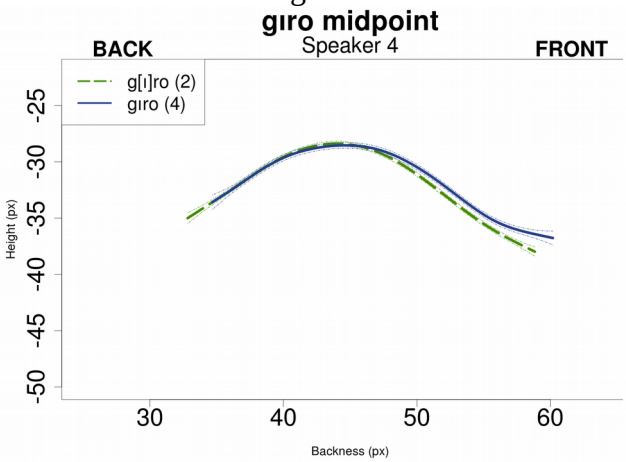
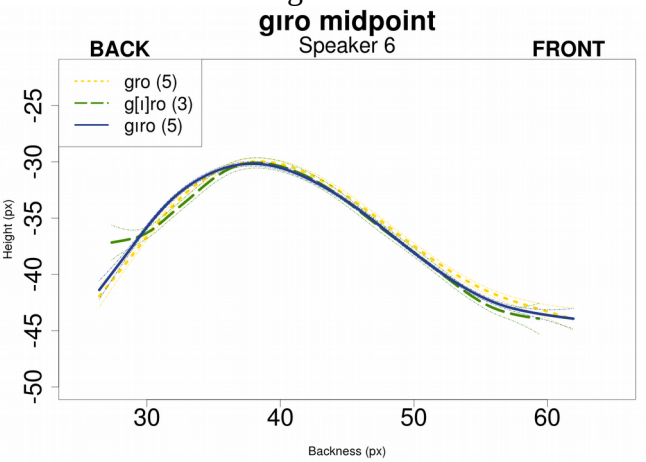


Figure 23



In the gestural data for S4, the inserted vowel is indeed lower than the underlying vowel. In the gestural data for S6, on the other hand, the inserted vowel is no lower than the underlying vowel – but the no-insertion cluster is equally high, too.

[guro]. For this condition, we have gestural data for S3 (Figure 23), S4 (Figure 25) and S6

(Figure 26). Results are similar to those in the [gɪro] condition, with height differences being subtle but significant, and accompanied by differences in backness. For all subjects, at least part of the tongue is lower in the inserted <u>, as predicted by coarticulation with /o/. For S4, the underlying vowel is also backer than the inserted vowel, similar to the [gɪra] condition. Possibly the lowering induced by /o/ has a centralizing effect on the tongue. This is consistent with the intrusive hypothesis, since an intrusive <u> is expected to be lower than the underlying /u/ in /guro/, because the intrusive vowel will reflect the transition to low vowel /o/. Meanwhile, underlying /u/ adds a [+high, +back] target between /g/ and /o/, blocking /o/'s lowering effect.

Figure 24

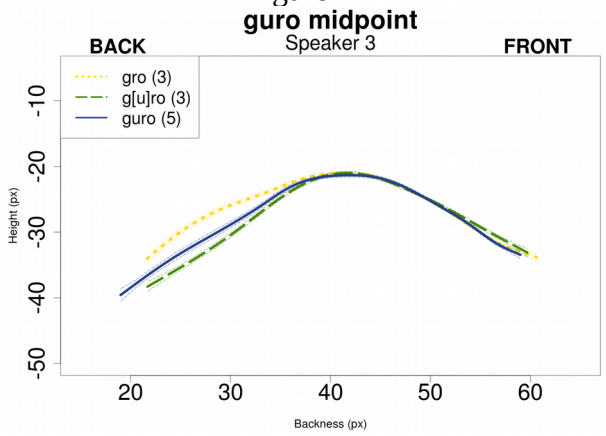


Figure 25

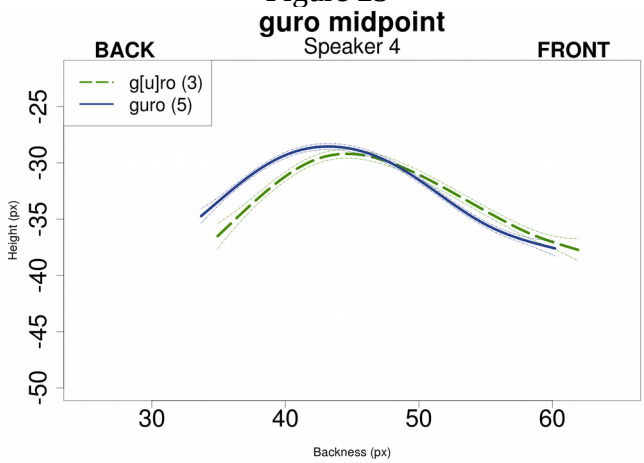
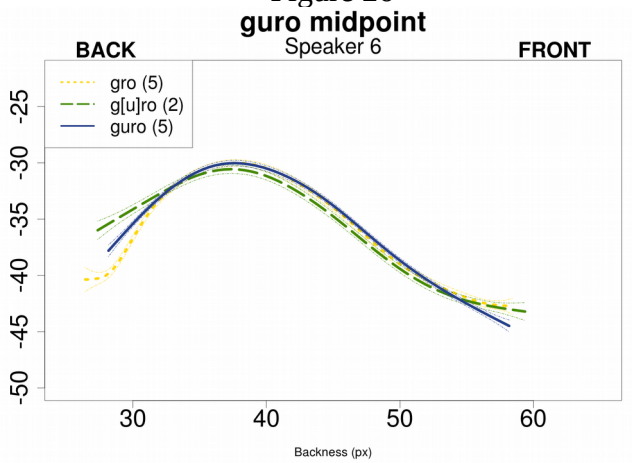


Figure 26



To sum up, results in the /g/ conditions were somewhat harder to interpret than in the /b/ and /d/ conditions. Nonetheless, in every /g/ condition, most subjects show small but significant

gestural differences between inserted and underlying vowels – differences that can be interpreted to support the intrusive hypothesis.

4.4 Summary and discussion

The following table summarizes the gestural differences found in this study.

Table 6: Summary of gestural differences

Condition	Gestural findings
biri	Inserted vowel is lower/backer than underlying vowel (S5)
bɪri	Inserted vowel is fronter (S7)
buro	Inserted vowel is higher (S4).
dɪri	Inserted vowel is fronter/lower (S4, S7)
dɪra	Inserted vowel is lower for S4 and S5, but not different for S7.
gɪri	Inserted vowel is fronter for S6 and maybe S4, but not for S5 or S7.
gɪra	Inserted vowels seem more central and perhaps lower (S4, S5, S6, S7)
gɪro	Inserted vowel is lower for S4, but not S6.
guro	Inserted vowel for S3, S4 and S6 is lower and more central.

This study found significant gestural differences between inserted vowels and underlying vowels. In some conditions, these differences were in the direction predicted by a priori phonetic expectations, and for some subjects, the differences were extremely clear. In other conditions, it was less clear how to interpret the differences, or the differences were more subtle, or there were no significant gestural differences between insertionless clusters, inserted vowels, and underlying vowels. But in every condition, the articulation of the inserted vowel by at least one subject (and usually by most subjects) was influenced by the following vowel in a way that the underlying vowel was not. This supports the intrusive hypothesis that the inserted vowels are targetless and therefore helpless to resist the coarticulatory effects of the preceding consonant and following vowel. The gestural differences also suggest that the initial consonant in the consonant cluster is tautosyllabic with the following lexically present vowel, since movement in preparation for that vowel usually begins at the start of the C_r interval. In short, the gestural differences, while not entirely clear-cut, support the intrusive hypothesis.

5 Discussion and conclusion

This study was concerned with two phonetic/phonological processes: vowel insertion and harmony (on the inserted vowel). Both processes are found to be variable/gradient. Perceived insertion occurs some of the time (~45%). Apparent harmony occurs some of the time (a much lower percent). Consequently, if insertion and harmony in onset-cluster repair are phonological, they must be optional. Also, inserted vowels differ from underlying vowels in their duration (they are shorter). Thus, if insertion and harmony are phonological processes, they must be gradient, in addition to being optional. That is, insertion must insert a vowel that is "less" of a vowel than the underlyingly present vowels – or must "partially insert" the vowel. If we allow phonological processes that are both optional and gradient, we can still conceive of Turkish onset-cluster repair as epenthesis. But with so much variability, it is simpler to think of onset-cluster repair as a phonetic process of intrusion, which would inherently be gradient.

If the onset-repairing vowel is intrusive, as argued here, then its behavior should not be used as the basis for arguments about vowel harmony and syllable-structure in Turkish phonology. In regards to harmony, an intrusive vowel's harmonic behavior does not bear on questions about harmony as a phonological process. An intrusive vowel has no phonological presence and therefore cannot be a target for phonological harmony. This suggests that the reasoning behind studies where the behavior of the onset-repairing vowel is used as a basis for claims about phonological harmony (e.g. Kaun 1999) – must be re-evaluated. In addition, the non-harmonizing behavior of the inserted vowel cannot be used as an argument to bolster the traditional understanding of vowel-harmony in Turkish as being a strictly left-to-right process, since an intrusive vowel could never be a target for phonological harmony anyway; neither can its occasional harmonic appearance – actually due to coarticulation – be attributed to the emergence of a normally invisible right-to-left harmony pattern. This study does speak to questions about the phonetic and gestural origins for phonological harmony, providing some examples of anticipatory coarticulation creating the percept of harmony (the occasional instance of <i> insertion before /i/, or the more frequent instances of <u> insertion before /o/).

Additionally, with regard to syllable structure, since the onset-repairing vowel is not phonologically present, we can conclude that there is no categorical prohibition of complex

onsets in the foreign stratum of Turkish phonology. Rather, gestural timing relations create the percept of a vowel in a sequence that, phonologically speaking, remains a complex onset. Of course, there is always the possibility for hearers to reinterpret the acoustically ambiguous inserted vowel as representing a phonologically present vowel; this is probably the source of orthographic alternations like *stil ~ sitil* 'style'.

This project also bears on the extensibility of Davidson & Stone (2003)'s methodology to other phonological problems. This study applies D&S's experimental design but combines it with a more modern statistical technique, SSANOVAs, for a more nuanced analysis. Overall, I find that this comparative ultrasound methodology was successful in probing the phonological status of Turkish onset-cluster repair, but that the gestural results were best interpreted in conjunction with an analysis of the duration of the inserted vowels, since the differences between inserted and underlying vowels were often subtle, and varied significantly from subject to subject. Indeed, the gestural findings from this study suggest that there can be a great deal of interspeaker variability in the articulation of sequences that are not contrastive in a language. Further research with more speakers could illuminate this issue.

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Computational modeling of tone in language documentation: citation tones vs. running speech in Chindwin Khamti

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1 Introduction

Recent documentation of a four-tone system in Khamti (Dockum 2015), spoken along the Chindwin River in northwestern Myanmar, distinguishes it from all varieties of Khamti previously described, dating back to the 19th century (Robinson 1849, Needham 1894, Harris 1976, Morey 2005, etc). In addition to being tonally divergent from its closest known relatives, Khamti is also one of the more geographically distant members of the Southwestern Tai (SWTai) branch of the Kra-Dai language family, as compared to the majority of speakers of SWTai languages. This distance, both tonal and geographic, motivates closer investigation into the tones of the modern language.

This paper more closely examines tone in Chindwin Khamti along two tracks: first, it reports on a study to gather much more data on synchronic tones across social variables of age, gender, and village location; and, second, it uses a portion of this data to test methods for computational modeling of tone demonstrated by Shosted et al (2015) on Iu Mien. They advocate for the integration of computational methods early in and throughout the process of field documentation, to assist in achieving adequate description of understudied tonal languages while reducing impressionistic judgments in such descriptions. Computational models can serve as a potential check against human error in assigning tone categories, and can reveal interspeaker variation in tone systems that might go unnoticed using traditional methods. Both of these benefits then contribute toward the goal of greater replicability and falsifiability of linguistic research.

In the remainder of this paper, section 2 provides background on Khamti and the tones of the Chindwin River variety, section 3 describes audio data collection for a running speech corpus and a wordlist corpus, section 4 details the method for computational modeling of Khamti tones, section 5 presents the clustering results and discussion, and finally section 6 concludes the paper.

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2 Background

Khamti [ISO 639-3: kht], also known as Tai Khamti and Khamti Shan, is a language of the Kra-Dai (formerly Tai-Kadai) family, from the Southwestern Tai branch. Khamti-speaking communities are found in Northeast India and northern Myanmar (Lewis et al 2016). Khamti is among the earliest Tai languages to be described in detail, including Robinson (1849), Needham (1894), and Grierson (1904).[1] In the intervening century, however, it has received relatively little attention, and was assumed to be homogeneous. Previous fieldwork (Dockum 2015) uncovered important differences in the lexical tones of Khamti spoken in Khamti District, Myanmar, in particular only four tonemes, whereas all previous literature on Khamti has described five. Further analysis revealed a very different history of historical tone splits and mergers than other Khamti varieties, but from the same common ancestor, termed Proto-Khamti.

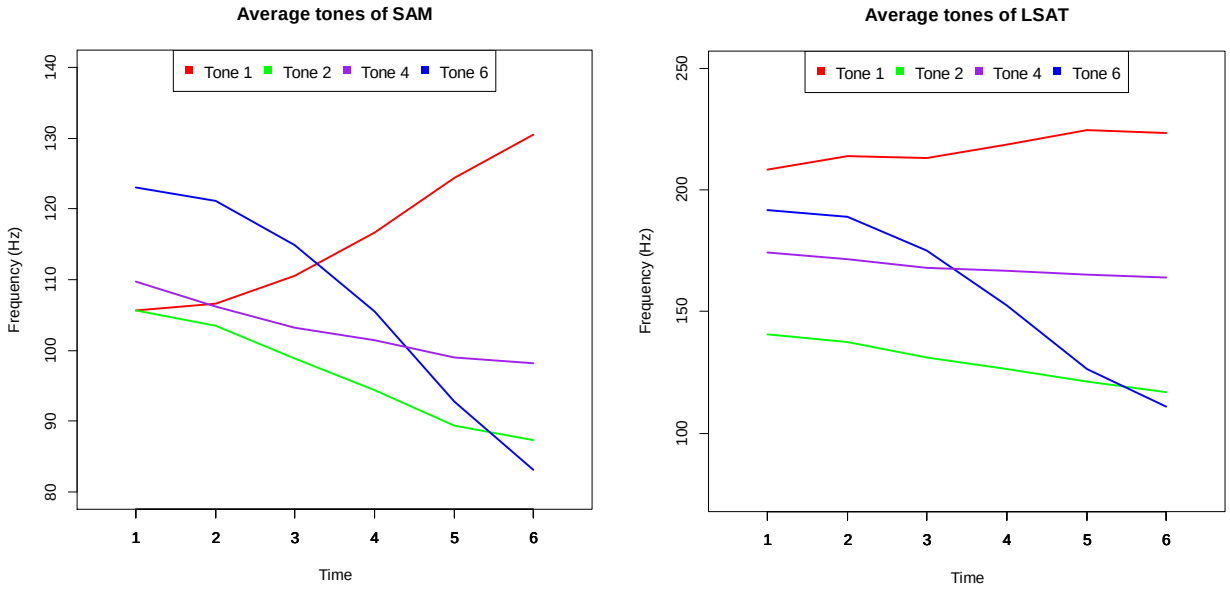
To help disambiguate the modern varieties, I use the name Chindwin Khamti to refer to the variety spoken along the upper Chindwin River in Khamti District, Sagaing Division, Myanmar. This distinguishes it from Khamti of Northeast India (see e.g. Needham 1894) and Khamti of Kachin State, Myanmar (see e.g. Inglis 2014), among other possible varieties.

2.1 Chindwin Khamti tones

Using traditional field methods of audition and instrumental comparison, Dockum (2015) reports that Chindwin Khamti has four lexical tones. These are referred to throughout this paper as tones 1, 2, 4, and 6, based on the subset of tone marks in Shan script that are used to write Chindwin Khamti locally. (Numbers 3 and 5 represent unused glyphs.) Examples of the mean tonal space of two speakers from that study are given in Figure 1. Both speakers are male natives of Khamti Township, and are aged 38 and 75, respectively.

[1] Preceded only by Low (1828), a sketch grammar of Thai.

Figure 1: Average toneme pitch tracks of SAM, age 38, and LSAT, age 75 (Dockum 2015)



Their approximate representation in the widely-used five level pitch notation system proposed by Chao (1930) is given in Table 1.

Table 1: Chindwin Khamti tones of two speakers in Chao (1930) tone numbers

Speaker	T1	T2	T4	T6
SAM	25	21	41	32
LSAT	45	21	41	33

The surface differences between these two speakers led me to gathering Khamti tone data on a larger scale, described in the next section.

3 Data collection

Two types of data were gathered, described further in §3.3 and §3.4: responses to question/answer stimuli and core vocabulary wordlist data.

3.1 Locations

Data were gathered from five locations in Khamti Township, Khamti District, Sagaing Division, Myanmar. All of the sites are located along the upper Chindwin River. The five locations include the main town of Khamti Township, abbreviated, KT, as well as four rural Tai villages, which are referred to herein as MP, MN, SN, and LP. All are accessible within a few hours by boat from the main town, a necessity as only day trips were allowed. A list of the village abbreviations and dates each was visited is given in Table 2, a map of approximate locations in Figure 2, and an area map in Figure 3.

Table 2: Recording sites and dates visited

Village	Date recorded
MP	8 June 2015
MN	11 June 2015
SN	13 June 2015
LP	15 June 2015
KT	17 June 2015

Figure 2: Map of recording sites along the Chindwin River, Khamti Township

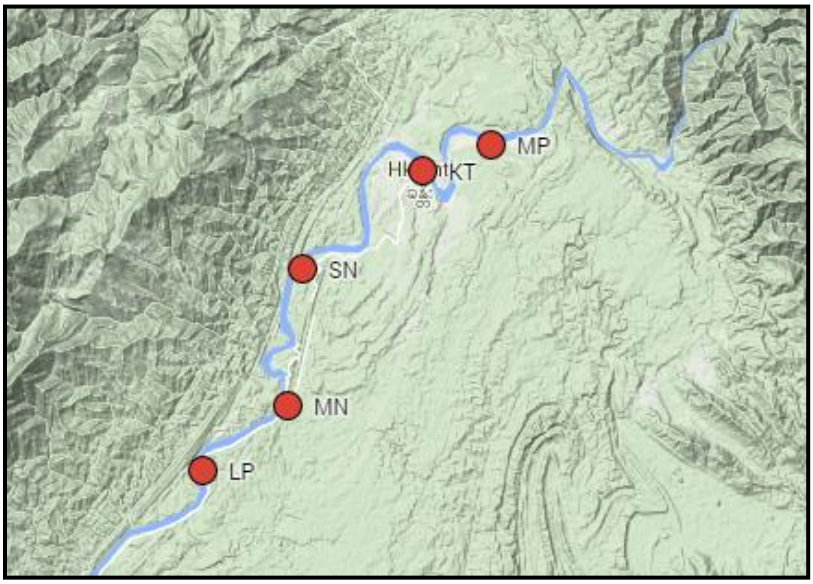


Figure 3: Area map with a black box to show the location of the area in Figure 2



3.2 Procedure

Upon arrival at each village recording site, my language informants recruited available speakers, with a goal of at least six speakers from four age groups: under 20, 20-40, 40-60, and over 60, with a mix of both genders. A full listing of the participants by age and gender is given in Table 3.

Table 3: Study participants by location, age and gender

Village	Male	Female
MP	28, 36, 47, 60	17, 18, 19, 19, 66, 76
MN	25, 35, 57	22, 42, 70
SN	20, 65, 74	18, 20, 40, 63
LP	24, 56, 78	24, 47, 63
KT	12, 18, 21, 62, 65	12, 53, 75

Explanation of the task ranged from approximately 10 to 20 minutes per speaker, and the recording of the questions answering itself took from 10 to 40 minutes, for a total participation time of between 20 minutes and 1 hour per speaker. All work was conducted at the monastery

building of each village, which is both the residence of local monks and the center of community activities.

Recordings were made in uncompressed WAV format using a Zoom H4N multitrack digital recorder, with the speaker wearing an Audio-Technica Pro 8HEx hypercardioid dynamic headset microphone connected via one XLR jack, and the second XLR jack recording with an Audio-Technica AT2005 cardioid dynamic tabletop microphone resting on a small tripod and pointing toward the speaker wearing the headset microphone. A backup recorder was also used, a Roland R-05, usually with the built-in stereo microphones for purposes of capturing the questions asked by the informant, should later review be needed. Though there was quite a bit variation in the specific questions asked, they were largely formulaic and thus entirely recoverable from the answers given by speakers, even in the event they did not get picked up by the tabletop microphone. On one occasion, the informant administering the stimuli also wore an Audio-Technica ATR-3350 omnidirectional condenser lavalier microphone on his shirt collar, in order to get a clearer recording of a set of questions.

3.3 Question/answer stimuli

Sixteen words were chosen, representing each of the four lexical tones with four words each. To guarantee speaker familiarity across all age groups, I selected concrete nouns, primarily nature and food items, with the assistance of my primary Khamti informants, two natives of Khamti Town, the small town that forms the administrative and economic center of Khamti Township. Originally a list of just 12 lexical items was used at the first village site, which I refer to as MP. Some of these differ from the final list, as they were changed after they turned out to be socially infelicitous to use.[2] The final list of target words is given in Table 4.

[2] Two words removed from the list after the first village trip were the words for 'father' and 'mother'. There was concern that asking elderly participants even in the abstract about their parents, who were likely deceased, could come across as inappropriate or insensitive.

Table 4: List of target words used in stimuli questions with order of presentation

#	Form[3]	Gloss	#	Form	Gloss	#	Form	Gloss	#	Form	Gloss
1	/maː^{1}/	dog	**2**	/kʰaw^{2}/	rice	**3**	/paː^{4}/	fish	**4**	/kai^{6}/	chicken
5	/mi^{1}/	bear	**6**	/maː^{2}/	horse	**7**	/kʰaːi^{4}/	buffalo	**8**	/kʰaː^{6}/	galangal
9	/pʰaː^{1}/	wall	**10**	/ɔi^{2}/	sugarcane	**11**	/naːw^{4}/	star	**12**	/taw^{6}/	turtle
13	/sʰɤ^{1}/	tiger	**14**	/saːŋ^{2}/	elephant	**15**	/nɤn^{4}/	moon	**16**	/tʰo^{6}/	bean/nut
Tone 1			**Tone 2**			**Tone 4**			**Tone 6**		

The stimuli were initially designed to showcase each of the tones in phrase initial, medial, and final positions, in order to capture variations in focus prosody, by using three carrier sentences for each word. The stimuli would need to be administered by one of the informants traveling with me. Based on their feedback, however, the stimuli were revised to avoid a task too confusing for potential participants.

Stanford (2008) describes similar difficulty with set carrier phrases, especially when the language to be documented is not a focus of formal study in school, and non-functional repetition of arbitrary sentences is a completely foreign task. Stanford instead settled on a 'flexible phrase list' (2008:16). In a similar vein, after some discussion with my informants we settled upon a 'flexible frame question' instead of trying to introduce the concept of carrier sentences.

The three frame questions followed the format in 1a-c:

(1) a. Have you ever seen / eaten / etc _____?[4]
b. What kind of _____ have you seen / eaten / etc?
c. Where is _____ found?

Participants were given some examples of the patterns by SAM, the informant who administered the stimuli, with an instruction to use the target word in their response, and to repeat their response

[3] All Khamti vowels are phonetically long in open syllables, but because there is a length contrast between /a/ and /aː/, the duration notation is used.

[4] As this is a binary question, it should be noted that Khamti, like many languages in Southeast Asia, has no simple 'yes' and 'no' words in the same sense as English. An affirmative response is minimally signaled by repeating the verb or verb complex of the question, and the negative is minimally signalled by negating it. Thus the expected answer for a binary question like, 'Have you ever seen a tiger?' would minimally be 'have seen' or 'have never seen', with pronouns and verb arguments recoverable from context. Thus while 'yes/no' answers to stimuli questions were not an issue, per se, participants still needed to be instructed to answer in a complete sentence, to ensure they would repeat the target word.

three times. With responses to three questions, and three repetitions of each response, for all sixteen words, this created 3 x 3 x 16 or 144 tokens per speaker. It was expected that each speaker would fail to use the target word in some responses, which did happen, but also other times they would also use it more than once (as in responses like, 'The rice that I've eaten is steamed rice'). As it turned out, the number of times the target word was repeated outnumbered the number of times it was omitted, for an average well above 144 tokens per speaker.

Some variation in prosody in responses was achieved, as desired, but this could not be controlled for closely. The majority of responses have focus prosody, and a large proportion were utterance initial, as Khamti is a topic-comment language with frequent topic fronting. While variation in focus prosody was not reliably achieved, ultimately the data gathering was still very successful. Each speaker produced several utterances of the target words, making for a substantial corpus to work with.

3.4 Wordlist data

Following a 2014 fieldwork trip, copies of the 436-item Mainland Southeast Asia (MSEA) wordlist (SIL 2002) were circulated to several neighboring Tai villages by my principal Khamti informants. This list contains glosses in English, Thai, and Burmese. A representative from each village that received the list filled out the list with the corresponding lexical items used in that village. Upon my return to the area in 2015, if time permitted after completing the stimuli response recordings at each village, one or more speakers were recruited to record a reading of the full wordlist, using the same equipment setup described in §3.2, by repeating each entry three times. The list of speakers who made wordlist recordings is given in Table 5. The wordlist recorded by the speaker from LP village was used to create one of the corpora in this study.

Table 5: Speakers who recorded a wordlist reading

Village	Speaker age, sex
MN	49, M
SN	57, M
LP	24, F
KT	36, F; 40, M

3.5 Corpora

Two corpora were prepared for use in computational modeling. A corpus of citation tones spoken in isolation from a wordlist, with a total size of 173 tokens, was prepared to serve as a baseline for evaluating modeling performance on the larger, more complex corpus: 750 tokens segmented from the stimuli responses of five speakers. Details by speaker with token counts for both corpora are given in Table 6.

Table 6: Speaker demographics and toneme distribution in each corpus

				Tone tokens				
ID	**Sex**	**Age**	**Data type**	**Tone 1**	**Tone 2**	**Tone 4**	**Tone 6**	**Total**
LP5	F	24	Wordlist reading	54 (31%)	43 (25%)	47 (27%)	29 (17%)	173
								173
MN2	F	42	Stimuli responses	35 (28%)	18 (14%)	39 (31%)	32 (26%)	124
SN2	M	74	Stimuli responses	49 (31%)	37 (23%)	39 (25%)	34 (21%)	159
SN3	F	40	Stimuli responses	47 (31%)	34 (22%)	37 (24%)	34 (22%)	152
SN5	F	20	Stimuli responses	40 (24%)	43 (26%)	43 (26%)	40 (24%)	166
KT5	M	65	Stimuli responses	33 (22%)	34 (23%)	41 (28%)	41 (28%)	149
				204	**166**	**199**	**181**	**750**

3.5.1 Controls

Both corpora were controlled for tone type, in order to achieve representative samples from each toneme. The wordlist corpus was also controlled for syllable shape, with only CV syllables selected. While Khamti has no contrastive vowel length in open syllables, all vowels are phonetically long in this position. Both monophthongs and diphthongs were used.

The target words in the stimuli response are described in §3.3. Syllable shape was also restricted to CV syllables in 14 of the 16 target words. The other two have shape CVN.[5] The stimuli corpus was also controlled for lexical category, targeting exclusively common nouns due to their ease of elicitation, whereas the wordlist corpus contains items from all lexical categories.

[5] Though open syllable vowels in Khamti are all phonetically long, the average duration of the sonorant period in CVN syllables in the running speech corpus was 28% longer (149ms) than the average duration of CV syllables (117ms).

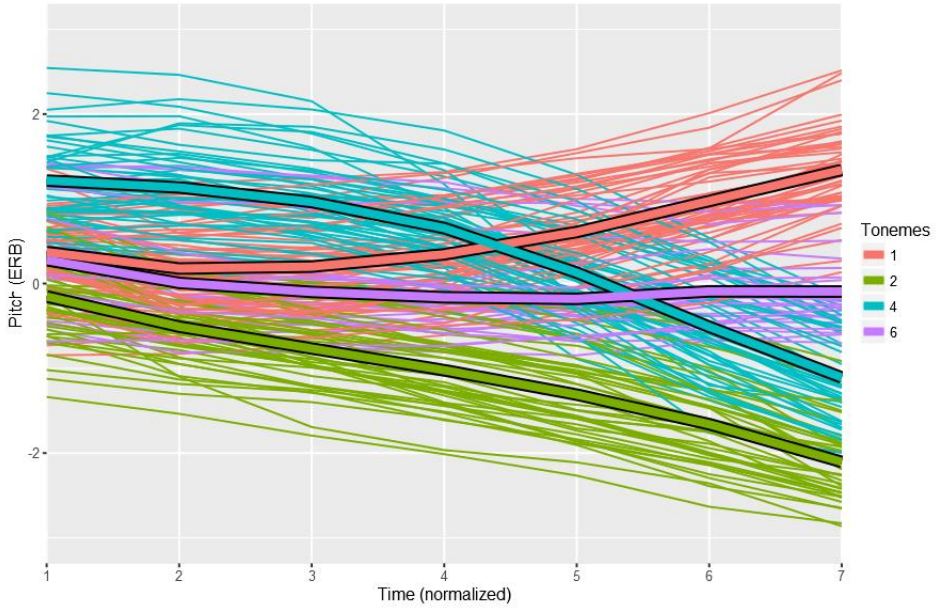
3.5.2 Segmentation and measurement extraction

For both corpora, each utterance of the target words was segmented and annotated using TextGrids in Praat (Boersma and Weenink 2016). The annotated portion for each token begins from the zero crossing immediately following the first full period after the onset of the second and third vowel formants, and ends in one of two places: (i) for open syllables, at the zero crossing after the last full period at the end of the vowel, or (ii) for sonorant final syllables, at the end of the sonorant coda. In some cases where the open syllable of a target word was immediately followed by the onset of the next syllable, then the end of the higher formants of the vowel were used to segment the end of the target word. Disfluent utterances of target words were not annotated.

A Praat script by Bennett (2015) was then used to extract acoustic measurements including pitch in hertz and ERB at seven time-normalized intervals across the space of each annotated tone token. In all, the annotated corpus used for the computational modeling below consists of the responses of the five speakers to the stimuli questions. With an expected 144 tokens per speaker (3 x 3 x 16 question responses), the actual raw count after was 832 tokens, though this was reduced to 759 tokens after omitting items for which F0 could not be extracted; still well above the goal of 144 per speaker.

Figure 4 shows average F0 tracks for the average of each of the four lexical tones for each of these five participants, as well as a normalized average for the whole tone corpus.

Figure 4: Normalized pitch tracks and toneme averages (speaker = LP5, corpus = wordlist)

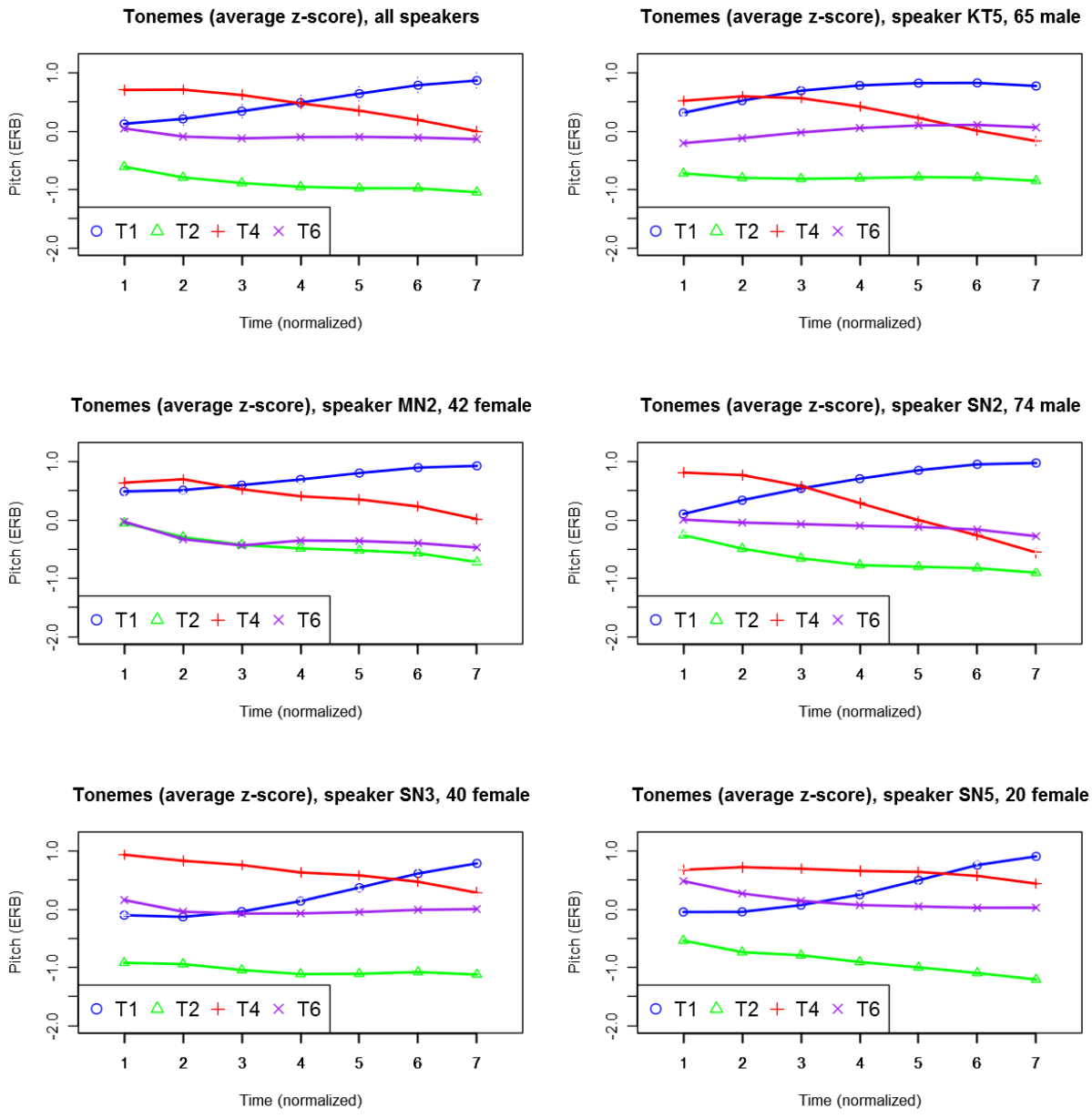


3.5.3. Tonemes

Pitch tracks from the wordlist corpus are given in Figure 3 along with the averages for each toneme category. These are in ERB and z-score normalized using the *scale* function of R. The toneme averages more closely resemble the younger of the two speakers whose tonal spaces were presented in Figure 1.

For comparison, the averages for speakers in the larger corpus are given in Figure 5.

Figure 5: Tonemes of each speaker (stimuli corpus)



Though these tonemes are averages, and intraspeaker variation by prosodic context would need to be examined in more detail before drawing strong conclusions, there are many notable points of variation between these speakers. For instance, speaker MN2 has tones 2 and 6 virtually on top of one another, which may indicate the use of non-modal phonation as a more salient cue for this speaker. Also, the falling tone of tone 4 appears nearly level in speaker SN5.

4 Computational modeling

Though much sophisticated hardware and software exists to assist with field language documentation, the core of the activity frequently still consists of linguists of varying experience making informed judgments to the best of their ability. This ranges across everything from deciding what symbols to use to represent sounds in transcription—even when not sure exactly which sounds they may be yet—to deciding how to boil down an often large number of allotones into a precise count of underlying tonemes in the language under study. There is inherently an impressionistic element in the task, and interactions with phenomena like phonation type or tone sandhi make the task very complex. Snider (2014) criticizes the state of tonal descriptions in the literature generally, arguing that there is a tendency to emphasize minimal pairs, while often failing to notice or control for copious possible confounds, both phonological and grammatical, that can invalidate minimal pair evidence.

One potential way to address the issue of impressionistic judgments or other weaknesses in the state of the art of tonal analysis is with the development and refinement of computational methods. Shosted et al (2015) outline a method for computationally modeling lexical tone. They advocate for incorporating such methods directly into the fieldwork process, as early as possible, rather than leaving it to post-analysis performed after leaving the field site, if performed at all. This adds replicability to the typically highly individualized task of language documentation fieldwork, and acts as a check against human error and impressionistic judgments. Principal Components Analysis is one possible method.

4.1 Principal Components Analysis

Principal Components Analysis (PCA) is a dimensionality reduction that abstracts observations with possible correlations into a set of uncorrelated variables (Jolliffe 1986). The output of a principal components analysis is a matrix of ‘scores’ and a matrix of ‘loadings’. Each column in

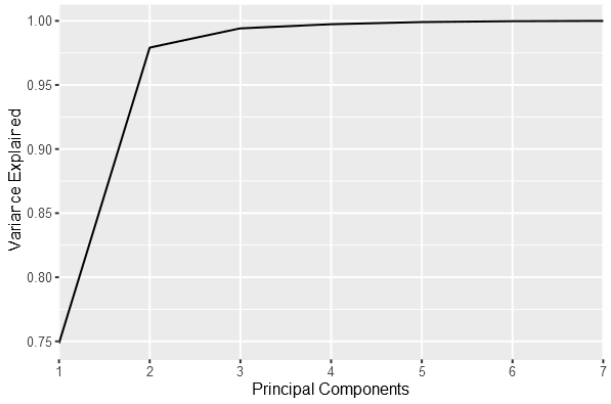
the loadings is one 'principal component', and represents a correlation present in the data. (Johnson 2008:99). The principal components are ordered by how much of the variance in the data they account for, so the first principal component (PC1) explains the most, followed by PC2, and so on. Each observation in the input data is assigned a score with respect to each PC.

The observations used for PCA in this paper are phonetic measures of pitch and phonation across several time steps in each tone token. The *prcomp* method of the default R package *stats* was used to perform the analysis (R Core Team 2015).

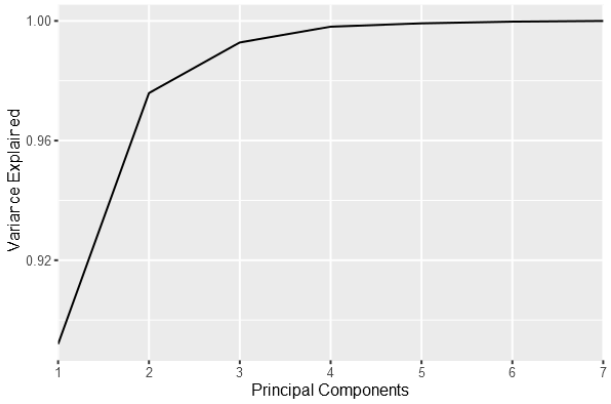
4.1.1 Variance explained

To determine how many of the principal components to make use of in analyzing a dataset, we look at the variance explained. This is calculated from the output of PCA and graphed in an elbow plot. While there is no hard rule for how many principal components to use, a rule of thumb is to use as many as are needed to explain 95% of the data, or else stop when the next principal component would explain less than 5% more of the variance (Baayen 2008:121). Two examples are in Figure 6.

Figure 6: Proportion of variance explained by principal components



Speaker = LP5
Corpus = wordlist
Measures = pitch



Speakers = KT5, MN2, SN2, SN3, SN5
Corpus = stimuli
Measures = pitch

Here, for the Khamti wordlist corpus, using only pitch measures, two principle components explain above 95% of the variance. Similarly, for the stimuli response corpus using only pitch measures, the first two principal components explain above 97.9% of the variance.

4.1.2 Loadings

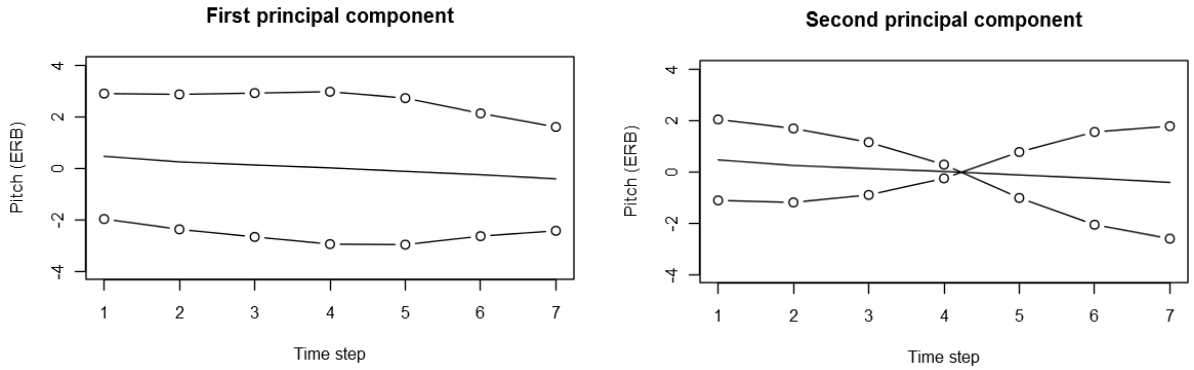
Having determined that for both corpora, the first two principal components explain above 95% of the data, we can make our cutoff for use in *k*-means clustering at PC2. To understand what we are clustering on, we need to look at the PCA loadings, given in Table 7.

Table 7: Loadings of the principal components (wordlist corpus)

Pitch step	PC1	PC2
Step 1	-0.3546	0.4132
Step 2	-0.3815	0.3774
Step 3	-0.4065	0.2689
Step 4	-0.4307	0.0702
Step 5	-0.4140	-0.2345
Step 6	-0.3470	-0.4737
Step 7	-0.2935	-0.5746

We can examine PC1 and PC2 to determine what their likely phonetic correlates are. Figure 7 plots the deviations from the corpus mean based on the loadings and standard deviations of the first two principal components.

Figure 7: First and second principal components, reflected around their centers



Given their shape, and what we know about the input tonal data, it is likely that PC1 corresponds to pitch height, and PC2 corresponds to pitch slope.

4.2 *k*-means Clustering

The output of PCA, with two PCs per tone token determined as optimum, can then be used as input to *k*-means clustering. This was done using the *kmeans* method of the default R package *stats* (R Core Team 2015). This method initiates by randomly selecting a specified number of centers after an initial burn in, here set to 1000 iterations. The distance between each initial center and datapoint is calculated, and each observation is assigned to its nearest center. New centers are then calculated from the mean of the currently assigned clusters, after which each observation is again assessed and reassigned to a new center if a closer one now exists. This process repeats until it converges (Hartigan and Wong 1979).

In order to narrow the space of possible models, I chose to begin by specifying four centers, so that the number of fitted clusters would be the same as the number of expected clusters. These could then be scored as a baseline and compared against models with different number of centers as needed.

4.2.1 Scoring *k*-means output

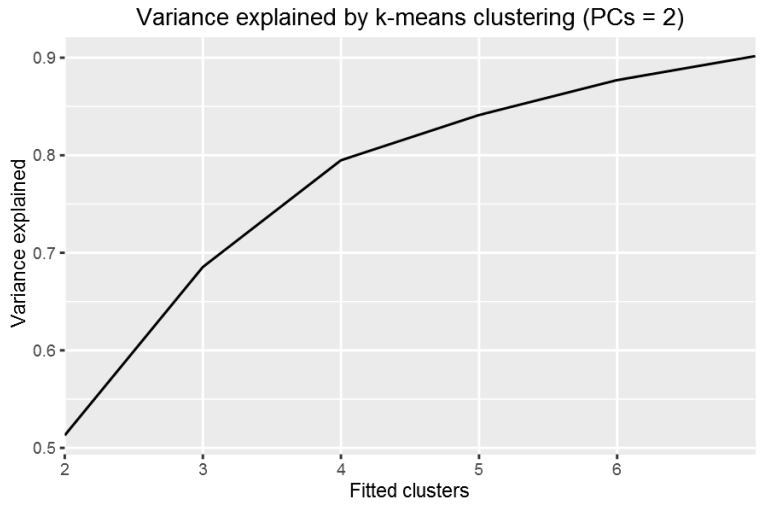
Although multiple runs of *k*-means will converge on the same clusters, given the same input and a sufficient number of iterations, since the starting clusters are randomly selected, which cluster corresponds to which toneme is random with each run. In order to allow repeated runs of *k*-means on different data sets and testing inclusion of different pitch and phonation measures, I created a simple method in R that determines the optimal assignment of output cluster to toneme categories. It operates by first identifying for each expected tone cluster, which inferred cluster matches the highest proportion of its tokens. If two tonemes are matched with the same inferred cluster, the second-best performing inferred clusters are compared, and the one with higher performance in that comparison is assigned to its toneme. If more than two tonemes are matched to a single inferred cluster, the process iterates until each inferred cluster is uniquely assigned to an expected toneme cluster. This also enables automated scoring of the output of *k*-means with maximized scores.

4.2.2 Determining optimal number of clusters

One of the potential benefits to computational modeling of tones is as a check against impressionistic evidence in language documentation, by providing falsifiable quantitative results (Shosted et al 2015). While computational models are a step in this direction, interpreting the output of the models may introduce a different vector for impressionistic judgments. In this case, determining the optimal number of clusters in a dataset. Numerous methods exist, with 30 methods included in the R package *NbClust* (Charrad et al 2015) alone.

One is the same method used above to identify the optimal number of principal components: with an elbow plot of the variance explained. This is given for a *k*-means analysis of pitch data from speaker LP5, using two principal components, in Figure 8.

Figure 8: Variance explained by number of clusters (speaker = LP5, corpus = wordlist, measures = pitch)



With this method, the location of the 'elbow'—past which an increase in the number of clusters does not gain substantial ground in variance explained—is not always unambiguous (Ketchen and Shook 1996). In Figure 8, with $k = 4$, we have accounted for 80% of the variance, and all successive clusters add gains of less than 5% each. But since the fifth cluster explains an additional 4.6% of the variance, one might also decide to make the cutoff there instead. The potential for influence from the expected number of clusters is obvious.

To address this problem, Charrad et al authored the R package *NbClust* (2015), which aggregates 30 different methods for determining optimal cluster performance. These include methods proposed by Scott and Symons (1971), Krzanowski and Lai (1988), Halkidi et al (2000), to select a few. *NbClust* returns counts which number of clusters had the most 'votes' by the different methods and returns a consensus.

Using the same data used to make the elbow plot in Figure 7, *NbClust* returns a consensus of $k = 3$ as optimal, with votes from 11 of the methods. The distribution of optimal scores returned by *NbClust* (configured to allow a maximum of 15 clusters) is given in Table 9.

Table 9: Number of clusters proposed as optimal by different methods in *NbClust*

No. of clusters	2	3	4	6	7	11	13	14	15
No. of methods	3	**11**	3	1	3	2	1	1	2

This would seem to be at odds with the results of the elbow plot method, however, as three clusters leaves just 68.5% of the variance explained. The discrepancies between these methods highlights the difficulty of this question. In this paper, I will follow the lead of Shosted et al (2015), however, in focusing on models where the *k* value matches the number of categories assigned by the researcher, that is, the four Chindwin Khamti tonemes.

5 Results and discussion

5.1 Wordlist corpus

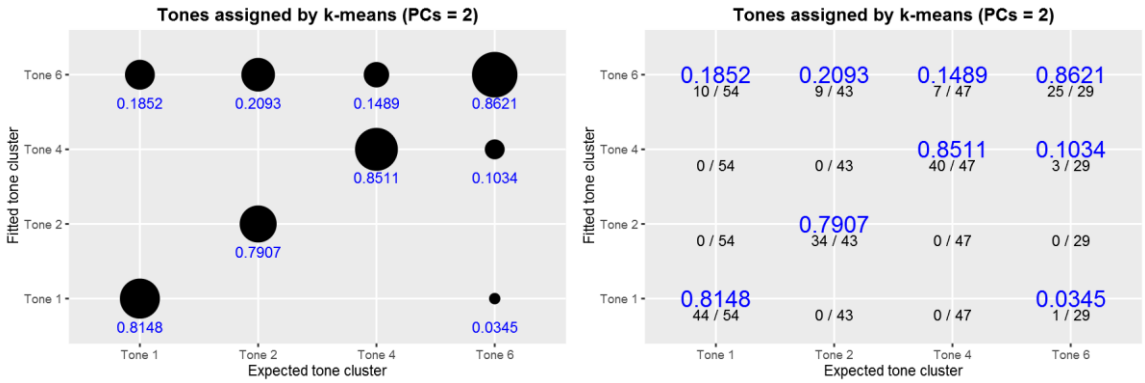
With input of 173 wordlist tokens from speaker LP5, a 25-year-old female, using two principal components, *k*-means produced the clusters summarized in Table 10. These have been subdivided by toneme for ease of comparison against expected categories.

Table 10: Output of *k*-means clustering (*k* = 4 speaker = LP5, measures = pitch)

	Cluster 1	**Cluster 2**	**Cluster 3**	**Cluster 4**	**Total**
Total	**34**	**51**	**43**	**45**	**173**
Tone 1	0	10	0	44	54
Tone 2	34	9	0	0	43
Tone 4	0	7	40	0	47
Tone 6	0	25	3	1	29

Using the method described in §4.2.1 to match each fitted cluster with the expected toneme that it most overlaps with, we can visualize these results with the graphs in Figure 9.

Figure 9: Clusters assigned by *k*-means (*k* = 4, speaker = LP5, measures = pitch)



These graphs reveal very good performance in all clusters except the cluster corresponding to tone 6, which is assigned a sizable portion of tokens from all four expected categories. The precision, recall, and f-scores of the *k*-means output are given in Table 11.[6]

Table 11: Performance of *k*-means clustering (*k* = 4, speaker = LP5, measures = pitch)

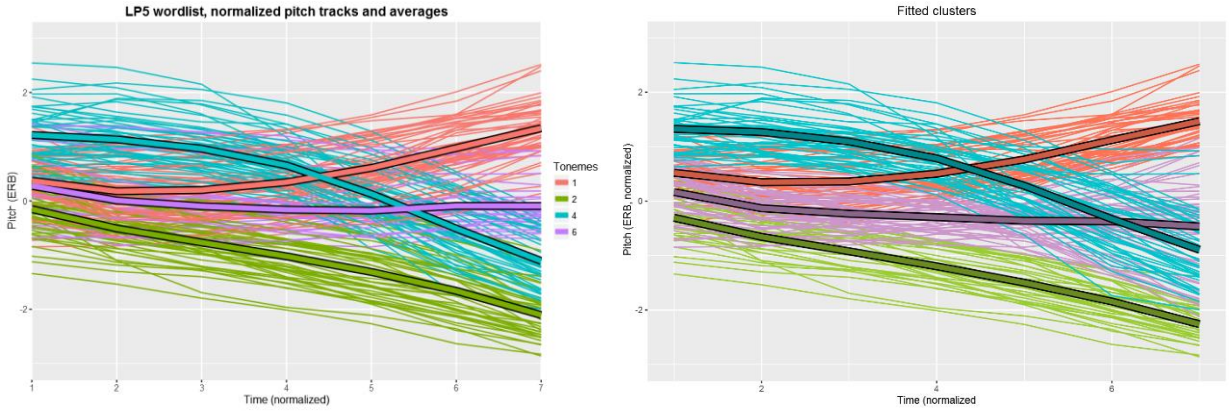
	Precision	**Recall**	**F-score**
Tone 1	0.97778	0.81481	0.88889
Tone 2	1.00000	0.79070	0.88312
Tone 4	0.93023	0.85106	0.88889
Tone 6	0.49020	0.86207	0.62500
Overall	**0.82659**	**0.82659**	**0.82659**

Matching the results seen in Figure 9, we get excellent precision for expected tones 1, 2, and 4, all well over 90%, and tone 2 even getting perfect precision. The precision for tone 6 is at 49%, but its recall is very high, meaning that nearly all of the actual tone 6 tokens were assigned to it, but that there were again as many false positives also assigned to that cluster, hence the poor

[6] Precision for a given toneme is calculated as the number of true positives (correctly clustered tokens) divided by the sum of true positives and false positives (tokens incorrectly clustered with that toneme). Recall is the number of true positives divided by the sum of true positives and false negatives (tokens that should have been clustered with that toneme but were not). F-score is the harmonic mean of precision and recall, calculated as 2 * (precision * recall) / (precision + recall).

precision. The normalized pitch tracks of the input are compared side by side with the fitted clusters in Figure 10.

Figure 10: Expected clusters (left) vs. fitted clusters (speaker = LP5, measures = pitch).

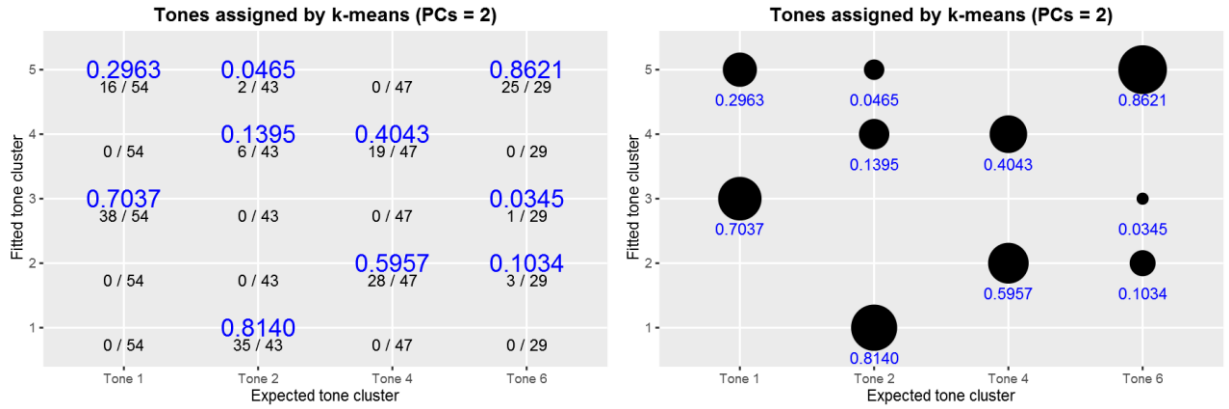


The cluster corresponding to tone 6 is slightly lower in the fitted model, but otherwise the average fitted tones are virtually identical to the expected clusters.

5.1.1 Testing other *k* values

To compare briefly with other possible models, if we take the consensus of *NbClust* for the wordlist corpus and model $k = 3$, we get the results shown in Figure 11.

Figure 11: Tone assignments (PCs = 2, *k* = 3, speaker = LP5, measures = pitch)



Although we have only three clusters, tones 1, 2, and 4 are all clustered by *k*-means as expected at rates above 90%. Tone 6, meanwhile, splits its mass predominantly between the two clusters corresponding to tones 1 and 2. The scores for this model are given in Table 12.

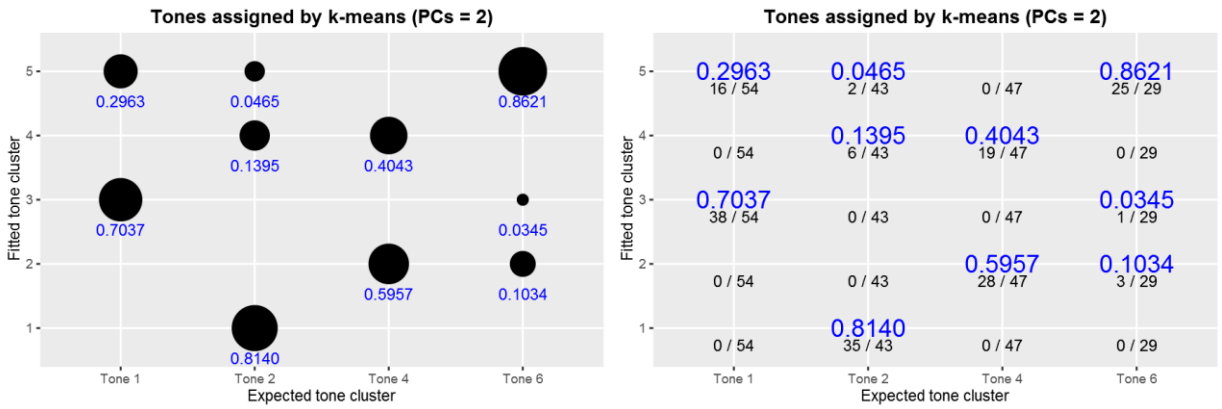
Table 12: Performance of *k*-means (PCs = 2, *k* = 3, speaker = LP5, measures = pitch)

	Precision	**Recall**	**F-score**
Tone 1	0.75362	0.96296	0.84552
Tone 2	0.73684	0.97674	0.83999
Tone 4	0.91489	0.91489	0.91489
Tone 6	--	--	--
Overall	**0.79191**	**0.79191**	**0.79191**

Recall improves for tones 1, 2 and 4, because there is no fourth cluster to split up the remaining three, but naturally precision suffers as a result. This seems to reflect the fact that tones 1, 2, and 4 are at the extremes of the tonal space, and are all contour tones, while tone 6, the mid-level tone, is in the center of the tonal space and overlaps to some degree with each of the other categories. Thus, when *k* = 4, the tokens from the other three categories that are closest to the center of the tonal space get misclassified by the *k*-means algorithm. Conversely, when *k* = 3, all of the tokens that should be assigned to tone 6 simply blend into the other three categories, but especially tones 1 and 2.

Turning to *k* = 5, on the other hand, we see the results shown in Figure 12.

Figure 12: Tone assignments (PCs = 2, *k* = 5, speaker = LP5, measures = pitch)



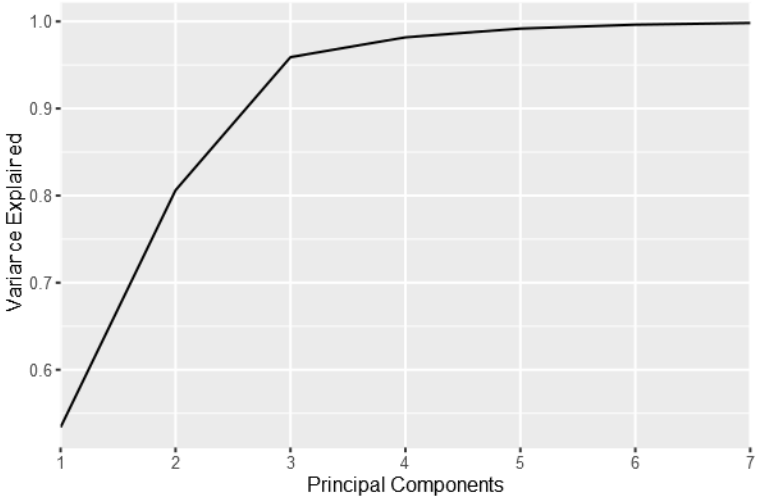
These figures indicate that tones 1, 2, and 6 correspond relatively well to clusters 3, 1, and 5, respectively. However, tokens from tone 4 are split in half between clusters 2 and 4. While this presents an interesting avenue to investigate what might cause that split, it is clear that the five-cluster model does not give us any obvious improvements over the model with four clusters. This does leave us with another option to see if we can improve our model: introducing additional phonetic measures besides pitch.

5.1.2 Introducing phonation measures

The only data provided to the principal components analysis so far was the 7-step pitch data. However, we can introduce additional measures to PCA in an attempt to improve performance: spectral tilt (H1-H2) measured over 3 intervals within each tone token. Spectral tilt is indicative of non-modal phonation, with creaky voice exhibiting shallower spectral tilt (Kirk et al 1993). Dockum (2015) claims that glottal constriction (or possible creaky phonation) is a historical conditioning factor for the emergence of tone 2 in modern Chindwin Khamti, so these additional data might be expected to improve performance.

Additional dimensions in our data require us to reevaluate the number of principal components we should optimally be feeding to *k*-means. The elbow plot for the variance explained in Figure 13 indicates that three PCs is optimal. The first two PCs explain 80.6% of the variance, while the third brings the total up to 95.9%.

Figure 13: Variance explained by PCs (speaker = LP5, measures = pitch + spectral tilt)



Since we have introduced a third principal component, we should examine the loadings again to determine what its likely phonetic correlate is, and see how if we can expect much to be gained from introducing phonation measures.

Table 13: Loadings for PC 1-3 (corpus = wordlist, measures = pitch + spectral tilt)

	PC1	PC2	PC3
Pitch step			
Step 1	-0.33973532	0.211421802	-0.36242291
Step 2	-0.37129187	0.155498357	-0.35394212
Step 3	-0.39807764	0.120794049	-0.25358796
Step 4	-0.42458736	0.065918618	-0.06373062
Step 5	-0.41076796	-0.006377505	0.23556202
Step 6	-0.34675064	-0.064300256	0.47182595
Step 7	-0.29507263	-0.095411381	0.56941716
H1-H2 step			
Step 1	-0.05706411	-0.564178097	-0.13072954
Step 2	-0.07821412	-0.572019417	-0.16238065
Step 3	-0.15024674	-0.503391448	-0.17088997

In PIC1 there is little to no movement at all in the loadings corresponding to spectral tilt (the bottom three rows), while in PC3 we see what appears to be another kind of contour change in the variables derived from the pitch steps. We might interpret this to mean that there is not significant ground to be gained in this particular corpus by adding spectral tilt. The clusters assigned by *k*-means with a three-PC model are given in Figure 14. Scores are given in Table 14.

Figure 14: Tone assignments (PCs = 3, *k* = 4, speaker = LP5, measures = pitch + spectral tilt)

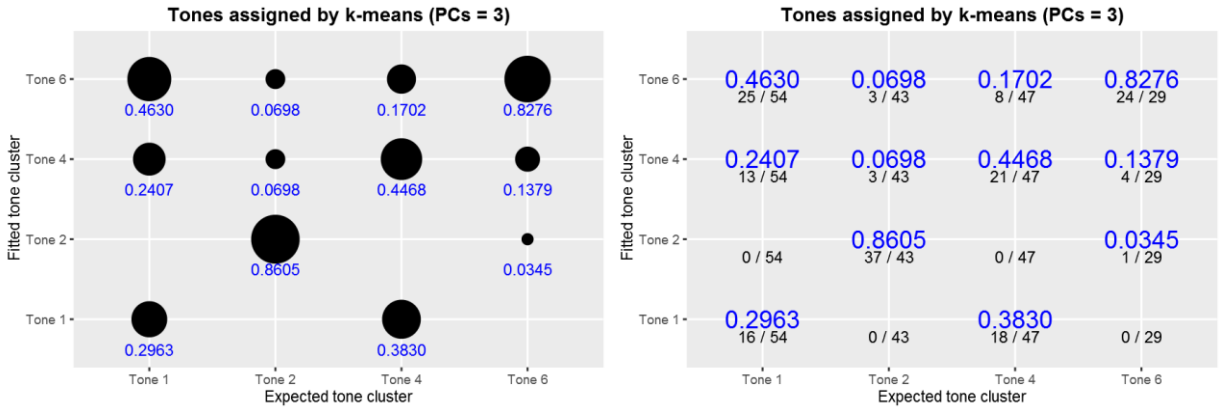


Table 14: Performance of *k*-means (PCs = 3, speaker = LP5, measures = pitch + spectral tilt)

	Precision	Recall	F-score
Tone 1	0.47059	0.2963	0.36364
Tone 2	0.97368	0.86047	0.91358
Tone 4	0.5122	0.44681	0.47727
Tone 6	0.4	0.82759	0.53933
Overall	0.56647	0.56647	0.56647

Indeed, the performance of most clusters suffers greatly as a result of introducing phonation measures, with the exception of tone 2. In this category, recall and thus f-score improve with the introduction of phonation measures and a third principal component, as shown in Table 15.

Table 15: Comparison of scores for tone 2

	Precision	Recall	F-score	PCs	Measures
Tone 2	1.00000	0.79070	0.88312	2	pitch
Tone 2	0.97368	0.86047	0.91358	3	pitch + spectral tilt

Though the effect is not very large, this likely is the result of tone 2 having non-modal voice in some portion of tokens, something easily confirmed by audition of Khamti recordings. This creaky phonation may act as a secondary phonetic cue to the tone category for Khamti speakers. This observation also supports the proposal in Dockum (2015) that this phonation conditioned the merger of multiple historical tonal categories into the modern tone 2 surface tone. Those historical tonemes would have had different tone shapes but shared creaky phonation, and eventually collapsed into a single tone, with remnant creakiness.

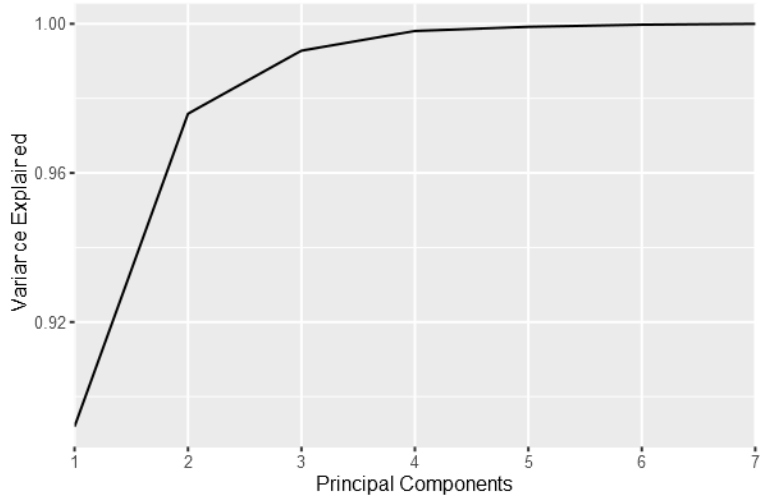
Ultimately, the two-PC model with only pitch data is the best performing model. This serves as a nice baseline for comparison against the more complex corpus of stimuli responses.[7]

5.2 Stimuli response corpus

As described in §3.3, the corpus of stimuli responses is the larger of the two corpora used, consisting of 750 tokens from five speakers. Starting with only the pitch measures, we can determine the number of principal components we need from the elbow plot in Figure 15.

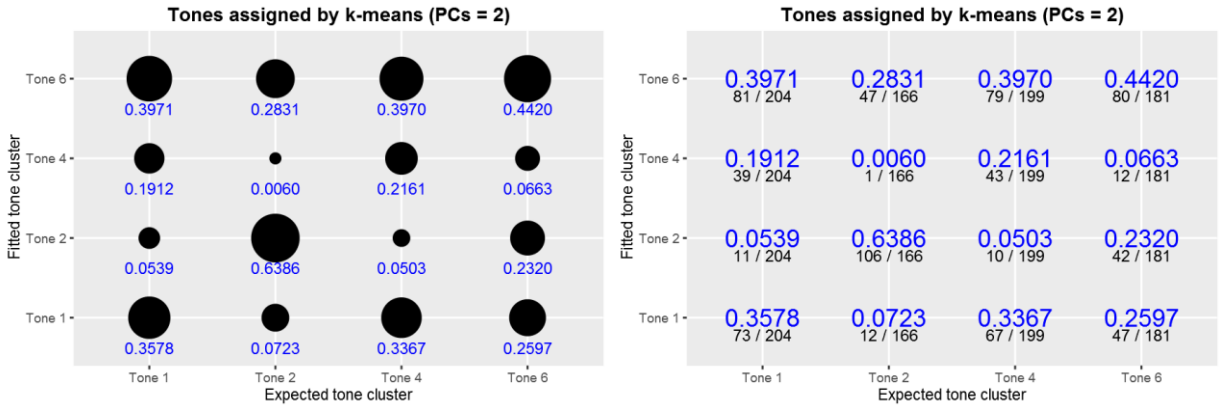
[7] Additional models were tested include measures of duration, jitter, and shimmer. None improved clustering.

Figure 15: Variance explained by PCs (5 speakers, corpus = stimuli, measures = pitch)



The first two principal components explain 97.6% of the variance, so that is the number to be used with *k*-means for the pitch data in this corpus. The results of *k*-means clustering are given in Figure 16.

Figure 16. Tone assignments (PCs = 2, *k* = 4, 5 speakers, corpus = stimuli, measures = pitch)



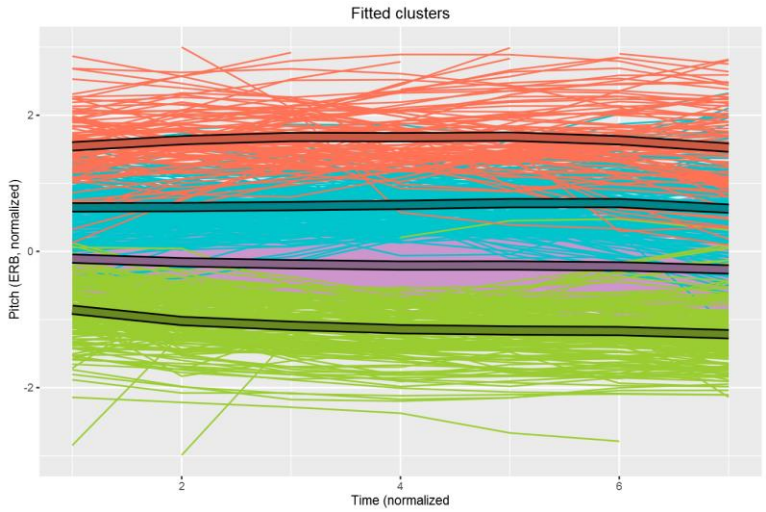
The single largest overlap is 63% of tokens from tone 2, but the poor fit of this model to the data is driven home by the precision, recall, and f-scores, given in Table 16.

Table 16: Performance of *k*-means (PCs = 2, 5 speakers, corpus = stimuli, measures = pitch)

	Precision	Recall	F-score
Tone 1	0.36683	0.35784	0.36228
Tone 2	0.62722	0.63855	0.63284
Tone 4	0.45263	0.21608	0.29252
Tone 6	0.27875	0.44199	0.34188
Overall	0.40267	0.40267	0.40267

Further, the average normalized pitches for the assigned clusters bear little resemblance to the tonemes of Khamti. This is seen in Figure 17.

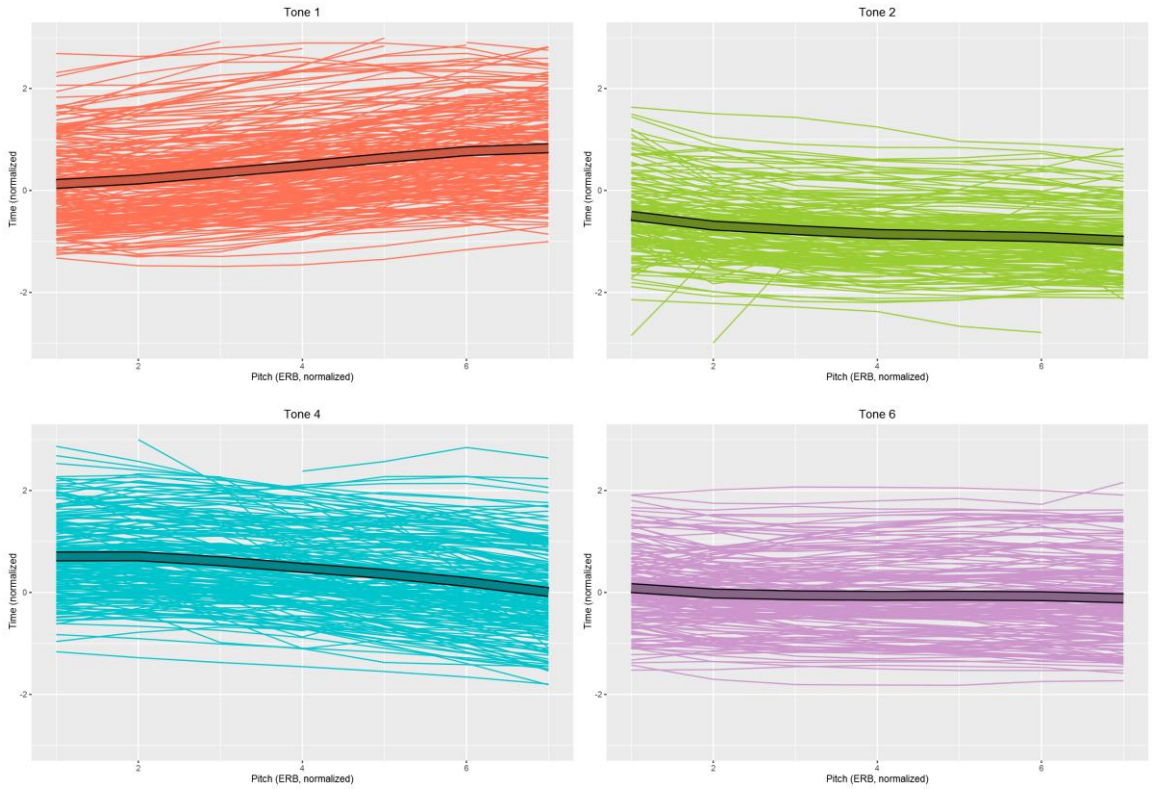
Figure 17: Fitted tone clusters (5 speakers, corpus = stimuli, measures = pitch)



There appears to be so much variation in the data that tone contours do not emerge from the clustering at all, and we are left with what is essentially four level tones of different heights. To understand this result, it is useful to step back and examine both the input and output more closely.

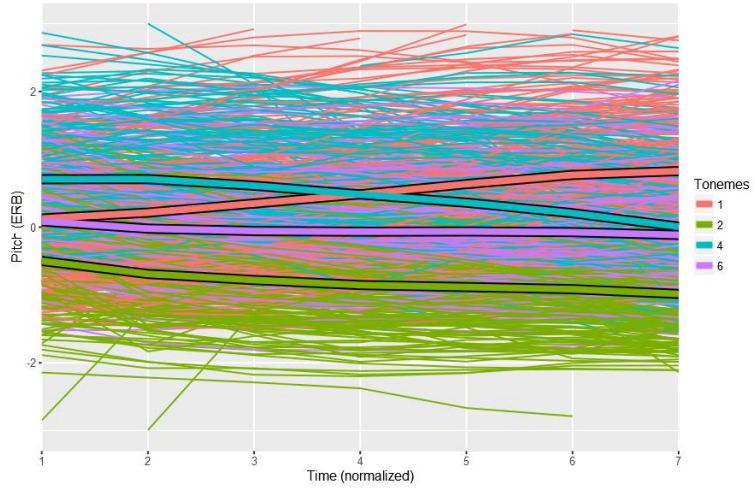
The pitch tracks of the expected clusters from the stimuli corpus are given in Figure 18. Even though this data has been normalized, the spread of possible pitch tracks for each tone makes it perhaps unsurprising that the clustering algorithm has performed so poorly.

Figure 18: Pitch tracks of expected tone clusters (5 speakers, corpus = stimuli)



The messiness of the stimuli corpus comes into sharp focus when these are overlaid one on top of another in Figure 19. Though, notably, these look like the same tonemes seen in Figure 4, just with a compressed pitch space.

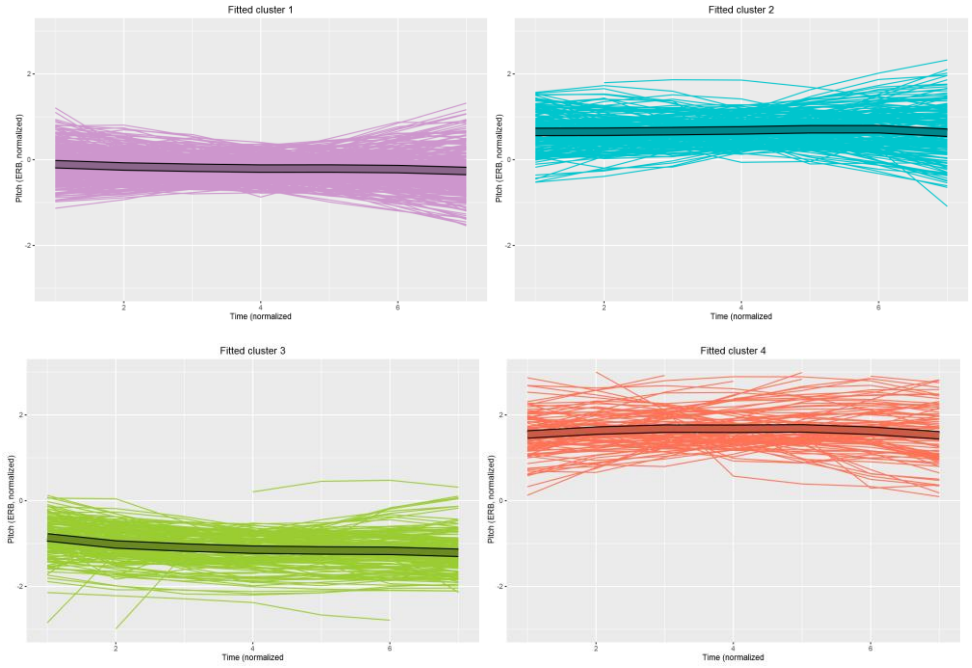
Figure 19: Expected tone clusters (5 speakers, corpus = stimuli)



Tone sandhi is typologically unexpected for this language family, so the reason for this is likely to be the result of general intraspeaker variation in producing the pitch targets, combined with tone boundary effects and other prosodic effects like focus.

The fitted clusters from this model, especially 1 and 2, show a bowtie shape in the normalized pitch tracks, as seen in Figure 20. The bowtie shapes indicate that both rising and falling contours are being clustered together, which supports the idea that the only thing this model is really distinguishing is overall pitch height, as shown in Figure 16.

Figure 20: Fitted clusters (PCs = 2, *k* = 4, 5 speakers, corpus = stimuli)

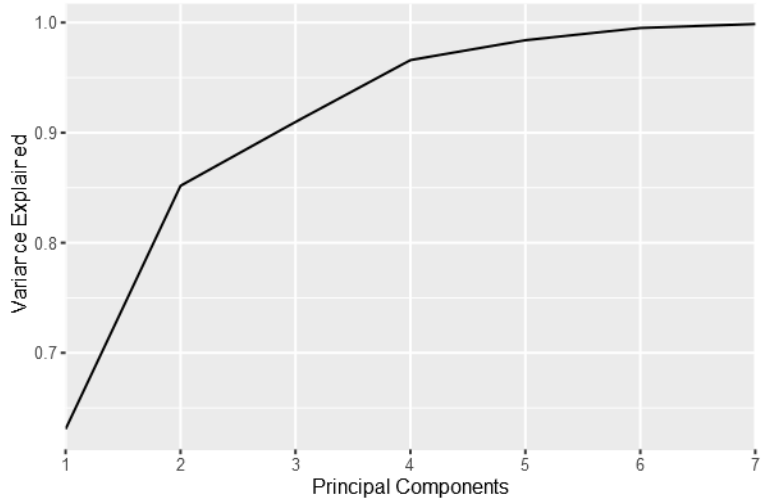


Once again, we can turn to additional measures to attempt to achieve a better fit.

5.2.1 Introducing phonation measures

The elbow plot in Figure 21 indicates that the number of principal components we will need with the expanded dataset is four.

Figure 21: Variance explained by PCs (5 speakers, corpus = stimuli, measures = pitch + spectral tilt)



And once again, running our *k*-means clustering with a four-PC model using pitch and spectral tilt measures, we get the clusters in Figure 22 and the scores in Table 17.

Figure 22: Tone assignments (PCs = 4, *k* = 4, 5 speakers, corpus = stimuli, measures = pitch + spectral tilt)

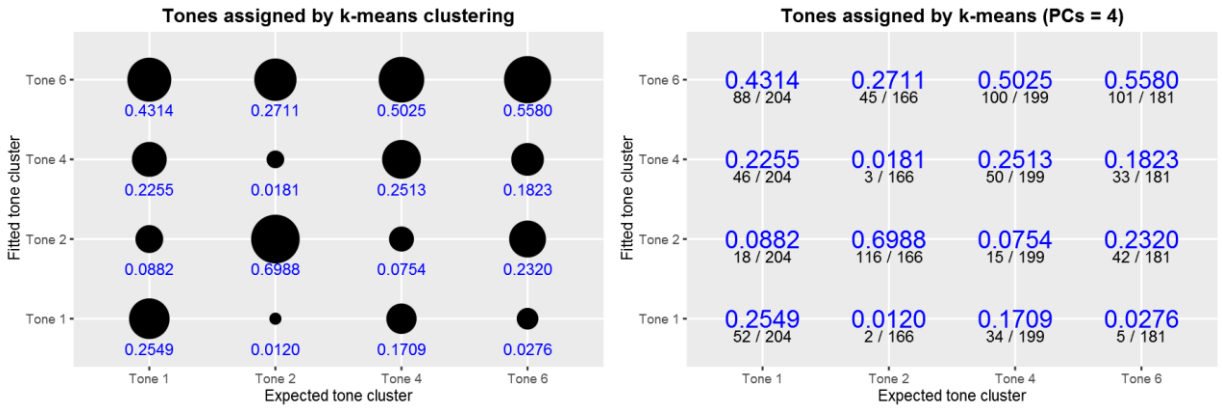


Table 17: Performance of *k*-means (PCs = 4, 5 speakers, corpus = stimuli, measures = pitch + spectral tilt)

	Precision	Recall	F-score
Tone 1	0.55914	0.2549	0.35017
Tone 2	0.60733	0.6988	0.64986
Tone 4	0.37879	0.25126	0.30211
Tone 6	0.3024	0.55801	0.39223
Overall	0.42533	0.42533	0.42533

Whatever marginal improvement there is in some categories is offset by others that perform worse, and overall once again this is a very poor fit for the data, even though we have expanded the dataset to include spectral tilt information.

6 Conclusion

Computational modeling of lexical tone by combining principal components analysis with *k*-means clustering produced very promising results on the small single-speaker wordlist corpus. These results motivate the markup of additional data to create a larger database, and to expand across all syllable shapes in the lexicon. This method also uncovered non-modal phonation in tone 2, which might be a phonetic cue used by speakers, though this requires further study.

The performance on the larger corpus of stimuli responses was poor, apparently due to the considerable intraspeaker variation in tone shapes in running speech. Further tagging of the corpus to account for prosodic focus and position within the utterance may help to make this dataset more tractable. As is, however, the low performance serves to highlight the limitations of the technique. Given a larger corpus of properly annotated tone tokens, this method has good potential for relatively easy comparison between speakers or speaker groups. For instance, coding several parameters such as age, sex, and village location, along with toneme, one could quite readily compare each tone category pairwise with each other tone category across all of these dimensions, and identify vectors of sociolinguistic variation in the tonal space. In the pursuit of individual tonal variation, it may also be useful in identifying tonal splits or mergers in progress. This analytical toolset does come at the cost of the time investment in marking up the tone corpus and processing the input and output data. Development of a method that reduces or removes the need for manual markup for running speech would greatly increase the utility of these methods.

Tonal categorization is a promising area to apply these computational techniques to. This paper highlights some of their successes and weaknesses, which helps to advance their development and refinement. Improvement of these methods has the potential to greatly benefit linguists conducting language documentation on tonal languages.

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Two agreeing heads does not make you special: Restrictions on person portmanteaux

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1 Introduction

This paper deals with complex agreement systems and their restrictions. Languages can have markers for subject, 1, and object agreement, 2, and the question raised in this paper is what happens with these markers if there are two arguments present. In other words, the question is how transitive agreement is expressed on a verb. One option would be to mark both subject and object separately, as in 3a. The second option is to mark one of the markers slightly different in the context of the other marker, thus it becomes an allomorph, 3b. The final, most important option for this paper, is to mark both subject and object as a new unsegmentable marker, forming Person Portmanteaux Agreement (PPA), 3c.

(1) $\text{AGR}_{\text{sub}} \leftrightarrow$ /X/ — Subject Agreement

(2) $\text{AGR}_{\text{obj}} \leftrightarrow$ /Y/ — Object Agreement

(3) a. AGR_{sub} - $\text{AGR}_{\text{obj}} \leftrightarrow$ /X-Y/ — Separate markers
b. $\text{AGR}_{\text{obj}} \leftrightarrow$ /X'/ / AGR_{subj} — Allomorphy
c. AGR_{sub} + $\text{AGR}_{\text{obj}} \leftrightarrow$ /Z/ — PPA

A language that displays PPA is De'Kwana (Hall 1988). This language has a split-ergative alignment in its agreement paradigm. Thus, when there is one argument present, the agreement differs based on the origin of this argument. For example, in 4a, first person is the external argument and is expressed with *w*-, and in 4b first person, being the internal argument, is expressed as *y*-. The same happens for second person in 5.[1]

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[1]The abbreviations and conventions used in this paper are the following. *x*>*y* = portmanteaux morpheme where *x* is the agent and *y* is the patient, *x.y* = fused element where multiple features (other than only person) are expressed in one morpheme, 1/2/3 = first/second/third person, 12 = first person inclusive, 13 = first

(4) a. **w**-amo-a 1 EA
1.EA-cry-PRES
'I cry / I am crying.'

b. **y**-a:wo-a 1 IA
1.IA-swell-PRES
'I swell.'

(5) a. **m**-amo-a 2 EA
2.EA-cry-PRES
'You cry / You are crying'

b. **əd**-a:wo-a 2 IA
2.IA-swell-PRES
'You swell'

(Hall 1988:154, 326)

When we now look at a situation where there is both an internal and an external argument present, it is not the case that the markers from 4 and 5 are expressed together. For example, in 6a with 1π EA and 2π IA *mən-* is expressed on the verb, which is not a combination of *w-* plus *əd-*. The same happens in 6b for the reverse pattern of arguments, where a different PPA marker is expressed. This means that when PPAs are formed, not only person information is important, grammatical role is too.

(6) a. **mən**-endant(ö)-a.
1>2-meet-PRES
'I meet you'

b. **kə**-(e)ndant(ö)-a.
2>1-meet-PRES
'You meet me'

(Hall 1988:155, 327, 328)

I argue in this paper, based on 6 languages from 4 unrelated families[2], that there is no language that only has instantiations of 3c in its verbal paradigm. Thus, no language is a pure PPA language. I provide evidence that all languages investigated show instantiations of 3a and 3b as well. This provides evidence against analyses that take PPA to arise from multiple probing (Georgi 2013, Woolford 2016), where phi-features from multiple arguments are being collected on one head. Instead, I argue that languages with PPA are similar to languages with separate subject and object markers. The difference is that languages that allow PPA have agreement probes in one domain (a complex head; Bobaljik 2012,

person exclusive (excluding addressee), π = person, # = number, ABS = absolutive, ACC = accusative, AP = antipassive, APPL = applicative, ASP/ A = aspect, CAUS = causative, DAT = dative EA = external argument, ERG = ergative, F = feminine, HAB = habitual, IA = internal argument, IMM.PST = immediate past IMPERF = imperfective, INV = inverse, LOC = locative, M = mood, MASC = masculine, NEG = negation, NPAST = non past, NOM = nominative, OBJ/O = object, PFV = perfective, PL = plural, PRES = present tense, PST = past tense, SG = singular, SUB/S = subject, T = tense, TV = theme vowel, V = verb

[2]Language families/ languages: Algonquian: Maniwaki (Oxford 2015); Carib: De'Kwana (Hall 1984, 1988), Hixkaryana (Derbyshire 1985); Chukotko-Kamchatkan: Chukchi (Bobaljik & Branigan 2006), Itelmen (Bobaljik 2000, Bobaljik & Wurmbrand 2001); Penutian: Nez Perce (Crook 1999, Deal 2015).

Embick 2010, Moskal 2015). Thus, PPA does not in and of itself constitute a theoretically distinct phenomenon in the syntax of agreement. Nevertheless, it tells us something about the syntax of these languages; it reveals locality restrictions for contextual allomorphy, along with cross-linguistic variation in positions of agreement probes.

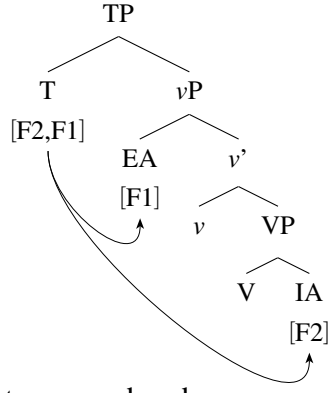
The paper is organized as follows. The next section shows evidence against a multiple probing approach and I provide data where a mixture of separate markers, PPA and allomorphs occur in one verbal paradigm, thus setting up a system for agreement with two probes. Section 3 provides evidence for 2 probes in all languages, specifically for languages like De'Kwana where in most cases only one marker is visible. Section 4 provides an analysis in terms of where agreement probes are placed and I model the interaction between the probes via contextual allomorphy. Section 5 provides a conclusion.

2 No pure PPA-languages: evidence against multiple probing

This section provides two types of evidence against multiple probing approaches for PPA (Georgi 2013, Woolford 2016). First of all, I show that using the proposed mechanism of case-agreement (Georgi 2013) does not work. Second, I show that there are no pure PPA languages, which is predicted if all features are collected onto one head.

The reason for analyzing PPA with multiple probing is that one probe, the probe on T in the structure below, can collect features of multiple goals such as the external and internal argument, which can be spelled out as one morpheme as shown in 7b.

(7) a.



b. $\boxed{[F1, F2] \leftrightarrow Z}$
$[F1] \leftrightarrow X$
$[F2] \leftrightarrow Y$

Different approaches have assumed different restrictions on multiple probing. The first restriction has to do with the features that are being collected. If only the person

features (F1, F2 in 7) are collected, then the syncretic form Z should be the same whether F1 is the external or internal argument. These syncretisms are attested in some cases (cf. Surinam Carib, Georgi 2013), but in most cases it is important where the features come from. That is, most languages have a pattern like De'Kwana. Recall from the introduction that 1π>2π has a morpheme *mən* which differs from 2π>1π, *kə*. Georgi (2013) argues for Case Agreement (Rackowski 2002, Richards 2011, Hamann 2011) to distinguish where person features come from. This means that when there is agreement with the person features, the case-features on the arguments are picked up as well. When the features are being spelled out, Vocabulary Insertion (VI)-rules can make reference to case and person features. This is illustrated for De'Kwana below, where F1 and F2 are specified for case features.

(8) a. { [F1, ABS], [F2, ERG]} ↔ /kə-/ [VIs De'Kwana]
b. { [F1, ERG], [F2, ABS]} ↔ /mən-/
c. { [F1], [F2]} ↔ /k-/

This account predicts that case and agreement are aligned in the same way: both NPs and verb agreement need to be ABS-ERG or NOM-ACC. However, there are languages where case and agreement alignment is different, but which have PPA. Examples are Chukchi (Bobaljik & Branigan 2006) and Coos (Frachtenberg 1992). In these languages the alignment for NPs is ABS-ERG, whereas the agreement is NOM-ACC and thus track the grammatical role of the arguments rather than surface case. This is illustrated for Chukchi in the examples below. The prefix on the verb marks subject ABS, 9a, or ERG, 9b, arguments. Thus, in order for the prefix to be spelled out, case is not important and is not referenced in the VI for the prefix. However, when the ABS argument is the subject in a transitive clause, the person features are a prefix, 9a, but when the ABS is the object, it is referenced on the verb as a suffix, 9c.

(9) a. ɣəm **tə**-kətɣəntat-ɣʔak 1 ABS
1.ABS **1SG.SUB**-run-1.SG.SUB
'I ran'

b. ɣəm-nan ɣet **tə**-ɬʔu-ɣət 1.ERG > 2.ABS
1-ERG 2.ABS **1.SG.SUB**-see-2SG.OBJ

'I saw you'

c. ərɣə-nan ɣəm ne-ɬʔu-**ɣəm** 3.ERG>1.ABS
3PL-ERG me.ABS 3.SUB-see-**1SG.OBJ**
'They saw me.' (Bobaljik & Branigan 2006:48)

Based on languages like Chukchi that have mixed alignment and PPA, case agreement cannot be used to distinguish where person features come from. Importantly, we do need to mark where these features come from, but they are always tracking grammatical role and not case. Thus, we need another mechanism to distinguish where person features come from and in the next section I propose that different probes track where person features come from. Before we move to the observation that there are two probes, the second argument against multiple probing will be discussed.

This argument comes from the fact that there are no pure-PPA languages. If PPA's are formed via multiple probing, the prediction is that we can find languages that have PPA throughout the verbal paradigm, since all feature combinations are on one head. However, if we look at Table 1 we observe that all languages only have PPA in a subset of their verbal paradigm. The Table should be read as follows. All cells that have person combinations are a PPA marker. Thus, Chukchi has a PPA for 1SG external argument and 3π internal argument, but it does not have a PPA for 3π external argument and 1SG internal argument. This means that all '–' are not PPA, but are markers that express subject and object agreement separately or via allomorphs. Thus, all cells of the paradigm are filled, but only a small subset forms PPA.[3]

[3]This paper does no focus on generalizations on the actual combinations of different person features in forming PPA. Georgi assumes only PPA with 1π and 2π are possible, which is empirically not borne out (see Table 1). Woolford (2016) assumes that PPA with 3π is only possible in ABS-ERG languages, but Itelmen and Hixkaryana have NOM-ACC alignment and PPA with 3π. I leave open the question of whether there are generalizations possible (see Fenger 2017 for some ideas).

Language	π	SG		PL	
Chukchi	1	1SG>3	–	1PL>3	–
	2	–	–	2PL>3	–
	3	3SG>3(PL)	–	–	–
Hixkaryana	1	1>3	3>1		
	2	–	3>2	13>2	
		3>3	–	–	–
Itelmen	1	1SG>3	–	1PL>3	–
	2	2SG>3	–	2PL>3	–
	3	3>3	–	–	–
Maniwaki	1	1SG>3	–	1PL>3	3>1PL
	2	2SG>3	–	–	3>2PL
Nez Perce	3	3>3	–	–	–

Table 1. 3π-PPA with 1/2π

In an account, like Georgi's, which posits multiple probing by a single probe in order to account for PPAs, deriving PPAs is straightforward. However, in order to account for separate markers in the same language, with the same underlying multiple probing, additional assumptions are needed, since the features on one probe need to be split. Moreover, a language like Itelmen or Maniwaki has, in addition to PPA, also a separate marker simultaniously expressed on the verb. An example is given for Itelmen below, where 10a has both a prefix, which is the subject marker, and a PPA, which combines subject and object features. This 3π suffix differs when there is a different subject, as is shown in 10b.

(10) a. **n**-zəl-**nen**
3.PL-give-**3>3SG**
'They gave it'

b. **t'**-əłčqu-s-**čen**
1.SG.SUB-see-PRES-**1>3.SG.OBJ**
'I see him'
Itelmen (Bobaljik 2000:19)

To summarize, a multiple probing account does not predict languages where case and phi agreement are not aligned and it does not allow easily for languages that have PPA only in a small subset of their paradigm. The next section develops an account with two probes and takes the insights that person features need to track grammatical role and that PPA are not formed in the syntax.

3 All languages with PPA have two probes

I assume that languages with PPA have 2 probes (Bobaljik 2000, Chomsky 1995, among others): one for subject and one for object agreement. Thus, in this respect languages with PPA are no different than languages without. What differentiates them is where probes are placed. It has been argued that probes may be in different structural positions in different languages (cf. Béjar 2003) and in the languages here, the probes are at least as high as T (Bobaljik 2000, Bobaljik and Branigan 2006, Georgi 2013, Oxford 2015).

Secondly, I assume that PPA is not derived via a special syntactic mechanism, but is formed via contextual allomorphy (Bobaljik 2000, Trommer 2007). I assume that contextual allomorphy can occur in these languages, since the probes, since they are as high as T, will be in the same morphological head (see e.g. Bobaljik 2012, Embick 2010, Moskal 2015). Thus, since PPA is contextual allomorphy, it has a similar locality restriction.[4] This section focuses on evidence for two probes in languages with PPA. This evidence will come from (i) the order of morphemes in verb morphology and, (ii) evidence for two markers even in languages that seem to have only marker. In the next section the focus will be on the analysis of PPA and I provide evidence for PPA being derived via contextual allomorphy.

3.1 Evidence # 1:Verb morphology

The first piece of evidence for the location of the agreement probes come from the order of morphemes on the verb. In the table on the next page, the templates of different language families are summarized. The grey boxes refer to the position of the verb root and person agreement. Other material refers to functional morphemes such as aspect, tense and mood. Even though these languages have different positions for verbal material, none of the languages mark π between V and ASP.[5] Assuming affix order reflects hierarchical structure, agreement, including AgrO, is always peripheral to Asp and usually to T. This is

[4]Next to the locality constraint, there is a directionality restriction: higher heads in the structure can influence lower heads, but not vice versa. See footnote 10 and Fenger (2017) for discussion on this restriction.

[5]Number agreement is in most cases outside of ASP and T. The focus is not on number in this paper. However, note that in Nez Perce the position of the number marking is dependent on aspect/mood and that number never occurs as a suffix if Tense is overtly expressed (Deal 2015).

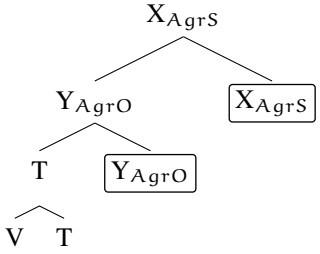
unexpected if agreement is on *v* (Chomsky 2000, 2001). The patterns found here are also found in a larger survey on verb morphology by Julien (2002).

			Verbal Template						Language
AGR	M	*v*	V	*v*	T/A	AGR	M	AGR	
			V	TV	T	π, #	M		Conjunct Algonguian
π			V	TV	T	π, #	M	π, #	Independent Algonquian
π		PRF	V	CAUS	T/A			#	Carib
$\{\pi, \#\}_S$	M		V		T/A			$\{\pi, \#\}_{S/O}$	Chukotko-Kamchatkan
π-$\#_{S/O}$		CAUS	V	APPL	A/M-T				Nez Perce
π-$\#_O$		CAUS	V	APPL	A/M	$\#_S$			

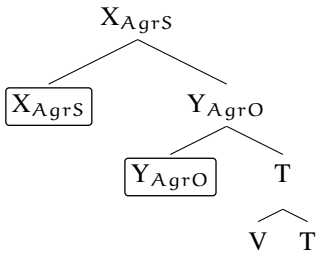
Table 2. person agreement and verb morphology

The structures from the table are structurally represented as follows after head movement.[6] Observe that languages can differ with respect to where markers are placed: they can be prefixes or suffixes, but in all cases the agreement probes are high.[7]

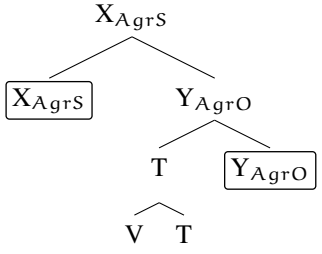
(11) a. Algonquian: (Agr)-V-T-[Agr]-[Agr]



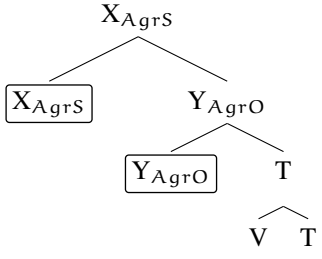
b. Carib: [AgrS/AgrO]-V-T



c. Chuk.-Kamch.: [AgrS]-V-T-[AgrO]



d. Nez Perce: [π]-{#S}-#O-V-{#S}-T



[6]For Algonquian, Oxford (2016) follows Harbour (2003) in that the subject prefix is actually fissioned features from the subject probe. If that's right, the tree in the example is in essence correct, but during linearization some of the features of the subject agreement are spelled out in a different part of the verb.

[7]I use X_{AgrS} and Y_{AgrO} as representations for phi-bundles and I remain agnostic as to where they are. However, they are as high as T. Presumably the probes are located on different heads, like T and M.

To summarize, even though we have seen data from unrelated language families, all languages in the survey mark agreement at the edge of all other verbal material. This can be captured if we assume two probes that are as high as T. The following section provides evidence for two probes in different language families, based on the actual morphemes.

3.2 Evidence #2: Transitive agreement

The evidence for two markers comes from Chukotko-Kamchatkan and Carib. First of all, in 3.2.1 the focus will be on languages that have PPA in some part of their paradigm, but usually express separate markers. The second part of the evidence for two probes, discussed in 3.2.2, comes from languages that seem to usually have one agreement marker, but actually show evidence for two markers.

3.2.1 Chukotko-Kamchatkan

The first language family discussed is Chukotko-Kamchatkan and the focus is on Itelmen, but the same applies to Chukchi. Itelmen, like Chukchi, marks the subject in the prefix and the object in the suffix. This is exemplified in the following examples. The first example marks the suffix for second person, in both the a. and b. examples, the second example marks first person in the suffix. Comparing the b. examples, it can be observed that the prefix stays the same if the subject is the same (third person).

(12) a. t'-əlčqu-**(ɣ)in**
1.SG.SUB-see-**2.SG.OBJ**
'I saw you'

b. **n**-əlčqu-**(ɣ)in**
3.PL.SUB-see-**2.SG.OBJ**
'They saw you'

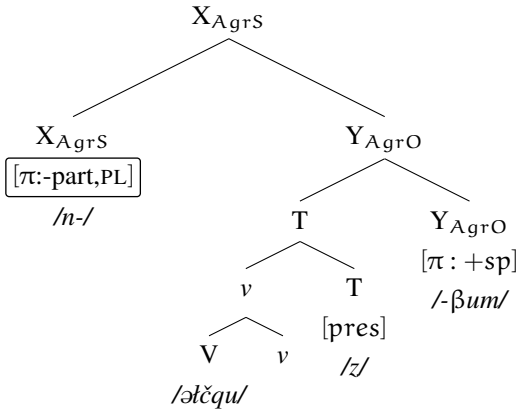
(13) a. q-əlčqu-β**um**
2.IRR-see-**1.SG.OBJ**
'Look at me'

b. **n**-əlčqu-z-**um**
3.PL.SUB-see-PRES-**1.SG.OBJ**
'They see me'
(Bobaljik & Wurmbrand 2001:5)

Thus, in this language there is evidence for two markers: a prefix and a suffix. We can derive this as follows, using 13b. We form a complex head via head movement and get the structure below (a repetition of the structure in 11c, but now with specific values for the heads). After head movement, we start vocabulary insertion with the most embedded

element, the verb root. Second, we insert T. Next, the features of Y_{AgrO}. Due to agreement the features that need to be spelled out are [+speaker]. Based on the elsewhere principle the vocabulary item in 14b-i. is inserted. After vocabulary insertion for Y_{AgrO}, X_{AgrS} gets spelled out. In this case there is no VI rule that refers to [-part] features and thus only plural features are spelled out, according to the rules in 14civ.

(14) a.



b. VI rules for Y_{AgrO}
- i [sp., pl.]↔/-βuʔm/
- ii [sp.]↔/-βum/
- iii [add., pl.]↔/-sxen/
- iv [add.]↔/-[ɣ]in/

c. VI rules for X_{AgrS}
- i [sp., pl.] ↔/nt-/
- ii [sp.]↔/t-/
- iii [add.] ↔/∅/
- iv [pl.] ↔/n-/

This means that this structure derives the correct morpheme order and allows for two agreement markers on the verb. Before moving on to the possible interactions between the probes, De'Kwana will be discussed and will provide evidence for two probes.

3.2.2 Carib

Carib languages seem to go against a two probe analysis, since in most environments only one marker shows up. Recall from the previous sections that De'Kwana is a split-ergative language and marks intransitives differently. In transitive environments including 3π only the features of 1π or 2π are expressed on the verb. Some examples for De'Kwana are given in 15.

(15) a. **w**-endant(ö)-a 1S>3O
1.EA-meet-PRES
'I meet him/her'

b. **m**-endant(ö)-a 2S>3O
2.EA-meet-PRES
'You met him/her'
(Hall 1988:154, 155, 327, 328)

As repeated from the introduction, when there is a 1π and 2π argument, a PPA occurs. The examples are repeated below.

(16) a. **mən**-endant(ö)-a. 1π>2π
1>2-meet-PRES
'I meet you'

b. **kə**-(e)ndant(ö)-a. 2π>1π
2>1-meet-PRES
'You meet me'
(Hall 1988:155, 327, 328)

Thus, so far there is always one marker on the verb. However, if we look at exclusive first person (excluding the addressee) and second person, another marker shows up, which is shown in the examples below.

(17) a. **nña:-mən**-edantö-a 13>2
13-1>2-meet-PRES
'We(excl) meet you'

b. **nña:-kə**-edantö-a 2>13
13-2>1-meet-PRES
'You meet us(excl)'
(Hall 1988:151, 155, 287, 328)

As can be observed, the same PPA markers show up in 17 and 16, since there is (at least) a combination1π and 2π features. However, there is an additional marker, *ñña-* attached to the verb. Thus, this means that even in languages where usually only one marker shows up, there is evidence for two slots. In conclusion, even languages with PPA that seem to go against a two probe analysis have evidence for multiple slots. Together with the evidence for verbal morphology, I assume that there are two probes. The next section shows how these probes can interact via contextual allomorphy to form PPA.

4 AGR-probes in the same domain: PPA allowed

The proposal so far accounts for complex agreement systems without looking at PPA. The two probes are as high as T and can be spelled out at the edge of the verb. This section focuses on possible interactions between the two probes. First, by looking at Itelmen and Chukchi, evidence will be given in favour of contextual allormophy and against a fusion analysis. After that I show how both PPA and allomorphs can occur in the same language and are derived in the same way.

Chukchi, like Itelmen, marks the subject in the prefix and the object in the suffix. Some examples are given in 18. However, in the context of 3π>3π in Chukchi, there is no prefix

present, as shown in 19a. Thus, this suffix forms a PPA, since there is no prefix and the suffix marks information of both the subject and the object. Moreover, the suffix is different when there is another subject than 3π, 19b, which means that the marker in 19a is truly a PPA marker.

(18) a. tə-ɬʔu-ɣət
1.SG.SUB-see-2.SG.OBJ
'I saw you'

b. ne-ɬʔu-ɣəm
3.PL.SUB-see-1.SG.OBJ
'They saw me'
Chukchi (Bobaljik & Branigan 2006:55)

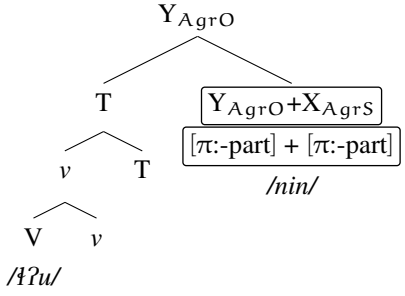
(19) a. ɬʔu-**nin**
see-**3.SG>3.SG.OBJ**
'(S)he saw him/her/it'

b. tə-ɬʔu-**ɣʔen**
1.SG.SUB-see-**3.SG.OBJ**
'I saw him/her/it'
(Bobaljik 2000:19)

I assume the same complex head structure for Chukchi as for Itelmen, thus the object agreement is a suffix and the subject agreement is attached to the left. The same analysis holds for data as in 18, where no interaction between the markers is happening. We can account for the PPA in 19a in different ways. One option is to analyze this marker via fusion, (20) (Noyer 1992).[8] In this case the subject and the object marker are fused into one head and the features are combined as well and can be spelled out together. This means that the first VI-rule in 20b is chosen, since this rule matches the features in the structure the best.

(20) Chukchi ✓**Fusion**: /ɬʔu-**nin**/

a.



b. VI rules X_{AgrO}

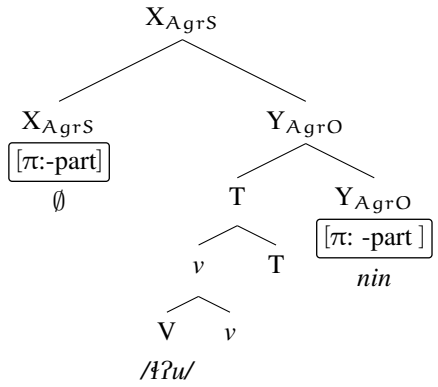
i	[-part, -part] ↔ /-nin/
ii	[-part] ↔ /-ɣʔen/
iii	[+add] ↔ /-ɣət/
iv	[+sp] ↔/-ɣəm/

[8] I discuss fusion here, but the same should hold for spanning accounts (Svenonius 2016, Merchant 2015). Moreover, spanning allows for ADJACENT heads to influence a certain form, but if the actual position of AGR probes is taken into account, they will not be adjacent in Chuckhi or Itelmen: Most likely the feature bundles will be on different heads and thus other functional material intervenes. See for evidence that the AGR probes are in different positions (Bobaljik 2000).

Thus, fusion means that we can still have a special mechanism that forms PPA: in some cases the features of the subject and agreement marker are fused together and spelled out as one marker. Another option of forming PPA is via contextual allomorphy (CA). Thus in this case, as can be seen in the tree in 21, the subject and object marker stay separate. However, the interaction between the two markers is modeled via contextual allomorphy rules (Bobaljik 2000, Trommer 2007). That is, the [-part] feature of the object is spelled out slightly different in the context of specific features of the subject. Again, this rule is more specific than the second VI rule and thus the Y_{AgrO} be spelled out as *-nin*.

(21) Chucki ✓**CA**: /ɬʔu-**nin/**

a.



b. VI rules X_{AgrO}

i	[-part] ↔ /-nin/ / $[\text{-part}]_{AgrS}$
ii	[-part] ↔ /-ɣʔen/
iii	[+add] ↔ /-ɣət/
iv	[+sp] ↔/-ɣəm/

With Contextual Allomorphy we do not have a special mechanism that forms PPA, since this operation is also used to form allomorphs. PPA are in a sense more opaque forms of the same feature bundle, but are not two feature bundles together as would be the case with fusion. For Chukchi both fusion and CA give the desired result.

However, looking at the neighbouring language, Itelmen, we have evidence in favour of CA and against fusion. Looking at 22, a verb with 3π object, it can be observed that the prefix is present and the suffix encodes information of both subject and object. Again, the suffix is spelled out differently in case of a different subject, as is shown in the b. example.

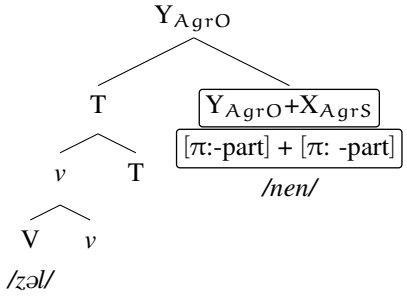
(22) a. **n**-zəl-**nen**
3.PL-give-**3>3.SG**
'They gave it'

b. **t'**-əłčqu-s-**čen**
1.SG.SUB-see-PRES-**1>3.SG.OBJ**
'I see him'

In this case, Fusion will not lead to the desired result, 23, CA will 24. Let us go over both derivations. In the following structure the subject and object features are fused into one head. First, the features of the object are spelled out. It is possible to spell out the fused features as one marker, just like in Chukchi. However, unlike Chukchi, the prefix still needs to be spelled out in Itelmen. However, due to fusion, there is no room for these features anymore in the structure. This means that the prefix cannot be spelled out and the an incorrect surface order is derived. Thus, fusion does not lead to the desired result.

(23) Itelmen ✗ **Fusion**: /zəl-nen/

a.



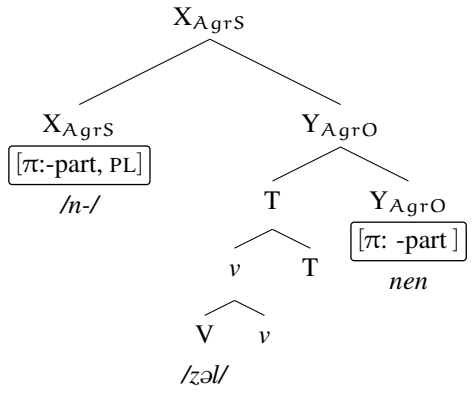
b. VI-rules Y_{AgrO}
- i [-prt, -prt]↔ /nen/
- ii [+sp]↔/-βum/
- iii [+add]↔/-[ɣ]in/

c. VI-rules X_{AgrS}
- i [+pl]$_{AgrS}$ ↔ /n-/
- ii [+sp] ↔ /t'-/
- iii [+add] ↔ /q-/

Turning to CA to account for PPA, the structure of the complex head after verb movement is as in 24. The object agreement is spelled out differently in the context of specific features of the subject and will surface as *-nen*. The subject features are still available and can be spelled out too. This means that the correct surface order is derived.

(24) Itelmen ✓**CA**: /n-zəl-nen/

a.



b. VI-rules Y_{AgrO}
- i [-prt]↔ /nen/ / [-prt]
- ii [+sp]↔/-βum/
- iii [+add]↔/-[ɣ]in/

c. VI-rules X_{AgrS}
- i [+pl]$_{AgrS}$ ↔ /n-/
- ii [+sp] ↔ /t'-/
- iii [+add] ↔ /q-/

Thus, since CA can account for both Chukchi and Itelmen, I use that to derive PPA. At this point the system allows for languages to have two agreement markers to be spelled out separately, since there are two probes, and the system allows for PPA, since the agreement markers are in the same domain. Since I am taking PPA to be an instantiation of CA, the system also allows for allomorphs to occur in the verbal paradigm. Again, this is also visible in Itelmen. The third person object marker is spelled out differently in the context of a different subject. Some examples are given in below for 1π and 2π subjects.

(25) a. **t'**-il-ał-**čen**
1-drink-FUT-**1>3.SG**
'I drink it'

b. ∅-əlčqu-z-**in**
2-see-PRES-**2>3**
'You see it'

This can be accounted for by extending the list of VI rules for [-part] by having multiple contextual allomorphy rules. Thus, the features of the object are spelled out slightly different, depending on the features of the subject. The subject features then can still be spelled out separately. Note that the 'portmanteau' marker is now a contextual allomorphy rule in a list of different rules.

(26) VI AgrO (SG only)

a. [-part]↔/-čen/ / [sp]$_{\text{AgrS}}$
b. [-part]↔/-sx/ / [add,pl]$_{\text{AgrS}}$
c. [-part]↔/-(i)n/ / [add]$_{\text{AgrS}}$
d. [-part]↔/nen/ / [-part]$_{\text{AgrS}}$

To conclude this section, a system where there are two probes for agreement allows for multiple markers and for the interaction of allomorphy, PPA and separate markers. Moreover, making the probes interact via contextual allomorphy derives PPA. Thus, PPA markers are a less transparent form of a 'standard' allomorph.[9] The next section shows evidence for PPA as allomorphy by looking at locality restrictions.

[9]See for a discussion on the directionality of contextual allomorphy Fenger (2017), where the difference between the potential allomorphy of object markers and subject markers is discussed (e.g. only CA is possible for the object marker, the subject marker is either spelled out as a full marker or as zero, whereas the object marker can spell out only object features or subject and object features overtly).

4.1 AGR-probes in different domains: no PPA

If we believe that PPA are formed via contextual allomorphy and that contextual allomorphy is restricted to contexts in which both probes are inside a single complex X^0, we predict that not all languages with multiple agreement markers can have PPAs. Specifically, if the agreement markers are not in the same morphological word, then the probes are not both in the same complex X^0, and PPAs should be systematically excluded. This section provides evidence from Bantu languages, and from contexts in De'Kwana that do not have PPA.

Example languages that mark agreement in different positions on the verb (Julien 2002), are Bantu languages (Bresnan & Mchombo 1987). In the following example from Chichewa there is subject and object agreement, with tense material intervening.

(27) Njuchi **zi**-na-**wa**-lum-a alenje 3>3π
bee **SUB**-PAST-**OBJ**-sting-FV hunter
'Bees stung hunters' Chichewa (Monich 2015)[10]

It has been argued that the verb consists of multiple morphological words, thus the AGR-probes never end up in the same domain and cannot interact. This means that the forming of PPA is not possible, since the context for contextual allormorphy rules is not met. Thus, these languages have the same order for functional morphemes, but differ with regard to agreement placement (cf. Cinque 1999, Julien 2002). This means that looking at the possible existence of PPA in a language tells us something about locality domains for CA.

Even in languages with PPA we can see that PPA is not allowed if the agreement probes are not in the same domain. Comparing De'Kwana and Itelmen, two languages with PPA, shows an interesting difference. De'Kwana has no PPA in negative clauses. In these clauses there are two verbs, as shown in example 28: the main verb agrees with the internal argument, whereas the auxiliary agrees with the external argument.

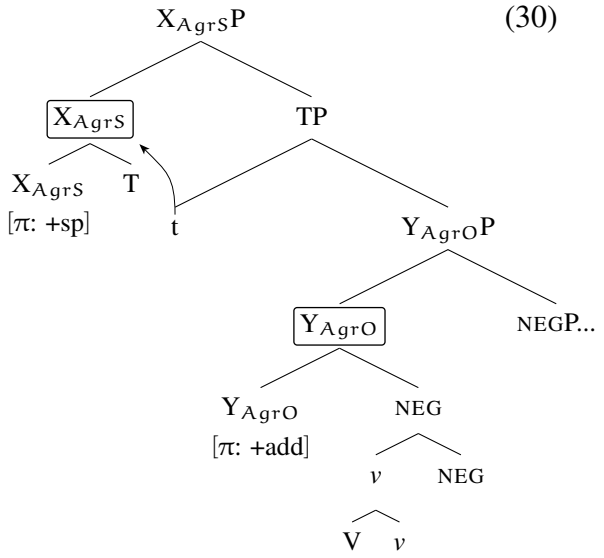
(28) a. **ad**-ayhuku-'da **w**-ö-a üwü 1π>2π
2.IA-hit-NEG **1.EA**-be-PRES I
'I don't hit you'

[10]The glosses are adapted slightly and do not include the class markers, since the focus is on the position of the subject and the object markers in the verb.

b. **y**-ayhuku-'da **m**-ö-a ömödö 2π>1π
1.IA-hit-NEG **2.EA**-be-PRES you
'You don't hit me' (Hall 1988:338)

Recall that De'Kwana allows for PPA when there is a combination of 1π and 2π. I argue that the absence of PPA in 28 this is due to a structural difference in declarative and negative clauses. In declarative clauses the agreement probes and up in the same domain, but in different domains in negative clauses. Thus, the structure of 28a is as follows.

(29)



(30) VI rules for X_{AgrO}

a. [+add] ↔ /mən/ / [+sp]$_{AgrS}$
b. [+add] ↔ /əd/
c. [ ] ↔ /n/

The language has the same VI-rules for the object agreement slot, but the first rule is not applicable, since the features of the subject marker are not local enough. This means that 30b needs to be inserted, which leads to the marker that only expresses addressee features. Thus, no PPA surfaces.

The situation with multiple verbs is different in Itelmen, because even with multiple verbs PPA is still allowed. This can be seen in the following example where there is an auxiliary that contains prefixes and suffixes: the main verb does not have any person agreement.

(31) qa'm łem-aq **t'**-iɬ-**čen**
NEG kill-NEG **1.SG**-AUX-**1>3.SG**
'I didn't kill it' (Bobaljik 2008:7)

This can be accounted for in the following way. Unlike De'Kwana negative clauses, all agreement heads end up in one morphological head in Itelmen. This means that the context for the allomorphy rules is still met and the PPA can still be spelled out.

5 Conclusion

I have shown in this paper that there is no such thing as a pure-PPA language, and argued against analyses that take PPA to be derived from a special mechanism. I have shown that all languages that allow for PPA in their agreement paradigm have evidence for two slots. I accounted for this by assuming that languages with PPA have two agreeement probes and interaction between these probes are modeled via contextual allmorphy. As such, PPA obey the same restrictions as other allomorphs. More specifically, I have shown that these markers can arise when the agreement heads are placed in the same domain, if they are not, PPA (and allomorphy) can not occur.

Analyzing agreement with two probes as high as T accounts for (i) the order of verb morphology, (ii) the possible interactions of the probes and (iii) the existence of PPA, allomorphy and separate markers in one paradigm. Thus, PPA are not syntactically special — there is no special probe syntax for PPA distinct from regular subject and object agreement. Nonetheless it tells us something important about the syntax of languages with PPA: namely, looking at PPA tells us what the structural locality conditions are on contextual allomorphy, along with cross-linguistic variation in positions of agreement probes.

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Honorific alignment and pronominal paradigm: Evidence from Mixtec, Santali, and Dhimal

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1 Introduction

Honorific vocabularies have been shown to differ from one another in terms of the "axes of politeness" (Comrie 1976) over which they enact respect (Levinson 1983, Brown & Levinson 1988, Errington 1988, Agha 1993, Fleming 2016). Some honorific vocabularies enact speaker's respect towards addressee, independent the topic of discourse (e.g. the krama vocabulary in Javanese [Errington 1988]). Other honorific vocabularies enact speaker's respect toward the discourse referent, independent of the identity of the discourse addressee (e.g. Tibetan lexical honorifics [Agha 1993]). In the extant literature on honorific patterning, respect-based variation in addressee-referring pronouns—the so-called T/V distinction—has been assimilated to the latter, "speaker-referent axis" of politeness. For instance, Brown and Levinson concur with Comrie (1976), in observing that:

> "... the familiar T/V pronoun alternation in European languages is in fact a case of referent honorifics, and not addressee honorifics as might be supposed. For in these European T/V systems, as in all systems based on the speaker-referent axis, it is not possible to express respect to H [=hearer] without *reference* to him or her..." (Brown & Levinson 1988:180)

In this paper I show that honorific pronominal paradigms vary in their patterning and that this variation, just as with lexical honorifics, reflects whether honorific pronouns in these systems enact speaker's deference towards discourse addressee or towards discourse referent. Although the majority of attested cases of T/V alternation do, indeed, index the relationship between the speaker and the referent, there is a small, but robust, set of cases where this distinction indexes the relationship between speaker and addressee. The paper offers arguments in support of, diagnostic methods for determining, and divergent diachronic pathways motivating, these different honorific alignments of pronominal paradigms.

1.1 Nonreferential indexicality

I begin by offering some background on the analytic framework employed in the paper. This paper forms part of ongoing research on grammaticalized social indexicals that seeks to understand how conventionalized type-level social pragmatic systems are structured. I use a metalanguage, common in linguistic anthropology but much less widely used elsewhere, which distinguishes between NONREFERENTIAL INDEXICALITY and REFERENTIAL INDEXICALITY (or DEIXIS). Nonreferential indexicality consists of all indexical relationships between linguistic tokens and the speech context that "do not contribute to the referential speech event" (Silverstein 1976:201). Although most social indexicality is highly evanescent, context-specific, and variable, some social indexicals—especially those that signal relatively stable social identities, distinctions, and relationships—are often highly conventionalized sociopragmatic types. It is the structure of such types that will be of interest to us here. Such type-level nonreferential indexicality contrasts with, and indeed often interacts with, type-level referential indexicality. For instance, the respect function of an honorific 2nd person pronoun (e.g. French *vous*) is a nonreferential indexical function that is laminated over the referentially indexical function of the expression that picks out addressee as discourse referent. Formally trained linguists will be familiar with an analogous distinction emerging from Potts' 2005 work on CONVENTIONAL IMPLICATURE between "at issue" and "not at issue" meanings. Or, for yet more nomenclature, think of what those descended from an older Berkeley tradition, after Fillmore 1975 and Levinson 1983, call SOCIAL DEIXIS in contrast to other kinds of deixis (e.g. spatial deixis, temporal deixis, person deixis). The study of honorifics, whether lexical or pronominal, concerns itself with type-level nonreferential indexicality.

1.2 Indexical focus

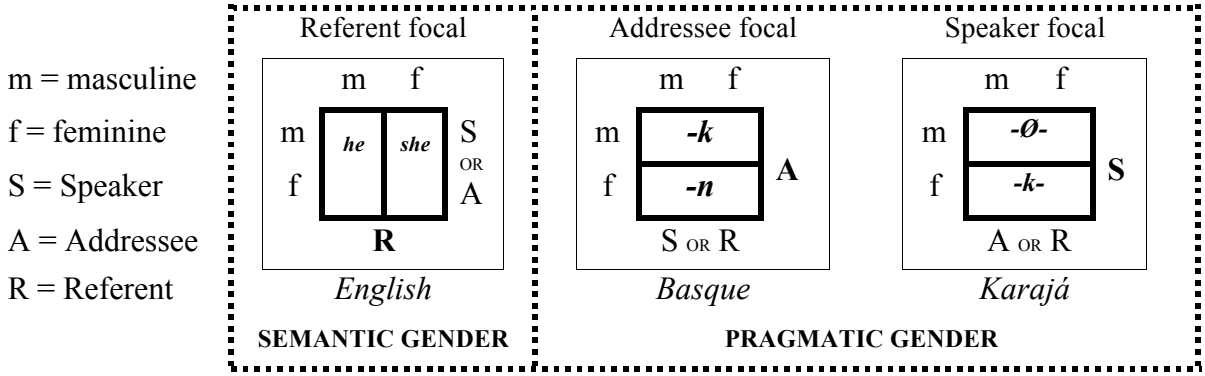
The crucial distinguishing feature between referential and nonreferential indexicals is that in the case of the latter the set of unique individuals, or atoms, over which a feature is applied (or a function is achieved) are not isomorphic with the atoms denoted by the expression in question (Fleming 2012:316, n.4). The analytic of INDEXICAL FOCUS (after Agha 1993) helps to make this distinction clear. The indexical focus of a social pragmatic type is the set of interactional roles

over which the pragmatic feature is applied. We illustrate this for the case of categorical gender indexicals. I use gender indexicality as an example because in these cases we can hold the feature-like element of the expression constant across semantic and pragmatic domains; gender features as they occur in systems of sex-based semantic (or 'referential') gender (Corbett 2003, Weschler 2009) and gender features as they occur in sex-based pragmatic gender systems trigger equivalent discourse presuppositions (Fleming 2012, 2015, Rose 2015). This allows us to look directly at the relationship between feature, interactional role and reference.

1.2.1 Example of gender indexicality

Gender may be an inherent feature of the noun head (as in Greville Corbett's treatment), or it may reflect social gender of referent (as in Stephen Wechsler's treatment of French human nouns), or it may have a purely pragmatic application, as in cases of categorical gender indexicality (Fleming 2012, 2015). It is these latter cases that involve a nonreferentially indexical application of gender features. Crucially, in such cases the gender feature is applied to an indexical focus non-isomorphic with the referent (or referential set). We can see this by distinguishing English anaphors from Basque inflected verb suffixes from morphophonological alternants in Karajá (see Table 1). So, in definite reference, English singular anaphors characterize the social gender of the referent. In Basque, verbal suffixes characterize the social gender of the addressee. In Karajá, a morphophonological alternation characterizes the gender of the speaker (independent of discourse reference).

Table 1: Gender features as applied to interactional roles of Referent, Addressee, and Speaker.



Our criteria for distinguishing between gender as a semantic feature and gender as a pragmatic feature depend upon whether the feature maps uniquely onto the interactional role of referent or not. Where gender features map exclusively onto referents we speak of semantic or referential gender. Where gender features map onto some set of interactional roles non-identical with the referential set, we speak of pragmatic gender. In these latter cases, social gender is nonreferentially indexed by linguistic form. The interactional roles onto which gender features are mapped constitute the indexical focus of the pragmatic type.

1.3 Honorifics and indexical focus

With important caveats which I don't want to enter into here (see Fleming 2014a:146), indexical focus types typically range over the core interactional roles of Speaker (S), Addressee (A), and Referent (R). Gender indexicals in Basque and Karajá are ABSOLUTE or one-place social indexicals. But social indexicals can also have a RELATIONAL or two-place structure (this terminological distinction follows Levinson 1983). Indeed, honorifics—the subject of this paper—are always minimally two-place indexicals; they enact respect between some indexical ORIGO (almost always Speaker) and some indexical TARGET. There are three principal types of relational indexical focus types built upon the interactional role primitives of S, A, and R: Speaker-Addressee indexicals; Speaker-Referent indexicals; and Referent-Referent indexicals. In Table 2 we illustrate this distinction by looking at Javanese honorific registers. In Javanese different register repertoires correspond (in the main) to the three different indexical focus types listed in the leftmost column of the table. The method we employ for writing the indexical focus of relational social indexicals is to list the interactional role mapped onto the origo of the index followed by the role mapped onto the target of the index.

Table 2: Javanese honorific variants for 'to give' by indexical focus type (Errington 1988).

Origo-Target of Honorific	**'to give'**	**Register name**
Speaker-Addressee	*wèneh*	Ngoko
Speaker-Referent$_{=\text{Subject/Agent}}$	*paring*	Krama inggil
Referent-Referent$_{=\text{Recipient}}$	*caos*	Krama andhap

As we can see, the three honorific terms translated as 'to give' index deference entitlements between different interactional role sets (see also Fleming 2016). The first term, *wèneh*, indexes the deference entitlements of addressee with respect to speaker. The second term, *paring*, indexes the deference entitlements of the discourse referent with respect to speaker. And the third term, *caos*, indexes the deference entitlements of the referent of the benefactive recipient of the predicate with respect to the referent of the subject argument of the verb. Examples like Javanese illustrate the need for an analytic akin to indexical focus to account for how lexical honorifics pick out their targets of respect.

2 Indexical focus and the T/V distinction

At this point we are ready to turn toward the data on honorific pronouns. After Brown and Gilman (1960), the alternation between an honorific and a nonhonorific pronoun employed in addressee reference is called a T/V SYSTEM. ("As a convenience we propose to use the symbols *T* and *V* (from the Latin *tu* and *vos*) as generic designators for a familiar and a polite pronoun in any language" [Brown & Gilman 1960:254].) Comparative work on T/V systems has been biased toward languages of Europe and, to a lesser degree, South Asia. In those languages, honorific pronouns can have quite variable social functions depending upon the context of their occurrence. So, in Parisian French, *vous* may acknowledge the status asymmetry between speaker and addressee, but it might alternatively foreground the social distance between the two individuals, or index the formality of the speech event, among many, many other contextually nuanced social meanings that honorific tokens may trigger (see Morford 1997). In many small-scale societies we find a quite different patterning to the T/V distinction. Although the same formal resources are often employed—nonsingular number being employed in respectful reference to a unique individual—norms governing the use of respectful forms may be much more specific. In many language groups, honorific pronouns are exclusively employed between individuals standing (or wishing to stand) in particular social relationships to one another. So, for instance, in the Papuan language Kobon, skewing of dual number in singular pronominal reference is limited to same-sex in-laws (a man uses it for his brothers-in-law and father-in-law; a woman for her sisters-in-law and mother-in-law), whereas skewing of the plural is used for

cross-sex in-laws (Davies 1991).[1] Following Choksi (2010) we may call this a distinction between GENERALIZED HONORIFICS (e.g. French) and RESTRICTED HONORIFICS (e.g. Kobon).

The distinction between restricted and generalized honorification is certainly not limited to honorific pronouns. In last year's proceedings, I discussed honorific registers in Austronesian languages (Fleming 2016). In that context I contrasted Polynesian CHIEFLY LANGUAGES with Indonesian SPEECH LEVEL SYSTEMS. The former are restricted systems in the sense that honorific vocabularies are stereotypically used in referring to particular social categories of individual.

Table 3: Restricted honorifics for 'to go' in Samoan (Keating & Duranti 2006).

Origo-Target of Honorific	**'to go'**	**Social Identity of Target**
Speaker-Referent	*afio*	*ali'i* (chief)
Speaker-Referent	*maliu*	*tulāfale* (orator)
Speaker-Referent	*alu*	commoner

One can contrast lexical honorifics of this type with lexical honorifics in Javanese. In Javanese, "honorific language stereotypically indexes deference to persons who have a relatively high status within multiple social configurations: kinship (grandchild-grandparent relation), schooling (student-teacher relation), politics (subject-royal relation), etc." (Fleming 2016:297, see the original for citations). The use of lexical honorifics in Javanese can index an indeterminate number of contextual parameters. As we can see in Table 3, Samoan honorifics contrast with this pattern. In Samoan, a conventional implicature of honorific usage is that the referent is of a particular social category (e.g. orator, chief, king).

This dimension of variation between restricted honorific and generalized honorifics has been overlooked in the typological literature (e.g. Head 1979, Malsch 1987, Helmbrecht 2005). Many of the examples discussed in this paper come from languages with restricted honorifics, and we might ask if this factor is important for understanding the diachronic processes driving the patterns of honorific alignment that are to be discussed. This is a theme that we will return to further along (see section 6).

[1] I use the term SKEWING, in a rather distinct manner from Heath 1998, to indicate a usage where honorification is achieved by means of semantic feature values which do not correspond with the co(n)textual characterization of the referent (e.g. PLURAL for a unique individual, the 3rd person for a discourse addressee).

2.1 Overspecification of the indexical target in T/V systems

With that caveat behind us, let us return to the treatment of honorifics in terms of the analytic of indexical focus. What is the indexical focus type of a V pronoun? Which interactional role—addressee or referent—is the target of honorification? Intuitively, we might want to say that it is the addressee. The T/V distinction is canonically framed in terms of "address systems" and as concerning itself with the relationship between speakers and addressees. And yet, if we restrict ourselves to the analytic frameworks for social indexicality (i.e. Comrie 1976, Levinson 1983, Agha 1993) we can see that it would be equally correct to say that the discourse referent is the target of honorification (cf. Brown & Levinson 1988:180). Indeed, in T/V systems, the indexical target—that is, the interactional role to which deference is "paid"—is overspecified: the indexical target is both the Referent (R) and the Addressee (A). This reflection begs the question: Does one honorific alignment—either Speaker-Addressee or Speaker-Referent—predominate over the other in a given case, and how should we go about figuring that out? The rest of this paper considers this question and shows that taking this distinction seriously opens up a space of typological variation.

2.2 Person-number-gender feature value skewing

We will be concerned here with cases where pronominal honorifics operate—or historically operated—by means of the suspension of number or person values. (There are cases where the suspension of gender features has an honorific implicature associated with it, but these are much more rare and will not concern us here.) Even for a scholar like Corbett (2012), who sometimes treats "respect" as a morphosyntactic feature, FEATURE SUSPENSIONS are cases where respect is a "condition on agreement" rather than a morphosyntactic feature. There is no question about the fact that we are dealing with a social pragmatic process that operates by means of distortions in the application of morphosyntactic features. Social indexicality operates here by suspending the application of semantic features. The most canonical category skewed in honorific pronouns is that of number. We first treat cases of that sort and subsequently turn to honorific skewing of person categories.

3 Honorific alignment

To figure out the indexical focus of different T/V systems, it is helpful to look at cases where the feature value that is skewed in honorific usage is employed in this manner over multiple person categories. Where the same feature value is suspended across multiple persons, we can discern what we might call the honorific alignment of the pronominal paradigm. Indeed, we can characterize the systematic patterning of honorifics by indexical focus type across a pronominal paradigm as the HONORIFIC ALIGNMENT of that paradigm.

3.1 Speaker-referent alignment: Djaru (Australian)

As an example of this phenomenon we take the language Djaru (spoken in the Kimberley in northwest Australia). Note that this is a restricted honorific system in the sense that plural pronouns are used honorifically only in reference to taboo in-laws or *maliji*, the wife's mother and the wife's mother's brother and their reciprocals (Tsunoda 1981).

Table 4: Djaru nominative verbal suffixes (Tsunoda 1981).[2]

SING.	DUAL		PLURAL		PERSON
	excl.	incl.	excl.	incl.	
-ŋa	*-lijara*	*-li*	*-ŋalu*	*-liwa*	1st
-n(i)	*-nbula*		*-nda*		2nd
-Ø	*-wula*		*-lu*		3rd

Djaru nominative verbal suffixes

As we can see from the diagram, skewing of the plural number value (i.e. suspension of the singular) is employed honorifically, but only in the 2nd and the 3rd persons. In Djaru pronominal honorifics, the indexical target of the honorific pronoun is always the referent, whether or not that referent is the addressee. For this reason we can characterize Djaru as having a Speaker-Referent alignment.

3.2 Speaker-addressee alignment: Mixtec

[2] In Tables 4, 8, and 12, shaded boxes indicate pronominal forms that are also used for honorific functions.

This Djaru-type paradigm contrasts with the kind of patterning that we find in some dialects of Mixtec. Here I draw on a wonderful essay by Barbara Hollenbach (2003) on the historical development of honorific pronouns in Mixtec. As Hollenbach's essay illustrates, in some Mixtecan dialects the plural has been effaced by the honorific distinction. Compare Xochapa Mixtec (Guerrero, Oaxaca) to Mixteca Alta Central.

Table 5: Mixtec 1st and 2nd person pronouns showing replacement of number by respect marking (Hollenbach 2003).

	non-honorific	honorific	INCLUSIVE
1st	*ri*	*sa*	*o*
2nd	*ro*	*ni*	

Mixteca Alta Central

	SINGULAR	PLURAL	
		EXCLUSIVE	INCLUSIVE
1st	*i*	*nde*	*yo*
2nd	*un*	*ndo*	

Xochapa Mixtec

As we can see in Table 5, in Mixteca Alta Central the honorific distinction (which is historically derived from a plural) is operative in the 1st and 2nd person, but not in the 3rd. There is not an honorific distinction in the 3rd person anaphors/demonstratives, which consist of a series of forms derived from monosyllabic words for 'man', 'woman', 'child', 'god', 'animal', etc. with similar extensions. It is important to observe that the first person honorific is not a "humiliative" pronoun of the kind so prevalent in southeast Asia (something of the order of 'your humble servant'). Neither is it a self-raising form of the royal "we" variety. Rather, as with the 2nd person honorific pronoun, it is historically derived from the plural (Hollenbach 2003).

If honorific functions in Djaru are mapped onto the Speaker-Referent axis—that is, they are conventionally understood as indexing the deference-entitlements of the Referent vis-à-vis the Speaker—then in Mixtec, it would appear that honorifics are mapped onto the Speaker-Addressee axis. That is, honorifics index deference entitlements of Addressee regardless the referent of the pronoun.

3.3 Speaker-addressee alignment: Dhimal (Sino-Tibetan)

Since this second type has not been explicitly theorized in the literature on honorifics, let's look at some more cases of this sort. Our next example comes from Dhimal, a Tibeto-Burman language spoken in Nepal and India, as described by John King 2001.

Much as with Mixtec, we see that honorific distinctions occur only in 1st and 2nd but not in the 3rd person in Dhimal (see Table 6). As in Djaru, here we are dealing with a restricted honorific system—these honorifics are used reciprocally in conversations between in-laws who stand in a ritualized respect relationship to one another. Synchronically, the western dialect of Dhimal studied by King marks in-law relationships in three ways: (1) nonce first person pronouns and verbal agreement morphology (which marks person, number, tense, and aspect) used in addressing the affine, (2) nonce, but formally analogous, second person pronouns and verbal agreement morphology employed in addressing the affine, and (3) a semantically vacuous phrase-final suffix, *-nyo*, used only in addressing in-law relations. The morpheme *-nyo* is a Speaker-Addressee [S-A] focused, phrase final, purely nonreferential index. The nonce forms in both 1st and 2nd person consist of palatalization in the nominative and *-i* in the genitive and dative. King is able to show with historically documented pronominals from the eastern dialect, that the affinal forms were nonsingular forms originally.

Table 6: Dhimal nominative pronouns (King 2001).

SING	DUAL	PLURAL	person	SING	DUAL	PLURAL
ka	*kidhimi*	*kelai*	1st	*kya*	-	-
na	*nidhimi*	*nelai*	2nd	*nya*	-	-
wa	*odhimi*	*obalai*	3rd	-	-	-
Dhimal nominative pronouns				Honorific pronouns		

King's analysis of this system is nuanced and insightful, and it is refreshing to read an author who really seeks to separate out Speaker-Addressee from Speaker-Referent from Speaker-Bystander functions for these forms. He observes that usage of honorific pronouns is not ever conditioned by the identity of bystanders (King 2001:171), and goes on to argue that "[w]e need only concern ourselves here with ... the speaker-referent and speaker-addressee axes [i.e. 'of

politeness', he is citing Comrie 1976]" (ibid.).[3] Nevertheless, an even more parsimonious account—and it is the one which I favor—might treat all nonreferential indexicals which serve to signal the in-law relationship as having a Speaker-Addressee alignment. The semantically vacuous phrase-final suffix, *-nyo*, in particular, offers support for this treatment. Indeed, this suffix operates like other referentially vacuous Speaker-Addressee indexes in other languages, such as the phrase final particles, or 'speech level' distinctions, in Korean.

3.4 Paradigmatic patterning as diagnostic of honorific alignment

In the cases just reviewed, the patterning of honorifics over person categories is diagnostic of the honorific alignment of the T/V system. Gaps in the occurrence of honorific pronouns can thus be used to determine the underlying indexical focus type (i.e. S-A or S-R) of the T/V system. The 1st-and-2nd-but-not-3rd pattern is associated with a Speaker-Addressee alignment while the 2nd-and-3rd-but-not-1st pattern is associated with a Speaker-Referent alignment (see Table 7 for a schematization).

Table 7: Paradigmatic patterning of honorific pronouns diagnostic of honorific alignment.

	e.g. Santali (Austroasiatic)	e.g. Kobon (Papuan)
1st	✓	-
2nd	✓	✓
3rd	-	✓
	Speaker–Addressee Alignment	Speaker–Referent Alignment

This patterning—1/2 versus 3 or 2/3 versus 1—should not, however, be taken as an absolute rule. In particular, some Speaker-Referent aligned languages may extend plural marking to forms that include Speaker in their denotation. Gooniyandi (Australian) offers a good example of this sort of system.

[3] King seems to argue that the 1st person pronominal forms involve a Speaker-Referent 'politeness axis' while the 2nd person agreement suffix involves Speaker-Addressee indexicality. I would have thought the null hypothesis would be precisely the reverse—the form which actually refers to the target of honorification (i.e. the 2nd person pronoun) seems the more plausible candidate for S-R focus, but he would appear to claim the opposite when he writes that the suffixes "...<-kya> and <-nya> fall on opposite sides of the speaker-referent and speaker-addressee cleavage" (King 2001:172).

Table 8: Gooniyandi honorific pronouns, nominative paradigm (McGregor 1990:19-20, 170). Again, shaded boxes indicate forms that can function as honorifics.

	SINGULAR	NON-SINGULAR	
		RESTRICTED	UNRESTRICTED
1st	*nganyi*	*ngidi*	*yaadi*
2nd	*nginyji*	*gidi*	
3rd	*niyi*	*bidi*	

Table 8 is a re-presentation of McGregor's Table 3-5 (McGregor 1990:170), with shading added to indicate forms employed honorifically. Gooniyandi pronominals are typologically anomalous. The system has affinities with a minimal/augment system, but cannot be neatly fit into such a framework. At the same time it cannot be treated as exhibiting a straightforward inclusive/exclusive distinction. The problematic term is *ngidi*, which can either denote 1+2 or 1+3. This is not a dual, though, since what I have represented as 1+3, following the notation from Cysouw 2003:93, can refer to any number of individuals, as long as it doesn't include the addressee in its denotation. The *yaadi* form is UNRESTRICTED in the sense that it includes all three persons in its denotation (i.e. 1+2+3).

This honorific patterning suggests that the system is conceptualized by native speakers in terms of the logic of a minimal/augment system. That is, it is the would-be MINIMAL forms that should not be used to refer to a *maddiyali* (classificatory or actual wife's mother and daughter's husband). Again, employing Cysouw's notation for minimal/augment systems, the 1+2, 2, and 3 forms are targets of avoidance, but not the 1 form, *nganyi*. Indeed, *ngidi* is only a target of avoidance when a potential token would be used in reference to a Speaker+Addressee dyad composed precisely of the members of a *maddiyali* relationship—that is, where it has the extension characteristic of a 1+2 minimal pronoun:

> "[*M*]*addiyali*, with whom speech was permitted, were addressed with the second person non-singular pronominal *gidi*, instead of the singular form *nginyji*. S/he would be referred to by means of the third person plural *bidi* if the relationship was a close one, but otherwise more frequently by the singular *niyi*; and the first

person unrestricted *yaadi* 'we three or more inclusive' would be used instead of *ngidi* 'we two, we exclusive' in reference to the speaker-hearer dyad." (McGregor 1990:19-20)

In terms of native speaker reanalysis, it is the would-be AUGMENT number which is associated with an honorific function in Gooniyandi. Whether readers find this claim concerning the folk-analysis of the pronominal system convincing or not, I hope that they will grant that Gooniyandi illustrates a Speaker-Referent aligned honorific system which extends into the space of what is classically called the 1st person.

Now we might ask whether Speaker-Addressee systems ever extend into the 3rd person. We haven't found systems like this at present, but there is no reason to believe that they couldn't exist. As we have seen, Speaker-Referent honorifics are largely limited to the person categories (2nd and 3rd) used in referring to the target of honorification. It seems that in the Speaker-Addressee alignment type, honorifics are typically limited to those person categories (1st and 2nd) defined in and by the act of address (cf. Benveniste 1966).

3.4 Predominance of speaker-referent alignment

Some comments about the typological distribution of these two alignment types is in order. Where skewing of the same number feature occurs across more than one grammatical person, it is much more common that honorifics are found in 2nd and 3rd but not 1st, than in 1st and 2nd but not 3rd. Some cases that might be cited here are Kobon (Papuan) dual and plural after Davies 1981, Wik (Cape York Peninsula, Australia) plural after Sutton 1978, Korowai (Papuan) plural after Stasch 2003. In all of these cases, the same number value has an honorific function in the 2nd and 3rd person but not in the 1st. The predominance of the Speaker-Referent alignment over the Speaker-Addressee alignment is consonant with Asif Agha's findings concerning lexical honorifics (Agha 2007:315-322). Many more languages have lexical honorific alternants showing respect towards Referent than towards Addressee. Speaker-Addressee alignment in pronominal paradigms—as in lexical honorific registers—is the typologically marked pattern.

4 Skewing over person categories

Of course, cross-linguistically it is not just number values which are skewed to achieve honorific effects. In many languages, person categories are also skewed in particular social relationships. The Europeanist tradition (often drawing on German *Sie* and Italian *Lei*) sometimes presents person and number as two equally available grammatical categories for indexing social relationship (Head 1979, Malsch 1987). Certain implicational relationships have been suggested. For instance, skewing of person is typically viewed as being more honorific than skewing of number: "Variation of person in pronominal reference indicates greater differences in degree of respect or social distance than does variation of number" (Head 1979:191). This line of analysis misses an important distinction between the skewing of person and number values. The shift from 2nd to 3rd person does not—as with the shift from singular to plural—merely involve some deviation from the default usage in accomplishing the speech-act of reference. Rather, it additionally involves deviation in terms of the speech-act of address. Indeed, in the context of in-law avoidance relationships the switch to 3rd person is often accompanied by non-linguistic markers (lack of consumated eye-gaze, lack of reciprocally coordinated bodily orientation) which serve to cancel out the act of address.

> "The use of third-person forms for expressing honorific second person is a very common strategy to express honorificity and politeness and is well-attested in European languages such as German, Italian, and Polish. ... Using high-honorific second-person forms [in Maithili] usually entails the speaker's avoidance of any glance at the highly respected hearer while using these forms, thus physically enacting a third-person situation. Typical situations of this are the taboo relations that prevail in traditional society between various 'in-laws' of opposite sex and differing generation..." (Bickel et al. 1999:499).

The suspension of the distinction between 2nd and 3rd persons is often part and parcel of a multimodal suite of interactional displays that serve to symbolically negate the act of communication of which they form a part as constituting an act of address towards the indexical target that they nevertheless pick out (Fleming 2014b:274 infra). In summary, skewing of person categories often interacts with the pragmatics surrounding the speech act of address—that is, second person forms may be avoided because they presuppose the social authority of speaker to

ratify an interactional other as addressee. As an example of this phenomenon take the honorific pronouns employed for Pohnpeian paramount chiefs (see Table 9).

Table 9: Pohnpeian pronouns (Rehg 1981).

CHIEFLY HONORIFIC		HONORIFIC		SINGULAR	DUAL	PLURAL
2nd	*ihr*	2nd	*komwi*	*kowe*	*kumwa*	*kumwail*
3rd		3rd	*ihr*	*ih*	*ira*	*ihr*

In Pohnpeian, in the paradigm of pronouns used to honorifically refer to chiefs, there is a suspension of the distinction between 2nd and 3rd persons. This is best interpreted as a pragmatic suspension of the capacity of speakers to constitute chiefs as discourse addressees in and by the act of reference.

4.1 Second person > third person: speaker-referent alignment

Another example of this type of phenomenon—only now drawn from the regulation of kin relations in an egalitarian society rather than the negotiation of political hierarchy in a conical chiefdom—can be seen when we look at the paradigm of affinal pronouns presented by Burenhult 2005 for the Aslian language, Jahai (see Table 10). (Recall that the Aslian language groups are traditionally hunter-gatherer communities living in peninsular Malaysia which practice highly formalized in-law avoidance relationships [e.g. Benjamin 1999].)

Table 10: Honorific pronouns keyed to affinal relationships in Jahai (Burenhult 2005).

SEMANTIC CATEGORY	2nd person	3rd person
dual	*jih*	*wih*
plural	*gin*	

KIN RELATION OF REFERENT$_{target}$ TO SPEAKER$_{origo}$	2nd person	3rd person
sibling-in-law	*jih*	*wih*
child-in-law	*wih*	*gin*
father-in-law	*gin*	

Here again, in the linguistically indexed relationship requiring the greatest respect (that is, in the relationship between a son-in-law and his father-in-law) there is a suspension of the distinction

between 2nd and 3rd person marking. That is, there is a suspension of grammatical person as a formal means of achieving discursive address; acting in accordance with social norms, a son-in-law simply cannot constitute a parent-in-law as addressee through pronominal reference alone.

Whatever the relationship to discourse address, it should be noted that this pattern of person skewing parallels the patterns of number skewing in Djaru and Kobon that we looked at before. These are Speaker-Referent aligned systems. Indeed, it is not only the collapsing of 2nd and 3rd persons, but also the use of dual and plural number for siblings-in-law and children-in-law in both 2nd and 3rd persons, which patterns in terms of a Speaker-Referent alignment. In Jahai, pronominal tokens that refer to respect relations—rather than tokens addressed to respect relations—are the ones that get special treatment.

4.2 Second person > first person: speaker-addressee alignment

The Jahai father-in-law pattern can be contrasted with cases where the distinction between second person and first person is collapsed. There are a number of T/V systems where the distinction between 1st and 2nd person is suspended in honorific speech. Following the logic of the agreement hierarchy (Corbett 2006), in such languages 1st person forms tend to be employed in addressee-reference. An example of this type of phenomenon can be found in Guarijío (Uto-Aztecan; Mexico), as described in Wick Miller's 1980 BLS paper (see Table 11). In Guarijío, respect relations including in-laws and compadres, use the 1st person plural pronoun in both speaker-reference and addressee-reference. The ethnometapragmatic term used to designate the register is *ewéwame* or 'speaking for two.'

Table 11: 1st and 2nd person pronouns and the honorific form in Guarijío (Miller 1980).

SINGULAR	PLURAL	PERSON	HONORIFIC
née	*remé*	1st	*remé*
muú		2nd	

Following the same line of argumentation that we employed for the suspension of number features in honorification, we can see that the use of the 1st person inclusive for both addressee-

reference and speaker-reference is diagnostic of a Speaker-Addressee alignment for the Guarijío T/V system.

4.2 Speaker-addressee alignment: Santali (Austroasiatic)

A case that suggests that a uniform treatment of honorific alignment can be used for both number and person features is Santali.[4]

Table 12: Pronominal reference in affinal speech participant dyads in Santali (Ghosh 2008:33).

Number category	Speaker-Reference	Addressee-Reference	*S-A social relationship type*
DUAL	*aliñ* 1+3	*aben* 2+3	Lineal cross-generation in-laws
PLURAL	*abo* 1+2+3		Co-parents-in-law

PERSON	SING.	DUAL excl.	DUAL incl.	PLURAL excl.	PLURAL incl.
1st	*iɲ*	*əliɲ*	*alaŋ*	*alɛ*	*abo*
2nd	*am*	*aben*		*apɛ*	
3rd	*uni*	*unkin*		*onko*	

Santali independent pronouns

In Santali, both number and clusivity are employed honorifically, though they are associated with different respect relationship types. The DUAL and the EXCLUSIVE are associated with the cross-generational lineal affinal relationship, while the PLURAL and the INCLUSIVE are associated with the same-generation and, as it were, collateral affinal relationship between spouses' parents (cf. co-affines). Note that the two honorific repertoires are, within the domain of participant deixis, inverted images of one another. In the cross-generational paradigm relatives are always kept separate on the denotational plane, something assured by the use of the exclusive dual in the 1st person. In speech between co-parents-in-law, however, the speaker and addressee are always merged, something achieved by the use of the inclusive plural and the suspension of all 2nd

[4] The descriptions of honorific pronominal usage in Santali in Choksi (2010) and Ghosh (2008) differ from one another. Choksi only discusses the use of the dual, while Ghosh discusses an honorific use of both the dual and the plural. Choksi states that the dual is only employed by the junior relation, while Ghosh indicates that the dual is employed reciprocally (Ghosh 2008:33, but see page 44 for potentially contradictory information). Choksi states that the dual can be used in the 1st, 2nd, and 3rd persons, while Ghosh suggests that it is only used in the 1st and 2nd. These differences likely reflect regional variation in honorific usage. Yet a third description of honorific usage in Santali is provided by MacPhail (1983:23) cited in King (2001:170): "In Santali, first (exclusive) and second person dual forms are used by a mother and father-in-law to their son or daughter-in-law, while first (exclusive) and second person plural forms are used between the parents of a husband and wife." Unfortunately I have not been able to consult MacPhail's text to check these details. A fuller account of regional variation in patterns of usage would constitute an interesting study. In any case, I draw on Ghosh's description here.

person forms. One might speculate on the sociocultural correlates of these, in essence, denotational-to-interactional metaphors.[5] The co-parent-in-law plural would seem to involve a trope of inclusion, of indivisible union rather than separation. This is quite a different theme than the denial of interactional mutuality diagrammed through the 2nd/3rd person neutralizations (cf. the Jahai son-in-law/father-in-law relationship), a characteristic of cross-generational in-law avoidance cross-culturally, where in-laws often cannot directly look at one another, touch one another, share food, etc. Santali is an interesting case, for our purposes, because it has both person and number values patterning in a Speaker-Addressee alignment.

Table 13: Honorific systems with a speaker-addressee alignment.

Guarijío (Uto-Aztecan) PRO ⇒ 1st person INCLUSIVE	Dhimal (Sino-Tibetan) PRO ⇒ NONSINGULAR
Santali (Austroasiatic) PRO ⇒ 1st person INCLUSIVE { between co-parents in-law }	Santali (Austroasiatic) PRO ⇒ DUAL (EXCLUSIVE) { between lineal in-laws }
Skewing of person categories	Skewing of number values

A brief recap of some of the cases of Speaker-Addressee alignment that we have looked at so far is presented in Table 13.

5 Honorific alignment in light of theories of politeness

[5] Interestingly, Neukom 2001:37 (cited in Cysouw 2005:231) observes that the 1st person dual inclusive is used in speaker-reference "in threatening language" in Santali. Cysouw contends that "[t]he aggressive use of the inclusive as found in [Santali] can be explained by the fact that including reference to the addressee is a violation of the addressee's negative face" (Cysouw 2005:232). Unfortunately, the politeness-based interpretation fails to attend to how the anti-honorific function of the dual inclusive is motivated by system-internal characteristics of the honorific paradigm (cf. the discussion in section 5). Use of the 1st DUAL.INCLUSIVE in speaker-reference separates and mixes the feature values which are bundled together to enact Speaker-Addressee deference elsewhere—that is, the [DUAL + EXCLUSIVE] feature pairing, on the one hand, and the [PLURAL + INCLUSIVE] pairing, on the other. Note also that the anti-honorific 1st DUAL.INCLUSIVE is further evidence of the Speaker-Addressee patterning of the system, since it indexes the speaker-addressee relationship in speaker-reference.

Honorific patterns in pronominal reference are often seen as grammaticalized sedimentations of discourse strategies of politeness themselves related to Gricean conversational maxims or their equivalents (Brown & Levinson 1988, Malsch 1987, Heath 1991, 1998, Cysouw 2005, Helmbrecht 2005). For Brown and Levinson, T/V pronouns provide "good evidence for the non-arbitrary nature of polite forms, being for the most part 'frozen' or grammaticalized outputs of productive politeness strategies" (1988:23). The honorific plural is interpreted as a form of indirectness "since it does not *literally* single out the addressee, it is *as if* the speaker were giving H [=hearer] the option to interpret it as applying to him rather than, say, to his companions" (Brown & Levinson 1988:198-199).

The materials developed here suggest that such politeness-strategy centered accounts for the development of T/V systems are, at best, incomplete. Even if one is convinced that politeness strategies are often the source for the pragmatic forms initially grammaticalized as honorifics, this may represent only the first step in a diachronic account. This seems to be particularly true for what we have called restricted honorific systems. As we have seen, whatever their diachronic points of origin, T/V systems tend to become structured in terms of the social categories, identities and relationships they index, on the one hand, and the interactional roles across which respect is enacted (or indexical focus), on the other. Each of these factors may affect the development of T/V systems, rendering them more opaque to the "respectful-plurality principle" that putatively exerts a "[c]ontinuous pressure" selecting for the mobilization of non-singular numbers in honorific function (Brown & Levinson 1988:202, 200).

A good source of evidence for the claim that honorific systems cannot be reduced to politeness-strategies is that, in the highly structured T/V systems that we have been looking at, the same formal resources are employed to enact deference across multiple person categories. Indeed, in restricted honorific systems, in particular, the non-singular number that is skewed across multiple persons is typically the same. This suggests that the number values which are already stereotyped as having honorific functions in one person category have been analogically extended to other persons. This is the case, for instance, in Djaru, where the plural, but never the dual, has honorific function in both 2nd and 3rd persons. Many other cases could be cited (e.g. the dual but not the plural in Kharia [Peterson 2014]; the plural but not the dual or the trial in Tigak

[Beaumont 1979:74]). If the motivation here were the respectful-plurality principle we would expect there to be equal motivation for the recruitment of each of the non-singular number values, rather than convergence upon particular number values.

Alternatively, if certain nonsingular number values (e.g. dual over plural) were more motivated to serve honorific functions than others we would expect convergence cross-linguistically in systems with the same set of number distinctions. Silverstein (1976:39) contends that "[i]n those languages with a dual number category, more highly marked than plural, deference is indicated along the axis of number by switch to dual-number addressee index." This is just simply not bourn out empirically. In some languages the dual functions honorifically while the plural does not (e.g. Kharia [Peterson 2014], Beaver Dené [Goddard 1916:221]). But in others the situation is reversed. As we have seen, in Djaru the plural, but not the dual, is employed honorifically. The same is true of Guugu Yimidhirr (Haviland 1979:178, 221). In Tigak the plural, but not the dual or the trial, is employed honorifically (Beaumont 1979:74). Convergence on a particular number value across person categories cannot, therefore, be chalked up to considerations of semantic markedness alone. The most parsimonious explanation for the same number value being employed honorifically across multiple person categories is that the stereotyped deferential value of the number value already established—prototypically, in addressee-reference (i.e. in the 2nd person)—is extended by analogy to other person categories (i.e. 1st or 3rd persons).

In a particularly interesting set of cases, different number values enact respect towards different social relations. So, for instance, in the Papuan language Kobon, dual number is used in honorific reference to same-sex in-laws, but the plural is used in honorific reference to cross-sex in-laws. This usage holds in both the 2nd and 3rd persons (Davies 1991). Many more cases of this sort could be cited (see Table 12 for the case of Santali, where the dual/exclusive is employed between lineal affines while the plural/inclusive is employed between co-affines). For our purposes, the takeaway is that particular number values are stereotypically linked to particular social relationships, and it is this conventional association which serves as the basis for the analogical extension of the honorific system across multiple persons, not politeness strategies of depersonalization achieved by means of the plural.

As we have seen, T/V systems exhibiting honorific alignment often employ restricted honorifics. In such cases T/V systems are diachronically structured by stereotypes concerning the social categories of person by which and towards whom they should be employed. It appears that in restricted systems, the highly patterned character of both the formal resources used to enact deference (use of the same number values across person categories) and of their functional instantiation in discourse (their use in addressing or referring to the same social categories of individual across discourse tokens) serve to ground the coherent patterning of honorifics by indexical focus type across the pronominal paradigm.

6 On the diachrony of speaker-addressee alignment

Before concluding, I wish to offer a brief speculation concerning the development of the marked Speaker-Addressee aligned systems. As we have seen, the Speaker-Addressee pattern is often associated with restricted honorifics—that is, with honorifics that are keyed to particular social relationships. More specifically, the T/V distinctions in Santali, Kobon, Dhimal, Guarijío, Jahai and Djaru are all instantiated in ritualized in-law avoidance relationships. In such relationships, reciprocal usage of honorifics is often the norm. The extension of the honorific plural from the 2nd person into the 1st person, may represent an exaggeration of this symmetrical pattern of honorific reference between individuals who stand in ritualized respect relationships. A passage written by the 19th century missionary linguist of island Melanesia, Robert Henry Codrington, regarding the Ambae of Vanuatu, offers a promising clue:

> "In Lepers' Island a man speaks to his mother-in-law, and she to him, but they will not come near; when he speaks to her she turns away. ... When a woman calls to her son-in-law she addresses him as *mim*, you in the plural; when she sends a message to him she says, using his name, 'They want Tanga to go to them,' that is, 'I want Tanga to come to me.'" ([1891] 1957:45)

Notable here is the use of the plural not only in reference to the taboo relation, but also in self-reference addressed to (or targeting) the taboo relation. In the context of ritualized avoidance relationships, the symmetrical patterning across 1st and 2nd persons may reflect the need to take into account the other's point of view—to refer in the singular to oneself is to violate the taboo of

the other. Out of respect for the other's practice of respect vis-à-vis oneself, one refers to oneself in the plural. Perhaps such perspective shifting is one path by which the plural becomes grammaticalized as a Speaker-Addressee honorific in such languages. Grammaticalization of a Speaker-Addressee alignment seems to be motivated where the reciprocal use of V forms is the default pattern of the emerging honorific pronoun system (King 2001:179).

7 Conclusion

In telegraphed form, this paper has argued that T/V systems vary in the specification of the indexical focus of their pragmatic types. With certain caveats, I have suggested that the patterning of honorific gaps across pronominal paradigms can be used to diagnose the honorific alignment of such systems. To be sure, such an analysis will work better for some languages than for others. It seems, in particular, that T/V systems that are functionally anchored to particular social relationships may ground this kind of structuration of the formal resources employed to achieve honorification. Although the politeness-based approach to honorifics has spawned a prolific literature, because it is so concerned with the "mutual awareness of 'face' sensitivity" (Brown & Levinson 1988:5) as the final cause of sociopragmatic patterns, it tends to overlook some of the internal structural complexity of these social pragmatic systems. As we have seen, social patterning in the functional instantiation of T/V systems—what we have discussed in terms of the distinction between restricted and generalized honorifics—seems to have important consequences for their formal patterning. Understanding this distinction between restricted and generalized honorific systems may require attending to factors like speech community size (cf. Trudgill 2013), institutional orders which stabilize and circulate honorific norms (cf. Agha 2007), and how these factors condition different ideologically-mediated diachronic developments of social "indexical orders" (cf. Silverstein 2003). This paper suggests that more anthropologically sensitive approaches, concerned as much with sociocultural variation as they are with putative universals of politeness, will be necessary if we are going to be able to account for the sources of variation attested between honorific systems.

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Exploring the relation between argument structure and distributivity

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1 Introduction

Some predicates, when applied to a plural subject such as *Alice and Bob*, are understood DISTRIBUTIVELY, meaning that the predicate is understood to be individually true of (to 'distribute' down to) each member of the subject, as in 1. Other predicates are understood NONDISTRIBUTIVELY, meaning that they are NOT understood to be individually true of each member of the subject, as in 2 (unless we re-interpret the verb *meet* to have an implicit object). Still other predicates (sometimes called MIXED predicates; Link 1983) can be understood in both ways, as in 3.

(1) **Understood distributively:** Alice and Bob smiled
CONVEYS: Alice smiled and Bob smiled

(2) **Understood nondistributively:** Alice and Bob met
DOES NOT CONVEY: Alice met and Bob met

(3) **Can be understood in both ways:** Alice and Bob lifted the table
   a. COULD CONVEY: Alice lifted the table, Bob lifted the table
   b. COULD CONVEY: jointly lifted the table without each individually doing so

The main goal of this paper is to understand which predicates are understood in which way(s) and why. When we encounter a new predicate, how do we predict whether it will act like *smile*, like *meet*, or like *lift the table*?

First, some terminology and parameters. I refer to UNDERSTANDINGS of predicates rather than READINGS because I do not want to suggest that different understandings of

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a predicate necessarily correspond to different semantic representations. I describe understandings such as 2 and 3b as NONDISTRIBUTIVE rather than COLLECTIVE to avoid the notions of collaboration or joint responsibility sometimes associated with the latter term (Landman 2000, Champollion 2010). The term NONDISTRIBUTIVE also lumps together understandings sometimes described in the literature as CUMULATIVE (Scha 1981) with those described as COLLECTIVE, following many authors (Roberts 1987, Link 1998, Kratzer 2007; contra Landman 2000, Champollion 2010) who do not distinguish between these notions. Finally, while distributivity arises with all sorts of plural subjects (*children, some children, the children*), as well as group nouns such as *committee* (de Vries 2015), I focus on conjoined names such as *Alice and Bob* because these are least susceptible to the NONMAXIMALITY EFFECTS observed by Dowty 1987: *the children smiled* can be uttered felicitously if only some or most of the children actually smiled, while *Alice and Bob smiled* is only felicitous if each of them smiles – otherwise why mention them both?

Against this background, we return to the main question: which predicates go which way(s), and why? Researchers agree that the potential for distributivity of a given predicate depends fundamentally on what we know about the event it describes (e.g. Roberts 1987, Dowty 1987; to my knowledge, no author in the literature would outright disagree). *Smile* is understood distributively because people have their own faces, and so cannot *smile* jointly without each individually doing so. *Meet* is understood nondistributively because it describes a social action that an individual person cannot carry out unilaterally. *Lift the table* can be understood in both ways because it can be undertaken individually or jointly.

But the effect of such world knowledge is usually stated by fiat. Some authors use MEANING POSTULATES (Scha 1981) – constraints on the models that we consider, in a model-theoretic framework – requiring us to only entertain models in which a predicate such as *smile* distributes to each member of the subject. Others posit that a predicate such as *smile* only allows ATOMIC individuals such as *Alice* in its denotation, so that when *smile* is applied to a plurality such as *Alice and Bob*, it is required to be individually true of each member (Link 1983, Landman 1989). These strategies capture the effect of world knowledge, but do not explain it.

If we stipulate each predicate's distributivity potential, we do not predict or explain any patterns in the understandings available to various predicates – leaving unexplained at

least one hypothesized pattern: what I call LINK'S OBSERVATION, from Link 1983.

(4) **LINK'S OBSERVATION:** Predicates built from many intransitive verbs (e.g. *smile, walk, die*) can only be understood distributively, while predicates built from many transitive verbs (e.g. *lift the table, carry the piano*) can be understood nondistributively as well as distributively

After observing that *carry the piano* (built from a transitive verb) can be understood both distributively and nondistributively, Link writes: 'Common nouns and intransitive verbs like *die*, however, seem to admit only atoms in their extension. I call such predicates DISTRIBUTIVE' (Link 1983: 132). He reiterates (Link 1983: 141): 'Most of the basic count nouns like *child* are taken as distributive, similarly IV [intransitive verb] phrases like *die* or *see*'. In other words, Link hints at a connection between a predicate's argument structure and its potential for distributivity.

Is Link's observation true? There are certainly exceptions to it. We have already seen that the intransitive verb *meet* is understood nondistributively, as in 2. There are also predicates built from transitive verbs that only make sense distributively, such as 5: since individuals have their own sensory perception, it is very difficult to imagine a way for them to jointly *hear the noise* without each individually doing so.

(5) Alice and Bob heard the noise

a. ✓**Distributive**: each heard the noise

b. ✗**Nondistributive:** jointly heard the noise without each individually doing so

Of course, a predicate built from a transitive verb includes not just a verb, but also an object, which may itself affect the distributivity potential of the full predicate. In particular, restricting our attention to objects that are singular count nouns, it matters whether the object is definite or indefinite – and moreover, whether the action described by the verb can be repeated on the same object. If the predicate's object is definite and the action cannot plausibly be repeated on the same object (*eat the cookie*), then the predicate does not make sense distributively: since the same cookie cannot generally be eaten more than once, the distributive understanding 6a is implausible. In contrast, if the object is definite and the

action *can* be plausibly repeated on the same object (*lift the table*), then a distributive understanding is sensible, as in 7a, and also 5a above: the same table can be lifted multiple times; the same noise can be heard by multiple people.

(6) A&B ate the cookie

a. ✗**Distributive**: each ate it
b. ✓**Nondistributive:** jointly ate it

(7) A&B lifted the table

a. ✓**Distributive**: each lifted it
b. ✓**Nondistributive:** jointly lifted it

If a predicate's object is *indefinite* and the action described by the verb cannot be repeated on the same object (*eat a cookie*), then the only sensible distributive understanding will be one in which the indefinite covaries with each member of the subject – in 8b, each person eats a different cookie (what Dotlačil 2010 calls a distributive understanding WITH COVARIATION.) The distributive understanding WITHOUT COVARIATION, 8a, is implausible given that the same cookie cannot generally be eaten multiple times.

(8) A&B ate a cookie

a. ✗**Distributive without covariation:** one cookie, each ate it
b. ✓**Distributive with covariation:** each ate a different cookie
c. ✓**Nondistributive:** one cookie, jointly ate it

If the object is indefinite and the action *can* be repeated on the same object (*lift a table*), then two distributive understandings may be available, one with covariation, as in 9a; and one without, as in 9b (Winter 2002).

(9) A&B lifted a table

a. ✓**Distributive without covariation:** one table, each lifted it
b. ✓**Distributive with covariation:** each lifted a different table
c. ✓**Nondistributive:** one table, jointly lifted it

In other words, definiteness and repeatability interact to constrain the distributive understandings available to predicates built from transitive verbs. But in addition to whatever distributive understanding(s) are available to such predicates depending on these factors, it is striking that many predicates built from transitive verbs can be understood NONDISTRIBUTIVELY, as captured by Link's observation. For example, all of the predicates in 10 can be understood nondistributively: predicated of *Alice and Bob*, it is possible for Alice and Bob to carry out the event described by the predicate through their combined efforts, without each individually doing so.

(10) carry the piano, lift the table, fill the tub, break a vase, eat a cookie ...

In contrast, many intransitive verbs only make sense distributively: all of the predicates in 11, when applied to *Alice and Bob*, are understood to be true of Alice and of Bob. It is very difficult to imagine a way for these predicates to be understood nondistributively. The contrast between 10 and 11 constitutes Link's observation.

(11) run, swim, jump, walk, die, sleep, arrive, enter, exit, fall, blink, sneeze, read ...

Before I myself became aware of Link's observation, I was struck by the same tendency while attempting to code the verbs of Levin (1993) for their distributivity potential. Levin organizes over three thousand English verbs into a series of classes based on shared aspects of their meaning – verbs of putting, filling, building, saying, and so on. For every transitive verb in this database which can appear in the frame Subject+Verb+Object, I coded its distributivity potential using a conjoined subject (*Alice and Bob*) and a semantically plausible, singular, indefinite object (e.g. *eat a cookie, write a paper*), because definite objects raise the issue of whether the action described by the verb can be repeated on the same object. I noted whether the predicate could only plausibly be understood distributively (for example, it is difficult to imagine a way for two people to jointly *hear a noise* without each individually doing so, so it was coded as exclusively distributive), or whether it could also be understood nondistributively (two people could *eat a cookie* between the two of them without each individually doing so, for example by each eating a different half of it, so it was coded as allowing a nondistributive understanding). For every intransitive verb, I coded its distributivity potential using a conjoined subject (*Alice and Bob*), noting again

whether the predicate could only plausibly be understood distributively (*smile, walk*) or whether it could also be understood nondistributively (*meet, differ*). Quite often, verbs within a given Levin class would pattern together – not surprising, given that these classes reflect regularities in the types of events described by such verbs. But sometimes not all verbs in a given class would behave the same way, so I coded each one individually.

As a side note, some transitive verbs can also be used as intransitive verbs, if they undergo the causative-inchoative alternation (*she broke the vase/the vase broke*). I simply coded these as transitive verbs. But it is worth noting that, when used as intransitive verbs (*the vase broke*), these verbs pattern like other intransitive verbs in that they overwhelmingly tend to be understood distributively: if two vases break, they generally each do so. There are a few exceptions (if *the paths separated*, it is not necessarily true that they each did so); but the trend is striking here just as among the basic intransitive verbs.

Based on this coding scheme, I found the results reported in Table 1: consistent with Link's observation, predicates built from many intransitive verbs are only understood distributively, whereas predicates built from many transitive verbs can be understood nondistributively as well as distributively.

Table 1: Coding the distributivity potential of VPs built from the verbs of Levin (1993)

	Only distributive	**Can be nondistributive**	**Not sure**	**Total**
Intransitive verb	656 (84%) e.g. *smile*	109 (14%) e.g. *meet*	23 (2%)	788
VP w/ transitive verb	182 (8%) e.g. *hear a noise*	2057 (90%) e.g. *lift a table*	64 (2%)	2303

These findings give weight to Link's observation – raising the question of why it should be so. If a predicate's potential for distributivity is grounded in world knowledge about the event it describes, why would it also correlate with the predicate's argument structure?

In the remainder of this paper, I use Link's observation as a wedge to investigate the broader question of which predicates are understood in which way(s) and why. In section 2, I sketch the theoretical analysis of distributivity used to frame the investigation, as well as some other alternatives from the literature. In section 3, I propose that Link's observation arises as a byproduct of the behavior of predicates built from two major classes of tran-

sitive verbs: CAUSATIVE verbs (section 3.1; C.S. Smith 1970, Dowty 1979, Levin 1993); and verbs with objects construed as INCREMENTAL (section 3.2; Tenny 1987, Krifka 1989, Dowty 1991, Krifka 1992). I argue that causative predicates (*open the door*) can always be understood nondistributively because, as a general fact about causation (predicted by the counterfactual analysis of Lewis 1973), multiple parties' contributions may be individually insufficient, but jointly sufficient, to cause the result. Moreover, I argue that incremental-object predicates (*eat the cookie*) can always be understood nondistributively because, as a general fact about such predicates (predicted by the LEXICAL CUMULATIVITY assumption of Krifka 1989 and Kratzer 2007), multiple parties may each affect a different part of the object, only jointly affecting the whole thing. Because predicates built from both of these large classes of transitive verbs can be understood nondistributively, Link's observation arises as an epiphenomenon. To conclude (section 4), I suggest that by deriving Link's observation, we stake out some order within an otherwise idiosyncratic realm.

2 Theoretical background

Our analysis of a predicate's distributivity potential depends on our assumptions about where, semantically or pragmatically, distributivity comes from. This section briefly overviews some influential analyses of distributivity in the literature. I ultimately endorse a version of the Cover analysis of Gillon (1987) and Schwarzschild (1996), because I see it as the most unified and flexible.

For researchers in the tradition of Landman (1989), all distributive understandings are derived by the pluralization operator, $\star$, from Link (1983). On this approach, a verb such as *smile* denotes a set of individuals (*Alice, Bob*) who smile – parallel to a singular count noun such as *child*, which denotes a set of individual children. In order to be applied to a plurality such as *Alice and Bob*, a verb like *smile* would need to be pluralized using the plural operator, $\star$ – just as *child* needs to be pluralized to apply to pluralities of children. For any predicate P, if $\star P$ is true of the plurality *Alice and Bob*, it is because the unstarred predicate P is true of Alice and of Bob individually; and if P is true of Alice and of Bob individually, then $\star P$ is true of their sum. On these assumptions, the $\star$ operator simultaneously makes a predicate P plural and distributive – framing distributivity and

plurality as 'two sides of one and the same same coin' (Landman 1989a: 591).

On this view, *smile* is lexically restricted to only apply to ATOMS such as *Alice*. *Meet* is lexically restricted to only apply to a special sort of individual known as a GROUP (Link 1983, Landman 1989), similar to a group noun such as *faculty* (a plurality such as *Alice and Bob* can be turned into a group using Link's group-forming operator $\uparrow$). *Lift the table* admits both atoms and groups; so 12 is ambiguous between a distributive, plural interpretation and a nondistributive, singular, group interpretation.

(12) Alice and Bob lifted the table

a. **Distributive:** $\star$lift the table$(Alice \oplus Bob)$

b. **Nondistributive**: lift the table$(\uparrow (Alice \oplus Bob))$

In contrast, for Scha (1981), all distributive understandings stem from MEANING POSTULATES – restrictions on the models we entertain in a model-theoretic framework. *Smile* is associated with a meaning postulate requiring us to only consider models in which it is understood to distribute to every individual in its subject, reflecting the world knowledge that individuals can only *smile* individually. Today, this approach is not widely accepted, because it does not handle predicates that can be understood nondistributively as well as distributively, such as *lift the table* or *eat a cookie*. Meaning postulates cannot be optional (Roberts 1987), so it is not clear how meaning postulates could be used for such predicates. While no current authors follow Scha in attributing all distributivity to meaning postulates, this idea still lives on in approaches to distributivity that posit two distinct sources of it.

For many authors (Link 1991 and its English translation Link 1998: Ch. 2; Roberts 1987, Lasersohn 1995, Winter 2000 et seq, Champollion 2010 et seq, de Vries 2015, de Vries 2017), there are two distinct sources of distributivity. Some distributive inferences stem purely from extralinguistic knowledge (captured using meaning postulates), while other distributive inferences are derived in the semantic representation using an optional, covert operator (essentially a silent version of *each*) which ensures that the predicate is applied separately to every member of the subject. This operator is sometimes known as the D operator (Link 1991, Roberts 1987), and sometimes subsumed under the star operator $\star$ of Link (1983) discussed above.

This two-pronged approach can be seen as a synthesis of the two proposals we have

already seen: the meaning postulate proposal for inferences attributed only to lexical or world knowledge; and the star operator approach for inferences attributed to the presence of an operator (see de Vries 2017 for discussion). Generally, authors in this tradition use meaning postulates for predicates that appear to be consistently understood distributively (*smile*; based on the idea that meaning postulates cannot be optional), and use the optional operator for predicates that can be understood in multiple ways (*eat a cookie, lift the table*), particularly those requiring an operator in the predicate (e.g. an indefinite, a numeral) to 'covary' with each member of the subject, as in the DISTRIBUTIVE WITH COVARIATION examples (*eat a cookie*) sketched above.

Finally, for Gillon (1987) and Schwarzschild (1996) – building on the work of Higginbotham – all distributivity inferences are explained in terms of a theoretical device called a COVER: a contextually supplied set of subparts of the subject. Any time a predicate is applied to a plural subject, it is analyzed to be individually true of every cell of the Cover. A sentence such as *the suitcases are too heavy* is analyzed to mean that for every cell of a contextually supplied set of subparts of *the suitcases*, the predicate *too heavy* is true of that cell. If the suitcases are placed in a single cell together, then they are *too heavy* as a group without necessarily being *too heavy* individually; if they are each placed in their own cell, then they are *too heavy* individually.

The setting of the Cover depends on the discourse context (do we care about the weight of the suitcases individually, or together?) as well as our world knowledge about the event or state described by the predicate. In the realm of adjectives, individuals can be *heavy* jointly or individually, so both settings of the Cover make sense. In contrast, if two individuals are *green*, it is generally because they each are (it is difficult to imagine a way for individuals to be *green* jointly but not individually); so for a sentence such as *the suitcases are green*, only a distributive setting of the Cover (placing each suitcase in its own cell) is plausible. Returning to the realm of VPs, people can generally only *smile* individually, so for a sentence like *Alice and Bob smiled*, we decide on a Cover placing each individual in its own cell. People can *lift the table* individually or jointly, so we entertain a Cover placing each individual in its own cell, as well as one placing them all in the same cell. This analysis allows us to explain all distributive and nondistributive understandings in a unified, fundamentally pragmatic fashion.

Stepping back, the goal of this paper is to understand which predicates go which way(s) and why. I believe that this investigation is best framed against the Cover analysis. The other analyses capture a predicate's distributivity potential quite rigidly: if we use meaning postulates or a lexical requirement for atoms in a predicate's denotation, we predict a predicate such as *smile* to be understood distributively in all contexts. But as pointed out by Winter and Scha (2015), in an unconventional context such as 13, we may be able to understand *smile* nondistributively, given that lips can work together to create a smile while individual humans generally cannot.

(13) Alice's lips smiled adapted Winter and Scha (2015)
?? **Distributive**: Alice's lips each smiled
✓**Nondistributive:** Alice's lips jointly smiled without each individually doing so

Such pragmatic flexibility poses a challenge for the more rigid theories, but is predicted and handled on the Cover analysis. In contrast to other approaches, the Cover analysis does not attach any stipulations to individual lexical items; instead, the distributivity potential of any predicate stems purely from pragmatic reasoning about the setting of the Cover.

Moreover, on the two-pronged analysis (in which some distributivity comes from meaning postulates while other distributivity comes from an operator), the present investigation becomes more complicated. We would have to first separate the distributive understandings to be modeled with meaning postulates (which, as 13 shows, might be too rigid in any case) from those to be modeled with an optional operator, and then explain not just which meaning postulates we need and why, but also when and why the D operator is present or absent. In contrast, on the Cover analysis, we can explore the distributivity potential of all predicates in a unified manner, drawing on information about the discourse and the world at the same time.

Therefore, the current exploration – of which predicates are understood distributively or nondistributively and why – can be seen as an investigation of how we decide which Cover(s) to entertain, given what we know about the event described by the predicate. Since the Cover analysis leaves everything to pragmatic reasoning, the real task lies in explaining how this pragmatic reasoning works. The rest of the paper takes up this challenge, using Link's observation as a demarcated first step.

3 Explaining Link's observation as an epiphenomenon

If a predicate's potential for distributivity is grounded in world knowledge about the event it describes, why would it also be related to whether the predicate is built from an intransitive verb or a transitive one? Perhaps it is because predicates built from intransitive verbs and transitive verbs describe different sorts of events, about which we have different world knowledge. In particular, there is converging evidence from the acquisition literature (e.g. Gropen et al. 1991), the typology literature (e.g. Dixon 1979, Hopper and Thompson 1980), and the lexical semantics literature (e.g. Dowty 1991) that transitive verbs prototypically describe events in which an agent AFFECTS another entity in some way; while intransitive verbs describe events involving only one basic participant, which either acts autonomously or is affected by another entity that goes unmentioned.

In other words, the idea is that verbs with similar argument structures describe classes of events sharing certain commonalities (e.g. Levin 1993). Assuming that a predicate's potential for distributivity depends on world knowledge about the event it describes, we expect predicates describing similar sorts of events to pattern together in their potential for distributivity. Thus, I propose that the apparent connection between argument structure and distributivity is an indirect one, driven by our world knowledge about the types of events that tend to be described by transitive verbs versus intransitive ones.

In particular, I argue that Link's observation is driven by the behavior of predicates built from two major classes of transitive verbs: (i) CAUSATIVE verbs (*lift the table*), and (ii) INCREMENTAL-OBJECT verbs (*eat the cookie*).

Causative verbs (C.S. Smith 1970, Dowty 1979) describe events in which the subject causes the object to undergo a change: in 14, Alice causes the vase to break.

(14) Alice broke the vase

Many causatives undergo the CAUSATIVE-INCHOATIVE alternation (C.S. Smith 1970), meaning that the verb can have two arguments (one argument which causes the change, one which undergoes it; 14); or only one argument (which undergoes the change; *the vase broke*). While all verbs undergoing this alternation are considered causative, some causative verbs do not alternate: for example, *kill* is widely considered causative, but

does not alternate. Another diagnostic for whether a verb is causative is to ask whether a sentence built from that verb entails that its object undergoes the change described by the verb (Levin & Rappaport Hovav 1991, Levin & Rappaport Hovav 2011). If Alice broke the vase, the vase broke; if Alice killed the chicken, the chicken is dead; and so on.

Turning to the second major class of transitive verbs, incremental-object verbs (Tenny 1987, Krifka 1989, Dowty 1991, Krifka 1992) describe events in which the object is affected in tandem with the progress of the event: in 15, there is a homomorphism between the cookie and the event of eating it, so that when the cookie is half gone, the event of eating it is half over, and when the cookie is gone, the event of eating it is over.

(15) Alice ate the cookie

Famously (e.g. Verkuyl 1972, Dowty 1979, Krifka 1989), the telicity of a predicate with an incremental object depends on whether its object is bounded: *eat the cookie* is telic while *eat cake* is atelic, because the boundedness of the count noun *cookie* gives an endpoint to the event of eating it, while the unboundedness of *cake* does not.

These two major types of predicates are not always distinguished. For example, while Dowty (1979) predates the concept of incremental-object predicates, he discusses many such predicates (e.g. *paint a picture*) under the guise of ACCOMPLISHMENTS in the sense of Vendler (1967) – and suggests that all accomplishments are causative. Conversely, Rothstein (2004) subsumes many causative predicates (*repair the computer*) under the category of accomplishments, which she analyzes as inherently incremental. Such analyses blend causatives and incremental-object predicates together.

There are, however, compelling arguments for distinguishing these two classes. For example, causative predicates entail a result state (*break the vase* entails that the vase is broken), while incremental-object predicates need not: *read the book* does not entail any change in the book (Rappaport Hovav 2008). Causative verbs usually cannot be used with implicit objects (*I broke* cannot be used to convey *I broke stuff*), while incremental-object verbs often can (*I ate* is roughly equivalent to *I ate stuff*; Rappaport Hovav 2008). Incremental-object predicates are understood as atelic with mass objects (*eat some cake* is atelic), while causatives can be understood as telic even with mass objects (*break some glass* can be telic; Levin 2000).

Some predicates can be placed into both classes: if *Alice de-iced the road*, then *the road* is causally affected, in that it is made free of ice; but may also be understood to be incrementally affected, in that each portion of the road may correspond to a different part of the event of de-icing it. But there are also predicates that only fit into one class or the other: *read the book* has an incremental object but is not causative; *assassinate the despot* is causative but does not have an incremental object. These two classes are thus treated as overlapping, but distinct.

Against this background, I propose that predicates built from these two major classes of transitive verbs describe events that can be brought about by the joint contributions of multiple participants – generalizations which can be derived from existing, widely accepted analyses of such predicates. Predicates built from these major classes of transitive verbs can thus systematically be understood nondistributively, deriving Link's observation as a byproduct.

3.1 Causative predicates

Causative predicates describe events of causation, in which the subject causes a change upon the object. Informally, it is always possible for multiple individuals to jointly bring about a result without each individually doing so – meaning that causative predicates with subjects denoting multiple individuals should always allow a nondistributive understanding. I argue that this is the intuition behind the nondistributive understanding of all of the causative predicates in 16: that Alice and Bob somehow realized the result upon the object through their combined efforts.

(16) Alice and Bob lifted the table
collapsed the tent
moved the statue
removed the stain
angered the committee
debunked the rumor
beautified the room
melted the chocolate

doubled the revenue
shortened the skirt . . .

(✓**Distributive**: each did so)

✓**Nondistributive:** jointly caused the result without each individually doing so

As foreshowed by Dowty (1987), this intuition is already captured by a leading analysis of causative verbs. Causative verbs are often said to comprise a primitive building block of meaning known as CAUS, meant to express that they describe events of causation (e.g. McCawley 1968, Dowty 1979). Most influentially (in a tradition dating back to the philosopher David Hume and revived by Lewis 1973), CAUS can be defined in terms of a *counterfactual* analysis: the idea that an event A causes (CAUS) an event B only if B would not have happened but for A. Analyzing counterfactuals in terms of possible worlds, the counterfactual analysis states that in all of the worlds most similar to the actual world in which A does not happen, B does not happen either. In other words, if *Alice opened the door*, then in the closest worlds in which Alice doesn't do anything to the door, the door does not open. The counterfactual analysis has its critics, but it makes interesting predictions about the distributivity potential of causatives (Dowty 1987).

If two events $A \wedge B$ cause a third event C, then, according to the counterfactual analysis, in the closest worlds in which $A \wedge B$ does not happen, C does not happen either. Some of the closest $\neg(A \wedge B)$ worlds might be $A \wedge (\neg B)$ worlds, or $(\neg A) \wedge B$ worlds – all predicted by the counterfactual analysis to be $\neg C$ worlds (Dowty 1987). In other words, the counterfactual analysis of causation captures an intuition: that two factors may be jointly sufficient, but individually insufficient, to cause a result.

On this analysis, a sentence like *Alice and Bob opened the door* means that Alice and Bob did something which caused the door to open. The event of Alice and Bob doing something can be decomposed into an event of Alice doing something, and another event of Bob doing something. In the closest worlds in which nothing is done to the door by Alice or Bob, the door does not open. Some of these worlds may be ones in which Alice or Bob does something to the door alone, but the door still does not open in these worlds. In other words, the individual contributions of Alice and of Bob may be separately insufficient, but jointly sufficient, to cause the door to open – giving rise to a nondistribu-

tive understanding of the predicate. This logic predicts all causative predicates to allow a nondistributive understanding (in addition to whatever distributive understandings are available depending on the definiteness of the object and the repeatability of the action, as discussed above). The counterfactual analysis therefore explains why all of the causative predicates in 16 can be understood nondistributively. It can be extended to all of the 530 verbs listed by Levin which undergo the causative/inchoative alternation, as well as the 244 non-alternating but still causative *kill*, *destroy,* and *amuse* verbs – nearly half of the 2057 transitive verbs which were coded as ones that allow a nondistributive understanding.

This analysis is reinforced by testing its further predictions. In some cases, the same verb can be understood as either causative or non-causative (Levin and Rappaport Hovav 2014): *clean* can be understood as 'causing something to become clean', or as 'carrying out some prototypical actions associated with cleaning,' such as vacuuming or dusting, without entailing that its object becomes clean. We therefore predict that when a predicate built from *clean* is understood as causative, it must allow a nondistributive understanding; but when it is NOT understood as causative, it might only make sense distributively.

This prediction is indeed consistent with the data: the causative 17 can be understood nondistributively, in a situation in which Alice and Bob only jointly make the stove clean – for example, if Alice sprays it with degreaser and Bob wipes it off. In contrast, it is much more difficult to imagine a nondistributive understanding of the non-causative 18: if Alice and Bob did some apartment-cleaning, we normally infer that they each did so.

(17) A&B cleaned the stove (so that it was spotless when they finished)
✓**Distributive**: each cleaned it (perhaps on different occasions)
✓**Nondistributive:** cleaned it jointly without each individually doing so

(18) A&B cleaned the apartment (for awhile; but it was still messy when they stopped)
✓**Distributive**: each did some apartment-cleaning
?? **Nondistributive:** jointly did some apartment-cleaning without each doing so

The contrast between 17 and 18 illustrates that a predicate's distributivity potential does not just depend on the specific verb involved, but is further shaped by whether that verb is construed as causative, as predicted by the present analysis.

This analysis does not just apply lexical causatives such as *open the door*, but is also predicted to extend to PERIPHRASTIC causatives such as those in 19, on the assumption that these also describe events in which Alice and Bob cause a change upon the object. And indeed, periphrastic causatives seem to allow a nondistributive understanding, just as lexical causatives do.

(19) a. Alice and Bob caused the door to open
b. Alice and Bob got the door open
c. Alice and Bob made the door open
✓**Distributive**: each caused it to open (perhaps on different occasions)
✓**Nondistributive:** caused it to open only jointly

Summing up, causative predicates describe a unified class of events – those in which the subject causes a change upon the object. As a general fact about causation (predicted by the counterfactual analysis), the actions of multiple agents may be individually insufficient, but jointly sufficient, to cause some result – explaining why a large class of predicates built from transitive verbs can systematically be understood nondistributively, and indirectly contributing to Link's observation.

3.2 Incremental-object predicates

Incremental-object predicates describe events in which the subject gradually affects the object, subpart by subpart. Intuitively, it is always possible for multiple individuals to each affect a different subpart of the object, only jointly affecting the full object – meaning that incremental-object predicates with subjects denoting multiple individuals should always allow a nondistributive understanding. I propose that this is the reasoning underlying the nondistributive understanding of all the incremental-object predicates in 20: that Alice and Bob each carry out the event described by the verb on a different subpart of the object.

(20) Alice and Bob ate the cookie
wrote the book
painted the wall
ran the marathon

copy-edited the document
built the Lego castle
searched the house
vacuumed the basement
loaded the truck
recited the poem ...

(✓*Distributive*: each did so)
✓*Nondistributive:* did so jointly but not individually (each doing a different part)

As hinted by Krifka (1992), this intuition is already predicted by a common, motivated assumption about verb meaning: the LEXICAL CUMULATIVITY assumption, named by Kratzer (2007) and invoked by Scha (1981), Krifka (1989), Krifka (1992), Champollion (2010), and others. Lexical cumulativity is the assumption that all verbs (and, in the event semantics in the tradition of Davidson 1967, all thematic roles) are inherently closed under sum[1], guaranteeing CUMULATIVE INFERENCES (Quine 1960) as in 21.

(21) **Cumulative inference:** $P(a) \wedge P(b) \rightarrow P(a \oplus b)$
'This is water and that is water, so this and that together are water'
'Alice smiled and Bob smiled, so Alice and Bob smiled'

More concretely, a verb such as *eat* can be analyzed as a set of eating events, as in 22 (where events are represented as tuples consisting of a label for the event and its thematic roles, based on Kratzer 2007). Then, for any two events $e1$ and $e2$ in this set, lexical cumulativity requires that their SUM ($e1 \oplus e2$) is also in this set. On the lexical cumulativity assumption, the sum of two *eat* events is also an *eat* event; its agent is the sum of the agent of $e1$ and the agent of $e2$, and its theme is the sum of the theme of $e1$ and the theme of $e2$. This setup guarantees the natural result that if Alice eats half the cookie and Bob eats the other half, then Alice and Bob eat the full cookie[2].

[1]Note that this assumption is directly opposed to the analysis of Landman (1989a), discussed in section 2: Landman requires a verb like *smile* to only apply to individuals, not pluralities.

[2]Some authors (e.g. Kratzer 2007, Champollion 2010) represent the lexical cumulativity assumption by placing the plural symbol $\star$ (from Link 1983) before all verbs and thematic roles (e.g. $\star$*eat*, $\star$*agent*), as a typographical reminder that these are all assumed to be closed under sum. However, this convention may cause some confusion, because other authors (e.g. Landman 1989a, de Vries 2015; see section 2) use the

(22) *eat* = $\{\langle e1, agent = Alice, theme = half\ the\ cookie_1\rangle,$
$\langle e2, agent = Bob, theme = half\ the\ cookie_2\rangle,$
$\langle e1 \oplus e2, ag = Alice \oplus Bob, thm = half\ the\ cookie_1 \oplus half\ the\ cookie_2\rangle\}$

Whenever a predicate's object is construed as incremental in this way, we predict the predicate to allow an understanding in which the members of the subject each affect a different portion of the object. If the extension of an incremental-object verb includes an event of Alice and Bob affecting the full object, it is always possible for the extension of the verb to also include a subevent of Alice affecting one part of the object and Bob affecting the rest, as in 22. The lexical cumulativity assumption thus explains why all of the predicates in 20 can be understood nondistributively. Levin does not single out an incremental-object class (and anyway, this category is notoriously pragmatically flexible; Smollett 2005), but it should minimally include Levin's *spray/load*, *build*, *scribble*, *devour*, *eat*, *create*, *perform*, *fill*, and *wipe* verbs – a quite conservative estimate of 304 verbs, or nearly 15% of the 2057 transitive verbs coded as ones which allow a nondistributive understanding.

To test further predictions of this analysis, we consider cases in which the same predicate may or may not be understood as an incremental-object predicate (Dowty 1979, Krifka 1991, Rappaport Hovav 2008). A predicate such as *read the magazine* can be construed as an incremental-object predicate, if the magazine is fully read when the event culminates – or can be considered a simple activity predicate, if only some arbitrary portion of the magazine is read over the course of the event. Our analysis predicts that when such a predicate is understood to have an incremental object, it should allow a nondistributive understanding; whereas when it is NOT understood to have an incremental object, it might only have a distributive understanding.

And indeed, the incremental-object predicate in 23 can be understood nondistributively, for example if Alice reads one half of the magazine and Bob reads the other. In contrast, it is much more difficult to imagine a nondistributive understanding of 24, in which the magazine is not construed as an incremental object: if Alice and Bob did some magazine-reading, we generally infer that they each did.

$\star$ symbol to indicate distributivity. Authors who assume lexical cumulativity do NOT intend $\star$ to indicate distributivity. They assume that all verbs are closed under sum, but they do NOT assume that all verbs are distributive.

(23) Alice and Bob read the magazine (from start to finish, to check it for errors)
✓**Distributive**: each read it
✓**Nondistributive:** each read part of it, only jointly reading the whole thing

(24) Alice and Bob read the magazine (for awhile, but didn't finish it)
✓**Distributive**: each did some magazine-reading
?? **Nondistributive:** jointly did some magazine-reading, without each doing so

As predicted, the contrast between 23 and 24 shows that what matters most, even more than the specific predicate involved, is the incremental construal of its object.

The present analysis is predicted to extend to all cases in which a verb's object is construed as incremental. Sometimes, we ascribe incrementality even to the objects of verbs that are not typically classified as incremental-object verbs – particularly when the object is a numeral plural (Krifka 1992). For example, *see* is not a prototypical incremental-object verb (the subparts of a *see-the-zebra* event do not correspond to subparts of *the zebra*); but an event in which Alice *sees seven zebras* can be split into subevents in which each individual zebra is seen, culminating when seven zebras are seen in all (Krifka 1992).

Normally, *see* – even though it is a transitive verb – generally only allows a distributive understanding with a definite singular object: if Alice and Bob *saw the zebra*, we generally infer that they each did so. But when its object can be construed as incremental, as in *see seven zebras*, we predict a nondistributive understanding to be systematically available. As predicted, 25 can be understood nondistributively – for example, in a situation in which Alice sees three zebras and Bob sees four more. Again, the incremental construal of the object is more important for a predicate's distributivity than the particular verb involved.

(25) Alice and Bob saw seven zebras
✓**Distributive**: each saw seven zebras
✓**Nondistributive:** saw seven zebras between them

Summing up, incremental-object predicates describe a unified class of events – those in which there is a homomorphism between the object's affectedness and the progress of the event of affecting it. As a general fact about such events (predicted by the lexical cumulativity assumption), multiple agents may each individually affect a different subpart of the

object, only jointly affecting the whole thing. This analysis explains why a large class of predicates built from transitive verbs can systematically be understood nondistributively, driving Link's observation as a byproduct.

3.3 Intransitive verbs

We have now explored one half of Link's observation: why predicates built from many transitive verbs can be understood nondistributively. I have argued that this tendency is driven by the behavior of two major classes of predicates built from transitive verbs, causatives and those with incremental objects. But to fully understand Link's observation, we must also investigate the second half: why predicates built from many intransitive verbs (*walk, die, arrive, smile*, and so on) strongly favor a distributive understanding – and, conversely, why they disfavor a nondistributive understanding.

Some intransitive verbs (*meet, gather, split up*) describe inherently multilateral events, and thus cannot be understood distributively when predicated of *Alice and Bob*. But apart from verbs specifically describing events of multiple parties coming together or apart, the majority of intransitive verbs (*sleep, laugh, talk, run,* and so on) describe events that can be carried out by a single individual. That is why, when predicated of a plural subject, such verbs can be understood distributively. We saw above that some predicates built from a transitive verb can only be understood nondistributively, if they have a definite object and describe an action that cannot be repeated on the same object (*Alice and Bob ate the cookie* does not make sense distributively, given that the same cookie generally cannot be eaten more than once) – but, since intransitive verbs do not have objects, this complication never arises. In other words, apart from verbs like *meet*, the majority of intransitive verbs are predicted to always allow a distributive understanding, because a sentence of the form *Alice and Bob VERBed* could always describe a situation in which Alice and Bob each individually carried out the action described by the verb.

It is therefore not surprising that the majority of intransitive verbs can be understood distributively. The real question is why so many intransitive verbs are NOT easily understood NONdistributively – in contrast to predicates built from many transitive verbs, which robustly allow such an understanding.

As always, I believe the answer lies in our world knowledge about the events described by these predicates. I have argued that causative and incremental-object predicates describe classes of events sharing a commonality – causation, an object/event homomorphism – that systematically allows the event to be brought about by multiple participants' joint contributions. In the realm of intransitive verbs, there are also classes of verbs describing events sharing certain commonalities – for example, Levin (1993) lists 115 locomotion verbs (*run, stroll, tiptoe*, and so on) and 263 sound verbs (*bang, snap, crackle, bark, jingle,* and so on). However, the commonalities among these events tend not to be ones allowing the event to be brought about by the joint contributions of multiple individuals. Instead, some of the commonalities among these events are ones requiring these events to be undertaken only be single individuals.

In particular, many intransitive verbs describe events that are typically carried out by an individual body or mind: *walk, run, swim, jump, smile, laugh, sniff, sigh, cough, breathe, blink, wink, cry, faint, worry, meditate, think, die*, and so on. Given that individuals have their own legs, faces, and minds, then if multiple individuals *walk, smile,* or *worry*, it is generally because they each do so. It is very difficult (although not impossible, as the *lips smiled* example 13 shows above) to imagine a way for the events described by these predicates to be carried out by multiple parties' joint contributions without the predicate also being true of each member. Like causatives and incremental-object verbs, verbs describing bodily or mental actions can be grouped by the commonalities among the events they describe – but unlike causatives and incremental-object verbs, these commonalities are not ones allowing the event to be 'split' between multiple participants. Instead, the commonalities among these events – particularly, the fact that they involve an individual body or mind – favor a distributive understanding for the predicates that describe them.

Apart from the many intransitive verbs describing bodily or mental events, there are also classes of intransitive verbs describing events that *can* be brought about by the joint contributions of multiple individuals, parallel to causative and incremental-object verbs in the realm of transitive verbs. For example, there are intransitive verbs which describe events of sound produced by contact between multiple surfaces (Levin et al. 1997), such as *jingle, rattle,* and *clang*. If two keys *jingle*, it does not necessarily follow that each key jingled (distributive); it is also possible that the keys only created a jingling sound

by contact with one another (nondistributive). There are also intransitive verbs describing speech acts which can be carried out collaboratively, such as *lie* and *apologize*: if *Alice and Bob lied*, it does not necessarily follow that they each did so (distributive), because they may also have lied in a jointly issued statement (nondistributive).

Like the causative and incremental-object verbs discussed above, these verbs describe events sharing commonalities allowing them to be effected by multiple participants, and thus to be understood nondistributively. But unlike causative and incremental-object verbs – classes which have attracted significant attention in the literature because they are large, superficially diverse, and grammatically significant – the classes of verbs like *jingle* and *lie* are much smaller, encompassing only handfuls of verbs in contrast to the hundreds of verbs that count as causative or can have an incremental object. Thus, some intransitive verbs can be grouped into classes sharing commonalities that allow them to be understood nondistributively; but these classes are rather piecemeal in comparison to the vast categories of causative and incremental-object verbs among transitives.

To recap, we have explored the other half of Link's observation: why many intransitive verbs strongly favor a distributive understanding. I have suggested that this tendency is partly driven by the fact that many intransitive verbs describe events involving an individual body or mind. Moreover, although there are classes of intransitive verbs describing events that can be effected by the joint contributions of multiple individuals (verbs like *jingle* and *lie*, as well as those like *meet, split up* and so on), these classes are relatively small and patchy. In contrast, the classes of causative and incremental-object verbs among transitives are so extensive that they are argued to drive the tendency for predicates built from transitive verbs to allow a nondistributive understanding.

4 Conclusion

This paper set out to discover which predicates are understood distributively or nondistributively and why, using Link's observation as a way into the question. Summarizing, we begin from the uncontroversial idea that a predicate's potential for distributivity is grounded in world knowledge about the event it describes. Next, we show that the events described by two large classes of transitive verbs (causatives and incremental-object pred-

icates) can be brought about by the joint contributions of multiple parties, allowing them to be understood nondistributively. In contrast, the events described by most intransitive verbs do not allow a systematic way of being 'split' between multiple participants, so that these verbs generally default to a distributive understanding. Therefore, Link's observation arises as a byproduct of our world knowledge about the events that tend to be described by these different types of verbs. More generally, any time a linguistic phenomenon depends on world knowledge, the real challenge is to explain what world knowledge matters and why. In taking on this challenge, we uncover the way patterns in the extralinguistic world are manifested in the lexicon that we use to describe it.

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Simultaneous articulation as a window into structure: nonmanuals in ASL

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1. Introduction

Syntactic structure and phonetic form are usually analyzed as separate systems, with syntactic structure determining aspects of the final phonetic form. This can be seen, for example, when asymmetrical syntactic structures correspond to the linear production of the phonetic form. Hierarchical syntactic structure seems to determine much of the physical expression of language and we use this assumption as we study hierarchical structure by examining the physical expression of an utterance. However, usually a close examination of the physical aspects of language is kept separate from an analysis of the hierarchical structure. This paper will show a close relationship between the physical form of language and the hierarchical structures being investigated. This 'interface' between the syntactic structure and the phonetic form of the utterance gives us important information about the foundational hierarchies of syntactic structure.

The issues at work here are at the heart of the study of hierarchical structure. Syntactic structure is not knowable the naked ear: only the surface word order can be explicitly perceived. So in order to investigate hierarchical structure at all, there has to be a connection between the data we have (word order) and the structures we are trying to determine (constituent hierarchy). Higginbotham (1983) argues that we must divorce linear order and hierarchical structure: if linear order were the only thing determining hierarchical structure, syntactic structure would be simplistic. We would not have to use analyses that resort to movement or copies in order to satisfy both syntactic requirements and surface word order. Since the syntactic structure of constituents and the linear order of words do not perfectly align, Higginbotham's solution is to treat linearization and hierarchical structure as separate. In doing so, many syntactic structures that break the rules (lines crossing etc.) can be used to explain phenomena like discontinuous constituents. However, if structure is divorced from linearization, what data should predictions about structure be based on?

It is possible to go in completely the opposite direction concerning the relationship between word order and hierarchy. Kayne (1994) argues for a close relationship between hierarchical structure and linear order, since the study of hierarchical structure must be based on linear order if it is to be based on natural language data. For Kayne, the anti-symmetrical properties of phrase structure are inherited from the anti-symmetry of linear order. Phrase structure is then tightly constrained by linear order. This makes strong predictions against discontinuous constituents (at the level of syntax) and multidominance. If linear order and phrase structure were not as tightly entwined, structures with discontinuous constituents would be more easily modeled, but the predictive power of the constrained model would be lost. What I am arguing for in this paper is not completely throwing out the linear-order-constrained phrase structure, but that linear order might not be completely determined by hierarchical structure (i.e. that there might be non-syntactic forces acting on linearization). Kayne's model predicts that we must have antisymmetry in phrase structure, and that is directly tied to antisymmetry in linear order. In this paper I provide evidence for a linear ordering that is simultaneous, not antisymmetric. Since the antisymmetric relationship cannot be inherited from linear order in a simultaneous case, what is the hierarchical structure? And if we have a structure divorced from linear order, how is linearization accomplished?

So, the starting point for investigating syntactic structure is the surface linear order of the words of the utterance. We assume that certain word orders are based in antisymmetrical relationships between constituents. However, there are some aspects of syntactic structure that are difficult to determine because they are implicit in antisymmetrical relationships. Since American Sign Language (ASL) offers the potential of parallel transmission of information, investigation of syntactic structures such as adjunction, focus, and question marking in ASL offers explicit evidence for structures that are implicit in spoken language.

This paper will look at nonmanual negation in ASL to investigate the syntactic structure of negation. The scope of negation is determined in part by the c-command relationship between the head of negation and the negated constituent, but the duration of scope is not overtly marked in English. In this paper, I will show that in ASL the scope of negation is explicitly marked with a simultaneous morpheme. This provides evidence for the structure of NegP that is not possible

to see in a spoken language where only the head of negation is overtly marked. Antisymmetrical relationships determine the linear order of the head of negation with respect to its scope, but the restriction in spoken language of only being able to say one word at a time erases the potential of overtly marking scope duration. By investigating the properties of the simultaneously-articulated morpheme of negation, it is possible to see different angles of syntactic structures.

2. ASL Articulation and structure

American Sign Language (ASL) is the visio-gestural language used by the Deaf community primarily in the United States. The basic unit of sign languages is the SIGN. Sign languages use arm, torso, head, and facial movements to articulate signs. Signs can be inflected for person, number, tense, etc. like a word in a spoken language. A sign is defined by a movement, a location, and a handshape (Perlmutter 1992). Minimal pairs can be found for each of these parameters of a sign, for example, two signs could use the same movement and location, but differ in handshape.

2.1 The parts of a sign – movement

Every sign has a movement, and it is analogous to the nucleus of a spoken language syllable. A movement may be either PRIMARY or SECONDARY; primary movement involves proximal joint movement, and secondary movement is defined by distal movement. For example, as shown in 1, the movement of the sign CANDLE[1] is only the wiggling of the fingers, the most distal part of the arm. Many other signs have only primary movement, such as THINK, shown in 2, which uses shoulder/elbow movement to touch the index finger to the forehead. A monomorphemic sign can only have one primary movement (Sandler & Lillo-Martin 2006). However, a sign can have both a primary and secondary movement, as in the sign FIRE shown in 3, where the primary movement is a circular movement in front of the torso, and the secondary movement is wiggling the fingers for the duration of the sign.

[1] Signs are usually written as an English gloss with small capital letters, so the sign for 'excited' is written as EXCITED. Photos used by permission of Bill Vicars and www.lifeprint.com © 2004. All forms are given as the isolation form unless otherwise specified.

(1) CANDLE (2) THINK (3) FIRE



2.2 The parts of a sign – location

If the movement of a sign can be thought of as the nucleus, the location can be thought of as the onset and coda. A starting and ending location can be specified for a sign. The sign SILLY begins with the hand up near the face on the right side in 4. The downward and across movement of the sign concludes at the ending location below the left shoulder in 5.

(4) SILLY – location 1 (5) SILLY – location 2



As in 2 (THINK) above, a sign can perhaps be analyzed as having only one place specification (i.e. forehead). However, THINK (and other such signs) could be analyzed as having a starting place *near* the forehead, and an ending place on the forehead.

2.3 The parts of a sign – handshape

The last major defining characteristic of a sign is the handshape. Handshape is normally constant throughout a sign, as in SILLY above. However, secondary movement can involve a change in handshape, as hands are, of course, more distal than the other parts of the arm used in primary movement. For example, the sign DESTROY in 8-9 begins with a '5' handshape shown in 6, but after the hands come together in the middle of the sign, the handshape changes to the 'A' handshape shown in 7.

(6) '5' handshape (7) 'A' handshape (8) DESTROY – 1 (9) DESTROY – 2





There have been analyses that separate handshape into smaller parts, using such terminology as 'selected fingers' (Brentari 1998) to describe constraints on handshape change within a single sign. Under such an analysis, the flexion of the selected fingers can change, but which fingers are selected cannot (Keane 2013). In DESTROY above, all fingers are selected and flexed at the beginning, and at the end, all fingers change their flexion together – there are not, for example, two or three fingers left behind with the original degree of flexion. The selected fingers terminology allows for predictions about how handshape can or cannot change significantly during a specified sign.

2.4 Nonmanuals in ASL

Besides the main articulators of the arms and hands, many ASL signs make use of the head and face for all or part of the sign. Some signs, for example signs for emotions, have manual and nonmanual components. The nonmanual component of the sign for an emotion word usually has an iconic facial expression component, i.e. for the sign EXCITED the speaker makes an 'excited'

facial expression, with raised eyebrows and the lips spread to show the teeth in a smile. The emotion signs also have a manual movement, in the case of EXCITED, circular movements of the spread hands in front of the chest. The manual and nonmanual components are articulated at the same time. There are also some signs that have *only* a nonmanual component. Some functional elements, like agreement, are marked with only nonmanual elements. Nonmanuals can also be used for lexical elements, like adverbs. These nonmanual adverbs are produced while the hands are articulating the manual signs of the verb phrase. Multiple nonmanuals can also be articulated at the same time. The eyebrow articulation of a yes-no question can be articulated while the headshake of nonmanual negation is also produced (Sandler & Lillo-Martin 2006).

3 Syntax and scope of negation

When determining the syntactic structure of negation, one aspect that must be considered is the position of NegP in the clausal hierarchy. This can be determined by looking at the relative linear ordering of negation marking with respect to other structural markers like tense and agreement. We base our structures on the premise that linear order is determined by syntactic structure, so we can use linear order to determine the hierarchical clausal structure. This works well for investigating the relationships between functional heads. The phonetic form, i.e. the linear order of phrases, provides evidence for the hierarchical structure, and the hierarchical structure determines the semantic content of the utterance.

This brings us to the question of the scope of negation: what exactly is semantically negated? We can use linear order to determine where NegP should be located in the hierarchy, but how can we use the position of NegP to determine scope? Usually in order to determine this, we rely on eliciting semantic judgements, and then fitting the syntactic analysis to fit those judgements. The structural position of the negation marker also plays a role: the more that falls in the c-command domain of NegP, the more that is within the scope of negation. Klima (1964) makes the connection between the c-command domain and the scope explicit: s-structure c-command domains map directly onto LF scope. So, if NegP is structurally higher than AgrP, and AgrP then is c-commanded by negation, then agreement is in the scope of negation. This

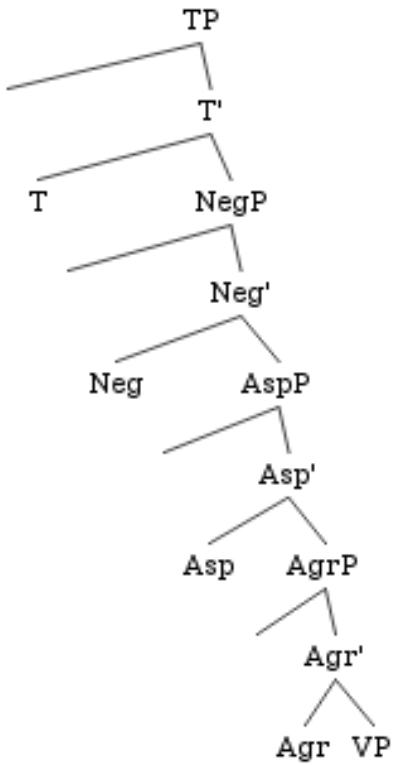
simplistic analysis of the scope of negation has been contested in the literature (Moscati 2006) since the semantic judgements of negation do not always match up with the predictions based on c-command relationships alone. In order to accommodate what the utterances actually mean, the scope of negation must not align strictly with the syntactic structure, so the analysis of the scope of negation is based on syntactic structure before movement or some other method of accommodating the mismatch between surface form and elicited meaning. ASL, however, provides a different surface form that allows for investigation of the scope of negation on an articulatory level rather than eliciting semantic judgements.

In a language where only the head of NegP is explicitly marked, the duration of the scope of negation must be inferred from structural relationships between NegP and other phrases. We can refine our understanding of scope by eliciting the semantic judgements from speakers, and change the inferred surface form relationships accordingly. But in ASL, the duration of the scope of negation is marked with a simultaneous morpheme. This provides evidence for a relationship between syntactic structure and scope based on articulation, not semantic judgement.

3.1 Syntax of negation in ASL

The basic clause structure of ASL, shown in 10, puts negation below TP but above aspect and agreement (Neidle 2000). It has been argued that the subject of a clause in ASL appears in Spec TP (Neidle 2000, Sandler & Lillo-Martin 2006), so the subject is above negation. However, there is some evidence from the spreading of nonmanual negation onto the subject that perhaps the subject is not that high in the structure (Sandler & Lillo-Martin 2006).

(10)



One of the typical methods for determining the syntactic structure in a language is to look at the linear order of words. We usually assume that if something has linear precedence, it is also higher in the structural hierarchy. So, to determine whether NegP is higher than TP, for example, we will look at whether tense marking or negation marking is linearly first in a sentence. The ordering of functional phrases determines the syntactic hierarchy.

For ASL, there have been some disputes over the position of NegP and other functional phrases like TP, and where elements like Subject should be located in the hierarchy. Disagreements arise not because the linear order of constituents is so variable, but because there is a layer of simultaneity in ASL that we don't see in spoken language. Simultaneity is another window we can use to see what the structure is doing behind the scenes of linear order.

3.2 Functional structure and simultaneous articulation

One of the claims that this paper is attempting to make is that there is a relationship between the parallel transmission of information and functional structure. To put it another way, the simultaneity of ASL nonmanuals and manual signs corresponds to a relationship between functional and lexical structure. While not the case for every functional phrase or every nonmanual, there seems to be a clear trend of nonmanuals in ASL marking functional structure. Many functional projections in ASL can be marked solely with nonmanuals, even if there is an optional manual sign. Negation is one such projection, and one that will be analyzed in detail in the phonetics portion (§ 2.1-2.4) of this paper. However, agreement, question-marking, focus, and topicalization are also marked nonmanually. Aspect can be marked by modifying the manual verb articulation, which is technically manual, but indicates a level of simultaneity rather than a strict linear ordering of functional projections.

Manual negation with NOT is articulated in NegP as described above, and the starting point of nonmanual negation is assumed to align with NegP as well (whether or not manual negation is expressed). How should the length of nonmanual negation be explained? I present two hypotheses:

1. INITIAL PEAK OF ARTICULATION AND TRAIL OFF: the nonmanual negation starts where the manual negation is articulated (or would be), and continues since there is no competing articulation. The trailing off articulation does not have a (syntactically) relevant endpoint. This predicts that the length of negation is determined by other non-syntactic factors like the need to use the head/neck in the articulation of another sign.
2. EXPLICIT SCOPE MARKING: Under this hypothesis, the nonmanual negation begins at the start of the scope of negation (which is indicated by the manual negation position), and continues through the entire scope. The trailing off articulation is incidental, and the endpoint of the nonmanual should align with the endpoint of negation scope. This predicts that the length of negation is directly tied to syntactic/semantic structure.

In order to determine the timing and length of nonmanual negation, this study tracks the movement of manual signs and the shape and length of the nonmanual movement. Two forms of nonmanual negation were analyzed: standard and intense (articulatory properties described below in §5) in order to determine the syntactic relevance of the length of articulation. The intense

version of negation is crucial for determining the endpoint of negation since it does not 'trail off' as it is articulated like the standard nonmanual negation.

4 Methods

4.1 Video data - the use of corpus video

For this study, I used videos of 12 native ASL signers. The videos were chosen from the ASL Language Research Project corpus (ASLLRP) and the public videos of DeafVideoTV, a website for speakers of ASL to upload messages to the ASL-speaking community. The signers were standing and a straight-facing, eye-level camera angle was used. The ASLLRP corpus includes profile and facial close-up camera views, as well as a whole torso view. Since I was looking at nonmanual morphemes articulated on the face, I used the facial close-up view to look at the articulation of the face. For the manual signs, I used the full torso view. Since the DeafVideoTV videos only had one camera angle, I looked at both the manual articulation and the nonmanual articulation in the same full-torso view.

The core set of videos used in the negation half of study are from the ASLLRP corpus. The ASLLRP is a corpus of native signers signing narratives. Each signer had a main camera and a face close-up camera. The videos were then transcribed with ASL glosses indicating not only the manual signs but also any nonmanual markers. For this study, I found 63 instances of negation by searching the glosses for instances of NO and NOT, as well as the gloss for nonmanual negation, indicated by 'neg'. After analyzing the videos from the ASLLRP, I turned to the wider online video corpus of ASL videos. 10% of the videos of nonmanual negation came from the Deaf Video TV and other Deaf video channels, for a total of 70 videos and 8 signers in the negation half of the study.

By studying videos of native signers communicating with native signers, problems with unnatural signing directed at English speakers are avoided. While a certain amount of 'mouthings' are always present on some signs in ASL, when speaking to non-native signers, speakers tend to mouth the English words that correspond to the manual signs (Bickford 2006). These mouthings, while they can help English speakers understand ASL, can also change the articulation or even

occurrence of the nonmanual morphemes that are articulated with the face. Relatedly, eliciting nonmanuals like adverbs proves difficult as signers try to find an exact manual sign for English lexical items. Explicit instruction on using nonmanuals would endanger the naturalness of the speech. The nonmanuals are more plentiful in ASL-speaker directed signing than in English-speaker directed signing, and the signing is as natural as possible. Using videos intended for other ASL speakers allows for more natural speech with more opportunity to use the nonmanual signs. The DeafVideoTV videos are excellent in this respect. The videos are filmed by Deaf people for other Deaf people, so there is not the risk that the speakers will be accommodating of English speakers in their ASL. The ASLLRP videos were recorded carefully to insure that the ASL speakers used only ASL. The fact of being recorded for research may have caused the speakers to use a slightly different register than they would use when speaking in a more informal context.

4.2 Video analysis

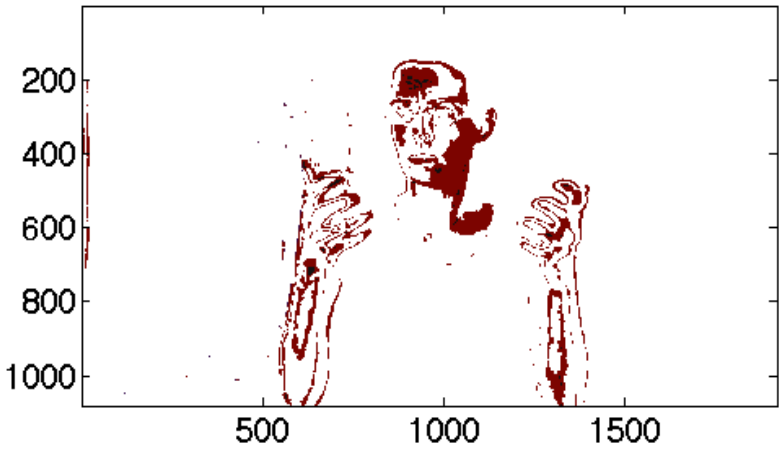
The negation videos were analyzed in MATLAB (version 2013b). The relevant parts of the signing are the timing of the manual signs and the timing of the nonmanual negation-marking headshake. The timings (marked by initial point of movement and endpoint of movement) indicate the length of the sign. Usually the manual sign that is most relevant for the negation timing is the first sign of the sentence or the verb. The initial point of the timing of the verb (or first sign of the sentence) is determined by the change in direction of manual movement from the preceding and following manual signs. The timing of the negation headshake was measured by looking at the length of the arc of the headshake as well as the speed of the shaking.

4.2.1 Color extraction

The different articulators tracked with color extraction were the arms, the hands, the fingers, the head, and the mouth. The movements of the various articulators were tracked using color extraction in MATLAB. The background and clothing colors were discarded, and the articulators were highlighted by choosing a minimum of three shades from each articulator. Because color extraction finds all pixels of that color in a frame, the process is prone to including similar-colored

elements like other areas of exposed skin. This is beneficial for tracking the arms and hands since more of the relevant surface area is picked up by only a few colors.

Figure 1: Articulator pixels extracted from 1 frame of video



The colors extracted from the various shades of each articulator were compiled into one matrix for that articulator for a single frame of video. The color-extracted pixels for all articulators are then saved in a MATLAB matrix for that frame of the video. The extracted pixels of one frame are displayed in Figure 1, where the axes are the pixels (1920x1080).

Each articulator can be analyzed separately for the timing of the various movements. Noise from neighboring articulators is discarded manually by excluding pixels outside a certain range. This is done by both cropping out outlying pixels and by restricting analyses to a smaller range for several frames.

Other problems with color extraction as a method of tracking movement arise because the colors can vary slightly depending on the lighting and shadows created during movement. For example, if the hand moves between the light source and the face, a shadow on the face darkens the colors. This requires the colors to be less restrictive in their matching in order to pick up the darker/lighter shades than appear in the representative frame that the colors are chosen from. However, less restriction means more noise from other similar-colored pixels. Alternately, a more restrictive color range could be extracted, but for the shadowed frames the ranges would be different. Both strategies were used depending on the difference in color shades and the number

of disrupted frames. In general, I attempted to have a single range of colors extracted for each video clip in order to avoid ad hoc manual manipulation of the data. For three longer clips (i.e. videos with more than one utterance), I was forced to analyze the video in sections with different color ranges as the signer shifted position/shadowing over the course of the video.

4.2.2 Manual sign timing

The beginning and end of the verb are determined by the changes in direction of the arm movements when the initial and final HOLDS (Sandler & Lillo-Martin 2006) of the verbs are reached. Holds are the starting and ending locations of the verb movement. The hands move from wherever they are from the previous sign to the first hold of the verb. The direction of movement changes once the hands are in the starting position for the verb. The same thing happens when the verb reaches the final hold of the verb: the direction of movement changes to get into position for the subsequent sign. These changes in movement direction are the articulatory markers of the beginning and end of the verb. The verb's manual sign timing is matched to the lip rounding timing determined by the ellipse analysis.

Because the direction of movement is used to determine the timing of the verb, only verbs with *primary* movement, or movement from the shoulder or elbow joints, were used (described above in §2). While the movement of signs with only *secondary* movement may be apparent from a manual-annotation perspective, the color extraction technique does not provide the right kind of data to show when movement begins or ends. The primary movement can be easily picked up by the color extraction technique as the hand and arm move across the contrasting background. The change in pixel location is determined by comparing the matrices of color-extracted pixels from one frame to the next. The locations of the pixels of the hand match the locations of the color-extracted pixels in the matrix. The timing of the manual gestures can then be determined by finding the change in movement direction by comparing the location of the color extracted pixels from frame to frame. If secondary movement were used, there would be very little location change from frame to frame or even over several frames.

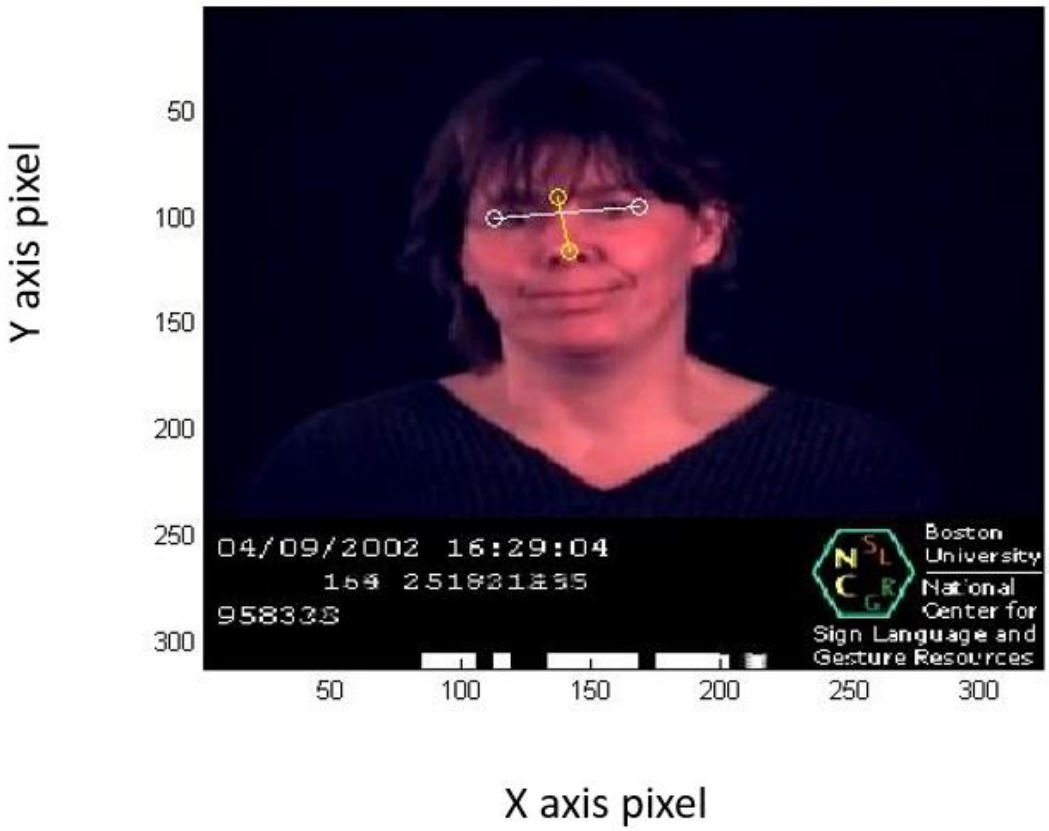
The manual sign movements were tracked with the color extraction technique. Because the hands are generally in front of clothing or background, it is usually trivial to track them with little noise. First, three colors were extracted for the arms and hand together. Because the hand is the most distal part of the arm, it generally has the greatest change in location during the movement. This greater change makes it easier to measure when direction change occurs. The instant of direction change was narrowed down to 4 frames by manual examination, and the location narrowed down to only the pixels around the hand. The horizontal and vertical movement of the hand were determined by looking at the change in the extracted pixels from frame to frame. The change in direction of hand movement corresponds to the minimum or maximum x or y pixels reached by the hands. These minima/maxima correspond to the endpoints of the verbs, or the initial and final holds (Sandler & Lillo-Martin 2006).

For measuring the relative timing of the head shake negation and the manual signs, the signs close to the initial and final points of the head shake were tracked. In almost all cases, the sign around the initial point of the head shake was either the verb or the initial manual sign of sentence. The endpoint of the headshake was almost always the endpoint of the utterance.

4.3 Point tracking for negation head shake

Because the head shake movement of nonmanual negation does not involve a change of movement against the background a color segmentation analysis was not viable for tracking the movement of nonmanual negation's headshake. Instead, fixed points on the head were manually input for each frame, and the movement of the average of those points was tracked. Four points in total were tracked for each frame: the outside corners of the eyes, a point in the middle of the forehead, and the tip of the nose, as in Figure 2.

Figure 2: Four points tracked in each frame



For each frame, the x and y coordinates of the average point were saved in a matrix. By the change in those average x and y points for each frame, the movement of the head was tracked over time. The noise of the incidental vertical movement was separated from the horizontal movement of the head shake. The horizontal movement curves were smoothed and the movement data from the manual articulators was integrated, like with the adverb movement, by marking the endpoints (changes in movement direction) of the manual signs. As elaborated in the results below, while the initial point of the head shake could be clearly located within the utterance, the endpoint of negation aligned with the end of the utterance.

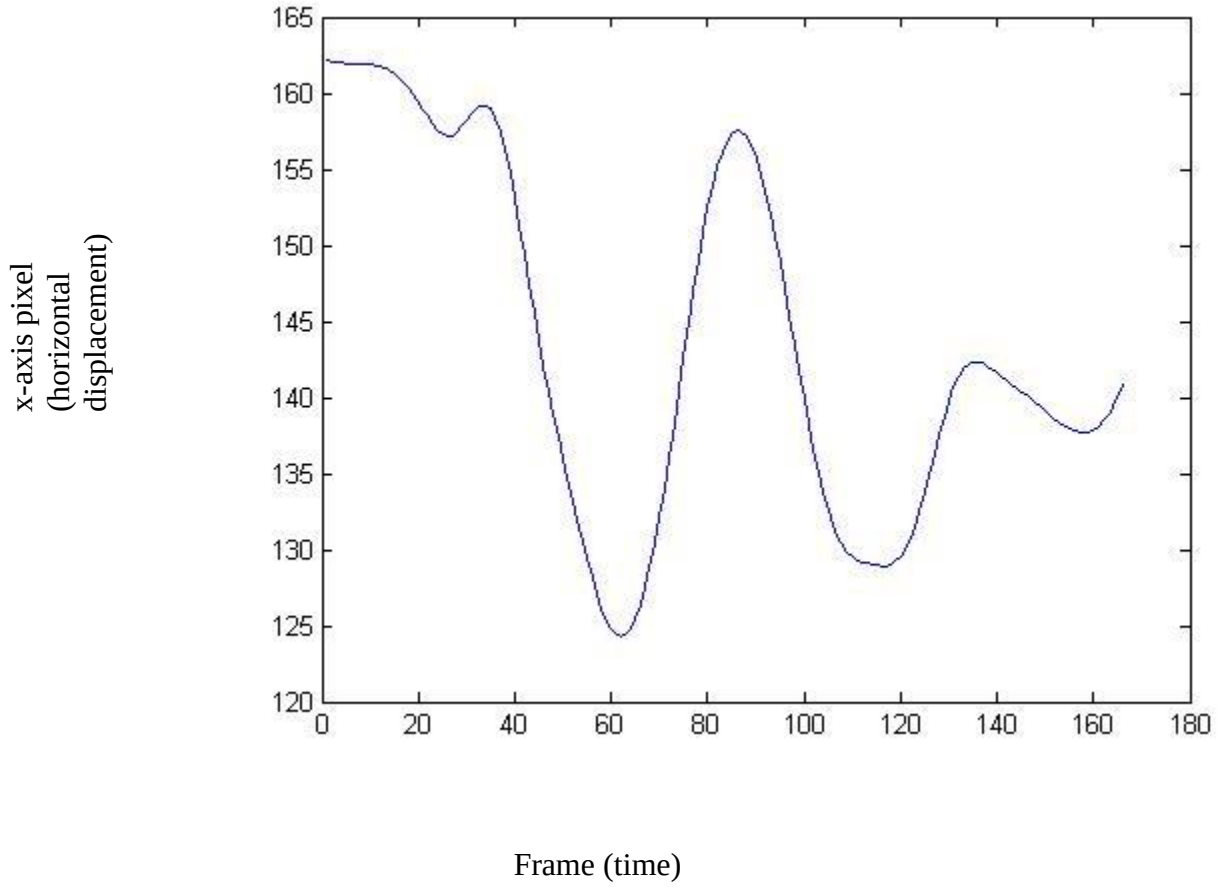
5 Results

Negation in ASL can be accomplished with a two main strategies. There is a manual sign, NOT, which is articulated with a closed hand brushing under the chin. This manual sign is produced

before the negated constituent. NOT has been analyzed (Neidle 2000) as marking the head of NegP. Manual negation can be articulated independently of any nonmanual negation.

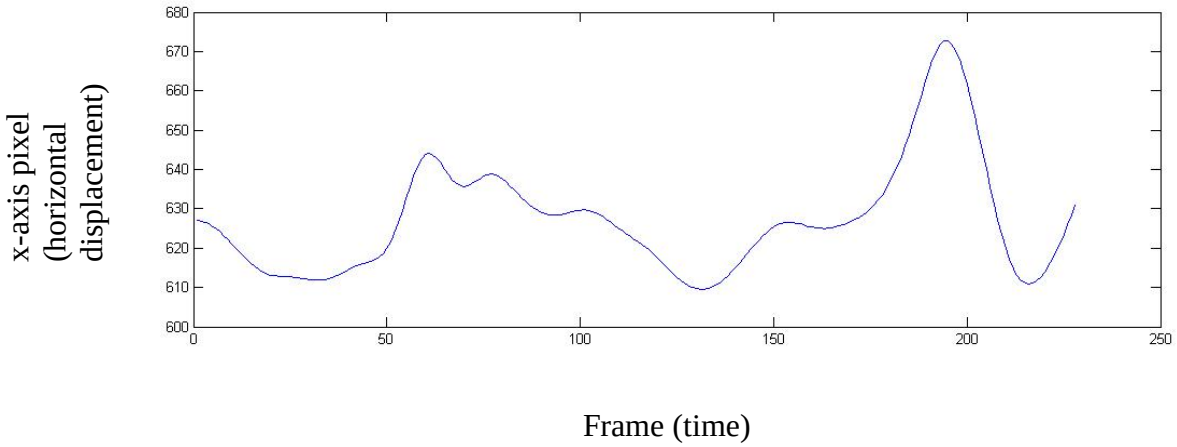
Nonmanual negation is articulated with a horizontal head shake. There are two main versions of the head shake. The first, canonical nonmanual negation, begins with a wide arc and continues with smaller and smaller arcs through the scope of negation in Figure 3. This is usually through the end of the sentence. Since the corpus data did not have examples of complex sentences where there were non-negated constituents after the negated TP or VP, it is difficult to say whether the ending of the nonmanual negation aligns with the ending of some particular, syntactically-relevant sign, or just continues through the end of the utterance regardless.

Figure 3: Horizontal shaking movement of the head over one utterance



The second type of nonmanual negation is the intense version in Figure 4. Like many ASL signs, when you add intensity, the movements become clipped, shorter, and faster. Intense nonmanual negation is articulated with head shaking like canonical nonmanual negation, but the arcs of the movements are very short. I measured 30-50% more shakes in the same length of time per speaker, so the arcs are also faster. The intense nonmanual negation is harder to distinguish from noise in the movement data because the movements are so small.

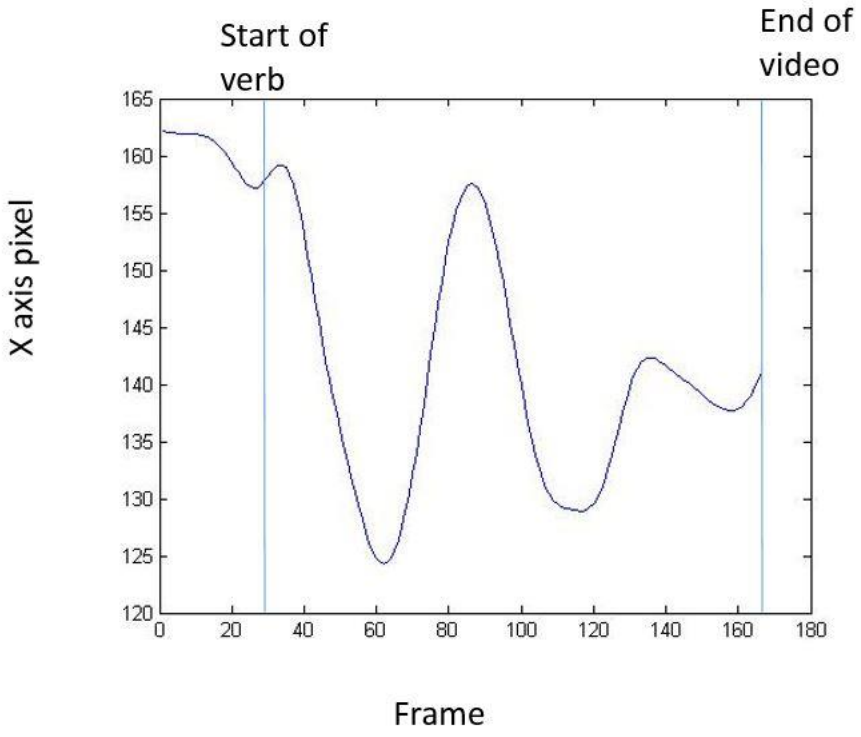
Figure 4: Horizontal shaking movement over one utterance with intense negation



Either form of nonmanual negation can be produced whether the manual sign NOT is produced or not. However, when the manual sign is present, the nonmanual negation does not have to be articulated over the whole NegP; it can be restricted to a single head shake during the articulation of the manual sign NOT. The nonmanual negation is free to continue through the rest of NegP, but it is not obligatory. However, if the manual sign is not present in the sentence, then the nonmanual negation head shake must obligatorily continue through NegP. This distribution has been described in the literature (Neidle 2000), and the data in my study confirms this.

The headshake of negation often (20/70 tokens) occurs throughout the *entire* utterance, like in the intense negation graph above. When this happens, the negation is aligned with the initial sign of the sentence, and the endpoint of negation aligns with the endpoint of the manual signs in the utterance. There is no indication of direction of lag (t-test, $p>.1$).

Figure 5: Shaking movement aligned with manual verb



When the initial point of the headshake is *not* concurrent with the initial point of the utterance, the initial point of the utterance aligns with the initial point of the verb movement (i.e. the change in manual movement direction), as in Figure 5. There is no indication of direction of lag (t-test p>.1). In most cases (46/70) the negation continues for the duration of the utterance and only ends when the utterance ends (though the length of the arc does decrease over time as discussed above). In a few cases (4/70), the nonmanual negation only lasts for a single headshake. These were cases when the manual sign NOT was also present, which allows for the nonmanual negation to be restricted to just the single headshake. These cases were not investigated in this study and will be discussed in further work. It is clear that the initial point of the negation headshake has some relationship with the syntactic structure: the initial point aligns with either the initial point of the sentence, or the initial point of NegP. The endpoint of the negation headshake is more difficult

to determine in the 'canonical' headshake that diminishes over time, but the 'intense' version makes it clear that the negation does continue through the end of the utterance. This is evidence in support of the EXPLICIT SCOPE MARKING HYPOTHESIS. The negation headshake does not end at some arbitrary point after trailing off: it continues through the end of the syntactic/semantic structure.

6 Analysis: negation as explicit scope marking

The results of the phonetic study are in concordance with the literature about the syntax of negation and where the nonmanual negation marking appears. The negation marking begins before the verb but after any tense marking, indicating that NegP is below TP. But the nonmanual negation also continues past where the manual sign NOT ends. This gives us some indication of the scope of negation. The negation marking typically continues through the end of the sentence.

In French, constituent negation uses two parts: *ne* and *pas*. *Ne* appears before the negated AuxP constituent, and *pas* appears after (Pollock 1989). So the scope of negation is marked in French by the combination of these two words. Syntactic treatments of *ne...pas* have put *pas* in NegP below AuxP, but with *ne* in Spec AuxP marking the start of negation scope. This is possible because NegP is a sister to Aux, so the negation is allowed to have scope over the Aux (Bouchard 1995). Negation also has scope over everything is c-commands. This analysis can also be used for ASL negation, where the scope is marked explicitly by the nonmanual headshake. In most negation cases in this study, the headshake continues from the verb through the end of the sentence. If NegP in ASL is said to c-command VP, the scope marking makes sense: the headshake continues through the c-command domain of NegP. This is not surprising, but ASL provides explicit evidence for this interpretation of negation scope.

Since we have some explicit, articulatory evidence for the scope of negation, we can use that to test the validity of syntactic analyses of negation. Zanuttini (1991, p. 153) has a constraint on the assignment of sentential scope to negation: 'Negation can take sentential scope only if at s-structure it is in a position from which it c-commands both the Tense Phrase and the Agreement Phrase.' If we look at the articulatory data from this study, we can see that when the nonmanual

negation marker is articulated over the whole utterance *and* the manual negation marker NOT is present, the manual NOT does occur at the beginning of the utterance.

(11) neg (headshake)

NOT TOMORROW MOTHER BUY CAR

Mother will not buy a car tomorrow.

11 is an example of sentential negation scope being explicitly marked while also having the manual sign NOT present. In this case, the manual sign is in a linearly precedent position from which it c-commands not only the subject and verb, but also the tense-marking adverb TOMORROW. This is evidence to support Zanuttini's (1991) analysis of scope as being dependent on the c-command domain of negation.

6.2 ASL 'Intense' negation

The results of this phonetic study also show some differences from the literature, particularly in the articulation of 'intense' nonmanual negation and the timing of the peak of nonmanual adverbs. Typically, nonmanuals that mark a functional domain like agreement or negation have their peak of intensity initially and have smaller and/or slower movements as the articulation continues (Neidle et al 2000, Sandler & Lillo-Martin 2005). The canonical nonmanual negation seen here fits that pattern. The initial peak could be used to mark when the NegP appears in the sentence, and the headshake declines in amplitude following the point of origin. While the concept of an initial peak of articulation is tempting to connect the articulation to the syntax, the phonetic data do not completely support that analysis. For the intense version of nonmanual negation, it is less clear. The intensity of articulation appears to stay constant and high-intensity throughout. This may be due to the pragmatic prominence of negation in these examples. The negation articulation does not wane because the speaker wishes to emphasize the negation.

The decrease in head shake length and intensity over time should probably be compared to declination of tone in spoken languages. Declination is a low level phonetic process where the

pitch of a sentence lowers gradually over time (Yip 2002). This process is important in languages where pitch is phonemic, and we might assume that declination could result in changes in the perceived tone, and thus some change in lexical items. However, unlike a phonological process like tonal downstep, declination is not perceived by speakers as changing the tone of a word, even if the absolute pitch of the word is changed significantly. The gradual decrease in head shake intensity is similar. The perceived marking of negation remains, even as the articulation changes.

Furthermore, other nonmanuals do not fit the pattern of initial articulatory peak as described in the literature (Sandler & Lillo-Martin 2006). The nonmanual adverbs do not fit the pattern of initial intensity peak. The articulation of the nonmanual adverbs reaches its peak only at the *center* of the manual verb movement (Harmon 2015). If the INITIAL PEAK analysis is used to describe the articulation of the nonmanual adverbs, then the alignment of the verb and adverb centers is no longer apparent, as the peak occurs in the middle of the verb movement. This difference between nonmanual adverbs and nonmanuals like negation could indicate a syntactic difference. Furthermore, other nonmanual markers like eye gaze for object agreement do not seem to have a clear articulatory basis for a peak, initial or otherwise.

6.3 Implications of nonmanual negation for investigating functional structure

While the current paper looks at nonmanual negation, there is still much to be studied in nonmanuals in ASL. I have shown that there nonmanual negation seems to be aligned with the initial point of the manual movement. By looking at a greater variety of nonmanuals in ASL, and perhaps even branching into other sign languages, it could be possible to see how different syntactic structures are formed. One hypothesis would be that functional structures like question marking and focus would show initial alignment like nonmanual negation. This could indicate that there is some similarity in the syntax of the functional structure. Another hypothesis would be that different functional structures show different articulation or alignment. This could indicate that there is some difference in how the syntactic structures should be analyzed.

7 Conclusions

The color extraction and point tracking methods used in this study could be further modified for use with the various nonmanual gestures found in sign languages. In this study I took my previous work (Harmon 2015) on nonmanual adverbs and modified the articulation-tracking methods to investigate nonmanual negation, but this method could be further modified to fit the requirements of the many other nonmanuals. For head movement gestures like agreement, looking at change in direction of movement using point tracking could be useful. The color extraction method is versatile since it is able to follow a single articulator automatically based on whatever specific shades are used in that particular video. The method could be improved by using video with a higher frame rate to obtain more precise temporal measurements. The method could also be used to look at concurrent phenomena besides facial morphemes in sign language, like changes in referent based on the spacial position of the torso.

This study measured the timing relationship between nonmanual negation and manual signs and found that while negation and the scope of negation are simultaneous, the articulatory specifics are different from those of adverbs, with the peak of articulation intensity occurring initially rather than at the center. This perhaps gives us a glimpse into the difference between the syntax of lexical items like adverbs and functional phases like negation. There is a correlation between nonmanual elements in ASL and functional projections, and this gives us some information about the structure of the grammar that we do not as easily see in a spoken language. The hierarchical nesting of functional structure is not as easily seen with linearly ordered words or signs, but with simultaneously articulated structure the structure becomes clearer.

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Prosody and Corrective Focus within the Nominal Domain of Mandarin Chinese

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1 Introduction

In addition to deciding what to say, interlocutors have to decide how to say it. An important task of linguists is to model how differences in prosody (i.e. changes in pitch, rhythm, and volume) affect the meaning of a sentence (Gussenhoven 1983, Pierrehumbert 1990). The same sentence can be used to express different information structures, and the way that prosody is used to encode such INFORMATION PACKAGING (Chafe 1976) is unique to each language. Tone languages are particularly challenging, since acoustic signals typically associated with the prosodic marking of information structure are at the same time used to distinguish lexical meanings (e.g. in Mandarin Chinese [ma˧˥] 'scold' vs. [ma˥] 'mother'). Previous research on the prosodic marking of focus in Chinese has mostly focused only on one or two acoustic dimensions of a single focused disyllabic word of Tone 1 (the high-level tone) serving as the subject or object in a Mandarin sentence, but different findings were reported with respect to different types of information structures. For example, narrow wh-focus may involve longer duration (Jin 1996, Greif 2010), larger F0 ranges (Jin 1996, Xu 1999), or higher mean F0 (Chen et al. 2009) than old information, and contrastive focus may be distinguished from old information through lengthening, increasing intensity, and enlarging the F0 range (Ouyang & Kaiser 2015). It remains unclear whether different types of foci (i.e. information focus vs. corrective focus) are expressed prosodically differently, and whether focus representations are acoustically distinguishable from the underlying lexical tonal representations. The current study attempts to answer these two questions.

In light of previous research on how prosodic structure convey discourse-level information, and assuming the framework of alternative semantics of focus (Rooth 1985, Krifka 2008), this

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study made use of a speech production experiment to investigate the prosodic realization of different types of focus (i.e. narrow-wh, wide-wh, and corrective foci), and different sizes of focus constituents, in four distinct lexical tone environments. Special attention was paid to the sequence of numeral-classifier-noun in Mandarin, which expresses a semantic core by itself, and naturally provides a phonetically controlled phrasal-environment that is comparable to previous studies on focus-related phonetic prominence at the sentential level. Assuming that the term CONTRASTIVE only refers to a situation in which the existence of concrete unselected or rejected alternatives is involved or at least implied, I used explicit corrections in this study representing contrastive focus, and distinguish it from the information focus that is expressed through answer-question pairs of wh-questions (cf. Büring 2003).

2 Experiment

2.1 Stimuli

As Table 1 shows below, the target items were three-syllable complex nominals containing a monosyllabic numeral, a monosyllabic classifier, and a monosyllabic noun. Every syllable in the target item bears the same Mandarin tone as follows: tone 1, tone 2, tone 3, and tone 4. It is known that two adjacent tone 3 syllables in Mandarin often requires the first tone 3 syllable to be pronounced as tone 2 (e.g. *lao3hu3* 'tiger' → *lao2hu3*). In addition, the lexical item *yi* 'one' was excluded from the set of tone 1 items, because *yi* 'one' undergoes two different types of tone sandhi obligatorily based on the tone of its following syllable unit.

Table 1. Target items of different tones

Tones			
Tone 1	三枝花	sān zhī huā	'three [classifier of] flowers'
Tone 2	十條魚	shí tiáo yú	'ten [classifier of] fish'
Tone 3	五碗酒	wǔ wǎn jiǔ	'five bowls of alcohol'
Tone 4	六对袜	liù duì wà	'six pairs of socks'

Six items of each tone condition were created. Each of such complex NPs shown in Table 1 were then embedded in sentences illustrating the following six different information structures manipulated on the size and the type of the intended focus constituent (as shown in Table 2):

Table 2. Six types of information structures

Information	positions	Leading questions	Target sentences
Answer NP (ANP)	subject	What should we put here?	Three flowers here look fine.
	Object	What will you buy this year?	I will buy three flowers.
Correct NP (CNP)	Subject	You surely will send a box of chocolates this Valentine!	No, three flowers will be enough to show my heart!
	Object	Did you give your girlfriend a box of chocolates last valentine?	No, I only sent her three flowers.
Answer numeral (ANUM)	subject	How many flowers will look fine here?	Three flowers here look fine.
	object	How many flowers are you going to buy this Valentine?	I will buy three flowers.
Correct numeral (CNUM)	subject	You surely will send 99 flowers this Valentine's Day!	No, three flowers will be enough to show my heart!
	object	Did you give your girlfriend 99 flowers last Valentine?	No, I only sent her three flowers.
All-new focus (NEWS)	Subject	What happened?	Three flowers withered away.
	Object	What did you do?	I went to buy three flowers.
Old NP (ODNP)	Subject	What happened to three flowers?	Three flowers withered away.
	Object	How come there are three flowers?	John sent me three flowers.

For corrective focus, statements contain incorrect information that similarly corresponds to either the numeral part of a noun phrase (CNUM) or the whole noun phrase (CNP). For information

focus, statements containing unknown information of the numeral (ANUM), the whole noun phrase (ANP), or the entire statement containing a sequence of numeral-classifier-noun (NEWS) were answered. When the whole noun phrase (NP) is part of the background, the NP represents old information (ODNP). The target items were manipulated as either the subject or object of a sentence. The stimuli consist of 288 target sentences in total (6 items ×4 tonal conditions ×6 information structures × 2 NP positions). Stimuli were all randomized, so that no identical target item was immediately adjacent in the trials while being presented.

2.2 Participants

Six native speakers of Putonghua Mandarin from Northern China participated in the experiment (3 female; 3 male), aged between 20 and 28 (mean: 23.5). None of them reported any history of hearing problems. The ethics approval for the data collection and the basic geographic information were obtained before each participant started the experiment. Each participant was paid $60 Hong Kong dollars as compensation after they finished the experiment.

2.3 Procedure

Each participant first filled out a language background questionnaire and signed an information consent form. During the experiment, all the stimuli were presented on a computer screen in a sound-attenuated room. Participants were instructed to listen and response to pre-recorded utterances as casual and natural as possible; no instruction was given to emphasize any token. Participants listened to the leading questions through a headphone and read the target sentences on the screen. Following a given trial, the next was presented 2s later. They only repeated the sentence once unless they mispronounced the words or accidentally paused in the middle of utterances. Recordings were stored in .wav format at a sampling rate of 44.1 kHz and a 16-bit quantization. Every participant had three practice trails before moving on to the experimental trails. The participants were forced to take a 5-minute break after 144 trials. The experiment lasted about 50 minutes.

2.4 Analysis

The target items were segmented using Praat (Boersma & Weenink 2013). Syllable boundaries were determined by using both visual (the waveform and spectrogram) and auditory information. The vocal pulses were manually checked and corrected when there were missing pulses, or creaky voice. The acoustic measurements were generated by a custom-written script ProsodyPro (Xu 2013*)* for duration, mean intensity, and normalized F0 across speakers.

The Linear Mixed-Effects model was conducted on the duration and mean intensity using R (R Core Team 2013) and the lme4 package (Bates et al. 2015). The fixed effects were information structure, tonal condition, and NP position. The fixed effects were only incorporated in the model if they led to a better fit, which was tested with hierarchical regression (*anova()* function in R). 'Listeners' and 'repetition' were included as random intercepts. Random slopes for fixed effects were not introduced because it resulted in a model that did not converge. The Satterthwaite approximation for degrees of freedom was used to estimate *p*-values. NP as old information (ODNP) was encoded as the baseline condition. To observe F0 contour patterns of different foci, Smoothing Spline Analysis of Variance (SSANOVA; Gu 2017) was applied to compare the normalized F0 (in semitone) by using *ssanova()* function from the gss package (Gu 2002) in R to generate the contour plots.

3 Results

In the following sections, I first report results of duration, and intensity (Section 3.1), and then report results of F0 in four tonal environments (Section 3.2). Attention will be paid to the difference between old information and different types of foci, and on the acoustic cues expressing different types of foci and the phenomenon of post-focal compression.

3.1 Duration and intensity

3.1.1 The numeral

As Table 3 below shows, the analysis revealed a significant main effect of information structure (F=186.419, p<.001) and tonal condition (F=296.985, p<.001) on the duration of the numeral. Focus of numeral (ANUM and CNUM) yielded significantly lengthened duration than conditions

of all-new focus (NEWS) and NP as old information (ODNP). With respect to intensity, the information structure (F=49.069, p<.001), and tonal conditions (F=30.936, p<.001) showed a significant main effect. When the focus was on the numeral, the intensity was higher.

When answering the whole noun phrase (ANP), the numeral (as a part of the overall focus phrase) was also prolonged compared with ODNP, but no specific difference on intensity as shown in Table 3.

Table 3. The effect of information structure on the duration and intensity of numeral.

Fixed effect: Information structure (intercept: ODNP)

	Variable	***β***	**95% CI**	***p***
ANUM	duration	75.16	52.65 – 97.66	**<.001**
	intensity	1.99	0.59 – 3.39	**.006**
CNUM	duration	67.96	45.45 – 90.46	**<.001**
	intensity	2.53	1.13 – 3.94	**<.001**
ANP	duration	29.65	7.14 – 52.15	**.010**
	intensity	0.96	-0.45 – 2.36	.182
CNP	duration	10.89	-11.62 – 33.39	.343
	intensity	0.87	-0.54 – 2.27	.227
NEWS	duration	17.00	-5.51 – 39.50	.139
	intensity	0.90	-0.51 – 2.30	.210

3.1.2 The classifier

Similar to the numeral, the analysis revealed a significant main effect of information structure (F=29.082, p<.001), and tonal condition (F=74.938, p<.001) on the duration of the classifier. The duration was longer in the focused numeral (ANUM and CNUM) and in NP answers (ANP) compared with NP as old information (ODNP), as shown in Table 4.

The information structure (F=32.39, p<.001), and tonal conditions (F=61.60, p<.001) had a significant main effect on the intensity as well. In the comparison with the whole NP as old

information (ODNP), however, different information structures did not differ from each other in intensity (ANP: p = .975, CNP: p = .191) as s3.1.1 The numeral hown in Table 4.

Table 4. The effect of information structure on the duration and intensity of classifier.

Fixed effect: Information structure (intercept: ODNP)

	Variable	***β***	**95% CI**	***p***
ANUM	duration	26.83	10.33 – 43.34	**.001**
	intensity	-0.11	-1.50 – 1.28	.877
CNUM	duration	17.80	1.30 – 34.30	**.035**
	intensity	-0.37	-1.76 – 1.02	.605
ANP	duration	21.62	5.12 – 38.13	**.010**
	intensity	-0.02	-1.41 – 1.37	.975
CNP	duration	11.20	-5.30 – 27.70	.184
	intensity	0.93	-0.46 – 2.32	.191
NEWS	duration	6.68	-9.83 – 23.18	.428
	intensity	0.76	-0.63 – 2.15	.285

3.1.3 The noun

The analysis revealed a significant main effect of information structure (F=36.787, p<.001), and tonal condition (F=59.642, p<.001) on the duration of the noun. When the whole noun phrase was focused (ANP and CNP), the duration of the head noun was longer than NP as the old information (ODNP). Once again, compared with answering a full-sentence (NEWS), only corrective focus of the noun phrase (CNP) led to an increase in duration. Remarkably, a significant reduction in the duration of NP with a focused numeral (CNUM) was observed while compared with NEWS and ODNP conditions.

The information structure (F=73.56, p<.001), and tonal conditions (F=55.95, p<.001) had a significant effect on intensity. Corrective focus on the preceding numeral resulted in a significant decrease in the intensity of the noun compared with ODNP and NEWS as shown in Table 5.

Table 5. The effect of information structure on the duration and mean intensity of noun.

Fixed effect: Information structure (intercept: ODNP)

	Variable	***β***	**95% CI**	***P***
ANUM	duration	9.61	-18.02 – 37.23	.496
	intensity	-1.35	-2.72 – 0.03	.055
CNUM	duration	5.51	-22.12 – 33.13	.696
	intensity	-1.99	-3.36 – -0.62	**.005**
ANP	duration	42.81	15.18 – 70.43	**.002**
	intensity	0.31	-1.06 – 1.69	.654
CNP	duration	44.75	17.12 – 72.37	**.002**
	intensity	0.63	-0.74 – 2.01	.366
NEWS	duration	15.86	-11.77 – 43.48	.261
	intensity	-0.07	-1.44 – 1.30	.921

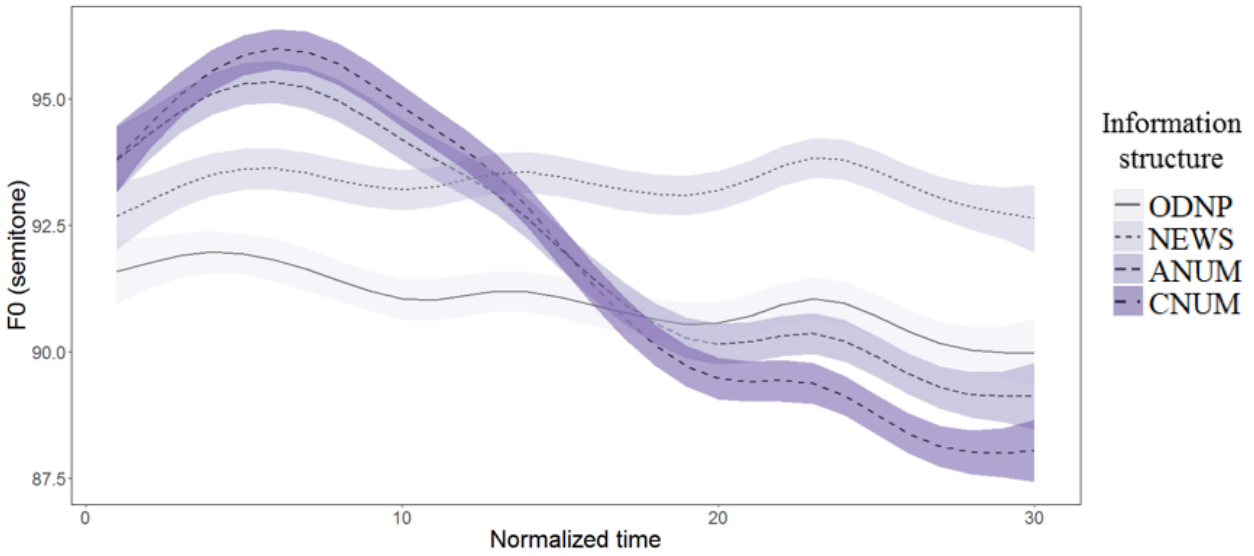
3.2 F0 contours

3.2.1 Numeral as focus

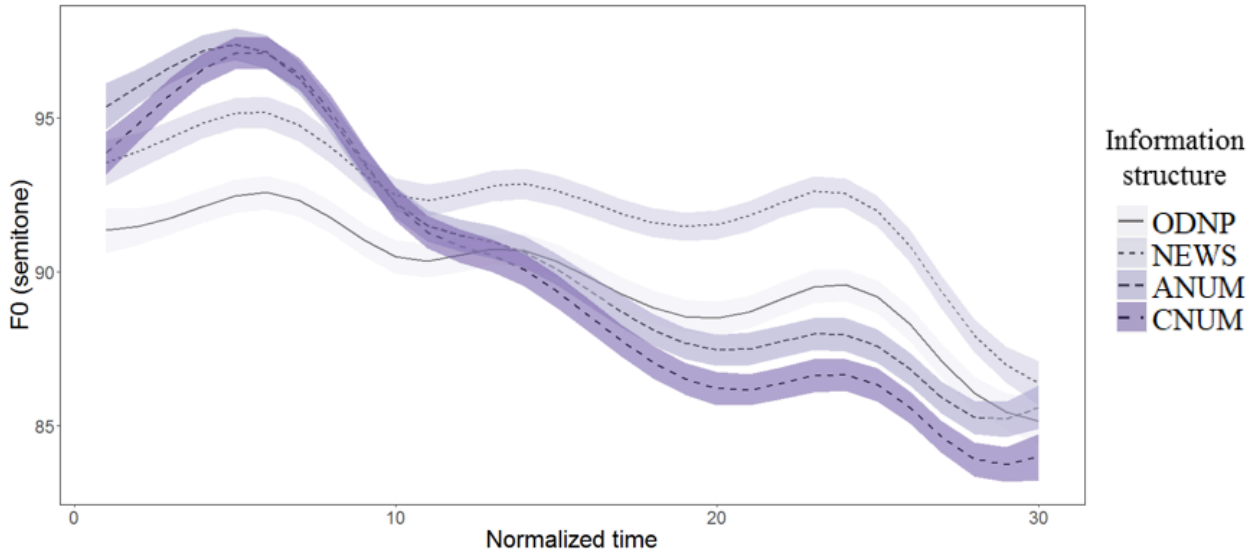
The plots from SSANOVA indicate that although patterns of lexical tones vary, complex nominals of different tones at issue encode information structure in a systematic way. As shown in Figure 1 below, except from tone 3, the F0 contours of NPs with a focused numeral (ANUM and CNUM) exhibited a rise of F0 on the focus unit and the clear post-focal compression of F0, when compared with old information (ODNP). Between ANUM and CNUM conditions, when the noun phrases bear tone 1 and tone 4, the corrective focus (CNUM) showed greater reduction in the final position (i.e. the head noun region), which is a characteristic that distinguished CNUM from ANUM. Moreover, except tone 3, the overall F0 of all-new focus (NEWS) was significantly or marginally significantly higher than that of ODNP.

Figure 1. F0 contours in four tonal conditions across four information structures (Normalized time points 0-10 refer to numeral, 10-20 classifier, and 20-30 noun)

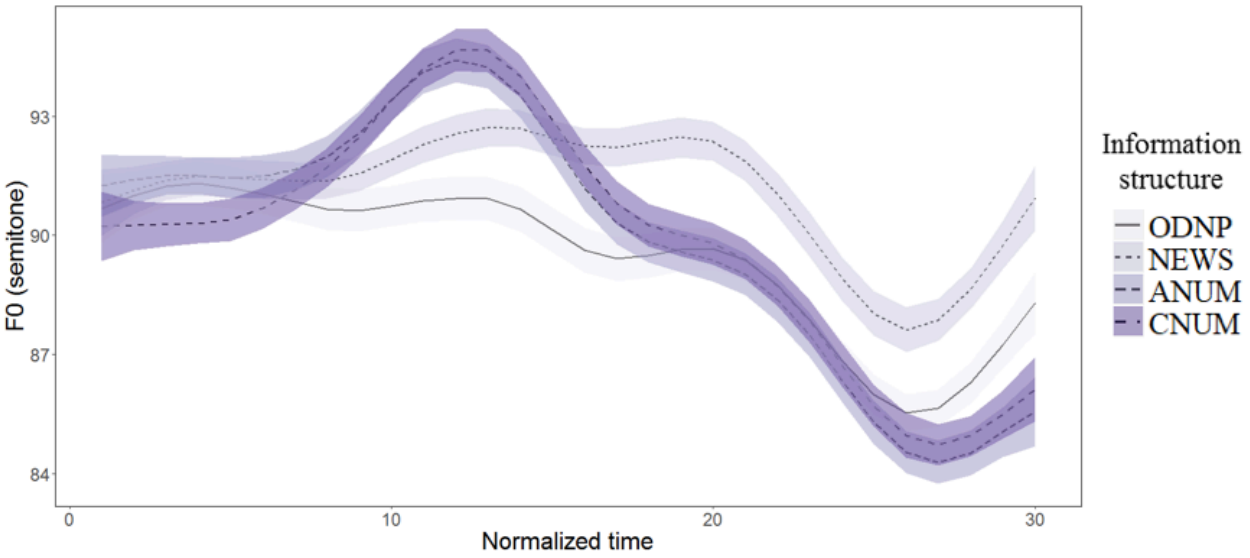
F0 contours of noun phrases in tone 1 condition



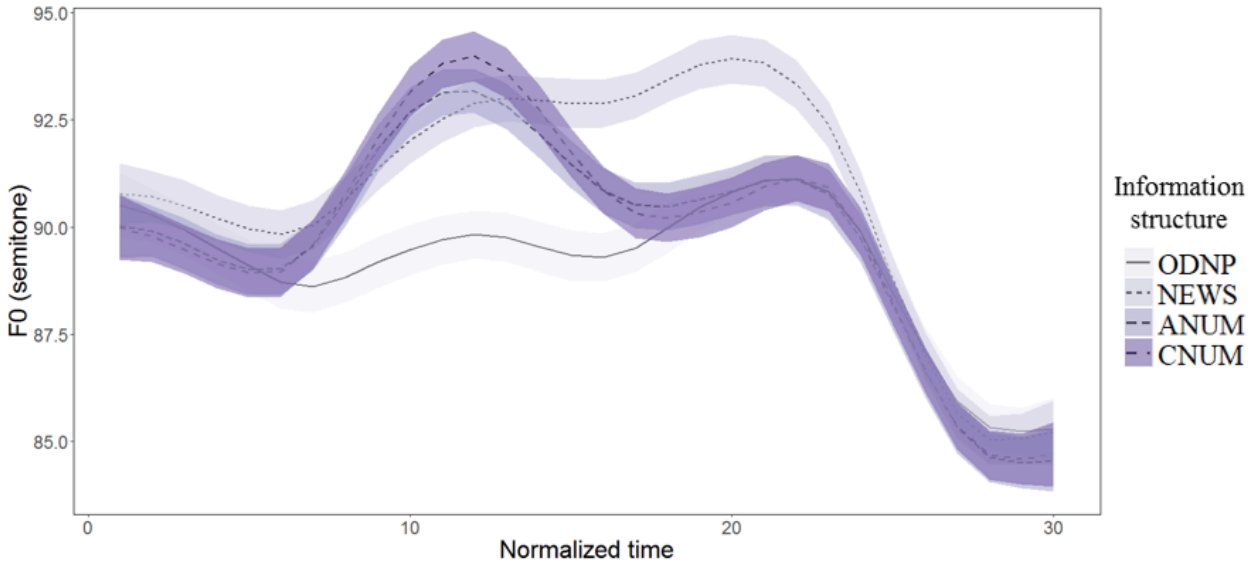
F0 contours of noun phrases in tone 4 condition



F0 contours of noun phrases in tone 2 condition



F0 contours of noun phrases in tone 3 condition exhibiting tone sandhi

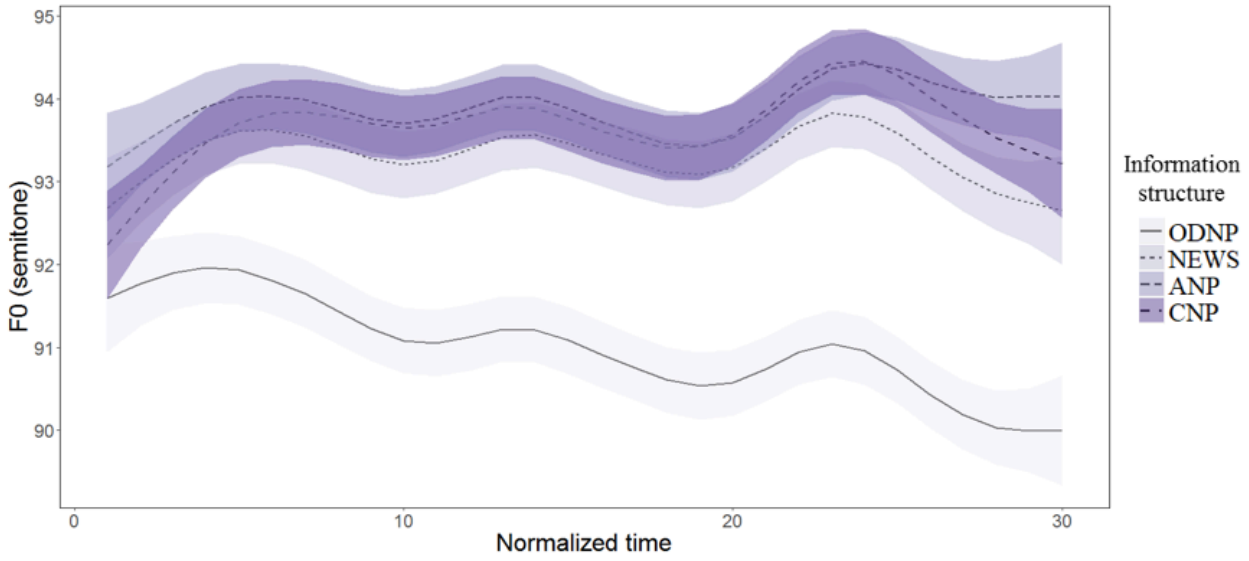


3.2.2 Whole noun phrase as focus

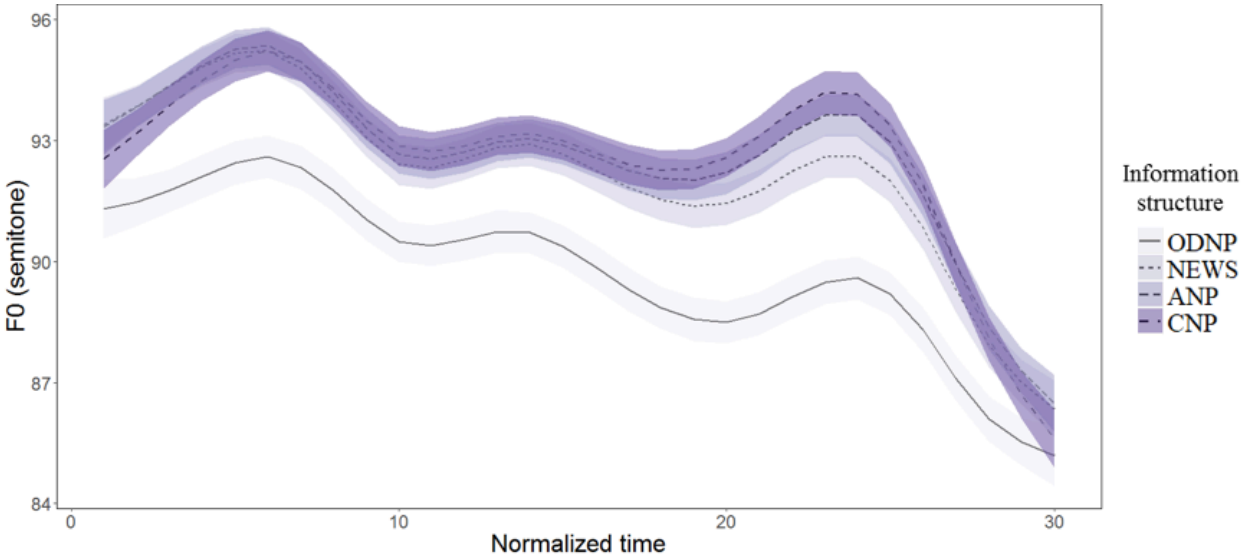
When the whole noun phrase was the focused or part of the all-new focus (ANP, CNP and NEWS), the F0 was higher than old information (ODNP) for tone 1 and tone 4. In tone 2 condition, the F0 contour of NP with old information was lower than the other three conditions in the classifier and noun positions. For tone 3 condition, the F0 contour of NP as old information was only lower than the other conditions at the classifier position.

Figure 2. F0 contour of whole NP foci across four different information structures (Normalized time points 0-10 refer to numeral, 10-20 classifier, and 20-30 noun)

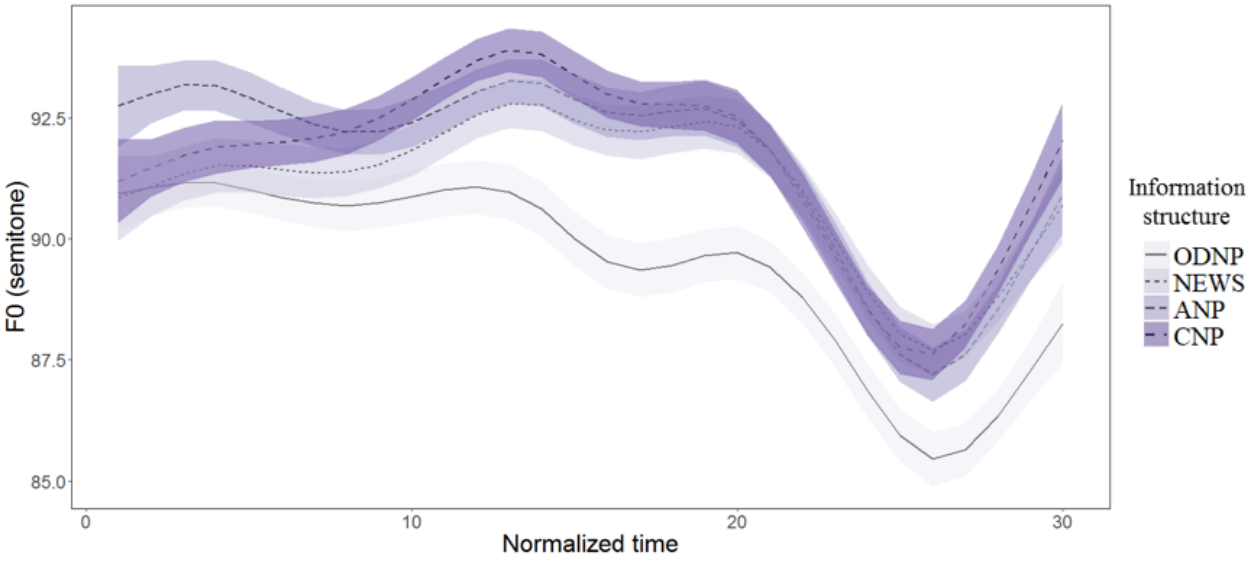
F0 contours of noun phrases in tone 1 condition



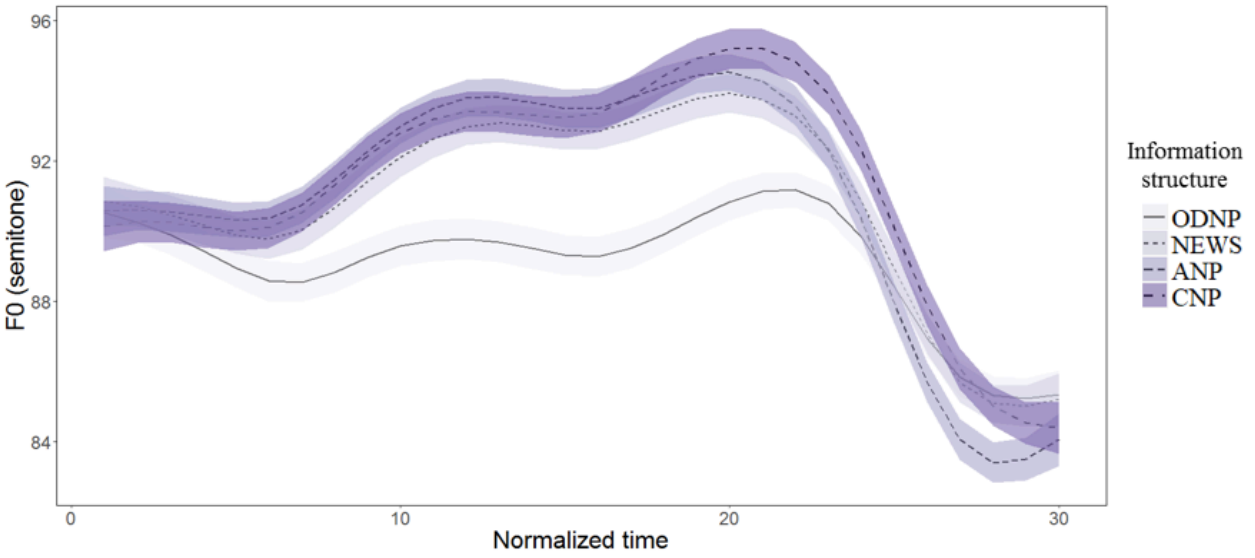
F0 contours of noun phrases in tone 4 condition



F0 contours of noun phrases in tone 2 condition



F0 contours of noun phrases in tone 3 condition exhibiting tone sandhi



4 Discussion

The results of this study showed that although patterns varied depending on the size of foci, the tonal conditions, or the type of information structure involved, focus constituents generally are different from old information in having longer duration, higher intensity, and higher F0. With respect to narrow foci, that is, answering the numeral (ANUM) and correcting the numeral (CNUM), the overall analysis of duration and intensity showed that the focused numeral was significantly lengthened, the duration and intensity was only marginally different on its following classifier, and significant reduction was found in intensity in the post-focal region (i.e. the noun).

Furthermore, corrective focus showed great post-focal compression of F0 in all data, only except for data in tone 3, which is a complex contour tone.

Although the design of the current study does not allow us to study post-focal patterns of full NP foci, results from narrow foci on the numeral within a noun phrase showed clear post-focal reduction in intensity and F0, similar to what was reported for wh-foci in the argument positions in a sentence. Specifically, this study showed that the higher initial intensity and the greater post-focally compressed F0 can be the most prominent acoustic indication that distinguishes corrective focus from information focus.

5 Conclusions

This study investigated how information structure is realized prosodically within a complex Mandarin nominal expression. The results showed that a multi-dimensional strategy was used in marking focus constituents acoustically in Mandarin: That is, longer duration, higher intensity, and higher F0 are used to mark focus in general; in addition, higher initial intensity and greater post-focal compression are used to express contrastive focus. It showed that although acoustic cues of F0, intensity, and duration are important in expressing lexical/word information in Chinese Mandarin. The result also showed that different information structural roles can be expressed in Mandarin through the same prosodic system that simultaneously expresses lexical meanings. Last, this study showed that the acoustic realization of focus is sensitive to the weight of constituent while marking the boundaries of such constituents to expresses specific information structures.

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Imperatives with the calling contour

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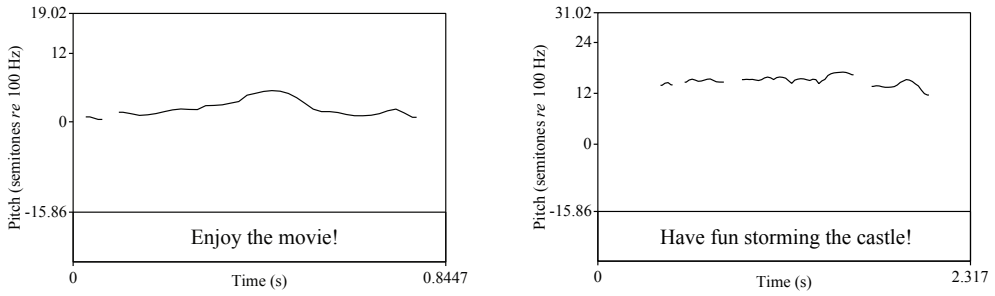
1 Introduction

Certain intonational configurations contribute highly nuanced meanings that are difficult to capture or distill. One such intonation is the 'calling contour' in American English, which we describe as a 'downstepped level terminal contour' (shortened as DLT), and transcribe as H* !H-L%, reflecting the distinct intonational profile demonstrated in figure 1. The 'calling contour' has been widely noted to occur with vocative or phrasal utterances, and has often been associated with diverse social and interactional meanings, ranging from lack of urgency to familiarity.

In this paper, we examine the systematic pairing between this 'calling contour' and a particular sentence type: imperatives. While the potential meaning contributions of the calling contour have been documented in previous work, it has never been looked at in the context of imperatives, although, as we will show, it occurs quite robustly and systematically with them. To give a concrete idea of how imperatives with calling contours sound, figure 1 presents the pitch contours of two examples. The sound clips can be accessed at `audio1` and `audio2`.[1]

Figure 1: Examples of DLT imperatives



We observe that DLT is usually compatible with imperatives favoring certain types of illocutions, such as well-wishes, but incompatible with imperatives favoring other types of illocutions, such as orders and offers. We also note that even when DLT is paired with compatible illocutions, its felicity/infelicity ultimately depends on certain contextual information. We hypothesize that the relevant contextual information is the extent of expected speaker involvement in the realization of the content of the imperative. We corroborate this hypothesis and further establish our initial

*We thank audiences at Stanford and at BLS 43 for comments on oral presentations of this work and Sven Lauer for comments on a written version.

[1]The second clip has been extracted from the movie *The Princess Bride*. Thanks to Prerna Nadathur for the pointer.

descriptive observations with an experimental study including contextual manipulations, as well as prosodically manipulated stimuli representing DLT vs. non-DLT imperatives.

We propose an analysis of the interaction between the intonation (DLT) and the sentence type (imperatives) in terms of their respective conventionally determined meanings. The analysis accounts for the illocution-dependent as well as other context-dependent aspects of the felicity of DLT imperatives. Although the main purpose of our analysis is to clarify the interaction between imperatives and DLT, our account of DLT is shown to generalize to non-imperative utterances (vocatives, declaratives, etc.).

In developing our analysis, we bring together two strains of inquiry: one focusing on the intonational meaning of DLT, the other focusing on the functional heterogeneity of imperatives. We show that DLT imperatives present an interesting case study to the more general issue of the *form-force* mapping, via which we can examine the systematic interactions between intonation, sentence-type, content, and the context, and how these come together to signal a variety of illocutionary, perlocutionary, and often highly nuanced social meanings.

2 The calling contour

2.1 Previous work

The contour in question (H* !H-L%) was originally discussed in Pike (1945). Pike describes the tune as a 'spoken chant', and argues that it is often used to summon someone. He gives examples in which the tune combines with vocative utterances, as in 1a. The tune has henceforth been standardly referred to as the 'calling contour'. In later work, Abe (1962), Fox (1969), Liberman (1975), Leben (1976), and Gibbon (1976) all attribute similar types of meaning to the tune, or attempt to further refine Pike's core observation. For instance, Liberman (1975) categorizes it as one variety of his 'warning/calling tune', and Fox (1969) notes that the tune is appropriate when calling someone who is some distance away or out of sight.

(1) a. *Anna!* H* !H-L% (Pike 1945)
b. *Jacob!* H* !H-L% *Your lunch!* H* !H-L% (Ladd 1978)
c. *Fire!* #H* !H-L% (Ladd 1978)

Ladd (1978) observes that the tune is not confined to summoning or warning utterances, but is often used in contexts where a familiar routine (shared between the speaker and the addressee) is evoked, as in 1b. Extrapolating from such uses, Ladd argues that the tune has a core meaning of 'stylization', or shared convention. He further adds that the convention signaled by this tune can be a private one between individuals, with the "flavor of everyday domestic life" (p. 520). In the case of 1b, for example, the 'calling contour' would signal that Jacob is being summoned

to his lunch yet again, and that this is a part of an established, stereotypical routine between the speaker and the addressee (Jacob). Ladd also notes that since the tune evokes familiar routines, it cannot be felicitously used in unfamiliar, urgent situations or emergencies, as seen in 1c, where the infelicity of the intonation is marked with #. Using minimal pairs with the same utterance in different contexts, Ladd highlights the fact that infelicity arises when the tune is used in contexts in which no shared convention or familiar routine can be inferred. For instance, the tune is infelicitous with the imperative *Look out for the broken steps!* as an out of the blue warning, but felicitous in a context where the addressee knows about the broken steps.[2]

Another take on this tune can be found in Pierrehumbert and Hirschberg (1990), whose main goal is to present a decompositional analysis of English intonation. Pitch accents, phrase accents, and boundary tones contribute distinct types of elementary meanings and combine with each other to derive more targeted meanings. In line with this broader aim, Pierrehumbert and Hirschberg break down the tune into its subparts: the nuclear pitch accent (H*+L),[3] the phrase accent (H-), and the boundary tone (L%). In generating the desired meanings associated with the tune, they attribute the bulk of its conventionalized meaning to the nuclear pitch accent H*+L. They propose (see p. 297) that H*+L signals that the salience of the accented item should be inferred from mutual public beliefs of the hearer and the speaker, which can be identified with the notion of the common ground in Stalnaker (1978). By comparison, the phrase accent H- and the boundary tone L% are argued to have more of a demarcating effect.

Pierrehumbert and Hirschberg (1990) argue that their analysis can give a more precise and comprehensive account of the tune than Ladd's 'stylization' account. For 1b, for instance, their analysis predicts that use of the intonation is appropriate when Jacob is already expecting his lunch and can infer the reason why it is being brought to his attention. In addition, they claim that the nuclear pitch accent H*+L of the tune (and by extrapolation, the entire tune itself) can be used to emphasize something that isn't necessarily associated with any shared past history between the interlocutors, but rather associated with information already in the common ground.[4] Finally, they observe that the nuclear pitch accent H*+L of the tune often has "a pedagogical flavor" (p. 298) and that this is expected on their account, as teaching often involves pointing the learner to connections between old and new information.

Previous work on the 'calling contour' thus captures the summoning, warning via reminder, or 'stylized' uses of the tune. It also describes a range of nuanced social and interactional meanings

[2]We discuss such cases in terms of our analysis in section 7.1.

[3]Following the later ToBI transcription convention proposed by Beckman and Ayers (1997) the present paper transcribes the +L part in this nuclear pitch accent as a downstep (!) in the subsequent tonal target. What Pierrehumbert and Hirschberg (1990) refer to as H*+L H-L% is thus equivalent to the tune we transcribe as H* !H-L%, except that the latter reflects more recent modifications to the ToBI transcription conventions.

[4]The actual example that they give to demonstrate this isn't H*+L H-L% itself, but H*+L combined with another type of phrase accent: H*+L H-H%; however, they expect this observation to be generalized to H*+L H-L% as well.

that can be associated with the tune, such as the existence of some physical distance between the interlocutors (Fox 1969), pedagogical flavor (Pierrehumbert and Hirschberg 1990), shared past history and everyday domesticity (Ladd 1978). At the same time, all previous work on the tune seems to assume that it has a rather special status (hence the notion of stylization), and focuses on cases in which the tune is paired with highly ritualistic phrases (like 'your lunch', or vocatives) and not with full sentences used in more ad hoc situations.[5]

It turns out, however, that H* !H-L% occurs quite robustly with full sentences, albeit with interesting restrictions. In particular, imperatives can host the tune provided context, content and illocutionary force are of the right type.[6] In addition, the meaning contribution of H* !H-L% has not yet been discussed in the broader context of sentence types and speech acts, although it seems to have systematic repercussions on inferences related to illocutionary force. The following section examines these effects and establishes a close connection between H* !H-L% and imperatives.

2.2 The calling contour with imperatives

Imperatives are associated with a heterogeneous range of illocutions (see Schmerling (1982)). Not only can they be used directively to command, request, or warn, but also to give advice, to offer, or to merely express a wish. The calling contour H* !H-L% occurs with a systematic subset of imperative uses. It standardly combines with imperatives that signal well-wish illocutions, as can be seen in 2a and 2b. It can also combine with 'mnemonic imperatives', in the sense of Crone (2016), with the function of reminder advice or request, as can be seen in 2c and 2d.[7] In contrast, the tune sounds infelicitous when combined with imperatives favoring other types of illocutions such as orders, non-mnemonic requests, offers, or advice, some of which are exemplified in 3.

(2) a. *Enjoy your dinner!* H* !H-L% [well-wish]

b. *Have a nice trip!* H* !H-L% [well-wish]

c. (speaker addressing his daughter while dangling the lunchbox from afar)
Don't forget your lunchbox! H* !H-L% [mnemonic advice]

d. (speaker about to leave the house addressing the house-sitter)
Remember to feed the cats! H* !H-L% [mnemonic request]

(3) a. *Hand in the assignment by Friday!* #H* !H-L% [order]

[5]To some extent, Pierrehumbert and Hirschberg (1990) and Ladd (1978) touch on examples involving full sentences. However, the examples of full sentences presented by the former do not directly concern the entire H* !H-L% tune itself, but rather just the nuclear pitch accent H*+L, and those presented by the latter are still subsumed under the more general characterization of 'stylization' and stereotypical usages.

[6]A few imperative examples appear in Ladd (1978) as we saw above. However, he treats them as part of the more general 'reminder warning' cases and does not mention the potential significance of their sentence type (imperative). He also does not bring in other systematic classes of imperatives that standardly host the tune, such as well-wishes.

[7]These differ in illocution from the 'reminder warnings' noted by Ladd (1978), although the notion of memory seems to play a role in both cases.

b. *Please close the window!* #H* !H-L% [request]
c. *Take a cookie!* #H* !H-L% [offer]
d. *Take your medicine for another week!* #H* !H-L% [advice]

The calling contour on imperatives often gives rise to particular perlocutionary and social meanings, such as friendliness and politeness (especially for well-wish cases) that are absent in the summoning or warning uses of the tune. Finally, we note that the tune can occur with full declarative utterances as well, but again with different illocutionary and perlocutionary inferences from the vocative and imperative cases. These often work to signal admonitions or advice, and seem to have the perlocutionary flavor of offhandedness. We postpone discussing these case until section 7.7 and focus on imperative examples in the main part of the paper. Given that H* !H-L% can combine with non-calling utterances, we will henceforth refer to it as DLT, short for down-stepped level terminal contour, as noted in the introduction.

The occurrence of DLT with imperatives calls for a reassessment of its hypothesized meaning contribution in previous work. Accounts that directly attribute the function of 'calling' or 'warning' to DLT are obviously too narrow and restricted in capturing the uses in which the tune combines with well-wishes or mnemonic requests. Ladd's 'stylization' account, although a lot more general, still seems to have difficulty capturing the exact flavors of the imperative examples. In particular, it cannot explain the split in the uses seen in 2 and 3. There is no a priori reason why well-wishes and mnemonic requests can be stylized but orders and offers, which can be just as stereotypical and ritualized, cannot. Moreover, 2d is felicitous with DLT even when the speaker is talking to a temporary cat-sitter who has never fed the speaker's cat before, hence there is no stereotypical routine to evoke. Similarly, Pierrehumbert and Hirschberg's analysis seems insufficient to capture the observation that imperatives with certain illocutionary biases can host DLT, but those with other illocutionary biases cannot. For instance, offers like 3c can be made in contexts where the preconditions of salience and mutual beliefs are satisfied but the tune is simply infelicitous.

A first-cut generalization about the connection between the illocutionary force of imperatives and the felicity of DLT is to say that depending on the content, the intonation endows imperatives with a particular illocution, such as well-wish. One could even carry this view a step further and reconcile it with existing approaches that associate 'reminder warnings' or 'summonings' with the tune; interpretations such as well-wishes can simply be added to the inventory of possible illocutions prescribed by the tune and chosen on the basis of the tune and the content. However, imperatives with the same content and illocutionary force favor or disfavor DLT depending on the context.[8] In 4 and 5, an imperative is put in two different contexts. Its illocutionary force

[8] As noted earlier, Ladd (1978) was the first to observe that the felicity of a given calling contour depends on certain contextual information, even when the content of the utterance remains the same. As will be shown in section 7.1, his generalization on what the relevant contextual information is differs from our account.

remains the same but the context affects the felicity of DLT. These examples suggest that the felicity/infelicity of DLT is sensitive to certain contextual inferences that don't make any reference to illocutionary distinctions. Therefore, DLT not only constrains the possible forces, however that happens, but it also has an effect even with a fixed illocutionary force.

(4) a. (Addressee has a light cold) *Get well soon!* H* !H-L% [well-wish]
b. (Addressee is seriously ill) *Get well soon!* #H* !H-L% [well-wish]

(5) a. (Speaker is stepping out the door while addressing the house-sitter)
Remember to feed the cats! H* !H-L% [request]
b. (Speaker is in the process of giving out instructions to the house-sitter)
Remember to feed the cats! #H* !H-L% *I'll leave a reminder note.* [request]

These observations suggest that a variety of factors conspire to generate the cloud of meanings associated with DLT imperatives, as well as their patterns of felicity/infelicity. First, the sentence type seems to play an important role, as DLT with imperatives generates systematically different illocutionary and perlocutionary inferences from DLT with vocatives or declaratives. Second, content seems to matter, as utterances with the content of 2a strongly favor DLT from the get-go, whereas those with the content of 3a do not. Third, illocutionary force plays a role as well: well-wish and mnemonic imperatives can generally host DLT, whereas imperatives favoring other illocutions cannot. Finally, the context seems to play a big part, as shown by 4 and 5. Our ultimate goal is to clarify the respective contributions of each of these factors.

3 Hypothesis

In order to corroborate our intuitions and to better understand the respective contributions of each of the factors above, we gathered more controlled empirical data on DLT imperatives by testing our generalizations via a perception experiment. For this purpose, we translated our observations into more specific, testable predictions. Based on the observations about 2 and 3, we first hypothesized that DLT will be judged to be felicitous when combined with imperatives that signal well-wishes or mnemonic requests and advice, but infelicitous when combined with imperatives that signal orders, offers, non-mnemonic requests and advice, etc. We also hypothesized that a non-DLT intonation will be preferred for these imperatives (e.g., the standard falling contours such as H* L-L% or L* L-L%, which have been noted to occur with imperatives by Keough et al. (2016)). Second, we hypothesized that while DLT is generally compatible (and preferred) with imperatives that signal well-wish or mnemonic requests and advice, its felicity in these cases is ultimately dependent on certain contextual information.

What could be the nature of the relevant contextual information that significantly affects the felicity/infelicity of DLT imperatives? One hypothesis is that the felicity of DLT imperatives de-

pends crucially on the extent of expected speaker control and future involvement in ensuring the realization of the content of the imperative. (We assume that the content of the imperative is the proposition corresponding to its fulfillment conditions, e.g., for 2b the proposition that the addressee has a nice trip.) For instance, it seems that the core contextual condition that renders DLT felicitous in 5a is the impending departure of the speaker, which preempts further involvement of the speaker in the addressee's remembering to feed the cats. Relatedly, it seems that the core contextual information that renders DLT infelicitous in 5b is the speaker's follow-up utterance promising a reminder note, which signals that the speaker can and will be further involved in the realization of the addressee's remembering to feed the cats.

Note that according to the formulation above, the relevant contextual information does not just concern the *objective* extent of speaker control. Rather, what is at issue is the choice of the speaker to bring attention to, or to signal this lack of speaker control. Regarding 4, for instance, in reality a given speaker can rarely have any control over a given addressee's recovery rate regardless of the seriousness of the illness. However, in the case of serious illness, the speaker is likely to be socially motivated to *not* draw attention to this contextual information, and to at least act as though she can be further involved in the addressee's speedy recovery. In contrast, for minor ailments, drawing attention to a lack of control may instead work to signal non-presumptuousness and friendly well-wishes on the part of the speaker, in the vein of 'I can only offer my words, but I do hope that you get well soon.' (see section 6 for more discussion).

We thus hypothesized that the felicity of DLT will depend significantly on the variation in the extent of expected speaker control and future involvement, even when the content and the illocutionary inference associated with a given imperative is held constant. More specifically, we hypothesized that for a given imperative with the same content and illocution, participants will prefer non-DLT when the context is such that the speaker is expected to be further involved (via her actions) in bringing about the realization of the content, whereas they will prefer DLT when the context is such that the speaker is expected to *not* be further involved and has reasons to signal that. The seemingly illocution-dependent behavior of DLT noted in 2 and 3 (and developed into our first hypothesis) can ultimately be subsumed under the core contextual constraint we posited in our second hypothesis. However, we postpone developing this until section 6 and turn now to the experiment.

4 Experiment

In the perception experiment, participants read through 8 dialogue exchanges with blanked out spaces that anticipated certain utterances. After reading each dialogue, participants were asked to choose the utterance that is more likely to have occurred in the blank space of the dialogue that

they had just read. In each target trial, they were presented with two choices: DLT (H* !H-L%) vs. non-DLT versions (H* L-L% or L* L-L%) of a given imperative sentence. The structure of the experimental trials resembled the one adopted in Keough et al. (2016), but differed in the types of intonation and imperative content that were tested, as well as in the ways in which contextual specifications were given. More details regarding the experiment are presented below.

4.1 Materials

We included three types of imperatives as target stimuli, labelled as group 1, group 2, and group 3. Group 1 consisted of imperatives with contents that were heavily biased towards well-wish illocutions. As noted in section 3, they were hypothesized to prefer DLT.[9] Group 2 consisted of imperatives with contents heavily biased towards other illocutions (orders, offers, advice, etc.). They were hypothesized to be infelicitous when combined with DLT. Finally, group 3 consisted of imperatives that were expected to behave more ambiguously with respect to DLT: they thus included well-wish and mnemonic imperatives noted in 4 and 5. Preference for sonorants and avoidance of obstruents was another consideration in choosing the imperative sentences, but priority was given to sentences with natural content. The full list of imperatives used in the experiment is presented in Table 1.

Table 1: Sentences used in the experiment

Group	Sentences
Group 1	Enjoy your dinner! Good luck with the test! Have a nice holiday! Enjoy the movie!
Group 2	Hand in the assignment by noon! (order) Take a cookie! (offer) Avoid the highway! (disinterested advice) Take these pills for a week! (advice)
Group 3	Get well soon! Have fun at the party! Remember to feed the cats! Don't forget your lunchbox!

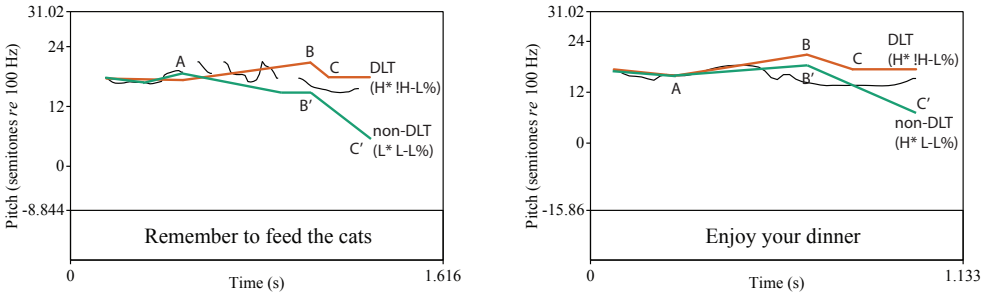
We recorded the above imperatives produced by 4 native English speakers (2 male, 2 female). During the first recording session, speakers were asked to produce the sentences as naturally as

[9] We did not include mnemonic requests in group 1, as we expected the felicity of these to be more dependent on the context; they figured in group 3 instead. We also did not include warnings, but discuss them in section 7.1.

possible. During the second session, speakers were asked to produce them in monotonous, sing-song intonation, aided by a sample production from the experimenter. The recordings from the second session were used as bases for further prosodic manipulation, whereas the recordings from the first session were used to establish criteria for manipulation, as well as assess the naturalness of the manipulated stimuli. Monotonous productions serve as suitable bases for prosodic manipulation, as they avoid being significantly biased towards one intonational configuration over the other, and prevent features, such as creaks, that would complicate prosodic manipulation (Jeong 2016).

We generated pairs of tokens (DLT vs. non-DLT tokens) from the same base recordings, using the following manipulation procedure. First, nuclear pitch accents, prenuclear pitch accents, phrase accents, and endpoints of the utterance were located. Second, new pitch values for nuclear pitch accents, phrase accents, and endpoints of the utterances were assigned: For DLT (H* !H-L%) tokens, the nuclear pitch accent (B) was 4 st. higher than the prenuclear pitch accent (A), the phrase accent (C) was 4 st. lower than the nuclear pitch accent (B), and the endpoint of the utterance had the same pitch value as the phrase accent (i.e., flat interpolation). For non-DLT tokens, the nuclear pitch accent (B′) was 2 st. lower (L* L-L%) or 2 st. higher (H* L-L%) than the prenuclear pitch accent (A), and the endpoint of the utterance (C′) was 10 st. lower than the nuclear pitch accent (B′).[10] The respective new values were posited by examining actual production patterns of DLT and non-DLT contours of 4 speakers in a pilot production experiment, as well as the first recording sessions. A visual summary of the process is given in figure 2.

Figure 2: Methods for creating two stimuli from the same base



For non-DLT tokens, we used two falling contours: the high falling (H* L-L%) and the low falling (L* L-L%) contours noted by Keough et al. (2016) in connection with imperatives. Instead of expanding the range of choices in each trial to include 3 options (H* !H-L%, H* L-L%, and L* L-L%), we paired DLT with just one non-DLT alternative for each sentence. Relying on results from a pilot production experiment as well as native speakers' judgments, we chose the non-DLT alternative that was judged more appropriate for a given imperative sentence. For imperatives such

[10]Due to space constraints, these simplify a few additional adjustments that depended on the expected values of preceding pitch accents; more detailed documentation can be found in the link in the Appendix.

as *Remember to feed the cats*, the more likely alternative was judged to be L* L-L% rather than H* L-L%. For imperatives such as *Enjoy your dinner*, neither of the non-DLT alternatives were judged to be an ideal match (as DLT was often judged to be the best match), but H* L-L% was judged to be marginally better than L* L-L% by native speakers. Therefore, the DLT token of the former was paired with L* L-L%, and the DLT token of the latter was paired with H* L-L%, as summarized in figure 2. The basic idea behind this strategy was to give the alternative intonation the best chance against DLT.

The new pitch values mentioned above were then interpolated in a linear fashion to create two tokens from each base recording. All manipulations were done in Praat (Boersma and Weenink 2015), using the built-in PSOLA manipulation program. As an added precautionary measure, the manipulated tokens were checked by 2–3 native English speakers to ensure that they were natural enough. Sample audio files of the manipulated stimuli can be found in the link in the Appendix.

Each pair of newly created stimuli was then embedded in a range of written dialogues that anticipated the imperative sentences. For the group 3 sentences that were expected to behave ambiguously with respect to DLT, each relevant answer pair was associated with two different contexts. The two contexts varied crucially in the extent of expected speaker control and future involvement. We sought to keep other dimensions of the contexts maximally comparable (e.g., same gender and names assigned to the interlocutors in the two context). The dialogues incorporated expansions of the contextual specifications exemplified in 4 and 5. Each participant was randomly assigned only one of the two available contexts associated with a given sentence in the experiment. Examples of the context pairs associated with the group 3 imperatives: *Remember to feed the cats!* and *Get well soon!*, respectively, are given in 6 and 7. Following our discussion concerning the relevant examples in section 3, the former pair varies along the extent of actual speaker control, whereas the latter pair varies along the extent of socially expected publicization of speaker control.[11]

(6) a. (Jane is talking to her house-sitter friend Amy, right before leaving home)
Jane: Thanks so much for doing this. I gotta leave now. Bye!
Amy: Okay. Safe travels.
Jane: Thanks. _____.

b. (Jane is giving out some instructions to her house-sitter friend Amy)
Jane: Thanks so much for doing this. Do you have any concerns?
Amy: Watering the plants, check. Getting the newspapers, check. Is there anything I am missing?
Jane: Yes. _____ (pointing at the cupboard). The food is in there. I will put instructions and a reminder note on the fridge.

[11] Representative samples of the stimuli paired with the two contexts in 6 can be found in the following links: non-DLT and DLT. Those paired with the two contexts in 7 can be found in the following links: non-DLT and DLT.

(7) a. (Marcus is talking to his friend Dan at school)
Marcus: Hi Dan! You've been sneezing a lot. Are you okay?
Dan: Oh yeah. It's just the allergy. Spring pollens do that to me but it's nothing serious.
Marcus: I see. Well; I gotta run to class now. _____.

b. (Marcus is talking to his friend Dan in the hospital)
Marcus: How are you feeling, Dan? I brought some flowers. When can you leave the hospital?
Dan: Thanks for the flowers. I have to stay another week to get the stitches out.
Marcus: I see. Well, I have to leave soon but I will come back in a few days. _____.

For group 1 and 2 sentences which we expected to behave less ambiguously with respect to DLT, it was more difficult to come up with naturalistic context pairs that varied along the dimension of speaker control (as we will see in section 6, certain imperative contents already seem to have strong contextual bias towards lack of or presence of expected speaker control). Therefore, only one canonical context was assigned to each of the group 1 and 2 sentences (e.g., a waiter talking to a customer in a restaurant, for *Enjoy your dinner!*), and all participants saw the same range of contexts. The full list of dialogue contexts used in the experiment can be found in the link in the Appendix.

4.2 Procedure

The experiment consisted of 8 trials: 6 target trials, and 2 filler trials. The six target trials consisted of all four group 3 imperatives (each randomly matched with one of the two possible dialogue contexts), two randomly selected group 1 imperatives, and two randomly selected group 2 imperatives (each matched with respective canonical contexts).

(8) Q1. Which of the two sounds below is better suited to be inserted in the blank space _____ in the dialogue above?
(presented with two sound clips, DLT vs. non-DLT, in random order)
Q2. How certain are you about your response to Q1?
(a 5-point scale from very uncertain to very certain)
Q3. Please type in what you heard from the first sound clip in Q1. (verification)
Q4. Please type in what you heard from the second sound clip in Q1. (verification)
Q5. Any additional comments? (Optional)

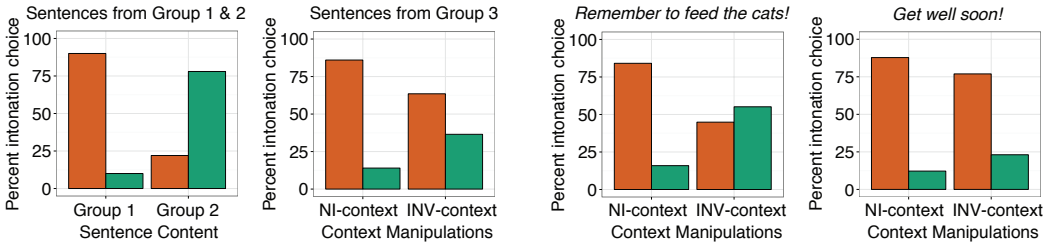
The response choices paired with each target trial were randomly chosen from two pairs of DLT vs. non DLT utterances, each pair spoken by a different speaker (one male, one female). Speaker gender and context type was counterbalanced across the experiment. The two filler trials consisted

of dialogues with blank spaces that also anticipated certain utterances. However, each filler dialogue was paired with two response choices that differed not just in their intonation (which was the case for target trials), but also in their content; participants thus had to choose the more relevant content to go in the blank space. In each trial, participants were presented with the same four questions summarized in 8. 400 native speakers of American English were recruited as participants from Amazon Mechanical Turk. The experiment lasted 10–20 minutes.

4.3 Results

Let us first examine the results for group 1 and group 2 sentences (i.e., sentences associated with only one type of canonical contexts). As we had hypothesized, content (reflecting illocutionary biases) was a significant predictor of participants' intonation choice. These results are summarized in figure 3a. The x-axis plots group 1 vs. group 2 sentences, and the y-axis plots percent response choice between DLT vs. non-DLT options. DLT options are color-coded in red, and non-DLT options (collapsing across H* L-L% and L* L-L% for ease of comparison) are color-coded in green. The graph demonstrates that group 1 sentences, such as *Enjoy your dinner!*, predominantly elicit DLT responses (higher red bar than green bar), whereas group 2 sentences, such as *Take a cookie!*, predominantly elicit non-DLT responses (higher green bar than red bar). These results were further corroborated by a mixed effects logistic regression model, with participants' choice between DLT vs. non-DLT (Q1) as the main dependent variable, sentence type (group 1 vs. group 2) as an independent variable, and speakers and participants as random effects. Content (group 1 vs. 2 distinction) was a significant predictor of intonation choice, and its effect ran in the hypothesized directions (β=3.66, SE=0.41, $p < 0.001$).

Figure 3: Summary of the experimental results



(a) Group 1 vs. 2 (b) Group 3 (c) Group 3-1 (d) Group 3-2

Legend: DLT: non-DLT:

Let us turn now to results for group 3 sentences (i.e., sentences associated with pairs of contexts). As we had hypothesized, context manipulation was a significant predictor of DLT vs. non-DLT choice, other things being equal (sentence content, speaker, etc.). These results are summarized in figure 3b. The x-axis plots contexts marked with expected *lack of* speaker control and

future involvement (NI-contexts) vs. expected *presence of* speaker control and future involvement (INV-contexts). The y-axis again plots percent response choice between DLT vs. non-DLT options, and the options are color-coded in the same way. The graph demonstrates that NI-contexts elicit significantly more DLT responses (higher red bar than INV-contexts), whereas INV-contexts elicit significantly fewer DLT responses (lower red bar than NI-contexts). These results were again further corroborated by a mixed effects logistic regression model, with participants' response to Q1 as the main dependent variable (DLT vs. non-DLT), context manipulation (INV vs. NI contexts) as an independent variable, and speakers and participants as random effects. Context manipulation emerged as a significant predictor of intonation choice, and its effect ran in the hypothesized directions (β=1.40, SE=0.01, $p < 0.001$). Given that other factors such as speakers and the content of the imperative were held constant, the significant effect of contextual manipulation strongly suggests that DLT signals, or is at least highly sensitive to, certain contextual properties.

While the results for group 3 sentences corroborate our hypothesis about the context-indexing function of DLT, the context manipulation elicited less dramatic shifts in judgments than the distinction in content (i.e., group 1 vs. 2 distinction). One possible reason for this relatively mitigated context effect can be located in the difference in the strength of context manipulations included in the experiment. Examining each case one by one, we noticed that the context manipulations we introduced for each sentence worked to different degrees. For instance, the two contexts paired with the sentence *Remember to feed the cats!*, presented in 6, did elicit dramatic shifts in participants' judgments as can be seen in figure 3c (higher red bar than green bar for NI-contexts, higher green bar than red bar for INV-contexts). In comparison, the two contexts paired with the sentence *Get well soon!*, presented in 7, elicited much less dramatic shifts as can be seen in figure 3d (the red bar (DLT) is indeed higher for NI-contexts than for INV-contexts, but INV-contexts do not flip the preferred responses to non-DLT).

The experimental results for *Get well soon!* suggest that many of the participants did *not* think that the INV-context we provided in (7b) triggers a serious ban on publicizing the lack of speaker control/involvement; even for a relatively more serious illness (speaker is hospitalized instead of having a minor allergy), the use of DLT with *Get well soon!* was licensed to some degree. A context involving an even more serious illness, or a speaker who does not leave the room right after the utterance, may have been necessary to generate stronger effects.

Although the strength of contextual manipulations differed from sentence to sentence, the high level observation to keep in mind is that all the context manipulations included in the experiment had effects in the hypothesized direction: more DLT responses for NI-contexts, and less DLT responses for INV-contexts.

4.4 Discussion

To recapitulate, the experimental results provide empirical support for our hypotheses in section 3. First, they confirm that DLT is closely associated with imperatives that have content biased towards well-wish and mnemonic request and advice illocutions, and is infelicitous when paired with imperatives that have content biased towards other illocutions such as orders, offers, etc. Second, they also confirm that the use of DLT is systematically constrained by contextual information concerning the extent of expected speaker involvement and control.

Having confirmed our generalizations noted in section 2.2 and established the empirical patterns, we now return to our initial question: what are the respective contributions of imperatives, both as sentence types and in terms of their particular content, of DLT, and of context such that the observed patterns are generated? In addressing this question, it seems worth investigating deeper the characteristics of imperatives, in order to find out why, like vocative utterances, they often become an ideal host for DLT, and why they show systematic restrictions on DLT. Their potential connections with other intonational configurations also merits a closer look. The next section presents a brief overview of these issues, in anticipation of our analysis.

5 Imperatives, illocutionary force, and intonation

5.1 Imperatives and illocutionary force

Recent work on the semantics and pragmatics of sentence types, such as declaratives and imperatives, and on the *form-force* mapping has established that the conventionally determined force of an utterance is more abstract than any particular illocutionary force. In recent analyses of imperatives by Portner (2007), Kaufmann (2012), Condoravdi and Lauer (2012), the illocutionary force of an imperative utterance is attributed in part to the conventionally determined meaning of imperatives and in part to properties of the context and pragmatic reasoning.

We focus here on the approach of Condoravdi and Lauer (2012), as their view of imperatives dovetails nicely with our ultimate analysis of DLT. Condoravdi and Lauer propose that the conventional effect of an imperative utterance is to commit its speaker to a preference for the content of the imperative to be realized. Depending on the content of the imperative and properties of the context, the activation of this core imperative convention may lead to the illocutionary inference of command, or it may instead lead to other illocutionary inferences (see Condoravdi and Lauer (2012) for details about the specific contextual conditions that license different types of illocutionary inferences).

Thus, the conventional effect ('force') of imperatives is more abstract than the specific illocutionary force. We would like the effects of intonational configurations to be captured in a parallel

fashion. In particular, we would like to see DLT as conveying some abstract information that may in turn generate a wide range of perlocutionary and social meanings depending on the context, as well as the apparent compatibility/incompatibility with certain illocutions. Before making this into an analysis, however, let us briefly examine some existing observations on the connection between imperatives and intonation.

5.2 Imperatives and intonation

Within the problem of the *form-force* mapping, a big open issue is the extent to which intonation determines the individuation of sentence types. In the domain of declaratives, this has been an active question and the answer has more or less been converging towards yes, with distinct conventions posited for falling vs. rising declaratives. In comparison, for imperatives, intonation has so far played no such role. However, recent works by Portner (2015) and Keough et al. (2016) argue that two distinct intonations may have an effect on the conventional force of imperatives.

More specifically, Portner (2015) claims that what he calls 'weak' vs. 'strong' imperatives (which correspond roughly to *may* (offers) vs. *must* readings (directives)) are distinguished by rising vs. falling tunes. Keough et al. (2016) adopt the strong vs. weak distinction as a starting point but suggest, based on experimental evidence, that the relevant distinction resides in the nuclear pitch accent and that the two contours are both falling: H* L-L% and L* L-L%. 9 and 10 exemplify the relevant split in the two accounts.[12]

(9) a. *Have a cookie!* ⇑ (Portner 2015)
Interpretation: You may have a cookie (if you want).

b. *Soldiers, march!* ⇓ (Portner 2015)
Interpretation: Soldiers, you must march.

(10) a. Context: addressee mentions that she is hungry; speaker happens to have a banana.
Have a banana! (H* L-L%; #L* L-L%; Keough et al. 2016)
Interpretation: you may have a banana (if you want).

b. Context: addressee has potassium deficiency; speaker is a parent of the addressee and orders the addressee to have a banana.
Have a banana! (L* L-L%; #H* L-L%; Keough et al. 2016)
Interpretation: you must have a banana.

Portner (2015) goes further and draws parallels between imperatives and declaratives. Inspired by Gunlogson's (2003) account,[13] he claims that rising imperatives propose to commit the addressee, while falling imperatives propose to commit the speaker, to treating the imperative's

[12] Portner uses ⇑ and ⇓ to mark rising and falling intonation, respectively.

[13] Gunlogson (2003) proposes that falling declaratives commit the speaker to the content of the declarative, whereas rising declaratives commit the addressee to that content. Gunlogson (2008) makes significant modifications to this earlier approach (see also Farkas and Roelofsen (2017)).

content as a priority. In effect, Portner is arguing that intonation fine-tunes the core effect of imperatives.

While it is not the goal of our paper to address the association between strong vs. weak imperatives and rising vs. falling or H* L-L% vs. #L* L-L% intonation patterns, the apparent parallels between the examples in 9 and 10 and our DLT examples[14] lead us to wonder whether the convention associated with imperatives is intonation-dependent. Rather, we would like to maintain that the convention for imperatives and the convention for DLT operate independently from each other, based on the following reasons. The behavior of DLT imperatives noted in 2 and 3 calls for a fundamentally different kind of illocutionary distinction that cuts across the strong vs. weak contrast. Orders (strong) and offers (weak) do not host DLT, while mnemonic requests (strong) do, but so do well-wishes, which do not fit either category. If directive uses of imperatives arise as a result of speaker commitment to a priority, and that does not come from the imperative itself, DLT would have to encode such a commitment. But since DLT is felicitous with only some directive uses, it should not do so. We will thus proceed on the assumption that the meaning contribution of DLT does not directly impact the status of the conventional effect of the imperative but rather affects other contextual conditions that are orthogonal to it.

6 Analysis

We propose that DLT imperatives call for two separate conventions that have a cumulative effect: one associated with the DLT intonation, the other associated with imperatives. We adopt the convention proposed by Condoravdi and Lauer (2012) to explain the core effect of imperatives (given in 11). We propose a new convention for DLT, by making more precise our initial hypothesis about the context-dependent felicity of DLT. The convention, given in 12, specifies that if a speaker produces an utterance with DLT, she thereby commits to the belief that the context is such that only the speaker's utterance (and not his/her subsequent actions) is relevant to the realization or non-realization of the content of the utterance.

(11) **Imperative convention**: If a speaker utters an imperative U, she thereby commits to a preference for the content of the imperative U.

(12) **DLT convention**: If a speaker utters U with DLT, she thereby commits to the belief that only the speaker's utterance (and not his/her subsequent actions) is relevant to the realization or non-realization of the content of U.

The DLT convention thus works in similar ways as the core sentence type conventions proposed by Condoravdi and Lauer (2012), in that it prescribes more abstract contextual information instead

[14] Specifically, the examples in 9 resemble our illocution-dependent DLT examples in 2 and 3, and the examples in 10 resemble our context-dependent examples in 4 and 5.

of directly prescribing specific illocutionary inferences. At the same time, it prescribes a different kind of contextual meaning from imperatives and is associated with its own meaning. While the formulation of the DLT convention can be rendered more precise, space limitations prevent us from providing the background information necessary for pursuing such a formulation. We thus characterize the convention at a more informal level, which will be shown to be able to capture all the relevant data we have discussed so far.

The two core observations that have been experimentally corroborated in section 4.3 are actually manifestations of the same underlying mechanism. In particular, DLT's preference for well-wishes and exclusion of orders and offers ultimately stems from 12. The apparent illocution-dependency of DLT is thus *not* because DLT directly specifies or affects the illocutionary force of the imperatives, but rather because DLT publicizes a certain contextual understanding of the speaker that in turn is compatible or incompatible with contextual requirements for particular illocutions (see section 7 for more detailed discussion).

To get a better grasp of how the respective conventions come into action and interact with the context, let us examine their application in the example in 2a, *Enjoy your dinner!*. The content of the imperative is that the addressee enjoys her dinner. By virtue of uttering the imperative, the speaker commits to a preference for the addressee enjoying her dinner (activation of the imperative convention in 11). By virtue of using DLT, the speaker signals that the context is such that only the speaker's utterance (and not her subsequent actions) is relevant to the realization of the addressee enjoying her dinner (activation of the DLT convention in 12).

In essence, DLT serves to signal that the speaker's future action choices are not affected by her stated preference. Given common sense, this is true in 2a, because the speaker cannot control the addressee's taste buds. It would thus be presumptuous for the speaker to assume that she can modify her future action choices in a direction that ensures the realization of the imperative content, other than uttering her preference as a well-wish. Therefore, informally speaking, *Enjoy your dinner!* with DLT ends up signaling something like: 'I would prefer that you enjoy your dinner, if you are so inclined; in having this preference that I just publicized, all I can do is offer my utterance as a well-wish; I won't presume to have further control over how your dinner experience pans out; it's up to the circumstances from now on to obtain this preferred state.' In sum, given the circumstances and the content of the utterance, DLT turns out to be well-paired with the well-wish illocution for this example, as well as having positive perlocutionary effects such as non-presumptuousness and friendly concern of the speaker.

7 Applications and advantages

Let us see how our analysis in terms of the two conventions in 11 and 12 fares with respect to the examples in 2–5, our experimental results, and data from previous work.

7.1 Influence of context

Our analysis is well-suited for capturing the context-sensitive uses of DLT (exemplified in 4 and 5 and corroborated by the experimental results for group 3 imperatives), in which imperatives with the same illocution and content either allows or disallows hosting DLT depending on the context. For instance, it can account for the distributional puzzles involving DLT and mnemonic verbs exemplified in 5: *Remember to feed the cats!*. The analysis would predict DLT to be felicitous when the context is such that the speaker has no further control over the addressee's memory and intends to mark her understanding of this contextual information, but infelicitous when the context is such that the speaker intends to actively aid the addressee's memory via further actions. It thus naturally predicts that DLT would sound felicitous when the speaker is leaving (5a and figure 3c), but infelicitous when the speaker promises to leave a reminder note (5b and figure 3c).

Similarly, our analysis accounts for the special case of well-wish we saw in 4: *Get well soon!*. Overtly marking the speaker's understanding of certain contextual information may be socially unacceptable in certain situations. It thus predicts that DLT with *Get well soon!* would be infelicitous when the addressee's illness is serious (4b and figure 3d). Although the circumstances are such that the speaker in fact has no control over the addressee's recovery, the speaker would be dissuaded from publicizing her understanding of the circumstances if it is *not* apparent that the addressee will get well in due course.

Although not directly tested in the experiment, our analysis can also explain the context-dependency of the felicity of DLT with warning uses, first noted by Ladd (1978). An adaptation of his examples is presented in 13. As mentioned in section 2.1, Ladd (1978) argues that the calling contour is felicitous with reminder warnings (e.g., 13a), but infelicitous with new warnings that call out unfamiliar dangers (e.g., 13b). He explains this using his notion of 'stylization' and claims that the calling contour is felicitous only when evoking familiar, shared routines.

(13) a. (Steps in the basement has been broken for months; the addressee knows this)
Watch out for the broken steps! H* !H-L%

b. (The addressee is a guest of the house, does not know that the steps are broken)
Watch out for the broken steps! ?H* !H-L%

Our analysis derives the observed felicity/infelicity of warnings in 13 via a different path. It would predict DLT to be generally felicitous with reminder warnings (e.g., 13a) because they

usually happen in contexts where the speaker knows that the addressee can deal with the danger by herself without the speaker having to help her via further actions (e.g., because the addressee is already familiar with ways of avoiding the danger at hand). In comparison, it would predict DLT to be generally infelicitous with new warnings (e.g., 13b) because they usually occur in contexts where the speaker is presumed to be in a position to help the addressee further in avoiding the danger (e.g., by informing her where the broken steps are).

Our analysis has broader empirical coverage and is more flexible than Ladd's (1978) stylization account, as new warnings are sometime felicitous with DLT. For instance, when it is clear that the addressee is fully capable of avoiding the broken steps by herself and when the speaker is giving out the warning from far away, *Watch out for the steps! They're broken!* sounds perfectly fine with DLT, although the latter utterance indicates a lack of addressee knowledge about the broken steps. In a similar vein, our account can also predict that reminder warnings are occasionally infelicitous with DLT (contra Ladd (1978)). For instance, when the addressee is a child and still requires close attention or help from the parent when going down the familiar broken steps, the same warning in 13a sounds infelicitous with DLT. In sum, the crucial contextual information associated with DLT does not seem to directly concern old vs. new information (Pierrehumbert and Hirschberg 1990) or familiar vs. unfamiliar routines (Ladd 1978), but rather, the extent of expected speaker involvement. Our account can derive the frequent correlation between familiarity/old routine and DLT, but can also capture cases when there is no correlation between the two.

7.2 Uses that support DLT

As pointed out in our discussion of *Enjoy your dinner!* in section 6, our analysis can capture why DLT occurs predominantly with well-wish imperatives and mnemonic imperatives (2 and figure 3a). These are generally cases that are characterized by lack of speaker future involvement, because in these cases, circumstances prevent the speaker from having action-related control over the stated preference. In conjunction with people's typical assumptions about other people's tastes (*Enjoy your dinner!*), personal experiences (*Have a nice trip!*), and memory (*Don't forget your lunchbox!*), namely, that the speaker cannot presume to have any control over them, and that it may even be polite to mark this non-presumption, our analysis predicts DLT to be well-paired with well-wishes and mnemonic requests and advice, thus capturing the patterns observed in 2 and figure 3. In sum, illocutions of well-wish and mnemonic request or advice (as well as contents that are biased towards such illocutions) standardly occur in circumstances where the speaker cannot have control over the realization of the stated well-wish or request/advice. Such circumstances often prompt the speaker to customarily mark her understanding of them as a way of signaling casual politeness or non-presumptuousness.

7.3 Uses that don't support DLT

Our analysis can also explain why DLT often sounds infelicitous when combined with other uses of imperatives, such as orders, offers, non-mnemonic requests and advice. This is because all of these illocutions standardly presume some amount of speaker control or future involvement. For instance, speaker action is standardly anticipated for offers (e.g., presenting a plate of cookies upon uttering *Take a cookie!*). The case of offer is interesting because it has similar perlocutionary effects as a well-wish (in many cases, both signal friendly concern and politeness) but doesn't allow for DLT. This state of affairs is easily explained using our account, but other accounts have been shown to have difficulty in predicting the infelicity of the former (section 2.1). For orders as well, speaker action is not precluded. After all, if a speaker has the authority to issue an order to the addressee, she can always sanction the addressee for not fulfilling the order; the speaker thus has a reason to *not* overtly signal that her control/action stops with the utterance.

Similarly, in advice uses speakers are standardly expected to leave the door open for their possible future involvement. For instance, if a doctor utters *Take these pills for a week!* to a patient, the context is usually such that the speaker (i.e., the doctor) has the authority to do something further to ensure that the addressee will take the pills for a week. Even if the doctor does not privately intend to do anything further to bring about this content, she would not be motivated to overtly signal this, as doing so would end up marking a lack of authority (thereby undermining her position as a person in charge) and/or a lack of genuine concern for the patient. Or, if someone gives out the following piece of advice: *Avoid the highway!*, the context is usually such that the speaker is expected to give out further information that will help in bringing about the content upon a clarification request from the addressee (e.g., the speaker may add: *You can take the boulevard instead.*). In sum, since the speaker is presumed to be more knowledgeable about the matter at hand than the addressee, and is presumed to be cooperative, she needs to act as though she is invested further and could provide more information. This prevents the speaker from publicly signaling that the circumstances are such that her involvement towards realizing the stated preference stops with the utterance.

For all of these imperative illocutions that have been hypothesized to be infelicitous with DLT, our analysis can also predict that they could become felicitous if they function as reminders (e.g., reminder offers, reminder orders, and reminder advice). Reminders often happen when the speaker has already performed actions that are considered to be relevant to bringing about the content of the imperative and thus wishes not to do anything further other than to remind the addressee of the speaker's previously stated preference (i.e., the ball is now in the addressee's court to obtain that preference). For instance, *Have the report on my desk by noon!* may be felicitously paired with DLT if the speaker had already asked for the report to be delivered to her by noon. Such an

observation is in line with Ladd's (1978) observation about reminder warnings, although as shown earlier, the way we capture this observation is different from his.

7.4 Perlocutionary and social meanings of DLT imperatives

In addition to predictably deriving the felicity/infelicity patterns of DLT imperatives, our analysis can also derive the range of social and perlocutionary meanings often associated with them. We expect these meanings to be generated from the interaction between our core DLT convention posited in 12 and diverse contents and contexts. Flavors such as lack of urgency, nonchalance, finality, friendliness, politeness, and casualness are inferences that further arise given the activation of 12 in the right context. While the former two often accompany DLT paired with warnings, the latter four often accompany DLT paired with well-wishes or mnemonic requests. In contexts in which warnings are used, publicizing that the context is such that there will be no further speaker involvement, often ends up signaling nonchalance and lack of urgency (i.e., the addressee can take care of herself). In contexts in which well-wishes and mnemonic requests are used, publicizing the speaker's understanding of the same kind of contextual information ends up signaling friendliness and casualness, given assumptions people make about other people's experiences and memories (section 7.2).

7.5 Absent wishes

We noted that the felicity or the infelicity of a DLT imperative does not depend solely on whether the context in which it is uttered is marked with lack of speaker control in realizing the content of the imperative; it also depends on whether the speaker has a reason to publicly signal such contextual information. In sum, the felicity/infelicity of DLT is computed not just via checking whether the contextual information signaled by DLT aligns with, or is in conflict with the state of the world, but also via reasoning about the speaker's intentions. This assumption can explain why DLT is infelicitous for a special case of wish imperatives, namely, imperatives without an addressee present, called absent wish imperatives. An example of this use is given in 14.

(14) (Speaker muttering to herself)
Oh please, don't have broken another glass! #H* !H-L%

Even though 14 is characterized by a context in which the speaker cannot control the realization of the content (i.e., that the (absent) addressee has not broken another glass) as she is away from the situation, she also has no motivation to publicly signal this contextual assumption at the moment of the utterance, as the addressee will not hear her (and interpret the speaker's intention underlying her use of DLT).

7.6 Back to the calling contour

Our analysis highlights the usefulness of examining the systematic pairings between DLT and imperatives in coming up with a more adequate construal of DLT, a.k.a., the calling contour. The cases we have examined so far demonstrate that the current analysis of DLT captures the examples of DLT imperatives better than previous approaches to the tune. Going back to the initial data of interest, however, can our analysis of DLT be generalized to non-imperative examples such as vocative and phrasal utterances which previous work has focused on? Since we argue that the DLT convention operates independently of the imperative sentence-type convention, we would expect the same DLT convention to apply to the existing examples as well. This prediction holds as long as we make one additional assumption. In the case of vocatives and phrasal utterances, the content that DLT latches onto isn't just the entity denoted by the phrase, but rather a contentful proposition. In the case of imperatives, this proposition was the literal content itself. In the case of vocatives, the relevant content needs to be reconstructed from the phrase that hosts the DLT and the context. We expect this to be predictably reconstructed by locating a salient goal including the uttered phrase in the context. (See Truckenbrodt (2012) for a similar approach to vocative uses of the calling contour.)

For instance, in the case of *Jacob! Your lunch!*, the content that DLT latches onto isn't just the denotation of the name 'Jacob', or of the phrase 'your lunch'; it is rather the salient goal that Jacob comes to lunch. Given this content, the DLT convention we posited in 12 applies straightforwardly, and the speaker thereby signals that all she will do in bringing about this content is to call Jacob; she will not take additional efforts of running up the stairs and fetching Jacob in person, for example. In other words, the speaker is conveying that only the speaker's utterance (and not her subsequent actions) is relevant to the realization of Jacob coming to lunch. The analysis can thus explain the requirement for physical distance often associated with the calling contour with vocatives (Fox 1969). If the speaker had the intention of actively reducing the physical distance between her and the addressee (via running towards that person) or were next to the addressee from the beginning, she would not be motivated to signal that all she will do in summoning someone is to utter her name.

Such a line of explanation also explains why DLT is infelicitous when calling out real emergencies, as in *Fire!*. Assuming that the reconstructed goal is escaping the danger posed by the fire, the speaker would not want to publicly signal that the speaker cannot or will not adjust her subsequent actions to realize this goal. Given the urgency of the situation, the speaker is standardly expected to call the fire department, go around and warn the people, or at least publicly act as though she can be of help in escaping the danger.

7.7 DLT with declaratives

As in the case of phrasal and vocative examples, we expect the same DLT convention to apply to DLT combined with full declarative sentences, as in 15.

(15) *You can try. But he's not going to hear you.* H* !H-L%

Just as in the vocative examples, an additional assumption concerning the reconstruction of the salient goal seems to be needed. For instance, in the case of 15, the speaker seems to be conveying via DLT that only her utterance is relevant to the realization or non-realization of the salient goal that the person referred to as 'he' hears what the addressee has to say. Again, we expect this salient goal to be predictably derived from the content of the declarative and the context, but postpone giving out more details about this process.

The inferences associated with 15 suggest that DLT with a declarative creates different shades of illocutionary and perlocutionary effects from DLT with imperatives. Whereas the former usually maps onto illocutions of admonitions or advice, and generally signal rather negative perlocutionary effects such as detachment or offhandedness, the latter often maps onto illocutions of well-wishes or mnemonic requests, and signal positive perlocutionary effects such as friendliness and non-presumptuousness.

Our analysis can capture this observed difference in perlocutionary flavor without needing to resort to additional stipulations. Our DLT convention is purposefully underspecified as to why exactly the speaker may want to publicly signal that the context is such that only her utterance is relevant to the realization of the salient goal (which is equivalent to the content, in the case of imperatives). It may either be because the speaker *cannot* adjust her future action choices in a way that facilitates the realization of it (because circumstances prevent the speaker from having control over it; as in the case of well-wishes), or because the speaker *will not* adjust her future action choices (because the speaker is too busy to bother, for instance) in a way that facilitates the achievement of a salient goal, other than to utter an offhand advice.

In many declarative examples such as 15, the motivation is more likely to be the latter, hence the flavor of offhandedness. In imperative examples (not all of them, but definitely for well-wishes), the motivation is more likely to be the former, hence the flavor of non-presumptuousness and friendliness. Given the space constraints, we will not discuss in more detail why different contents, contexts, and sentence types push the likely motivation of the speaker towards *cannot* vs. *will not*. Ultimately, the answer has to do with what the relevant sentence type conventions are and what contextual conditions are needed to license different types of illocutions.

8 Conclusion

In this paper, we probed the meaning contribution of an unusual intonation, DLT (H* !H-L%), by studying its systematic interaction with imperative clauses. We demonstrated experimentally that (i) DLT is compatible with certain imperative illocutions but incompatible with others, (ii) this distinction cuts across the traditional illocutionary boundary posited for imperatives, and (iii) the felicity/infelicity of DLT paired with compatible illocutions further depends on contextual information relating to speaker control and involvement in bringing about the content of the imperative.

We argued that although at a superficial level intonation can be taken to signal certain illocutions, the case of DLT with imperatives shows that intonation can be associated with its own convention of use, making no reference to sentence-type or illocutionary force. However, depending on the sentence-type, the content and the context of the utterance, use of DLT can lead to further inferences which make it appear compatible or incompatible with particular illocutions.

We have proposed that the intonation does not play a role in further individuating the imperative sentence type, and therefore, that the sentence type and intonation are each associated with their own independent conventions. The imperative convention and the DLT convention apply cumulatively to a given imperative content, and interact with diverse contexts to generate the observed compatibility/incompatibility with certain illocutions, as well as a range of perlocutionary and social effects.

9 Appendix

Link to the full data and the actual experiment (including all the sound files) can be found at: `https://github.com/sunwooj/dltimperatives`

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Community- and individual-level variation in Japanese compound loanword formation

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1. Introduction

An important issue for the theory of language change concerns the emergence of regularity from variation. Developments in the analysis of community-level sociological processes have highlighted the importance of considering networks of language users to address this issue, though the relationship between individual behavior and community-level behaviors remains poorly understood. This study explores how those two levels of grammar can behave differently in the evolution of new morphological processes from variation to regularity.

This work takes as an example a specific morphological process that occurs in the part of the Japanese lexicon that consists of loanwords. In Japanese, studying the lexicon constituted by recent loanwords can provide interesting keys to understanding the phonology of that language. Indeed, the phonological particularities that are observable in loanwords represent violations to the language's phonological constraints that would otherwise apply to Japanese words. The study of loanwords thus allows us to better understand the extremes of variation that are permissible in order to be considered part of the Japanese lexicon. In other words, loanwords give us an overview of the Japanese lexicon's boundaries as well as the phonological constraints that it must follow. It is not surprising then that Japanese loanwords have been the focus of many works, especially in an Optimality Theoretical framework (Itô & Mester 1995, 2008; Kubozono, Ito & Mester 2008; Lamarque 2013, 2015a; Lovins 1973; Ohso 1971; Shinohara 1996, 1997).

The morphological process that is the focus of this study involves the creation of an abbreviation out of two words of foreign origin. A well-known example is the word *pokemon*, which originates from the two English words 'pocket' and 'monster', pronounced *poketto* and *monsutaa* when adapted to Japanese phonology (Shinohara 1997). This abbreviation process is very productive in modern Japanese and gives rise to so called Compound Abbreviated

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Loanwords (hereafter 'CALs', Labrune 2006). CALs are derived from a compound base typically consisting of two constituents of a foreign origin. The final derived CAL always includes elements from both constituents, and its formation is subject to prosodic constraints. While the ordering of these constraints was initially variable in Japanese, it has stabilized in recent decades, such that more recent attested forms tend to conform to a single grammar (Lamarque 2015b). Here, we explore how this stabilization process relates to community-level processes by examining the results of two studies using different methodological approaches: the first involves an analysis of lexicons of attested CALs used by the community of Japanese speakers, while the second explores the abbreviation habits of individuals in the creation of new CALs using an experimental approach.

1.1 Outline of the paper

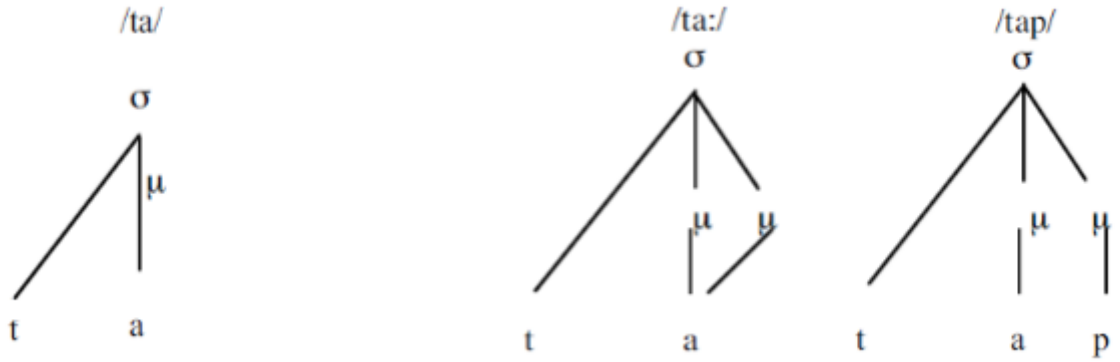
In section 2, we will review some of the previous studies on CALs. The first part of this section focuses on Labrune's contribution to the study of CALs through the creation and analysis of a large lexicon of abbreviations of Japanese loanwords (Labrune 2002, 2006, 2007, 2008). The second part of the section presents a previous study that builds on Labrune's research to explore the evolution of CALs by comparing lexicons from different time periods (Lamarque 2015b). By examining attested forms collected in different lexicons, this section focuses on the regularization of CALs at a community level. This section also provides an Optimality Theoretic (Prince & Smolensky 1993) analysis of the CAL derivation process.

Section 3 reports on the methodology and findings of a new study. The main objective of this study is to directly test several observations from the lexicon-based studies using a more experimental approach. The experiment takes the form of an online survey in which Japanese speakers are asked to create new abbreviations. The results suggest that in an isolated situation, individuals do not show the regular abbreviation patterns that are observed at a community level. In the discussion, we provide an analysis of the results of the survey and attempt to explain their apparent contradiction with data found in the lexicons. The last part of this section provides an analysis of CALs based on stochastic Optimality Theory (Anttila 1997; Boersma & Hayes 2001; inter alia). This framework turns out to be better suited to modelling highly variable processes such as those observed in the derivation of CALs at an individual level.

2. Previous studies on CALs

In order to understand how CALs are formed, it is crucial to understand the role of the mora as a prosodic unit in Japanese. A mora is a minor prosodic unit whose size ranges between a phoneme and an entire syllable. Morae are used to measure the weight of syllables (Davis 2011). A light syllable (i.e. a syllable without a coda) weighs one mora; whereas a heavy syllable (i.e. a syllable with a coda) weighs two morae. This is illustrated in figure 1 below, where syllables are represented by 'σ' and morae are represented by 'μ' (from Labrune 2005).

Figure 1: Syllable structure for a light syllable (/ta/) and two heavy syllables (/ta:/ and /tap/)



The presence of a coda is what determines the weight of a syllable. In Japanese, only three types of segments can appear in coda position, and these are all underspecified in some way:

- /R/: represents a vowel coda and corresponds to the lengthening of the preceding vowel (for example: /ta.**R**/ is pronounced [ta.**a**])

- /Q/: represents a consonant coda and corresponds to the first part of a geminate consonant (for example: /ta.**Q**.ta/ is pronounced [ta.**t**.ta])

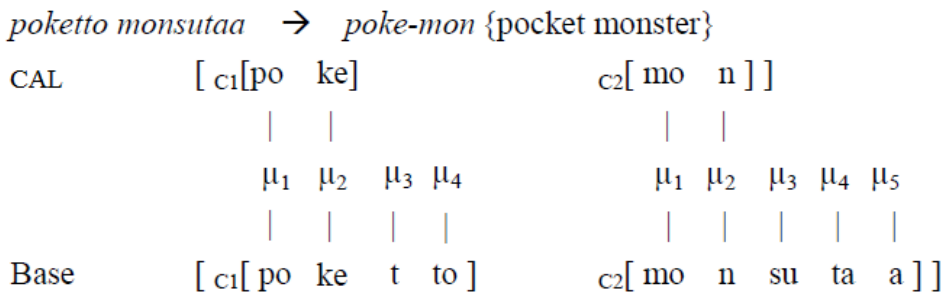
- /N/: represents a homorganic nasal consonant coda, which assimilates to the place of articulation of the following consonant (for example: /ta.**N**.ku/ is pronounced [ta.**ŋ**.ku])

In terms of prosodic typology, Japanese is classified as a mora-timed language (Ramus 1999), which means that the mora is its fundamental rhythmic unit (Labrune 2005). This implies that in Japanese, morae play an important role in a wide range of phonological processes. Of course, this is also the case for the formation of CALs.

2.1 The general derivation principle for CALs

The formation process for CALs follows a general derivation principle which superficially appears to be quite simple. Labrune (2007) describes it as follows: 'the two first morae of the two constituents of the base (hereafter 'C1' and 'C2') are maintained'.[1] The derivation process for the word *pokemon* is illustrated in Figure 2 below.

Figure 2: Derivation process for the word *pokemon*



In this example, the two first morae of ***po.ke****.t.to* and ***mo.n****.su.ta.a* are maintained to form the four-mora long abbreviation ***po.ke.mo.n*** However, while this general derivation principle represents the most typical way of creating CALs, there are a number of abbreviations that deviate from it in some way. This suggests that the CAL formation process is rather complex, and indeed, a statistical analysis of the phonology of CALs sheds light on the underlying regularity of a number of apparently exceptional abbreviations.

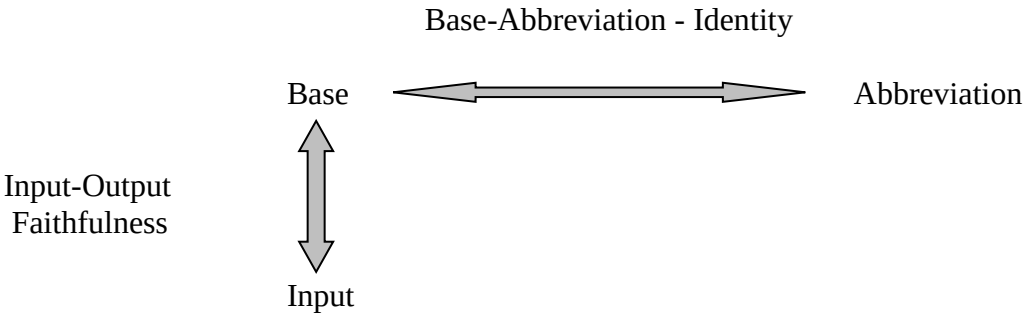
This was in fact the aim of Labrune's work on Japanese loanword abbreviations (Labrune 2002, 2006, 2007, 2008). By collecting and analyzing a lexicon of 1314 abbreviations, she was able, firstly, to make a distinction between Simple Abbreviated Loanwords (hereafter SALs) and CALs. While the formation of CALs, as already mentioned, relies on the conservation of the initial morae of several constituents, SALs' formation relies on the accent pattern of a single constituent. Since those two abbreviation types follow

[1] Translated from French (Labrune 2007:3).

entirely different rules, they deserve to be considered and studied as two different morphological processes.

A large proportion of the literature on Japanese loanwords has been grounded in an Optimality Theoretic approach (Prince & Smolensky 1993), which has proven to be an appropriate framework for this subject (Itô & Mester 1995, 2008; Shinohara 1997). In her work, Labrune also provided an analysis in Correspondence Theory (Benua 1995, 1997; McCarthy & Prince 1995). While this theoretical framework grew out of Optimality Theory, it proved to be better suited for the description of linguistic processes involving the reduplication of some already existing output (in our case: an abbreviation process). Whereas for standard OT studies, faithfulness constraints are involved in an input-output relation, Correspondence Theory focuses on identity constraints involved in an output-output relation, the first output being the base and the second output its abbreviation. This is illustrated in Figure 3 below (Benua 1995):

Figure 3: Differences between input-output and output-output relations



Building on the general derivation principle cited above, Labrune (2007) identifies the following identity constraints that play a role in the formation of CALs:

- BINARYFEET: all feet must be binary in morae.
- BINARYPROSODICWORD: the prosodic word (i.e. the abbreviation) must be binary in feet.
- MAXLEX: every lexeme of the base must be present in the abbreviation.
- ANCHORLEFT: every foot of the abbreviation must be anchored to the left border of the base lexeme it comes from.
- CONTIG: the maintained morae in each foot must be contiguous in the base.
- DEP: all segments in the abbreviation must be present in the base (no epenthesis).

- IDENTFEATURES: distinctive features are identical between corresponding segments in the base and the abbreviation (no modification of distinctive feature).

A statistical analysis of Labrune's lexicon suggests the following ranking for these constraints:

BINARYPROSODICWORD >> CONTIG, ANCHORLEFT >> BINARYFEET,
MAXLEX, DEP, IDENTFEATURES

Labrune (2007:5) also suggests that in Japanese, all morae must be parsed in a foot. This in enforced by an inviolable constraint PARSEμ.

BINARYPROSODICWORD enforces that all CALs are binary in feet, thus, one foot for the first constituent (C1) and another one for the second constituent (C2). Even if some CALs contain one or three-mora long constituents, there is however no four-mora long constituent in any CAL. Since violation of BINARYPROSODICWORD apparently never occurs, it seems logical that this constraint appears at the top of the hierarchy.

The fact that the two initial morae of each constituent are maintained in a CAL can be explained by the action of three constraints: CONTIG, ANCHORLEFT and BINARYFEET. CONTIG requires that the maintained morae are contiguous in the base, ANCHORLEFT that they are initial, and BINARYFEET that they are exactly two in number.

The three remaining constraints (i.e MAXLEX, DEP and IDENTFEATURES) provide some conformity between the base and its abbreviation. MAXLEX enforces that the abbreviation contains at least one element from the two constituents of the base, DEP prevents any element that is not present in the base to be added to the abbreviation, and IDENTFEATURES excludes eventual modifications that segments could undergo during the abbreviation process.

The tableau 1 below shows the derivation process for a canonical CAL [meta-kiN], from 'metal king' in English, pronounced [metaɾu-kiNgu]. This illustrates which types of output candidates are ruled out by which constraint.

Tableau 1: [metaɾu-kiNgu] => [meta-kiN] 'metal king'

	[metaɾu-kiNgu]	PARSEμ	BINPW	CONTIG	ANCRL	BINFT	MAXLEX	DEP	IDENTF
1.	(meta)		*!				*		
2.	(me-ki)		*!	*					
3.	(me)-(ki)					**!			
4.	(meta)-(ki)					*!			
5.	(me)-(kiN)					*!			
6. =>	(meta)-(kiN)								
7.	(meta)-(kiN)-(gu)		*!			*			
8.	(meta)-(kiN)-gu	*!							
9.	(meɾu)-(kiN)			*!					
10.	(taɾu)-(kiN)				*!				
11.	(meR)-(kiN)							*!	
12.	(meta)-(giN)								*!

2.2 Exceptions to the general derivation principle

The derivation principles for CALs described above represent only general tendencies, and there is a wide range of exceptions, which involve infractions to one or more of constraints mentioned above. Labrune (2007) notes certain phonological contexts that favor the creation of exceptional CALs. In a majority of cases, for example, the creation of an exceptional CAL is due to the presence of either /R/ (i.e. vowel lengthening) or /Q/ (i.e. first part of a geminate consonant) as the second mora of C2. For example, the name of the famous actor Brad Pitt, pronounced *bu.ra.d.do pi.**t**.to*, in which the second mora of C2 is the first part of a geminate consonant (*.t.*), is abbreviated as *bu.ra.pi*.

It appears then that the presence of one of those special segments in the final position of a CAL is somehow problematic for the Japanese phonological grammar. This is understandable if we consider, on the one hand, that /Q/ needs a consonant at its right which it can geminate in order to be pronounceable, and on the other hand, that /R/ is generally disfavored in the final position of Japanese words.

In those specific phonological contexts, there are four possible treatments for the special segments /R/ and /Q/:

#1: Maintained

The special segment is maintained as any other mora. CALs thus created are not exceptions to the general derivation principle but regular abbreviations. Note that it is impossible for /Q/ to be maintained, since there is no possible pronunciation for /Q/ if there is no consonant at its right.

Ex.1:	In English:	Mario	kart
	In Japanese:	マリオ[**ma.ɾi**.o]	カート[**ka.R**.to]
	CAL:	マリカー[**ma.ɾi.ka.a**]	

#2: Followed (by another mora)

The special segment is maintained, but it is followed by another mora (usually, the one that follows in the base constituent). This prevents /R/ or /Q/ to be in final position but creates a three-mora long C2 in violation of BINARYFEET.

Ex.2:	In English:	plastic	case
	In Japanese:	プラスチック[**pu.ɾa**.su.ti.Q.ku]	ケース[**ke.R.su**]
	CAL:	プラケース[**pu.ɾa.ke.R.su**]	

Ex.3:	In English:	magazine	book
	In Japanese:	マガジン[ma.ga.ʑi.N]	ブック[**bu.Q.ku**]
	CAL:	マガブック[**ma.ga.bu.Q.ku**]	

#3: Replaced

The special segment is replaced by another mora (usually, the one that follows in the base constituent). /R/ and /Q/ do not appear in the abbreviation, but this violates CONTIG.

Ex.4:	In English:	king	carnival
	In Japanese:	キング[**ki.N**.gu]	カーニバル[**ka.**R**.ni**.ba.ɾu]
	CAL:	キンカニ[**ki.N.ka.ni**]	

Ex.5: In English: american football
In Japanese: アメリカン[**a.me**.ɾi.ka.N] フットボール[**ɸu**.Q.**to**.bo.R.ɾu]
CAL: アメフト[**a.me.ɸu.to**]

#4: Deleted

The special segment is simply deleted. This creates a one mora C2, which is also a violation to BINARYFEET.

Ex.6: In English: mister donuts
In Japanese: ミスター[**mi.su**.ta.R] ドーナツ [**do**.R.na.t͡su]
CAL: ミスド[**mi.su.do**]

Ex.7: In English: potato chips
In Japanese: ポテート[**po.te**.R.to] チップス[**t͡ɕi**.Q.pu.su]
CAL: ポテチ[**po.te.t͡ɕi**]

Labrune's studies reveal many important facts about the main constraints that play a role in the derivation of CALs as well as the phonological contexts that favor the creation of exceptions. However, CAL creation as a productive morphophonological process entered into the Japanese grammar only relatively recently (post World War II). Studies based on a chronologically fixed lexicon, such as Labrune's, are not able to capture changes which may be taking place as this relatively new process diffuses through the community. Building on Labrune's research, the next section explores how CAL derivation has evolved over time, using as a first method the comparison of two lexicons from different time periods.

2.3 Comparison of corpora

The fourth possible treatment presented above, Deletion, is particularly interesting in that it results in a three-mora long CAL. Indeed, it seems that this kind of exception, even in the cases when it is not due to the presence of /R/ or /Q/ as second mora of C2, is frequent enough to be noticed by naive native speakers of Japanese. A few speakers we interviewed suggested that the tendency for three-mora CALs is a relatively recent trend. In other words, recent

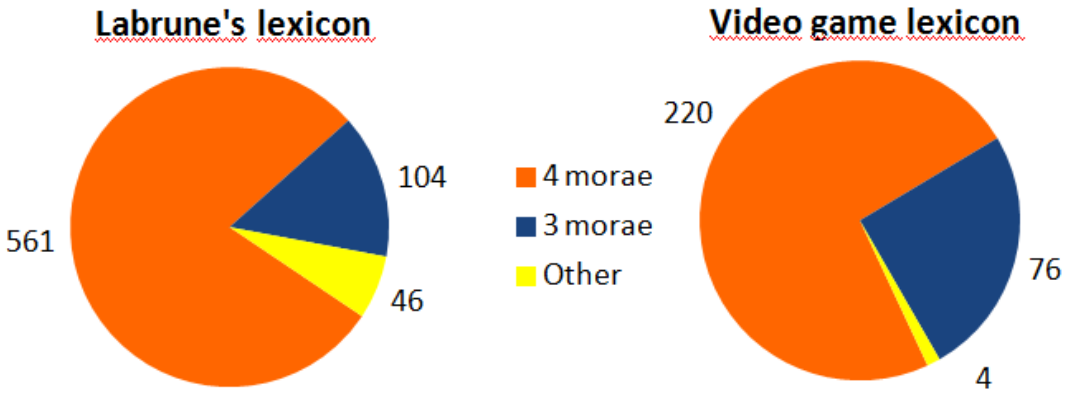
abbreviations would tend to be cut to three morae more often than older CALs. In a previous study (Lamarque 2015b) we tested the hypothesis that three-mora CALs are more frequent among recent abbreviations. Particular attention was paid to CALs involving Deletion of /R/ and /Q/ when these appear as the second mora of C2.

In order to compare CALs from different time periods, we created a second lexicon of more recent CALs. This new lexicon (hereafter the 'video game lexicon') contained 300 CALs found on websites concerning video games. Considering that video games are a relatively recent media mostly used by younger individuals, we thus intended to observe the newest tendencies regarding the formation of CALs. The video game lexicon was then compared to the sub-lexicon of 711 CALs (hereafter 'Labrune's lexicon') collected by Labrune. Note that Labrune's lexicon was collected around 2005 and contains CALs from diverse sources (dictionaries, newspapers, conversations, etc.). For the purposes of this study, we therefore take it as representative of 'older' tendencies in the formation of CALs. To assure that the comparison between the two lexicons was meaningful, we created the video game lexicon using the same criteria as Labrune:

- A single iteration of a CAL was sufficient for inclusion
- Only one entry for each CAL, even when attested several times.
- If two CALs were created from the same base, then both CALs were included.
- Certain types of abbreviations similar to CALs were excluded: acronyms (ex: *OL* (*oo-eeru*) < *ofisu redii* 'office lady'); abbreviations mixing a Japanese word with a foreign one (ex: *kara-oke* < *kara* 'empty' (Japanese) *ookesutora* 'orchestra' (English)); abbreviations involving the deletion of a whole lexical word (ex: *amerikan* < *amerikan koohii* 'American coffee'); etc.).

If we first compare the proportion of CALs in each lexicon by length in morae, it appears that the video game lexicon indeed contains a larger proportion of three-mora abbreviations. This is illustrated in Figure 4 below:

Figure 4: Proportion of CALs by number of morae in both lexicons



Overall, these results support the hypothesis that three-mora CALs are more frequent in recent abbreviations. A closer look reveals possible phonological motivations for this increased proportion of irregular CALs. As mentioned above, one of the major triggers for irregular CALs is the presence of /R/ and /Q/ as the second mora of C2. Figure 5 therefore shows the proportion of the four treatments of /R/ and /Q/ in each lexicon:

Figure 5: Treatment of /R/ and /Q/ as second mora of C2 in each lexicon

		Labrune's lexicon	Video game lexicon
/R/	Maintained	**38%**	11%
	Followed	10%	0%
	Replaced	7%	8%
	Deleted	**45%**	**81%**
/Q/	Maintained	0%	0%
	Followed	**40%**	0%
	Replaced	15%	14%
	Deleted	**45%**	**86%**

In the older lexicon, it is not possible to identify one treatment that is preferred over the others. It appears that at least two treatments are in competition both for /R/ and /Q/. In the case of /R/, it is Maintained almost as often as it is Deleted; and in the case of /Q/, it is Followed almost as often as Deleted. However, the video game lexicon does not show such a balanced competition. Indeed, the Deletion is the preferred solution in every case, with a proportion of more than 80%. This shows that the deletion of the special segments /R/ and /Q/

when they appear as second mora of C2 has become systematic with time. These results therefore suggest an evolution of the treatment of /R/ and /Q/ with time.

This new regularity should be included in the analysis of the CAL derivation process. From an OT point of view, this requires the inclusion or modification of certain constraints. The new analysis we present here builds on Labrune's (2007) though it is slightly different regarding the inclusion of the treatment of /R/ and /Q/.[2] First, it is necessary to include two constraints that express the dispreference for /R/ and /Q/ in final position. Such constraints are violated whenever /R/ or /Q/ are Maintained:

- *V:#: no long vowel in final position.
- LICENSE/Q/: the special segment /Q/ must be correctly licensed by a consonant at its right.

It is then necessary to distinguish between the Following and Deletion treatments, which are both in violation to the same constraint, *BINARYFEET, though in different ways. Without such a distinction, it would be impossible, for example, for the grammar to differentiate between the two candidates in Tableau 2 below:

Tableau 2:

	[misutaa doRnat͡su]	*BINARYFEET
1.?	(mi.su)(do.R.na)	*
2.?	(mi.su)(do)	*

To address this problem, we proposed in Lamarque (2016) that *BINARYFEET be divided into two different constraints. The first one disfavors the Following treatment whereas the second one disfavors the Deletion treatment:

- *FEET>2: feet must not be longer than two morae.
- *FEET<2: feet must not be shorter than two morae.

[2] Another difference is that we exclude the MAXLEX constraint from our analysis. We consider CALs to be abbreviations that maintain exactly two lexemes out of the base constituents. On the same basis that one-lexeme abbreviations (Simple Abbreviate Loanwords) follow a different derivation process, we consider that three or more lexeme abbreviations have to follow slightly different rules that take into consideration those extra lexemes. In other words, an abbreviation considered to be a CAL in violation of MAXLEX in Labrune's analysis is not considered a CAL at all in ours. In any case, such abbreviations are very rare and would not have a significant influence on the observations presented here.

Tableaux 3 to 6 below illustrate how the constraints involved in the treatment of /R/ and /Q/ should be ranked, according to the data from the video game lexicon.

Tableau 3:

[misutaa doRnat͡su]	*V:#	*FEET<2
*(mi.su)(do.R)	*	
(mi.su)(do)		*

Tableau 4:

|poteRto t͡ɕiQpusu]	*LICENSE/Q/	*FEET<2
*(po.te)(t͡ɕi.Q)	*	
(po.te)(t͡ɕi)		*

Tableau 5:

[misutaa doRnat͡su]	CONTIG	*FEET<2
*(mi.su)(do.na)	*	
(mi.su)(do)		*

Tableau 6:

[misutaa doRnat͡su]	*FEET>2	*FEET<2
*(mi.su)(do.R.na)	*	
(mi.su)(do)		*

Note that in each case, the lower candidate is the one that is selected by the grammar. This means that the constraint *FEET<2 is dominated by all the other constraints. Regarding the ranking of the other constraints, since LICENSE/Q/ and *FEET>2 are never violated in the video game corpus, they must be placed above CONTIG and *V:#. The slight preference for the Maintaining of /R/ over the Replacement treatment indicates that *V:# is ranked higher than CONTIG. The hierarchy of all constraints is thus as follows[3]:

[3] This is a simplified version that does not take into consideration, for example, the treatment of /R/ and /Q/ when they appear in final position of C1, which is also a source of irregularities in CALs. For a more detailed description, see Lamarque (2015b and 2016).

BINARYPROSODICWORD >> LICENSE/Q/, *FEET>2 >> *V:# >> CONTIG, ANCHORLEFT >> DEP, IDENTFEATURES >> *FEET<2

This new hierarchy illustrates how some irregularities in CALs could actually be included in the analysis of the derivation process. The general derivation principle mentioned above was in fact too simple to encompass rules conditioned by specific phonological contexts such as the presence of /R/ or /Q/ as second mora of C2. The treatment of those special segments seems to have evolved towards a single optimal option: Deletion. Among the 76 tri-moraic CALs in the video game lexicon (see figure 4), 60 are due to the deletion of either /R/ or /Q/ in final position. Therefore, the recent regularization of the treatment of those special segments seems to be linked to the overall increase in the number of three-mora long CALs that native speakers perceived. The comparison of two lexicons of different time periods allowed not only confirming this hypothesis but also identifying phonological explanations for it.

3. Influence of age on abbreviation preferences

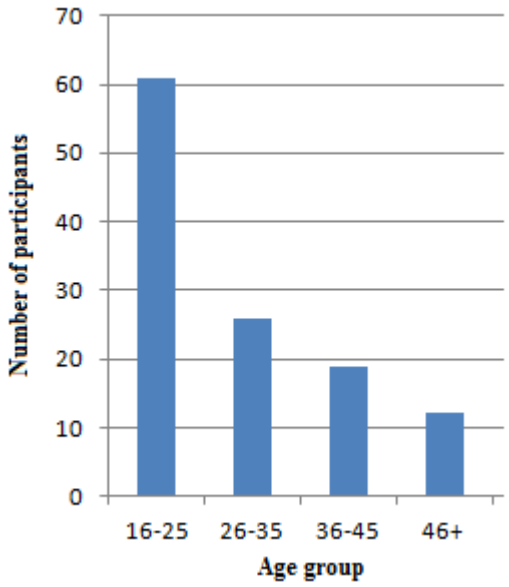
Through the analysis of lexicons of attested abbreviations, the results of the previous studies on CALs provided important insights regarding the phonological constraints governing their formation. Attested forms from the existing lexicons reflect well-formedness for CALs with respect to what is accepted and used by the community of speakers as a whole. Those studies also provided a general picture of the evolution of the derivation process over time. However, the associated attested forms do not necessarily reflect the grammatical preferences of individual language users based on their everyday experience with their language. One major issue with this methodology is that each entry in the lexicons has the same weight regardless of how frequently it occurred. In other words, a CAL that has been uttered once, in a very specific situation is represented with the same importance as a CAL that is used often and in a wide variety of situations. This makes it difficult to draw clear conclusions regarding the actual use of CALs, as well as how usage relates to the internal states of individuals. In order to obtain broad-based corroboration for the observations from the lexicon studies, we therefore conducted a new study using an experimental approach that explores the behavioral tendencies of individuals.

3.1 Methodology

The main hypothesis for the present study follows from the prediction that if the grammar governing the derivation process for CALs has recently undergone an evolutionary change, then there should be an observable change in the abbreviation preferences of individual speakers. We further assume that such a change-in-progress would manifest as a difference in behavior across speakers of different ages.

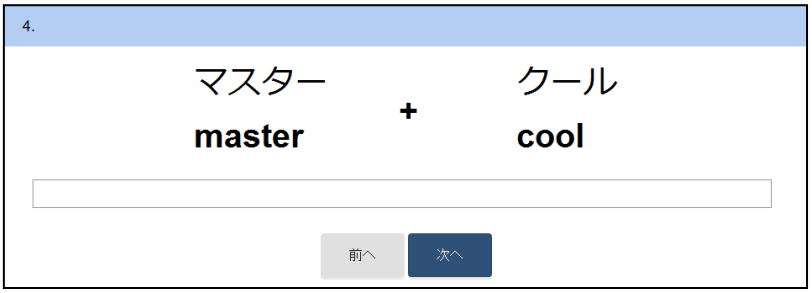
In order to test this hypothesis, we conducted an experiment in the form of an online survey in which Japanese speakers were asked to create new CALs from specific base constituents. This survey was created using SurveyMonkey, an online survey development cloud-based software. Participation was solicited by advertising through e-mails and social networks for about a month (from 03/08/2016 to 10/04/2016) and 118 participants answered over that period. Figure 6 below shows the distribution of participants by age.

Figure 6: Repartition of participants to the survey in age groups



The task consisted in creating new CALs from 100 pairs of English words. Both the English and Japanese *katakana* writing forms were visible to the participants. They were asked to enter their answer in an empty text box before proceeding to the next pair of words. However, they could not go back to modify a previous answer. Figure 7 below shows the example of the pair ‘master’ + ‘cool’.

Figure 7: Example of a pair of words to abbreviate



Most of the loanwords that were selected for this study were taken from the two lexicons used in previous studies, so that each constituent was already attested in a CAL. However, for some specific phonological contexts, the lexicons did not contain enough different items, so loanwords from different sources (online specialized dictionaries) had to be used. When extracted from a lexicon, loanwords were paired with a different word than the one they appeared with, so that participants were creating new abbreviations and were not simply using ones they already knew. Since the focus of the experiment was the treatment of /R/ and /Q/ in final position of C2, particular attention was paid to minimize the possible influence of C1 on the outcome. All C1s were selected to be as neutral as possible (i.e. containing no phonological characteristic that favors the creation of irregular CALs) and two versions of the survey were created with the same C1s associated with different C2s. Participants answered one of the two different versions at random.

3.2 Results

Figure 8 below presents the results for all items having /R/ as second mora of C2, while figures 9 and 10 show the results for /Q/. It appeared that the number of morae of the base constituent of C2 had a significant influence on the treatment of /Q/, so the data is presented separately according to whether C2 is tri-moraic (figure 10) or non tri-moraic (figure 9).

Figure 8: Treatment of /R/ as second mora of C2

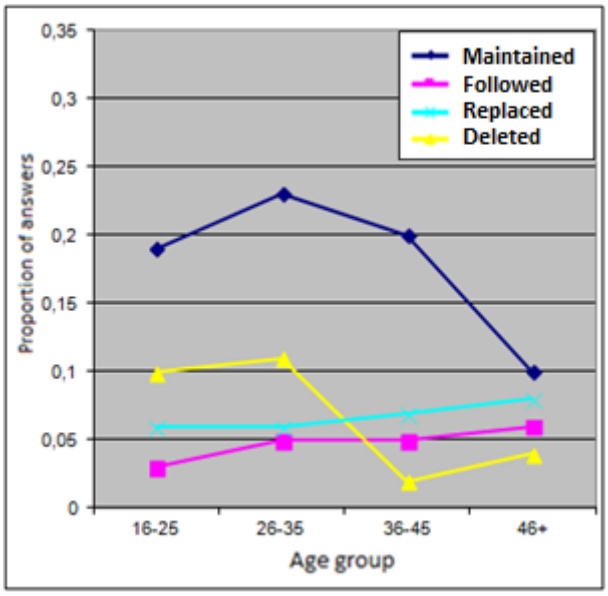


Figure 9 : Treatment of /Q/ as second mora of a non tri-moraic C2[4]

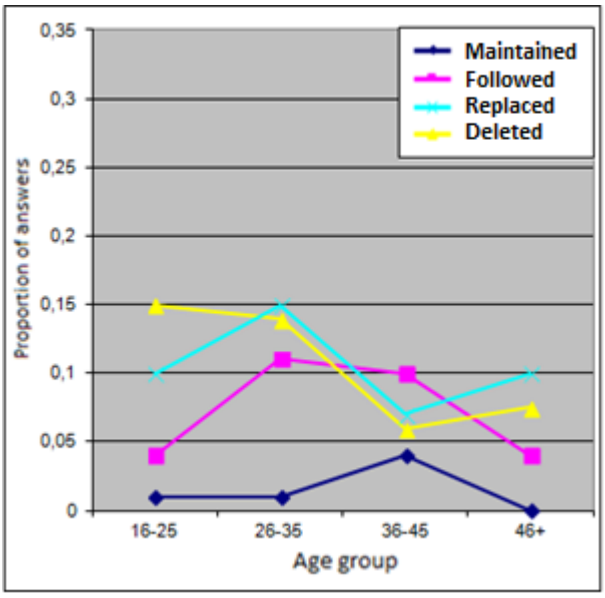
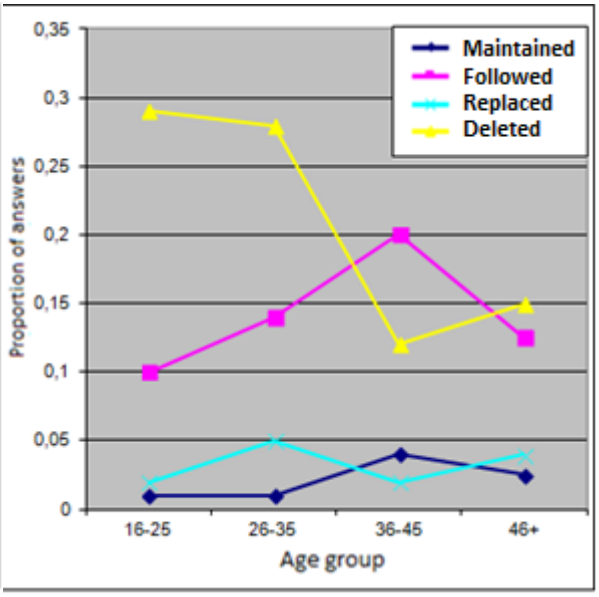


Figure 10 : Treatment of /Q/ as second mora of a tri-moraic C2



Note, first of all, that the percentage of responses corresponding to one of the four usual treatments for /R/ and /Q/ does not sum to 100%. This is due to the presence of responses involving either a CAL with very irregular formation or some other abbreviation type that could not be considered a true CAL. The first kind includes, for example, not maintaining the initial mora of C2 but the second and third morae instead (in violation of

[4] The results present a few cases of maintaining of /Q/ which is supposedly impossible. This corresponds to cases where /Q/ was changed to /t͡su/ because of the relation of those two morae in the Japanese writing system. Indeed, <Q>ッ is spelled with a smaller version of the character for <t͡su>ツ. Since /t͡su/ does not appear in the base, this is a violation of DEP. As those cases were very rare, they will not be discussed further here.

ANCHORLEFT), as well as violations of other constraints with no apparent phonological motivation. The second kind includes abbreviations such as acronyms or portmanteaux. Overall, the presence of such unexpected forms fits with a more general observation: the results of the survey show a high degree of intra-speaker variation. Indeed, regardless of the age of speakers, all possible treatments were used and in most cases there is not a single treatment that clearly dominates the others. Moreover, the participants explored in their responses some unexpected possibilities for deriving CALs.

Figure 8 shows that Maintaining is the preferred treatment of /R/ as the second mora of C2 regardless of the age of the speaker. However, this is not as clear in the case of /Q/. Indeed, it is clear from figure 9 that there is not one treatment that dominates the others, and figure 10 shows that the Deletion and Following treatments are preferred in the case of a tri-moraic C2, though age does seem to have an influence on which of the two is more frequent.

In all three figures, it appears that Deletion of /R/ and /Q/ is more frequently used by younger people (yellow line). The statistical analyses were run using a generalized linear mixed model on R with the lme4 package (Bates et al. 2014). In every case, the fixed factor is age and the dependent variable is the kind of treatment chosen. Even though age is divided in only four groups in the figures, for visual representation, it was considered as a continuum in the statistical analysis. This analysis revealed that the effect of age on proportion of Deletion is significant ($p<0.001$ for figure 8; $p<0.01$ for figure 9; and $p<0.001$ for figure 10). The increase in the proportion of Following treatment with age in figure 10 is also significant ($p<0.01$). This is consistent with the general pattern of the plots which suggests that, with age, Deletion decreases in frequency while Following increases.

3.3 Discussion

The results presented above partly corroborate the findings of the lexicon-based studies. In spite of some surprising aspects, for example, the survey results overall support the hypothesis that age has a significant influence on the abbreviation habits of Japanese speakers. Moreover, regarding the treatment of /R/ and /Q/, young people actually use Deletion more frequently than older people, which is also consistent with the results of previous lexicon-based studies. Additionally, as with the lexicon-based studies, the size of C2 had an influence on the treatment of /Q/. Looking back at figure 5, it can be noted that /Q/ was Followed in 40% of the cases in Labrune's lexicon while this treatment never occurred once in the video game

lexicon. In fact, the cases of /Q/ being Followed in Labrune's lexicon always occur when /Q/ is the second mora of a tri-moraic constituent. This kind of constituent usually arises from the adaptation of English words that consist of just one heavy syllable. For example, 'bed', bag' or 'pit' become respectively /be.Q.do/, /ba.Q.gu/ and /pi.Q.to/ in Japanese. In Labrune's lexicon, this kind of constituent would be kept as a whole in the abbreviation, whereas in the video game lexicon, there is not a single occurrence of such a treatment. This phenomenon is reflected in the results of the survey shown in figure 10, whereby young speakers have a strong preference for the Deletion of /Q/ in a tri-moraic constituent whereas older people tend to prefer the Following treatment. The crossing of the two curves underlines the change of preference from Following to Deletion with age.

In spite of some similarities between the results of the lexicon-based studies and those of the new experiment, they also differ in several important respects. Most saliently, the results of the survey show a high degree of variation regardless of the age of the speakers. While the data from the lexicons suggest that an already regular derivation process became more regular with time, the survey suggests that CAL formation at the individual level remains a highly variable process. Participants in the survey made use of all four possible treatments for /R/ and /Q/, whereas even in Labrune's lexicon, only two of these were dominant for each type of special segment. Moreover, Deletion, which was the preferred treatment in both lexicons and for both segments, is not the most common treatment for all cases in the survey. This includes the fact that it loses to the Maintaining treatment for /R/ across all age groups (figure 8), and to various other possible treatments for older age groups for both /R/ and /Q/.

Another important difference lies in the fact that the total proportion of responses involving the four main treatments for /R/ and /Q/ is much less than 100%. The use of a wide range of different abbreviation strategies and various unexpected violations to otherwise active constraints is surprising considering how productive and overall regular the CAL formation process appears to be among attested forms. In the end, the Deletion treatment represents less than 30% of survey responses (see figure 10), which is even less than in Labrune's lexicon. In that sense, it is difficult to say that this treatment represents a new regularity.

Since the present study sought to corroborate that CAL formation has regularized, the large amount of variation observed in the results is somewhat puzzling. The divergence between the results of lexicon studies and those of the survey may be due to differences in the nature of the collected data. On the one hand, the CALs in the lexicons represent actual

attested forms. Those abbreviations have been used and accepted by the community, at least to the point that their use does not seem completely out of place in their associated contexts (video game websites, dictionaries, newspapers, conversations, etc.). The lexicons thus represent the abbreviation habits in the community of Japanese speakers. On the other hand, in the survey responses, community-level considerations presumably played less of a role, and only abbreviation preferences of individuals were assessed. Consider that in the isolated setting of answering a survey on a computer, speakers do not have access to any kind of community feedback, and thus may not consider community norms when choosing their responses.

Given these considerations, it appears that the CAL derivation process is indeed undergoing regularization at the community level, but individuals are lagging in the assimilation of the newly emerged rules. The fact that the survey-based study shows similar overall tendencies to the lexicon data but to a smaller extent suggests that individuals actually follow the same path of regularization as the community, only at a slower pace.

With respect to the community-level patterns, which exhibited relatively less variation, a standard Optimality Theoretical analysis proved to be very useful for characterizing the results. But this kind of framework, without some adjustments, is not as well-suited for characterizing the inter- and intra-individual variation found in the survey study. Stochastic Optimality Theory (Anttila 1997; Boersma & Hayes 2001; inter alia), by comparison, can capture not only individual-level variation, but also subtle gradient changes to the pattern of variation over time or across generations. In this framework, constraints are not considered to be strictly ranked in a hierarchy but instead occupy overlapping distributions on a harmony scale, and the ordering on any given occasion is obtained by sampling from those distributions.

We will here examine only the five constraints that enter in consideration in the treatment of /R/ and /Q/ as second mora of C2: LICENSE/Q/, *V#, CONTIG, *FEET<2, *FEET>2. Since LICENSE/Q/ is never violated, it is not necessary to consider its overlap with other constraints. The figures below illustrate the overlapping distributions for the four remaining constraints. LICENSE/Q/ is not shown here; it would be out of frame on the left.

Figure 11: Stochastic OT analysis of older people's preferences

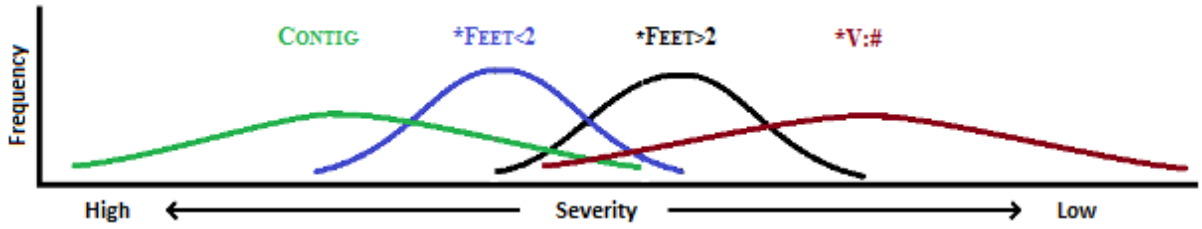
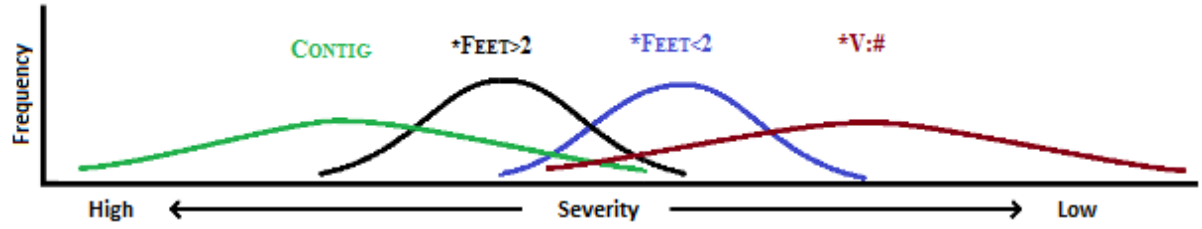


Figure 12: Stochastic OT analysis of younger people's preferences



The overall placement of the constraints on the harmony scale reflects the results presented in figures 8, 9 and 10 above. Since /R/ is more often Maintained than any of the other treatments, *V:# has to be the lowest-ranked constraint. By contrast, Replacement seems to be the least favored treatment[5], so CONTIG appears toward the upper end of the scale. The constraints associated with Deletion and Following would then appear toward the middle. In both figures, the distribution of all four constraints distributions overlap with every other constraint around the center of the figure. This reflects the possibility for every treatment (i.e., ranking) to be selected stochastically while also expressing the different level of preference for each one.

The influence of age on the abbreviation habits can be explained in terms of gradual shift of the distribution of *FEET<2 and *FEET>2 over time. As shown in the transition from figure 11 to figure 12, the shifting preference from Following to Deletion from older to younger speakers is represented by the reversal of those two constraints' positions on the harmony scale. It was observed in the lexicons that Deletion became systematic at a community level, which lead to the ranking of *FEET<2 at the very bottom of the hierarchy. It appears that this constraint is undergoing the same down-ranking at the individual level too, though the process is still ongoing.

[5] This may not appear clearly on those figures, but the survey study explores several other phonological contexts in which replacement is largely disfavored (Lamarque, 2016). We thus considered CONTIG to be the highest ranked of those four constraints. In any case, CONTIG's ranking does not have any effect on the following arguments.

4. Conclusion

The CAL derivation process, being a recent and productive process in modern Japanese, provides interesting insights into the evolution of that language's phonology. Since CAL formation is based on loanwords, it can, on the one hand, be viewed as relatively peripheral in in the lexicon of Japanese (Ito & Mester 1995, 2008). At the same time, CALs are formed according to a typically Japanese process, and therefore tend to be more respectful of the central phonological constraints in Japanese phonology. It seems that CALs have been well adopted by the community and this is reflected in the quantity of such abbreviations that already exists and which are constantly being created. Moreover, the community tends towards more and more regularity in the creation of new CALs, thus improving further their utility and acceptability as a means for appropriating words of foreign origin.

However, given the recent increase in the number of CALs, it appears that newly emerged preferences, especially those regarding the treatment of /R/ and /Q/, have not yet been fully assimilated by individuals. The results of our experiment show that the evolution observed in the lexicons is correlated with the abbreviation preferences of individuals, with younger individuals being more inclined to use the Deletion treatment for /R/ and /Q/. Nevertheless, there is still a strong discrepancy between the highly regular behavior of the community and the highly variable abbreviation patterns of individuals.

In that sense, the CAL derivation process represents an excellent case study for exploring community-level behaviors and their influence on the emergence of new linguistic regularities. In our future research we will explore the relationship between community-level and individual-level patterns directly by studying how individuals behave in the presence of real-time community feedback, and in the context of different types of community network organization.

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Morphological case and argument structure variation with hybrid Spanish-Yucatec Maya verbs: '*hacer* + V' in monolingual Yucatán Spanish

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1 Introduction

The Spanish spoken the State of Yucatán, México has long been suspected of featuring extensive influence from a 500 year history of contact with Yucatec Maya, the indigenous language of the region (Klee & Lynch 2009; Lope Blanch, 1987; Mediz Bolio, 1951). Most of the research documenting language contact interference features addresses the socio-phonetic features of Yucatán Spanish that are either directly or indirectly a result of language contact and bilingualism (Michnowicz 2008, 2009, 2010, 2011; Yager 1982). In this paper, I analyze a set of hybrid verb forms commonly referred to as '*hacer* + V' where a root form of a Yucatec Maya verb creates a complex predicate with the Spanish verb *hacer* 'to make or to do':

(1) Marco hizo **chuk** el pan dulce en el café
Marco do.PFV.3SG soak.RT the bread sweet in the coffee
'Marco soaked the sweetbread in the coffee'

This structure has been documented in other contact varieties of Spanish including Southwest US Spanish and Belize Spanish/English bilingual discourse (Balam 2015; Fuller Medina 2005; Jenkins 2003; Vergara Wilson 2013; Vergara Wilson & Dumont 2015).

In the case of Yucatán Spanish, there are a few distinguishing characteristics. This use of '*hacer* + V' structure is not an exclusively bilingual speaker phenomenon as it is used by monolingual Spanish speakers as well, to syntactically incorporate borrowed verbs from Yucatec Maya (Sobrino Gomez 2010; Michalski 2016). While '*hacer* + V' in Yucatán Spanish is also a regular part of the Spanish of Maya/Spanish bilinguals, the present study focuses on the use of this construction by monolingual Spanish speakers. In monolingual Yucatán Spanish, all of these hybrid verbs are semantically monotransitive verbs and therefore one would expect an argument structure of VERB + OBJECT where the direct object is marked with accusative case when

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pronominalized by means of a clitic pronoun. However, we see that there is variation found between two argument structures and related case morphology in which dative indirect object pronouns (le/les, and optional a + NP) (2a) and accusative direct object pronouns (lo/la/los/las) (2b) are both found with the monotransitive '*hacer* + V' constructions. In both variants, the direct object can be double (expressed overtly by an NP) but in a 'dative' construction it is marked with 'a' and in 'accusative' contexts it is not.

(2) a. Juan le hace **puch** (a la cucaracha)
Juan CL.DAT.SN do.PRS.3SN smash.RT to.DAT the cockroach
'Juan smashes the cockroach'

b. Juan la hace **puch** (la cucaracha)
Juan it.CL.ACC.SN do.PRS.3SN smash.RT the cockroach
'Juan smashes it (the cockroach).'

The goal of this paper is to empirically characterize this variation and identify factors that may condition the selection of argument structure and corresponding morphological case with the '*hacer* + V' construction in Yucatán Spanish by means of analyzing both language usage data and contextualized preference task responses. Given that '*hacer* + V' structure has been relatively understudied, and especially so in monolingual varieties, the present study adds to the much needed morphosyntactic description and characterization of this innovative morphosyntactic construction.

The organization of this paper continues as follows: In section 2, I provide a review of relevant literature regarding the nature of Spanish/ Yucatec Maya contact and hybrid verbs. In section 3, I discuss the literature on complex predicates and *hacer* + V in different varieties of contact Spanish. In section 4, I offer a brief background on Spanish case morphology and relevant aspects of argument structure. In section 5, I describe the methodology and data. In section 6, I describe the participants, sampling and data collection. In section 7 I describe and present the analysis of the data. In section 8, I present the results of the written contextualized judgment task. In section 9, I discuss and synthesize the results of the data analysis and what it can tell us about the factors that condition the variability in argument structure and case morphology with '*hacer* + V' in monolingual Yucatán Spanish. In Section 10, I conclude by drawing from a usage-based approach, building from work by Vergara Wilson (2013) to identify possible origins of this variability in processes of grammaticalization.

2 Background: Language Contact in the Yucatán

Spanish has been in contact with Yucatec Maya since the arrival of the Spanish explorers in 1521 (Mosely 1980). The nature of this contact has changed over the centuries. Initially, the number of Maya speakers greatly outnumbered speakers of Spanish and there was very little societal bilingualism. In fact, up until the mid-1800s there were very clear social divisions between Europeans and indigenous Maya, including walled cities with strict enforcement of rules regarding what hours during the day the Mayas could be present (Reed 1964). Following the "Caste War" in which the Maya rebelled against the social division and oppression, social contact between the Spanish speaking European descendants and the Mayas greatly increased (ibid). However, in terms of population demographics, the Maya-speaking population remained the numerical majority until the mid-20th century (Lope Blanch 1987). The monolingual Spanish-speaking population did not surpass 40% of the total population of the State of Yucatán until the 1970s (ibid). In the decades since, however, the rate of language shift to Spanish monolingualism has proceeded much more rapidly. By 2010, only 537, 516 (27% of the Yucatán population) people spoke Maya, most of whom were bilingual, and the monolingual Maya speaking population formed less than 7.5% of that group (INEGI, 2011). While extensive bilingualism was once very prevalent, recently, rapid language shift from Maya to Spanish has left a linguistic impact on the regional variety of Spanish spoken the in State of Yucatán. In the following section, I briefly summarize the recent work on the Yucatán dialect of Spanish and the effects of language contact that have been documented and studied.

2.1 Linguistic Features of Language Contact in Yucatán Spanish

Most prior research on language contact in the state of Yucatán has focused on the socio-phonetic characteristics of the dialect (Michnowicz, 2008, 2009, 2010, 2011). Making a conclusive case that the various distinguishing features that have been documented are, in fact, a direct result of contact and bilingualism with Yucatec Maya (Michnowicz, 2009) is difficult due to the lack of pre-contact era data. The body of scholarship produced by Michnowicz argues that Yucatán Spanish includes a set of distinctive features that are likely a result of Spanish-Maya bilingualism or retained features of the L2 Spanish spoken by the L1 Maya speakers that have become part of the regional variety of Spanish. These contact features include: the use of occlusive [bdg] where Spanish would normally have approximated forms [βðɣ]; aspirated /ptk/ as

indicated by longer VOT measurements than typically found in Spanish dialects; the use of bilabial nasal /m/ in word final position where Spanish would normally have /n/ or the velarized variant /ŋ/; the insertion of glottal stops at the hiatus across word boundaries; as well as super-segmental features (Michnowicz 2008, 2009, 2010, 2011; Michnowicz & Carpenter 2013). In many cases clear parallels can be found for these features in the contact language, Yucatec Maya. Michnowicz takes clear and careful steps to show that the more than likely source of many of these features is, in fact, contact with Yucatec Maya as indicated by a long period of bilingualism and shift from Maya to Spanish in the state of Yucatán (Michnowicz 2009).

While contact features on the level of phonetics and phonology are well documented, evidence for contact-related morpho-syntactic features has not been as widely studied. There is one article, however, that mentions a number of possible morphosyntactic contact features of Yucatán Spanish. Sobrino Gomez (2010) identifies a number of characteristics of Yucatán Spanish that are either explicitly related to Yucatec Maya, or pattern very similarly to a grammatical property of Yucatec Maya such as hybrid verb forms, aspectual markers, and word order patterns. While Sobrino Gomez (2010) provides an overview of potential contact-features, his examples are drawn from impressionistic observations rather than from elicited or interview data. The current study seeks to take a more empirically grounded approach to further investigating one of these features.

As described above, the focus of this paper is the morphosyntactic properties of Maya verbs as they are borrowed from Yucatec Maya and integrated into the regional Spanish variety. One of the two ways in which these Maya verbs are integrated is through the addition of inflectional morphology to mark number, person, tense, mood, and aspect. In these cases the verb ending '-ear' is added to the Maya root to create a Spanish verb (3).

(3) **Huix**-ar — **hoochob**-ear — **koy**-az-ear
urinate-INF — peer-INF — pinch-AUG-INF
'to urinate' — 'to peer/peek' — 'to pinch'

(4) Ellas hacían **jach** las camisas
They do.IPFV.3PL scrub. RT the shirts
'They scrubbed the shirts'

Spanish regularly uses this strategy when borrowing verbs from English as can be seen with verbs related to technology: *textear* 'to text', *chatear* 'to chat', etc. The other strategy used for incorporating Maya verbs into Spanish is through a complex predicate construction (4) with

"hacer" 'to make/ do'.[1] The Maya root is left alone and simply used alongside the verb 'hacer' which is inflected for person, number, TAM, etc., just like any other complex predicate in Spanish (i.e., light verb constructions, modal verbs, auxiliaries, etc.)

Interestingly, the distribution of Maya verbs across incorporation strategies is not even. Some of the verbs can be used in both ways, while others are exclusively found as morphologically integrated or has part of the '*hacer* + V' construction. One that is commonly used in both periphrasis and morphologically integrated forms is *hacerse chal* or *chalearse* meaning 'to rinse oneself'. In the following section I discuss the specific details of '*hacer* + V' as a complex predicate, as well as a review of the literature on '*hacer* + V' in other contact varieties of Spanish, before then giving an overview of what is known of this structure in Yucatán Spanish.

3 '*hacer* + V': a bilingual complex predicate

As I have mentioned, '*hacer* + V' has been documented and analyzed in several different varieties of Spanish in contact with other languages. The previous work on '*hacer* + V' has largely focused on issues of bilingual discourse and code-switching rather than the syntactic properties (Balam 2015; Balam, de Prada Perez, & Mayans 2014; Gonzalez-Vilbazo & Lopez 2011). This structure has generally been referred to with a number of different terms: a hybrid verb, a compound verb, a bilingual verb, or a bilingual light verb. The emergence of verbs of this type has been documented in a number of different language contact/bilingual discourse contexts and has generated great interest among scholars of code-switching (Edwards & Garnder-Chloros 2007). More generally speaking, '*hacer* + V' can be classified as a complex predicate which Butt (2010) defines as "a construction that involves two or more predication elements which predicate as a single unit, i.e., their arguments map onto a monoclausal syntactic structure" (p. 2). So, while complex predicates may be comprised of several verbal elements or a verb and noun phrase, together these pieces act as a singular verb both syntactically and semantically (Amaral 2011).

[1] The use of a verb such as 'do' or 'make' to incorporate verbs from another language has been widely documented in code-switching literature. Edwards & Gardner-Chloros (2007) provide an overview and analysis with implications for code-switching theory.

3.1 '*hacer* + V' in Contact Varieties of Spanish

Previous literature on '*hacer* + V' has been mostly dedicated to two contact varieties of Spanish where there is extensive bilingualism[2]: Southwest US Spanish/English bilingual communities (Jenkins, 2003; Vergara Wilson 2013; Vergara Wilson & Dumont 2015) and Northern Belize Spanish/English bilingual communities (Balam, 2015; Balam 2016; Balam, de Prada Perez, & Mayans 2014; Fuller Medina 2005). Early studies on the use of '*hacer* + V' to incorporate English verbs into Southwest US Spanish, such as the analysis provided in Jenkins (2003), argue that '*hacer* + V' does not fit within typical typologies of code-switching. Jenkins (2003) suggests a number of different potential origins for the structure focusing on the historical use of the 'dummy auxiliary' verb 'do' in English. More recent work on '*hacer* + V' in other contexts of Spanish/ English bilingualism in the Southwest also attempts to capture the novel and non-typical attributes of this construction within the theory and literature on codes-switching (Vergara Wilson 2013; Vergara Wilson & Dumont 2015). Vergara Wilson (2013) takes a usage-based approach to show that the use of this construction by bilinguals is not motivated by a lexical gap as has been suggested in previous research on the structure (Jenkins, 2003; Fuller Medina, 2005). Instead, Vergara Wilson (2013) argues that it is a "conventionalized construction used in bilingual discourse" that "shows evidence of grammaticalization" (p. 126). In later work, Vergara Wilson & Dumont (2015) take a close look at the ways in which '*hacer* + V' is used in bilingual discourse (New Mexico Spanish) and test to see if it is in some way related to the cognitive load of bilingual speakers. They further confirm empirically that is not associated with 'disfluencies' and propose its possible origins in bilingual speech. In (5) and (6) I provide examples from the Southwest US context (Vergara Wilson 2013: 130).

(5) se levante y, y se aliste, y se haga shower
REF get.up.3.SBJV and and REF get.ready.3.SBJV and REF do.3.SBJV shower.INF
'gets up and gets ready and takes a shower '

(6) Los estaba haciendo teach a nosotros
CL.3PL be.3.IMPF do.GER teach.INF to 1.PL.NOM
'he/she was teaching them to us'

While this body of work does not speak to morphosyntactic properties such as morphological case associated with '*hacer* + V', it does provide important context in terms of the likely origins

[2] One exception is Gonzalez-Vilbazo & Lopez (2011) which takes a Minimalist program approach to studying '*hacer* + V' as a light verb in Spanish-German bilingual discourse.

of the Yucatecan variety of '*hacer* + V' in bilingual Spanish/ Yucatec Maya discourse, which I comment on in the discussion section of this paper.

More recently, research on '*hacer* + V' in the bilingual context of northern Belize has provided rich, data driven descriptions of this construction with implications for language contact, bilingualism, code-switching, and sociolinguistics (Balam 2015, 2016; Balam, de Prada Perez, & Mayans 2014; Fuller Medina 2005). Moving beyond a merely descriptive account, Fuller Medina (2005) employed a picture description task to elicit use of '*hacer* + V' in the Spanish of Northern Belize, and analyzed the use this construction relative to syntactic and semantic features. In this study, Fuller Medina found that the lexical verbs that participated in the '*hacer* + V' construction tended to be mostly verbs of lower frequency and mostly dynamic (90%) rather than stative verbs (10%). While subsequent research (described below) shows that the use of '*hacer* + V' is much more productive across a wide range of verb classes, Fuller-Medina (2005) made a significant contribution to the study of '*hacer* + V' showing the value of empirical data and the use of elicitation techniques to study language forms that are otherwise relatively infrequent.

Building from the empirically grounded work of Fuller Medina, more recent work by Balam and colleagues has further analyzed the syntactic properties of '*hacer* + V' as well as the productivity of the construction, and the changes in use across generations via a sociolinguistic corpus of bilingual Spanish/English speakers (Balam 2015; Balam 2016). Balam (2015) finds that while all of the speakers analyzed use '*hacer* + V' across transitive, intransitive, and ditransitive contexts, the younger generations (under the age of 40) extend the use of this construction to other syntactic contexts. In (7), (8) and (9) I provide examples from Balam's data showing intransitive, transitive, and ditransitive uses of *hacer* + V (Balam 2015: 91). Despite the increased range of syntactic forms, it is important to note that for all generations studied by Balam (2015) monotransitive uses of '*hacer* + V' comprised at least half of the total tokens of the structure for each generational group. Balam also analyzed the use and incorporation of clitic pronouns with '*hacer* + V' and found a wide range of pronominal forms, especially among the youngest speakers. However, more frequent across all generations is the absence of an object pronoun (67%) followed by accusative (17.9%) and dative (6.5%). Interestingly there are no reported cases of dative case morphology being used with clitic pronouns in monotransitive contexts as is observed with "*hacer* + V' use in the Spanish of Yucatán. Instead, when clitic

pronouns are used, standard patterns for Spanish apply: accusative pronouns are used for monotransitive (7) contexts and dative pronouns for ditransitive contexts (8).

(7) I love them, so los hago **forgive**
I love them, so CL.3.ACC do.1.PRS forgive
'I love them, so I forgive them'

(8) Depués le haces **add** unos tomatoes
Afterwards, CL.3.DAT do.1.PRS add some tomatoes
'Afterwards, you add some tomatoes' (to the soup)

(9) Me gusta ase **travel** bastante
CL.1.DAT like.3.PRS do.INF travel a lot
'I like to travel a lot'

A follow up study (Balam 2016) analyzed the use of '*hacer* + V' in code-switched speech of the two youngest generations in the corpus paying special attention to the token frequency of '*hacer* + V' forms in the corpus as a predictive measure of relative frequency in code-switched contexts. This analysis also extended the previous analysis of syntactic verb type (Balam 2015) to consider the use of phrasal verbs in the '*hacer* + V' construction and found that while generational uses do not vary significantly, there were differences with respect to the semantic nature of the phrasal verbs. Balam (2015) contextualizes the results of his analysis in a discussion of verb borrowing, code-switching, and bilingual proficiency, arguing that while some frameworks such as that proposed by Wichmann & Wohlgemuth (2008) suggest mixed structures like '*hacer* + V' are a product of lower proficiency bilinguals, the data from Belize as well as from New Mexico Spanish/English bilinguals paints a different picture. The higher proficiency bilinguals and code-switchers in the Belize context as well as in the New Mexico context were the ones most likely to use '*hacer* + V', and to use it in a wide range of syntactic contexts (Balam 2016; Vergara Wilson & Dumont 2015).

3.2 '*hacer* + V' in Yucatán Spanish

In a previous study, I conducted a thorough analysis of the '*hacer* + V' construction as it is found in monolingual Yucatán Spanish (Michalski, 2016). In my analysis, I conclude that the hybrid verb is a complex predicate given that it forms a monoclausal unit: two parts forming one singular verb, semantically describing one event. In the case of '*hacer* + V', it syntactically forms a single unit as it disallows intervening material between the two elements or any type of separation whether via parenthetical insertion, clitic climbing, or clefting. However, this is quite

different from other complex predicates in Spanish. Unlike the typical light verb in Spanish which is formed by a verb (*hacer* 'to do/make', or *dar* 'to give' for example) combined with a noun phrase (*hacer una llamada* 'make a call', *dar una bofetada* 'give a smack'), the secondary element of '*hacer* + V' in Yucatán Spanish is not a noun or even a nominalized form of the Maya verb. It is an unmarked root form of a verb and is always interpreted by Yucatán Spanish speakers as a verb, and an action. The only situation in which *hacer* is used alongside another verb in Spanish is with a causative structure using *hacer*, as is also the case with 'make/do' in English. Yucatec Maya does not have a corresponding use of a verb like *hacer* or 'make/do' but it does have a relatively robust use of complex predicates such as light verbs (Bolles & Bolles, 2004). In Michalski (2016), I found that in the data set '*hacer* + V' was used productively in all person and number forms as well as across a range of tense forms and is even used along with common modal verbs.

A clear difference between '*hacer* + V' in Yucatán Spanish and other contact varieties where it has been studied is the limited range of lexical verbs with which it is used. In Yucatán Spanish, '*hacer* + V' is used most frequently with a subset of about 12-15 Yucatec Maya verbs, all of which are monotransitive. In Balam (2015; 2016), and Balam et al (2014) '*hacer* + V' is used very productively across a number of syntactic verb types ranging from intransitive, monotransitive, ditransitive, and passive, among others. The data from Southwest US Spanish/English bilinguals also shows a wide variety of syntactic contexts where '*hacer* + V' is used. While '*hacer* + V' is used with a limited set of lexical verbs there are areas of variability where it resembles, to some degree, what is found in Belize. For example, in Michalski (2016) where I analyzed data collected from Twitter, I found that these verbs were used in passive, active, and reflexive verb contexts as well as with pronominalized objects. With respect to object pronominalization, there was variability in terms of null versus overt objects, as well as with the case marking of the object pronouns. In (10) there is an example from the data where an object is overtly realized with an NP, and in (11) there is an example of an unrealized or null object.

(10) amo **hacer** **chuuk** mis biscottis de almendra en mi café
love.1.SG.PRS do.INF soak.RT my biscotties of almond in my coffee.
'I love to soak my almond biscotties in my coffee"

(11) ahora por un cafesito con lech! Y pan jeje y **hacemos** **chuk**
now for a coffee with milk! And bread hehe and do.1.PL.PRS soak.RT"
'now for a coffee with milk! And bread hehe and we can soak"

In my discussion of these results I suggested that with many of these verbs, there are potential lexico-semantic variations of telicity, where the verb in certain tense/aspects contexts could be interpreted as an activity, thus not necessitating an object as you might expect in the case of achievements and accomplishments. Furthermore, this characteristic closely parallels the behavior of verbs in Yucatec Maya where any verb can take part in a morphological process marking valency shifts, changing from transitive to intransitive or passive forms (Bohnemeyer 2004; Bolles & Bolles 2004; Kramer & Wunderlich 1999).

The other area of variability reported in Michalski (2016) is the case marking on cliticized object pronouns that are used with '*hacer* + V', which is the focus of this paper. Several of the verbs in the Twitter data set appear with dative (le/les) and accusative (lo/la/, los/las) third person object pronouns. My anecdotal experience with the Yucatán Spanish dialect would confirm that the variable selection of object pronouns reflected in the Twitter data is very common in spoken discourse as well. Linguistically speaking, this variability is an unexpected finding given that all of the verbs that participate in this construction are semantically monotransitive, taking a direct object which can be pronominalized with a accusative clitic pronoun (lo, la, los, las) marked accordingly for gender and number of the noun. In (12) and (13) there are examples of each of these variants as observed in the data set analyzed in Michalski (2016). Not unlike the data from Balam (2015; 2016) there is a range of pronominal forms attested in the Yucatán Spanish Twitter data, but the bulk of the instances of '*hacer* + V' occur without an object pronoun, followed by less frequent accusative and dative clitic pronouns.

(12) No sirve pan dulce si no lo **haces** **chuk** en el chocolate o café
No serve bread sweet if no CL.3.ACC do.2.SN.PRS soak.RT in the chocolate or coffee
'Don't serve sweet bread if you don't soak it in chocolate or coffee'

(13) Le **hacemos** **chuk** al pan en nuestro cafe
CL.DAT do.2.PL.PRS soak.RT to.DAT the bread in our coffee
'We soak the bread in our coffee'

Within the dataset there was a group of more frequent verbs which comprise most of the dative/accusative pronoun variation. These verbs were *loch* 'to hug', *puch* 'to smash', *chuuk* 'to soak', *putz* 'to skip', and *tomochi* 'to curse'. In total, the use of the dative variant represents 14.5% of object pronouns. When excluding passive and reflexive contexts, leaving only transitive, active contexts, the distribution of forms was: 15.6% dative, 35.3% accusative, and 49.1% null object forms.

As the review of literature above shows, nearly all of the work to date on '*hacer* + V' has been dedicated to contexts of bilinguals, bilingual discourse and code-switching and includes both descriptive and experimental accounts. The present case of '*hacer* + V' in Yucatán Spanish represents a departure since it is an example '*hacer* + V' involving Yucatec Maya rather than English, and it has persisted among monolingual speakers becoming a part of the regional variety of Spanish. Building on the initial analysis of Michalski (2016) the current paper now aims to directly study this variation of argument structure and morphological case with '*hacer* + V' means of acceptability judgments obtained by a written contextualized tasks with the explicit goal of characterizing this variation and identifying relevant conditioning factors.

4 Variable Case Morphology in Spanish

Variable morphological case with object pronouns is not uncommon in Spanish. This phenomenon is generally called LEÍSMO and refers to the use of the dative third person singular pronoun 'le' in contexts that typically require the accusative pronouns 'lo' or 'la'. According to Fernández-Ordóñez (1999), there are essentially two main types of leísmo: apparent and real. Real leísmo is the situation in which for a dialect of Spanish (such as the central northern region of Spain) the object pronoun paradigm has undergone a change that involves the expansion of the dative pronoun into accusative contexts (14-15).

(14) ¿Conoces a Juan? Sí, le conozco hace tiempo.
know.2.sg.pres to Juan? Yes, CL.DAT know.1.SG.PRS make.3.SG.PRS time.
'Do you know Jan? Yes, I've known him for a while."

(15) ¿Sabes dónde está mi libro? No, no le he visto por aquí
know.2.sg.pres where is my book? No, no CL.DAT aux.PRF see.PP around here.
Do you know where my book is? No, no I haven't seen it around here'
(Fernández-Ordóñez 1999)

In these two examples, the dative clitic is used in accusative contexts. Apparent leísmo, however, refers to the use of the dative instead of the accusative pronoun for the direct object of certain verbs. These verbs participate in a case-alternation where, depending on the case selected, there is a corresponding semantic difference with respect to the marking of the semantic roles of agent or patient.

In some dialects of Spanish the case assignment of specific verbs is rooted in the historical development of Spanish. This subset of verbs and constructions were intransitive and

required dative pronouns in Latin and in early medieval Spanish but are undergoing a 'transitivizing' process leading to the use of accusative pronouns. A third type of 'leísmo' is the 'polite leísmo' where dative pronouns are used instead of accusative pronouns as way to mark formality and politeness. Therefore, the use of both dative and accusative clitic pronouns with the same verb in Spanish is not uncommon and generally falls into the three types listed above. That said, Fernández-Ordóñez also explains that in varieties of Spanish in contact with indigenous languages in the Americas, there are innovative uses of clitic pronouns where the object pronoun is either unexpressed or when expressed it is not marked for gender or number, and invariably appears as "lo" (Fernández-Ordóñez 1999). This background with respect to variable case morphology with clitic object pronouns in Spanish provides, in part, some context within which to interpret the findings of the current paper.

5 Data and Methods

While '*hacer* + V' is certainly observable, salient, and identifiable in Yucatán Spanish, it is not very frequent. In fact, in a previous study (Michalski 2016), I compiled a small corpus of tokens of '*hacer* + V' through a Twitter search because the construction did not appear in sociolinguistic interviews, and I wanted naturally occurring examples. The Twitter search yielded 212 tokens, again attesting to the relative infrequency of the structure. A limitation with naturally occurring data is the challenge of finding tokens that represent the full range of what is syntactically possible for a given structure, and it is difficult to control for variables like tense, mood or aspect. Therefore, for the present study which seeks to analyze the variation of case-marking and argument structure associated with what is already a very infrequent structure, I decided to use a written contextualized preference task to elicit the preferences of speakers of Yucatán Spanish with respect to the morphological case of object pronouns used with '*hacer* + V'. This type of instrument has been successfully employed to study morphosyntax variation in L2 and bilingual varieties of Spanish (Geeslin & Guijarro-Fuentes 2006).

The written contextualized preference task used in this study was written entirely in Spanish and featured 20 embedded test items in a short narrative about a family outing to the beach. The test sentences formed part of the narrative and in some contexts represented dialogue between characters within the story. There were 9 test items that included '*hacer* + V' structures and 11 others that functioned as distractors. Great effort was made to keep the task as short as

possible. Previous experience collecting written survey type data in the Yucatán proved to be challenging as many participants either refuse to complete a long questionnaire/task, or they decide part way through they do not want to finish it. After various pilot versions testing different lengths and question/item presentation formats I determined that a 20 item task was most reasonable.

Each '*hacer* + V' test item consisted of one of 9 different Maya lexical verbs that are commonly used with this construction Yucatán Spanish, as attested by previous research (Michalski, 2016). Throughout the story there are several instances of Yucatec Maya lexical borrowings commonly used in Yucatán Spanish. I included as many of these regionalisms to first make the context as relatable as possible, and secondly to ensure that the use of '*hacer* + V', which includes a Maya verb, did not stand out to the participants. I controlled for tense, mood, aspect, person and number by ensuring that each test item of '*hacer* + V' occurred in the third person, singular, simple past (preterit). For each test item, the participant is presented with three variants (possible structures) which they were asked to rate along a Likert scale. After rating each of the possible variants, there was also a blank that asked if they had another preferred form. The Likert scale was explained in the task instructions as having the following corresponding values (translated from original Spanish): (1) "Does not sound good", (2) Sounds just OK to me", (3) "Sounds neither good nor bad", (4) "Sounds good to me", (5) "Sounds very good to me". The decision was made to use a Likert scale as opposed to simply choosing the better of three options because it allows for a more fine-grained understanding of the intuitions a speaker as regarding the possible variants and does not rule out the possibility that more than one variant could be acceptable but to different degrees.

The forms that appeared with each '*hacer* + V' test item corresponded with three options for argument structure, morphological case, and pronominalization. The first form was an accusative argument structure, the second was also accusative but included the marker 'a' which in Spanish is used to mark direct objects of transitive verbs that are animate and definite (often referred to as DIFFERENTIAL OBJECT MARKING or DOM), and the third form included a dative/ditransitive structure with a pre-verbal clitic pronoun and a post-verbal prepositional phrase which contained the NP co-referent of the object pronoun. Examples of each form are found below (16). Despite the fact that the object marking with *a* is only used with animate/definite referents (generally human), it was included as an option form for all test items

whether the direct object of the '*hacer* + V' construction in the test item was human or not.[3] This was done to maintain consistency across all test items. And finally, it is important to note that despite the different argument structures and morphological case, the meaning of each variant remains the same. Language informants with whom I piloted the instrument confirmed that each of the variants are often used by Yucatán Spanish speakers and they interpreted them all to be semantically the same.

(16) a. hizo jach la camisa (V+ DO [accusative])
b. hizo jach ***a*** la camisa (V + DO [DOM])
c. ***le*** hizo jach a la camisa (CL [dative] +V + DO [dative])
'he/she scrubbed the shirt'

6 Participants, Sampling, and Data Collection

In total, 23 individuals completed this written contextualized preference task. The participants were gathered through convenience and snowball sampling. I worked through friends and social connections to gather responses from any individual that fit the necessary criteria of being a native speaker of Yucatán Spanish over the age of 18. All participants are native speakers of Yucatán Spanish, residing in Merida, the capital of the State of Yucatán, and are comprised of both men (n= 6) and women (n= 17), ranging in ages from 18-75. In most cases, the participants completed the written contextualized preference task as part of a series of research tasks (including a sociolinguistic interview), but in some cases participants simply completed the written contextualized preference task. In all cases, the participants completed the task individually without any input from the researcher. The research packet also included a background questionnaire which gathered basic demographic information about each participant. The analysis presented here only consists of the responses to the test items and does not include individual participant characteristics.

7 Analysis

The analysis presented here is limited due to the relatively low number of participants that have completed the task. The central aim of the research instrument was to elicit judgments of argument structure and morphological case for '*hacer* + V' construction in Yucatán Spanish. The

[3] It is important to note that object pronominalization in accusative contexts was not included as an option in the task. This decision was made, again, to maintain as much consistency of form between the options, as well as to avoid intervening variables related to object pronominalization and doubling of even direct objects which could have potentially divided and distracted the attention of participants.

advantage however, is that by only using the 9 different Maya lexical verbs it is possible to take a very fine-grained look at speaker intuitions and judgments regarding a single morphosyntactic property. Furthermore, it also allows for comparison across the different verbs given that previous research has shown that these verbs do not all behave the same with respect to argument structure and case-marking (Michalski 2016). The responses from the judgment task were entered into a spreadsheet and then analyzed using basic descriptive statistics functions in SPSS 24 (Statistical Package for the Social Sciences). The Likert scale response rates were calculated for each of the three variants listed with each test item and they are presented in Table 1 as raw frequencies and percentages. In Table 2, I list the descriptive statistics (mean, median, mode, standard deviation) for Likert scale ratings of the three variants of each test item.

Table 1: Written Contextualized Task Results

VERB	ARGUMENT STRUCTURE	(1)	(2)	(3)	(4)	(5)
1. hacer putz (‘to skip’)	V+ DO [accusative]	5 (21.7%)	1 (4.3%)	4 (17.4%)	2 (8.7%)	10 (43.5%)
	V + DO [DOM]	5 (21.7%)	6 (26.1%)	4 (17.4%)	4 (17.4%)	3 (13.0%)
	CL[dative] +V + DO[dative]	10 (43.5%)	5 (21.7%)	5 (21.7%)	1 (4.3%)	1 (4.3%)
2.hacer chuk (‘to soak’)	V+ DO [accusative]	1 (4.3%)	2 (8.7%)	2 (8.7%)	4 (17.4%)	14 (60.9%)
	V + DO [DOM]	3 (13.0%)	8 (34.8%)	2 (8.7%)	9 (39.1%)	--
	CL[dative] +V + DO[dative]	8 (34.8%)	5 (21.7%)	2 (8.7%)	2 (8.7%)	5 (21.7%)
3.hacer hetzmek (‘to carry’)	V+ DO [accusative]	8 (34.8%)	4 (17.4%)	5 (21.7%)	4 (17.4%)	--
	V + DO [DOM]	3 (13.0%)	1 (4.3%0	2. (8.7%)	5 (21.7%)	11 (47.8%)
	CL[dative] +V + DO[dative]	6 (26.1%)	2 (8.7%)	3 (13.0%)	4 (17.4%0	6 (26.1%)
4.hacer puch (‘to smash’)	V+ DO [accusative]	1 (4.3%)	4(17.4%)	2 (8.7%)	4 (17.4%)	12 (52.1%)
	V + DO [DOM]	4 (17.4%)	1(4.3%)	8 (34.8%)	8 (34.8%)	2 (8.7%)
	CL[dative] +V + DO[dative]	5 (21.7%)	2 (8.7%)	5 (21.7%)	4 (17.4%)	6 (26.1%)
5.hacer jach (‘to scrub’)	V+ DO [accusative]	1 (4.3%)	3(13.0%)	5 (21.7%)	6 (26.1%)	8 (34.8%)
	V + DO [DOM]	2 (8.7%)	1 (4.3%)	4 (17.4%)	8 (34.8%)	7 (30.4%)
	CL[dative] +V + DO[dative]	7 (30.4%)	4(17.4%)	3 (13.0%)	1 (4.3%)	7 (30.4%)
6.hacer jich (‘to tighten’)	V+ DO [accusative]	2 (8.7%)	1(4.3%)	3 (13.0%)	6 (26.1%)	11 (47.8%)
	V + DO [DOM]	2 (8.7%)	1(4.3%)	8 (34.8%)	10(43.5%)	1 (4.3%)
	CL[dative] +V + DO[dative]	1 (4.3%)	4(17.4%)	4 (17.4%)	4 (17.4%)	9 (39.1%)
7.‘hacer koy’ (to pinch)	V+ DO [accusative]	11 (47.8%)	6(26.1%)	3 (13.0%)	1 (4.3%)	-
	V + DO [DOM]	3 (13.0%)	4(17.4%)	4 (17.4%)	8 (34.8%)	3 (13.0%)
	CL[dative] +V + DO[dative]	-	1(4.3%)	-	3 (13.0%)	18 (78.3%)
8.hacer chop (‘to poke’)	V+ DO [accusative]	9 (39.1%)	6(26.1%)	6 (26.1%)	1 (4.3%)	--
	V + DO [DOM]	2 (8.7%)	3(13.0%)	3 (13.0%)	12 (52%)	2 (8.7%)
	CL[dative] +V + DO[dative]	1 (4.3%)	1(4.3%)1	-	2 (8.7%)	19 (82.6%)
9.hacer loch (‘to hug’)	V+ DO [accusative]	13 (56.5%)	5(21.7%)	3 (13.0%)	-	-
	V + DO [DOM]	-	1(4.3%)	1 (4.3%)	7 (30.4%)	13 (56.5%)
	CL[dative] +V + DO[dative]	2(8.7%)	4 (17.4%)	3 (13.0%)	4 (17.4%)	10 (43.5%)

(1) “Does not sound good”, (2) Sound just OK to me”, (3) “Sounds neither good nor bad”, (4) “Sounds good to me”, (5) “Sounds very good to me”.
V = Verb, DO= Direct Object, CL= clitic pronoun, DOM=differential object marking “a”

Table 2: Descriptive Statistics

VERB	ARGUMENT STRUCTURE	Mean	Median	Mode	Std. Deviation
1.*hacer putz* (‘to skip’)	V+ DO [accusative]	3.50	4.00	5	1.655
	V + DO [DOM]	2.73	2.50	2	1.386
	CL[dative] +V + DO[dative]	2.00	2.00	1	1.155
2.*hacer chuk* (‘to soak’)	V+ DO [accusative]	4.22	5.00	5	1.204
	V + DO [DOM]	2.77	2.50	4	1.152
	CL[dative] +V + DO[dative]	2.59	2.00	1	1.623
3.*hacer hetzmek* (‘to carry’)	V+ DO [accusative]	2.24	2.00	1	1.179
	V + DO [DOM]	3.91	4.50	5	1.444
	CL[dative] +V + DO[dative]	3.10	3.00	1	1.640
4.*hacer puch* (‘to smash’)	V+ DO [accusative]	3.96	5.00	5	1.331
	V + DO [DOM]	3.13	3.00	3	1.217
	CL[dative] +V + DO[dative]	3.18	3.00	5	1.532
5.*hacer jach* (‘to scrub’)	V+ DO [accusative]	3.74	4.00	5	1.214
	V + DO [DOM]	3.77	4.00	4	1.232
	CL[dative] +V + DO[dative]	2.86	2.50	1	1.699
6.*hacer jich* (‘to tighten’)	V+ DO [accusative]	4.00	4.00	5	1.279
	V + DO [DOM]	3.32	3.50	4	.995
	CL[dative] +V + DO[dative]	3.73	4.00	5	1.316
7.*hacer koy* (‘to pinch’)	V+ DO [accusative]	1.71	1.00	1	.902
	V + DO [DOM]	3.18	3.50	4	1.296
	CL[dative] +V + DO[dative]	4.73	5.00	5	.703
8.*hacer chop* (‘to poke’)	V+ DO [accusative]	3.73	4.00	1	.950
	V + DO [DOM]	3.41	4.00	1	1.141
	CL[dative] +V + DO[dative]	4.61	5.00	5	1.033
9.*hacer loch* (‘to hug’)	V+ DO [accusative]	1.52	1.00	1	.749
	V + DO [DOM]	4.45	5.00	5	.800
	CL[dative] +V + DO[dative]	3.69	4.00	5	1.428

V = Verb, DO= Direct Object, CL= clitic pronoun, DOM=differential object marking “a”

8 Results

The response data from the written contextualized task show that for nearly all of the nine verbs of interest all three variants were rated as felicitous (4 or 5 on Likert scale) by at least one speaker. For the most verbs, there are identifiable trends of speaker preference for each of the variants. Beginning with the first verb listed in each table, *hacer putz* ‘to skip’, the response rates show that a V + DO argument structure is rated most favorably (4 or 5 on liker scale) by about half of the respondents (52.6%). When comparing the mean scores of each variant, the first variant (V+DO) has the highest mean. The third variant (with dative case-marked clitic pronoun)

is ranked least felicitously by 15/23 (65.2%) of the respondents and has an average score of 2.00. For this particular item, however, all three variants were rated by at least one speaker along all levels of the scale. This finding supports the notion that the argument structure and morphological case associated with these verbs is, in fact, quite variable given that in nearly all cases no single variant was consistently rejected by all participants.

The second verb listed, *hacer chuk* 'to soak', shows a very similar set of response rates where the first variant is rated very felicitously: 78% 4 or 5 on the Likert scale and a mean of 4.22. The third variant rated least felicitously: 56.5% 1 or 2 on the Likert scale with a mean of 2.59. Interestingly, the second variant that includes differential object marking (DOM), also received ratings ranging from 1 to 4, despite the fact that the object of the verb in the test item was neither animate nor definite. Similarly, for verbs 4, 5, and 6 in the table, the distribution also showed a preference for the first argument structure variant, but with a range of judgments on the other two variants as well. The verb *hacer jach* 'to scrub', however, stands out in the ratings because the first and second argument structure variants were very similar, with means of 3.74 and 3.77 respectively. The standard V+DO structure was rated as a 4 or a 5 by 60.8% of the participants, while the overtly marked variant (DOM) was rated as a 4 or a 5 by 65.2% of respondents. Again, this an unexpected finding because the object of the verb in the test item was neither human nor specific.

The remaining four verbs each did have an animate/definite object as the direct object. The prediction here would be that the second argument structure variant would be the preferred option given the way that Spanish typically marks direct objects with an overt accusative marker *a* (Balasch 2011). The results indicate that the respondents to the judgment task behave more or less as predicted for two of the verbs (*hacer loch* 'to hug', *hacer hetzmek* 'to carry'), and rather unexpectedly for the other two verbs (*hacer chop* 'to poke', *hacer koy* 'to pinch'). This difference in ratings for ease of comparison, I place these four verbs and the corresponding response rates in Table 3.

Table 3: Preference Task Results for *hetzmek*, *koy*, *chop*, and *loch*

VERB ARGUMENT STRUCTURE	(1)	(2)	(3)	(4)	(5)
3.*hacer hetzmek* ('to carry') V+ DO [accusative]	8 (34.8%)	4 (17.4%)	5 (21.7%)	4 (17.4%)	--
V + DO [DOM]	3 (13.0%)	1 (4.3%0	2. (8.7%)	5 (21.7%)	11 (47.8%)
CL[dative] +V + DO[dative]	6 (26.1%)	2 (8.7%)	3 (13.0%)	4 (17.4%0	6 (26.1%)
7.*hacer koy* ('to pinch') V+ DO [accusative]	11 (47.8%)	6(26.1%)	3 (13.0%)	1 (4.3%)	--
V + DO [DOM]	3 (13.0%)	4(17.4%)	4 (17.4%)	8 (34.8%)	3 (13.0%)
CL[dative] +V + DO[dative]	--	1(4.3%)	--	3 (13.0%)	18 (78.3%)
8.*hacer chop* ('to poke') V+ DO [accusative]	9 (39.1%)	6(26.1%)	6 (26.1%)	1 (4.3%)	--
V + DO [DOM]	2 (8.7%)	3(13.0%)	3 (13.0%)	12 (52%)	2 (8.7%)
CL[dative] +V + DO[dative]	1 (4.3%)	1(4.3%)1	--	2 (8.7%)	19 (82.6%)
9.*hacer loch* ('to hug') V+ DO [accusative]	13 (56.5%)	5(21.7%)	3 (13.0%)	--	--
V + DO [DOM]	--	1(4.3%)	1 (4.3%)	7 (30.4%)	13 (56.5%)
CL[dative] +V + DO[dative]	2(8.7%)	4 (17.4%)	3 (13.0%)	4 (17.4%)	10 (43.5%)

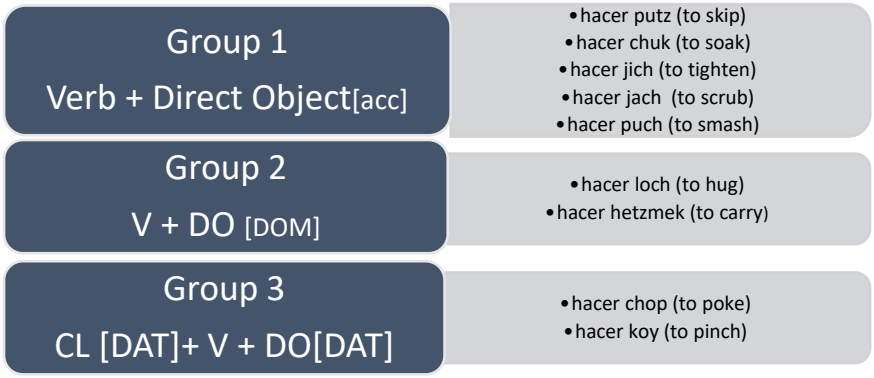
(1) "Does not sound good", (2) Sound just OK to me", (3) "Sounds neither good nor bad", (4) "Sounds good to me", (5) "Sounds very good to me".
V = Verb, DO= Direct Object, CL= clitic pronoun, DOM=differential object marking with accusative "a"

Consistently across all four of the verbs, the unmarked accusative argument structure (V+DO) is not highly rated and in fact is not given a ranking of 5 at all. *Hacer hetzmekv* received 4/23 (17.4%) ratings of 4 on the Likert scale for the unmarked accusative argument structure, *hacer koy* and *hacer chop* received one rating of 4 and *hacer loch* did not receive any rakings of 4. For all of these verbs, the expected variant with overt accusative case (DOM) was very highly rated with mostly 4s and 5s. But there are again some clear differences in the results for *hacer loch* and *hacer hetzmek* when compared to *hacer koy* and *hacer chop*. For *hacer loch* and *hacer hetzmek*, the highest rated variant was in fact the overtly marked accusative (DOM), with 69% and 87% ratings of 4 or 5 respectively. For these verbs it is very clear that variant with over accusative case is the one that sounds best to the respondents. For the other two verbs however, the third argument structure variant (CL + V + DO) with overt dative case marking was the much preferred variant with 91% ratings of 4 or 5 on the Likert scale.

To summarize the results of the written contextualized preference task, we can say that while for nearly all verbs and argument structure variants a wide range of acceptability ratings were observed, there are some trends. According to these trends, three groups among the nine verbs can be identified. The first group of verbs are those for which the participants showed the highest and most frequent ratings of the standard unmarked accusative argument structure: *hacer jich*, *hacer jach*, *hacer putz*, *hacer chuk*, and *hacer puch*. The second group is comprised of two

verbs, for which the participants frequently and highly rated the overt accusative case (DOM) argument structure: *hacer loch* and *hacer hetzmek*. And finally, the last group also consists of two verbs for which the participants very frequently rated the third argument structure variant the highest: *hacer koy*, and hacer *chop*. In Figure 1. I outline the groupings of the verbs.

Figure 1: Groupings of verbs with argument structure preferences



9 Discussion

The data collected in this study by means of a written contextualized preference task have provided a window into the mind of native speakers of Yucatán Spanish regarding the argument structure and morphological case associated with a set of hybrid complex predicates known in the literature as '*hacer* + V'. The results show several points of deviation from typical Spanish argument structure and morphological case patterns despite the fact that all of the verbs are semantically monotransitive and would typically be used in a V+DO structure with overt accusative case only used for differential object marking contexts (when the DO is animate/definite). Instead, much like the data from Twitter analyzed in Michalski (2016) the reality is that the preferences regarding argument structure and morphological case and '*hacer* + V' are quite variable. In fact, for most of the verbs, all three argument structure variants were rated felicitously by at least one speaker. However, as the groups identified in Figure 1 indicate, there are some clear patterns among the verbs that begin to show which argument structures are most likely associated with each of the verbs. In what follows, I review each group of verbs, comparing the results from the present study with the findings from Michalski (2016) to then be able to identify linguistic factors that may be related to the variable use and judgments associated with these verbs.

Drawing from the results of the written contextualized preference task the verbs in Group 1 are most positively associated the V+DO argument structure without any overt morphological case, which is the argument structure most associated with mono-transitive verbs. If the object were to be pronominalized, it would be done with the accusative clitic pronoun. However, consulting the Twitter data, this is not always the case. For the verb *hacer chuk* in the Twitter data there were only three instances of accusative object pronouns and 6 of dative pronouns. For the verb *hacer puch* there were 27 instances accusative clitic pronouns and just 5 dative pronouns. While there is still certainly variation with the selection of pronouns, the data from the Michalski (2016) confirm the findings of the present study that for the verbs in Group 1 the likely preference is for V+DO, with accusative case-marking when the object is pronominalized or when the NP object is +animate/ +definite.

The second group of verbs only differ from Group 1 in that the object of the verb is most commonly a person, given the specific lexico-semantics of the verb. *Hacer loch* 'to hug' and *hacer hetzmek* 'to carry' in Yucatán Spanish carry specific meanings where they are associated with human objects. *Hetzmek* has a general meaning of 'to carry' but in its use it always refers to carrying another person (often a baby or child) on the hip. The verb *hetzmek* is not generally found with a non-human object. The same applies for *loch* except you may find it being used with an animal or a stuffed animal (toy) as the object. When we compare the findings from Michalski (2016), which analyzed data collected from Twitter, with the preference task used in the present study, some connections and patterns are identified. For the verb *hacer loch*, the analysis of the Twitter data reveals that many object pronoun forms are used, but that 46.96% of forms were accusative and 25.75% (n=31) were dative (n=17). For *hacer hetzmek*, the data set only includes 5 tokens total of which only 1 token included the dative clitic pronoun. The remaining four either used the expected argument structure or did not have an overtly realized object at all. With very few tokens of *hetzmek* it is difficult to say very much with respect to how language use compares to the judgments and preferences indicted in this present study. However, the question remains: why does the CL[dative]+V+DO[dative] argument structure appear in both usage and preference data when the verb semantics do not indicate that such a structure should be used? Before discussing this question directly, I present in the following paragraph a discussion of the third group of verbs which show a high rate of acceptability and even preference for dative pronouns and argument structure.

The third group of verbs presented the most unexpected findings regarding argument structure and case. The verbs in this group are *hacer chop* 'to poke' and *hacer koy* 'to pinch'. Based on semantics and valency (monotransitive) one would expected typical V+DO argument structure with accusative object pronouns and DOM with NP objects that are +animate /+definite, much like the verbs of Group 1. However, the ratings form the judgment tasks show a strong preference for the CL [dative] + V + DO [dative] argument structure and case marking. *Hacer chop* and *hacer koy* were both rated at a 4 or 5 on the Likert scale by 21/23 (91.3%) of the respondents. While this is unexpected given the basic semantics of the verb alone, when you consider the semantics of the predicate as a whole (including the direct object of the verbs), the use of the dative morphological case makes sense. The use of the dative here falls within a category of special uses of dative case marking where the object of the verb is part of an inalienable possession relationship (Winters 2006; Zagona 2002). For these cases there is a 'part' and a 'whole' that form a relationship of inalienable possession, where the whole is the inalienable possessor of the part and is marked as a dative argument (Zagona 2002: 146). The typical uses of *hacer chop* and *hacer koy* include the mention of a body part. For *hacer chop* it is the 'eye' or 'eyes' while for *hacer koy* it usually refers to being pinched in the buttocks. Therefore, the strong preference for the dative-marked argument structure associated with these two verbs falls squarely within the realm of Spanish syntax. That said, this use of the dative to include the inalienable possessor is variable and not always used (Winters 2006). An example of this variability is provided below and also clearly indicated in the results of the judgment task given that the other possible argument structures listed were given positive ratings by at least some speakers.

When compared to the Twitter data from (Michalski 2016), there are only a few points of comparison because in the data set there were only five tokens of *hacer chop*. In (17) I list four of the tokens from the Twitter data. Two of these tokens are examples of the dative marked inalienable possessor (17a,c). The variability of the dative marked possessor can be seen in (17b), which does not include any dative pronoun indicating the possessor and instead uses the second person possessive pronoun *tu* to indicate that the eye belongs to the addressee of the tweet. In (17c) we see that the direct object (the speaker's eye) is not overtly expressed but instead it is implied. In (17d) there is an example of *hacer chop* being used in reflexive construction, also without a direct object. Since this verb is associated with the eyes it seems that

it is not always necessary to express the object overtly.[4] There were no examples of *hacer koy* in the Twitter data set to compare with the judgment task results.

(17) a. Cuidado te hace 'chop' tu ojo o tu boca
careful CL.2.DAT do.3.SN.PRS poke.RT your eye or your mouth
'Be careful, it pokes your mourth or your eye'

b. las alergias de otros hacen chop tu ojo
the allergies of others do.3.PL.PRS poke.RT your eye
'allergies of others poke your eye?'

c. hay mucho viento y mis pestañas me hacen chop
there is a lot wind and my eyelashes CL.1.SG do.3.PL.PRS poke.RT
'there is lots of wind and my eyelashes poke me'

d. en serio nadie los ve, o se hacen chop?
Seriously, nobody CL.ACC see or CL.3.REF do.3.PL.PRS poke.RT?
'Seriously, nobody sees them, or do you poke yourselves (in the eyes)?'

10 Conclusion

What remains to be addressed here is the source or origins of the variability of the argument structure and morphological case associated with '*hacer* + V' in Yucatán Spanish. With relatively limited data it is difficult to make any definitive conclusions. One important source to consider is the role of Maya grammar and linguistic properties in understanding the nature of argument structure and morphological case with these hybrid verb constructions. For the '*hacer* + V' complex predicates analyzed in this paper, it is the Maya verb that provides the lexical and semantic information like valency, argument structure, and semantic roles of arguments. Therefore, an important aspect of understanding the variation that is documented in the present study is to understand the potential linguistic contribution of Maya. In what follows, I draw from what is known of other cases of '*hacer* + V', the syntactic and semantic properties of both Yucatec Maya and Spanish, as well as the data presented here in the present study to suggest a number of potential origins of the '*hacer* + V' construction in Yucatán Spanish and its variable argument structure and morphological case.

Previous studies on '*hacer* + V' has suggested a couple of different origins of the structure. Vergara Wilson (2013) and Jenkins (2003) study the construction in synchronic contexts of bilingualism and acknowledge that the '*hacer* + V' construction does not have a

[4] Consultation with a native speaker language consultant confirms that *hacer chop* is generally associated with the eyes and *hacer koy* with the rear end (buttocks).

direct equivalent in either of the two languages spoken by the bilinguals they studied (Spanish and English). There are however a few constructions in both Spanish and English that share some similarities. Vergara Wilson suggests a pathway of grammaticalization of the verb *hacer* in a very similar construction in Spanish: causative *hacer* + infinitive. In this scenario, the verb *hacer* undergoes a semantic *bleaching* allowing it to become independent of the causative structure which retains the lexical semantics of *hacer* 'to make' and simply serves as a syntactic vehicle to integrate a borrowed verb from another language. Such a process is similar to the grammaticalization pathways of auxiliary verbs (Bybee 2010). Another potential model construction could be the various light verbs in Spanish that use the verb *hacer* + noun, like *hacer una llamada* 'make a call', *hacer un favor* 'do a favor', *hacer una sugerencia* 'make a suggestion', etc. While these are examples of light verb uses of *hacer*, there still retains some semantic content in that it carries the meaning of 'to make' in the sense of 'to realize'. In Vergara Wilson's dataset the '*hacer* + V' construction is used in a variety of semantic and syntactic contexts including monotransitive, ditransitive, and reflexive, among others, depending on the semantics of the lexical verb from English that is used in the '*hacer + V'* construction. A similar range of syntactic contexts was also attested in the data from Northern Belize (Balam 2015, 2016). Such a pathway is also quite possible for the '*hacer + V'* construction in Yucatán Spanish given that there was widespread Maya-dominant bilingualism for around one hundred years following the Caste Wars (Michnowicz 2009; Reed 1964). The verbs studied in this paper appear to be those that have persisted in Yucatán Spanish and are regularly used by monolingual Spanish speakers. As far as the variability of morphological case and argument structure attested with many of these verbs, I offer a few possible explanations in the following paragraph.

Complex predicates in Spanish that include the verb *hacer* such as light verbs and causative structures often use dative pronouns and a ditransitive or double object argument structure (Fernández-Ordóñez 1999). In fact, the use of dative object pronouns in causative structures is variable and often depends on the properties of the infinitival complement (Torrego 2010; Fernández-Ordóñez 1999). When the infinitive is transitive it takes an accusative pronoun but when it is intransitive it takes a dative pronoun. Therefore, while the dative pronouns are most typically associated with constructions and periphrasis using *hacer*, the use of both accusative and dative pronouns does occur in Spanish. And given the relative infrequency and potentially variable familiarity that monolingual Yucatán Spanish speakers have with the '*hacer*

+ V*'* constructions and the Maya verbs that are used with it, the great variability of judgments found in this study regarding argument structure and case-marking should not come as much of a surprise. A future analysis should compare the judgments found here with those of bilingual Yucatec Maya/ Spanish individuals to see if an increased knowledge of Maya changes the preferences for argument structure and case marking. Yucatec Maya does have a very robust and productive system of valency shifting where a verb can be realized as intransitive, transitive, and reflexive simply though use of grammatical morphemes (Bolles & Bolles 2004). In the same vein, future studies which include contextual background information about speakers in the analysis may also draw out some more patterns and trends in the judgments found in the current study. My anecdotal experience with Yucatecan Spanish speakers has indicated a potential for age to be a deciding factor, with older speakers preferring strict use of accusative pronouns and monotransitive argument structures, while younger speakers may be more likely to accept either or in many cases prefer the use of the dative pronouns. These patterns suggest a further reanalysis and grammaticalization by younger generations of speakers. While there is much more to be learned about '*hacer* + V*'* in contact varieties, the current study has added to our understanding of morphosyntactic variation associated with this hybrid complex predicate. Furthermore, this study has shown the value of using a range of methodologies and empirical data including social media discourse and written contextualized judgment tasks to study relatively infrequent or difficult to document linguistic structures found in contexts of bilingualism and language contact.

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The bifurcated nature of plural: Reconsidering evidence from English compounds

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1 Introduction

In this paper, we address a long standing assumption about English morphology: that regular plural morphology is generally banned within modifiers of compounds, while irregular morphology is generally allowed (see: Thomas-Flinders 1983, Kiparsky 1982, Hammond 1984, and Sproat 1985, among others). We argue that this pattern is illusory. It is brought about by a conspiracy of other restrictions derived through bifurcated Num(ber) functional heads (cf. Lecarme 2002, Borer 2005, Lowenstamm 2008, Wiltschko 2008, Alexiadou 2011, Kramer 2012, 2016, Mathieu 2012, 2014, and Adamson 2017, among others) and an incorporation analysis of English compounds coupled with cyclic spell out (Harley 2009, Jackson & Punske 2013). General patterns of allowing or disallowing plural modification are explained through selection of complements by a head, which is a consequence of the incorporation analysis.

The basic pattern is illustrated in the example sets below. Examples like those in 1 contrast with those in 2 where in 1 plural marking is disallowed on the left-element (modifier) of the compound but no such ban exists in 2.

(1) Regular Plural Inflection in English Compounds

dog-lover	*dogs-lover
rat-chaser	*rats-chaser
log-cutter	*logs-cutter
hand-made	*hands-made
finger-bowl	*fingers-bowl
coat-rack	*coats-rack
three-twinkie lunch	*three-twinkies lunch

(Sproat 1985:412)

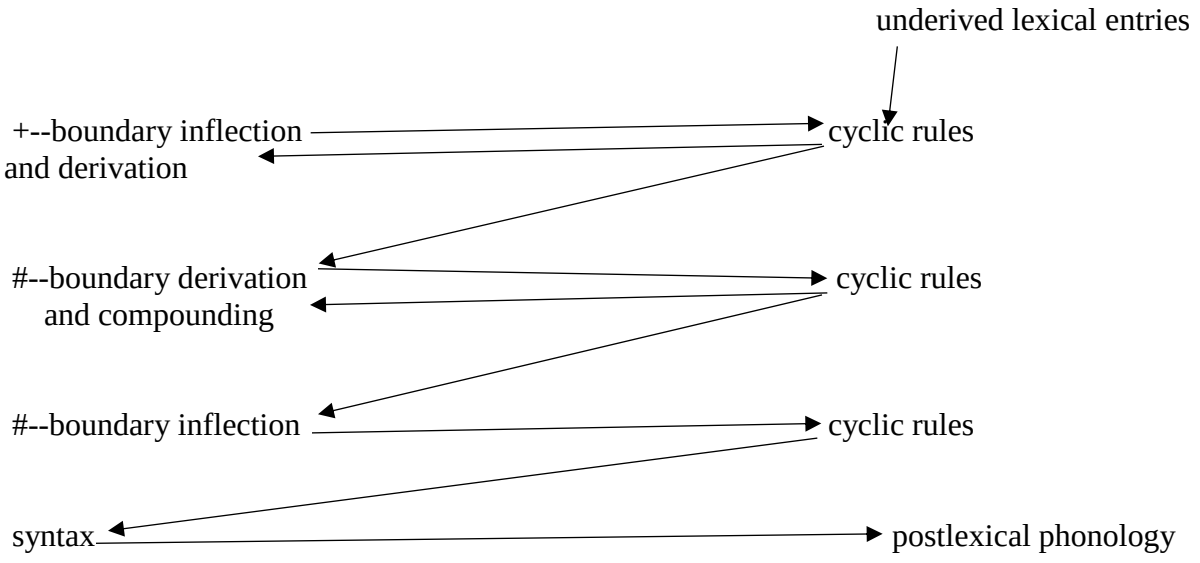
[*]We would like to thank the audience at BLS 43 for their helpful comments on the presentation that preceded this paper. Beyond them, we are indebted to Luke Adamson, Elizabeth Butler, Allegra Frazier, Heidi Harley, Ruth Kramer, Katherine Martin, and the audience at the University of Oklahoma for providing resources, commentary and support. All errors remain our own.

(2) Irregular Plural Inflection in English Compounds

feet-first
mice-infested
teeth-marks
alumni-club
menfolk (Sproat 1985:413)

The patterns found in 1 and 2 led theories such as Lexical Phonology (cf. Kiparsky 1982) to divide the morphological system into multiple strata. This is illustrated in the model from Thomas-Flinders (1983) below. In Lexical Phonology, irregular morphology is permitted within compounds because it occurs at an earlier stratum.

(3) Lexical Phonology



(Thomas-Flinders 1983:114)

Exceptions to this generalization are fairly common, as in pluralia tantum (see: 4) or group meanings (as in 5) where regular plural marking is available or even required.

(4) Plural Inflection on Pluralia Tantum Forms in English Compounds

pants-pocket
alms-giver
odds taking (Siddiqi 2009:57)

(5) Plural Inflection on Group Meanings in English Compounds

systems analyst
parks department
admissions committee
numbers racket
reservations deck

(Hammond 1984:30)

Selkirk (1982) uses examples like those in 5 to develop an analysis based on a context-free grammar and argues against level-ordering. However, for many analyses, these regular forms are regarded as a subclass of irregulars, side-stepping the issue of why regular morphology is allowed to appear in the left-element. Gordon (1985:88) argues '… they [group meaning compounds] are similar to the case of pluralia tantum in that one might consider the plural form in that particular usage to be a semantically idiosyncratic separate lexical form'. Gordon goes on to argue that if we accept these as special lexical forms they pose no problems for level-ordering or Lexical Phonology. Similarly, Siddiqi's (2009) fusion analysis requires that forms like *parks* found in *parks department* in 5 undergo an identical process of fusion as irregulars such as *mice* found in *mice-infested* in 2. Under this analysis, both *mice* and *parks* must be stored in the lexicon as separate, whole forms (see relevant discussion in Punske 2016a). We return to a discussion of Siddiqi 2009 in section 4.

Based on data like those from 4 and 5, Sproat (1985:420) makes the observation given in 6 below which he identifies as a 'rough characterization':

(6) The left member of a compound must be unmarked for number, unless the plural is interpreted collectively or idiosyncratically. (Sproat 1985:420)

Hammond (1984:41) similarly develops the Inflectional Access Constraint and the Relativized Inflectional Access constraint to account for examples like those in 5. For Hammond, '…these examples exhibit internal inflection, the internal inflection is not interpreted by the syntax as inflection'.

Our present work is, in many ways, a formalization of Sproat's and Hammond's constraints and observations about compounds within the framework of Distributed Morphology. We argue that 'group' interpretations are a consequence of a bifurcated Num(ber) structure (as part of a universal structural spine) where, in English, the feature [INDV] (for individuation) is housed in a higher functional head (Num). Crucially, we argue that this higher Num head is outside of the cyclic structural domain that delimits the modifier itself. That is, because the [INDV] feature is higher up in the bifurcated structure, it is unable to be associated with the compound modifier during the derivation of the compound.

Our analysis is motivated empirically by two general observations. First, irregular plurals are not always allowed in compound modifiers, which casts doubt on the explanation being purely a matter of regular vs. irregular morphology. Second, regular plurals are easily found when the interpretative circumstances are correct, which hints at the true nature of the restriction. Examples of these observations are given in 7.

(7)	**Singular**	**Plural**
Regular	rat-catcher	*rats-catcher
	dog-lover	*dogs-lover
	*pant pocket	pants pocket
	*odd maker	odds maker
	park department	parks department
	number game	numbers game
	rat lab	rats lab
Irregular	woman chaser	*women chaser
	toothbrush	*teethbrush
	*(wo)manfolk	(wo)menfolk

*alumnus club	alumni club
mouse infested	mice infested
person mover	people mover

In fact, the gaps seem to pattern very clearly with possible interpretations. We claim that regardless of regularity, singular modifiers are required when an individuating interpretation is required, plurals are required for a collective/group interpretation, and in cases where both are allowed, there are clear differences in meaning, such that the plurals support collective or idiosyncratic interpretations. This pattern is illustrated in 8, which matches the pattern of grammaticality in 7.

(8)	**Individuated**	**Collective**
Regular	rat-catcher	-
	dog-lover	-
	park department	parks department
	number game	numbers game
	rat lab	rats lab
Irregular	woman chaser	-
	toothbrush	-
	-	(wo)menfolk
	-	alumni club
	mouse infested	mice infested
	person mover	people mover

As we show throughout, the patterns in 7 and 8 exhibit a great deal of systematicity. We argue that this systematicity is best accounted for through an incorporation analysis which allows the head of the compound to select for its complement (which incorporates to become the modifier). In the next section, we describe the underlying theoretical assumptions that underpin this analysis.

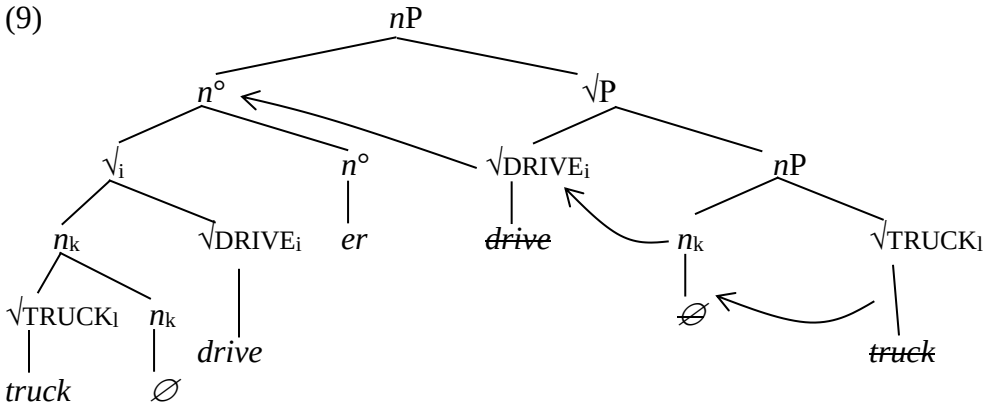
2 Theoretic background

Our core analysis is based on a synthesis of two previous analyses: an incorporation analysis of compounding, and an analysis of nominal Num(ber) as a bifurcated functional structure. We assume that compounding involves the incorporation of the modifier into the root following Harley (2009) (see also Wiltschko 2009a). We further assume, following Jackson & Punske (2013) that the incorporated modifier must be contained in a derivational phase, in the broad sense of Chomsky 2000, 2001, 2008, etc. We assume a bifurcated Num structure following Kramer's (2016) account of Amharic, among others. Finally, we assume, following Ritter & Wiltschko (2014), that languages share a universal spine of functional projections though the featural content of each functional head may vary. These analyses are discussed in more detail in the following subsections.

2.1 Compounding

We follow Harley (2009) in claiming that compounding involves incorporation of the modifier (cf. Baker 1988). Harley (2009:136) proposes that '[s]ince incorporated elements satisfy their Case needs by incorporation in Baker's system, let us assume that the feature which drives incorporation is Case-related'. The basic structure of this incorporation is given in 9 below.

(9)



(ex. 9 from Harley 2009:136)

Under Harley's analysis, because the incorporation is Case-driven, the presence of plural and other functional structure (such as D) prevents incorporation: 'If an *n*P is merged with Num° or D° material, that Case-related *n*P feature must be checked DP-internally; the feature is no longer

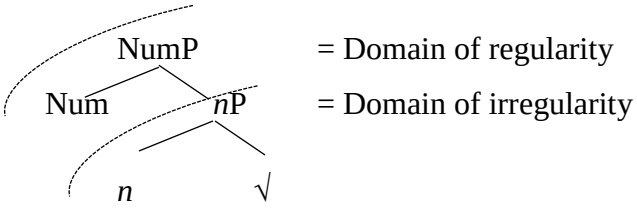
accessible for checking via incorporation into a Root' (Harley 2009:141). We maintain this analysis here, though we account for a wider array of plural marked compound modifiers.

Jackson & Punske (2013) expand Harley's analysis to account for so-called 'compound stress'. Under their account, the same phase-based stress rules which have been independently argued to apply more generally at the sentence level (see: Adger 2007, Dobashi 2003, Legate 2003, Ishihara 2007, Jackson 2007, Kahnemuyipour 2009, Kratzer & Selkirk 2007, Samuels 2009, Sato 2009) also apply within compounds. This extension of sentence-level stress rules to (derived) word-level stress rules is straightforwardly predicted in a framework such as Distributed Morphology, in which morphological structure is not distinct from sentence-level structure. Critically for this account, the *n*P is a phase, which we continue to assume here.

2.2 Number

We follow Kramer (2016) (see also: Lecarme 2002, Borer 2005, Lowenstamm 2008, Wiltschko 2008, Alexiadou 2011, Mathieu 2014) in assuming that number is split between multiple syntactic heads. We base the present analysis primarily on the one developed in Kramer 2016. Kramer (2016) argues for the structure 10 below:

(10) Number domains adapted from Kramer (2016:534)



We propose that Kramer's structure is universal, thus applying as well to English. However, we assume that languages can vary in the featural make-up of Num and *n*.

3 Analysis

By adopting the incorporation and bifurcated Num analyses outlined in the previous section, we can fully account for the distribution of English plural modification in compounds. In this section we outline how the bifurcated Num analysis can be applied to English and how, once this analysis

is combined with an incorporation analysis of compounding (with cyclic spell-out), one can derive the observed restrictions on the distribution of plurals in compound modifiers.

3.1 A split Num in English

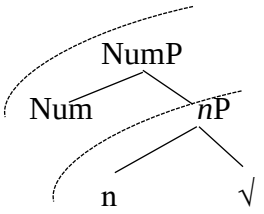
One critical difference between English and Amharic (along with a number of other languages[1]) is that double plurals are not generally available in English. Thus, it may be reasonable to conclude from this that while Num is split in languages like Amharic, it is not split in English. To the contrary, we argue, along with Adamson (2017), that there are properties of English plural best explained through a bifurcated plural along the lines of Kramer (2016): namely, irregularity and allosemy. To explain the difference in behavior between Num and *n* in English and in Amharic we assume, following Mathieu's (2012, 2014) discussion, that the content of Num(ber) (his Div^0) may vary. Specifically, we assume that the particular features associated with a functional projection may vary from language to language, similar to the variation in d-features and INFL-features discussed in Wiltschko 2009b and Ritter & Wiltschko 2009, 2014, respectively.

As Ritter & Wiltschko (2014:1379) note in their discussion of INFL and the universal featural spine more generally, '…different languages may associate different types of content with the same universal category (INFL)'. Thus while INFL has a universal feature (an 'unvalued coincidence feature [*u*coin]', (Ritter & Wiltschko 2014:1379), different languages may associate INFL with different substantive content, or INFL may have not substantive content at all. We are drawing on this line of reasoning to capture the distinct behaviors of bifurcated Num in English and Amharic.

We argue that the bifurcated structure of Num is English is structured as in 11 below. The critical difference between English and Amharic under this approach is that there is a semantic distinction between the two positions in English but not Amharic. In English, the higher position, Num, encodes individuation while the lower position, *n*, encodes general plurality.

[1] Wexler (2002: 465-468) notes a number of different possible semantic impacts of the double plural in Yiddish contra discussion in Kramer (2016). However, given the assumptions about the featural make-up of Num outlined in this paper, such semantic differences would not fundamentally alter the present analysis of Kramer's (2016) discussion of Amharic.

(11) Modified number domains adapted from Kramer (2016:534)



= Domain of individuation/regularity

= Domain of plural/irregularity

We assume an approach to regularity following Kramer's (2016) analysis of Amharic. 'Low number' may exhibit allomorphy, while 'high number' may not. We will not discuss here the ongoing questions of the derivation of allomorphy in Distributed Morphology and related frameworks (see Embick 2010, Bobaljik 2012, Merchant 2015, Punske 2016b, among others), but the approach we take most closely tracks with Embick 2010, as we assume that allomorphy is determined via syntactic adjacency and may be disrupted by cyclic domains.

What is crucial to our approach is that while the regular form of the English plural, *-s*, is typically realized in the higher number position, it may also be spelled-out in the low position when no competing irregular form exists. The lack of plural-stacking, like that found in Amharic, is likely a post-syntactic haplology effect (cf. Nevins 2010) or a Distinctness restriction (c.f. Richards 2010). A set of potential exceptional cases is discussed shortly.

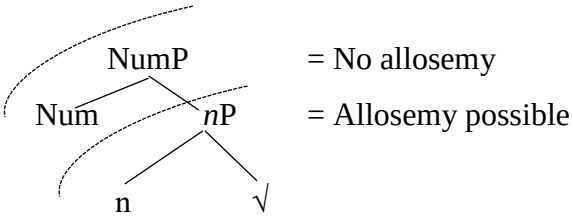
Similarly, this cyclic spell-out analysis can account for the exceptional pluralization facts. Acquaviva (2016) notes in his discussion that in previous work, Acquaviva (2004, 2014) and Alexiadou (2011:204) develop an analysis wherein 'canonical count pluralization, which applies to count nouns, is structurally external to non-canonical pluralization (as on mass nouns)'. Sproat (1984:420) discusses a distinction raised in Gordon 1985[2] between *drink-cabinet* and *drinks-cabinet*, noting that the former 'could be any cabinet in which potable items are stored…' while the latter 'seems to refer preferentially to a cabinet for alcoholic drinks, where *drinks* is interpreted idiosyncratically'. Gordon (1985) suggests that such forms may be lexically stored.

However, we argue that the bifurcated number provides a ready explanation for such idiosyncratic forms. We follow Adamson (2017) in arguing for a 'strong locality constraint on contextual allosemy: within one categorial/cyclic head.' Therefore, when a plural is interpreted in the lower domain, it is interpreted within a cyclic head, and can thus receive an idiosyncratic interpretation. The fact that these plurals are non-individuating also follows from this same

[2] Cited in Sproat as Gordon 1984.

analysis, given the claim that individuation is interpreted only at the higher Num position, because this would be outside of the *n*P phase. The alignment between structure and allosemy potential is shown in 12. Similar phase-driven idiomatic interpretations are discussed in Svenonius 2005, Harley & Stone 2013, and Harwood 2013.

(12) Allosemy in English number domains



One potential set of counter-examples to the restriction on double plural in English are a set of a special plurals discussed in Acquaviva 2016. Acquaviva (2016:197) notes a number of non-pluralia tantum English plurals that do not carry the meaning 'many X':

(13) Open list of English non-pluralia tantum plurals that do not mean 'many X'

> ashes, brains, crops, debts, depths, dimensions, directions, finances, foundations, funds, gates, heavens, heights, holidays, intricacies, loyalties, manners[3], mists, plans, preparations, proofs, rains, resources, results, skies, snows, suspicions, thoughts, times, views, waters, winds, woods…
>
> Acquaviva (2016:197)

What is intriguing about this list is that these (plural) forms are virtually unattested within compounds. We may note that such forms when not marked by the plural may receive an interpretation more consistent with a mass noun:

(14) There is ash on the road.

However, these nouns do also retain their countability:

(15) John flicked an ash from his cigarette.

[3] Included in the list, however we believe this is a true pluralia tantum.

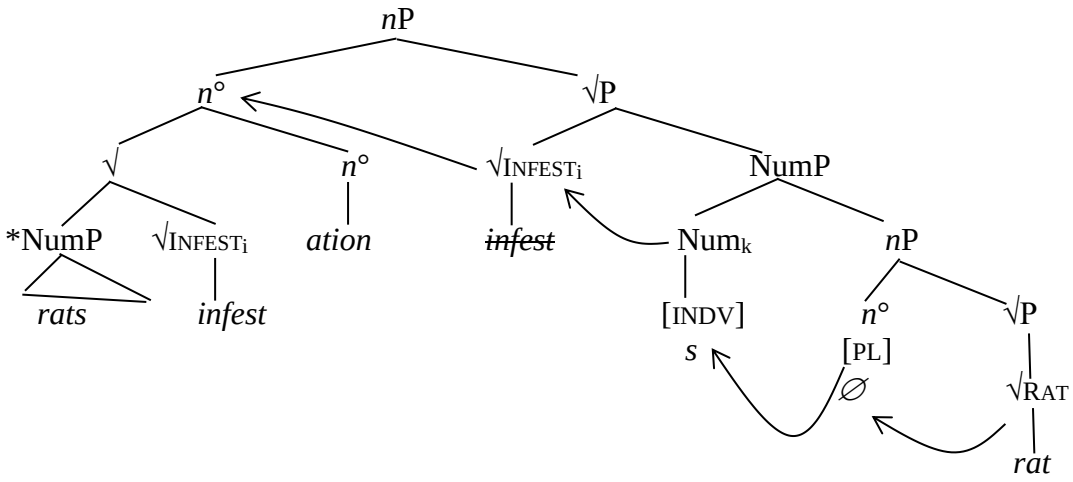
We argue that this suggests that these nouns have a special null *n* which carries the plural interpretation allowing for the contrast in 14 and 15. Overt plural marking realizing *n* is disallowed due to conventional contextual allomorphy. Forms like those in 13 involve the realization of plural in Num. Thus, the lack of these forms within compounds follows entirely from the analysis that we have presented here; Num cannot be incorporated as part of compound and each of these examples with overt plural marking involve Num.

In the next subsection we outline how the incorporation interacts with the bifurcated Num.

3.2 Incorporation analysis

Only the *n*P, not the larger NumP, can incorporate as a compound modifier. This follows entirely from Harley's (2009) analysis of compounding as case-driven incorporation, as discussed previously. Alternatively, we could delimit the size of an incorporate to a phase, thus preventing the larger Num from incorporating (though this would lose the motivation for incorporation).

(16) Illicit compound structure



The structure in 16 accounts for a bulk of the unavailability of overtly marked plural modifiers in English compounds. Plural forms cannot be individuated within compounds because Num (which houses [INDV]) is outside of the *n*P phase that is being incorporated. Thus when a head requires that its complements be individuated, the plural is disallowed, because that larger structure including Num cannot be incorporated, and therefore cannot be part of a compound. This captures why forms such as those in 17 and 18 require the singular.

(17) *dogs-lover ~ dog lover

(18) *women chaser ~ woman chaser

In contrast, so-called collective or idiosyncratic forms do not require individuation (and may even prohibit individuation) and thus do not need Num. Therefore, since the plural itself is housed in *n* it may be incorporated into a compound structure as in 19-21.

(19) parks department

(20) numbers game

(21) pants pocket

In *parks department*, the modifier *parks* represents a collective or group reading, distinct from *park department*. That is, a *park department* may be a department for the maintenance of a particular park, but a *parks department* is a department that deals with parks in general. The same analysis applied to *systems analyst* and many others, the key being that there is a collective rather than individuated interpretation.

In the case of *numbers racket*, the modifier represents an idiosyncratic meaning of the plural, which means something different than simply a plural of *number*. As discussed in the previous section, we analyze such idiosyncratic forms as having the plural feature on *n*, not the higher Num. This fits naturally into the incorporation analysis, because the idiosyncratic meaning is available because the root and plural are contained within the same derivational phase, which also means that it is available as the modifier of a compound, because the *n*P phase is incorporated, just as in regular compounds.

Finally, pluralia tantum cases such as *pants pocket* are accommodated because the plural inflection is not an individuating plural, and therefore does not reside at Num, but rather at *n*. Just as in all the other cases, this means that the entire plural is an *n*P and therefore can be incorporated into a compound.

In summary, the majority of cases can be explained straightforwardly by assuming that only non-individuating plurals can be contained in a structure small enough to incorporate (i.e. within the *n*P phase), and that there are several different types of non-individuating plurals available in English, including collective or group interpretations, idiosyncratic interpretations, and pluralia tantum.

3.3 Selectional consequences of incorporation

A key feature of the incorporation analysis is that the compound head and the 'modifier' stand in a head-complement relationship. The analysis of compound structure as head-complement goes back at least to Selkirk 1982, and it remains a key element of the arguments for an incorporation analysis of compounding (Harley 2009, Jackson & Punske 2013). A predicted consequence of this is that we expect the head to be able to exert selectional restrictions on the features of the complement. In terms of the present analysis, this means that we should expect that at least some compound heads should be able to select for or against non-individuating plural complements.

This prediction of the incorporation-based analysis is not only borne out, but it enables us to explain an otherwise difficult set of restrictions on compound modifiers. For example, this can explain why a pluralia tantum like *pants* must sometimes appear in its singular form *pant* as part of a compound. That is, whether or not it must appear as *pant* or *pants* or either is not a property of *pant(s)*, but rather a property of the head root and its selectional restrictions.

(22) pants pocket ~ %pant pocket

(23) *%pants leg ~ pant leg

If the ability to host plural were a property of irregularity or the pluralia tantum nature of a modifier like *pants* then the unacceptability of *pants leg* in 23 is unexpected. However, if the root has selectional requirements (requiring or disallowing a [PL] *n*) on its modifier, then the results in 22 and 23 are readily explained. Similarly, we can capture why it must be the singular *tooth* in the compound *toothbrush* not the irregular *teeth* in 24 below, without having to make strong claims that somehow *teeth* must be an individuating plural.

(24) *teethbrush ~ toothbrush

Under a selectional account allowed by the incorporation-based analysis of compounding and the split Num hypothesis argued for here, we can also account for the systematicity of certain roots to allow or not allow plural compound modifiers, regardless of the (ir)regular status of the modifier. For instance, a root like *lab* seems to be able to co-occur with regular or irregular plurals (as in 25 and 26) while a root like *trap* may only occur with singulars, regardless as to whether the modifier is regular or irregular and in 27 and 28.

(25) rats lab ~ rat lab

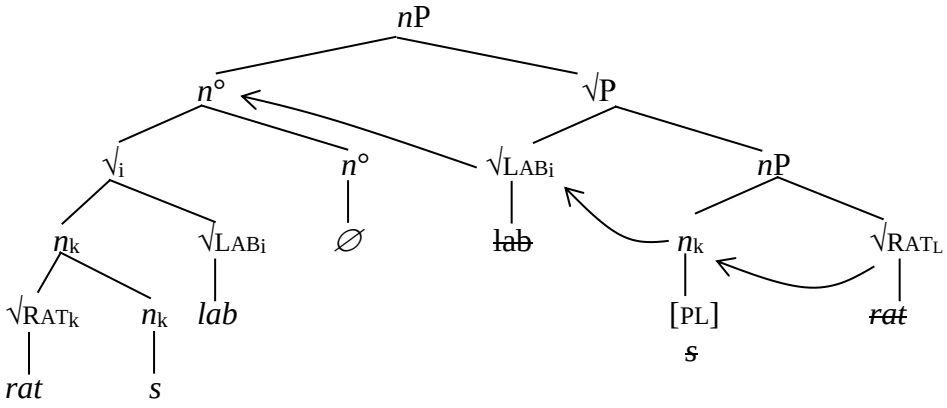
(26) mice lab ~ mouse lab

(27) *rats trap ~ rat trap

(28) *micetrap ~ mousetrap

While it may possible to account for this distribution in other approaches to compounding (say, within a purely lexical approach), the selectional account provided by the incorporation-based approach to compounding seems best able to fully account for this distribution. The incorporation-based structure of *rats lab* is given in 29 below.

(29) Well-formed compound structure



Note that this structure is identical to the one provided in Harley (2009), thus we can account for the availability of plurals in compound modifiers without the need for any additional modifications to the structure.

It is important to note that the ability of the compound head to select for +/-[PL] on its complement (i.e. on the compound modifier) does not obviate the rest of the analysis. Crucially, the head can never select for an individuating plural, because that is expressed in Num, not *n*. The head can select for or against non-individuating plurals such as pluralia tantum, and it can select against plurals that might otherwise be allowed as collective/group readings, such as **teethbrush*. But in our analysis, the selectional restrictions alone cannot account for the full range of data. It is simply the mechanism by which some lexical restrictions can appear within the constraints of the structure. Put another way, our general analysis allows us to derive compounds such as *parks department* without simply 'lexicalizing' *parks* as distinct from *park-s* (as Siddiqi 2009 must, for

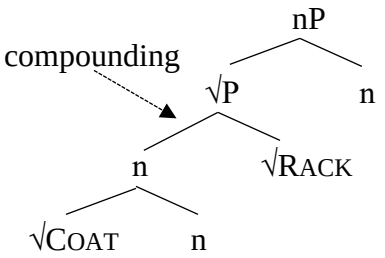
example) but there is still a role for lexicalization in our analysis, specifically in the ability of the compound head to select for or against (non-individuating) plural marking, which is needed to explain restrictions on forms such as **pants leg* or **teethbrush*. We take examples such as these to be true cases of lexical restrictions, defined narrowly through head-complement selection.

4 Comparison with other approaches

In this section, we compare the approach offered here with the two approaches most similar to ours: Siddiqi 2009 and Wiltschko 2008. We show that neither approach can sufficiently account for the pluralization data.

As previously mentioned, Siddiqi (2009) offers a fusion based account of plural modifiers in English compounds. For Siddiqi (2009:63), 'nominal compounding is an application of morphological merger that targets a root and the feature [n] and adjoins them'.[4] The basic structure of compound in this analysis is in 30 below.

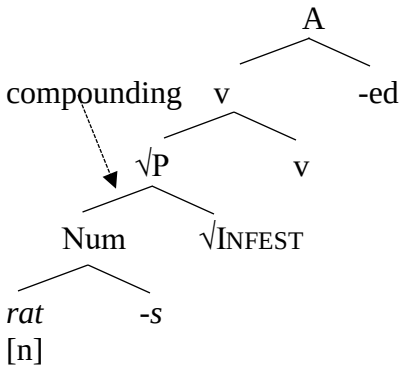
(30) Siddiqi (2009) Style Structure of *coat-rack*



Siddiqi (2009:59) posits that '[i]f nominal compounds are the result of an application of morphological merger to two adjacent heads where one is a root and the other bears the feature [n] we can see why regular inflection is blocked in forms like *rats-infested… [since] the feature [n] is imbedded below the inflection'. An illustration of this is seen in 31 below where the intervention of Num in Siddiqi's structure prevents compounding from occurring.

[4] See also Josefsson (1998) for adjunction-based approach to compounding within Distributed Morphology.

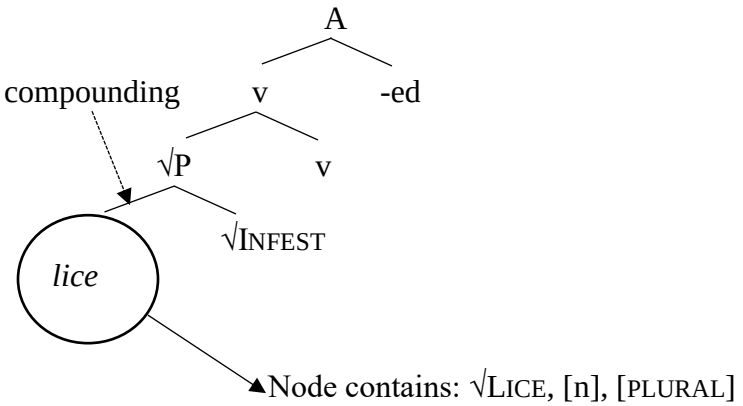
(31) Siddiqi (2009) Style Structure of **rats-infested*



(Siddiqi 2009:59)

Irregular forms are able to participate in compounding because the root, *n*, and Num fuse prior to merger. An example of the structure of a licit plural compound form is in 32. There, the node containing the root *lice* has fused with [n] and [plural] prior to the merger process that produces the compound. This fusion eliminates Num from the structure and allows the merger to proceed.

(32) Siddiqi (2009) Style Structure of *lice-infested*



(Siddiqi 2009:60)

In Siddiqi's general framework, irregular forms are stored as separate vocabulary items and part of the competition at Vocabulary Insertion with regular ones. This allows Siddiqi to eliminate readjustment rules. However, this has consequences for the present discussion.

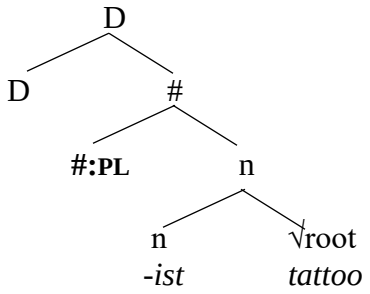
Others have noted that the fusion required generally in Siddiqi 2009 is not truly constrained (cf. Haugen & Siddiqi 2013 and Alexiadou 2016). Further, as noted in Punske 2016a, this analysis requires that the *parks* in *parks department* be stored wholly and separately from the forms *park* and *–s* that are found elsewhere in English for the fusion analysis of the plural of *parks* in *parks*

department to obtain within Siddiqi's assumptions. Beyond running counter to the aggressively decompositional underpinnings of Distributed Morphology, this analysis fails to provide any form of explanatory adequacy; under these assumptions, regular plurals are acceptable if they are stored in the lexicon and one can determine if a regular plural is stored if it can be found as a modifier to a compound.

The present analysis generally avoids such circularity. In our analysis, modifiers with regular or irregular morphology are constrained in identical ways—through selectional properties of the root. This is established through the complement relationship found in Harley 2009 and Jackson & Punske 2013. The selectional properties of the present analysis also account for why forms like **teethbrush* is ill-formed, which has no obvious account in Siddiqi's (2009) proposal.

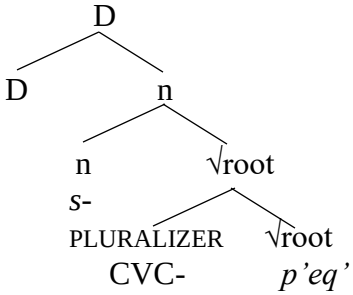
Wiltschko (2008) develops an account distinguishing the behavior of plural in English and Halkomelem. In this analysis, English plural 'is a functional head that selects for *n*…' (Wiltschko 2008:675). In contrast, Halkomelem plural is a root-level modifier. The relevant structures are provided in 33 and 34 below.

(33) Wiltschko's (2008) English structure



(Wiltschko 2008:675)

(34) Wiltschko's (2008) Halkomelem structure



(Wiltschko 2008:675)

Wiltschko (2008:644) bases this analysis on the assumption that 'in English, plural marking is prohibited inside of compounds'. She argues that examples of plural marking on modifiers in English compounds are actually examples of phrasal compoundhood:

(35) the Charles-and-Di syndrome, over-the-fence gossip, God-is-dead theology, a seat-of-the-pants executive, a who's-the-boss-wink

(Lieber 1992, cited in Pinker 1999:183, cited in Wiltschko 2008:677)

She further speculates that instances of irregular plural marking on modifiers occur in English compounds because they are more easily reanalyzed.

We believe that this approach cannot account for the systematicity of plural modification discussed throughout. A full discussion of phrasal compounding is beyond the scope of the present work (see Hoeksema 1988 and Lieber 1992 along with other works cited throughout). However, as noted in Ackema & Neelman (2004) and Harley (2009) (among others) phrases that appear as part of a phrasal compound may typically also participate in other word-level morphological operations (see Carnie 2000 for a potential analysis of these facts).

We can compare the examples 36-38 modified from Harley (2009:142-143) which involve phrasal compounding and phrasal word formation to those in 39-44 which involve plural compounding but disallow the same word formation strategizes. If plural modification were phrasal modification these results would be unexpected:

(36) bikini-girls-in-trouble genre

(37) the bikini-girls-in-trouble-ness of it all

(38) it's a bit too bikini-girls-in-trouble-y for me

(39) mice-infestation

(40) *the mice-ness of it all

(41) *?it's a bit too mice-y for me

(42) rats lab

(43) *the rats-ness of it all

(44) *it's a bit too rats-y for me

Much like a lexical-based approach, the phrasal compound approach expects a much higher degree of variability across the system, while the selectional-based approach argued for here appears much better equipped to deal with the compounding facts.

An additional empirical argument is that both Siddiqi's and Wiltschko's accounts struggle to explain why *rats lab* is an acceptable plural in English. For Siddiqi, *rats* would need to be stored as an independent, whole form—but one that is not allowed to surface with roots like *infest* or *trap* for reasons that not apparent from the fusion analysis. For Wiltschko *rats* would be need to be reanalyzed as a phrasal compound only when with *lab* but not with *infest* or *trap.* Both accounts fall under the same type of criticism that Lieber & Scalise (2006) offer of Bresnan & Mchombo's (1995) account of phrasal compounds. In Bresnan & Mchombo 1995, they require phrases to be 'innovatively lexicalized' (Lieber & Scalise 2006:11). Although the theoretic underpinnings are quite different, such requirements are effectively the same.

However, our overall analysis is largely consistent with the rest of Wiltschko's (2008) analysis. We too require a higher functional Num projection for English. We depart from Wiltschko in that our analysis allows lower number modification (similar to her analysis of Halkomelem in 34) in English as well. This, when combined with the selectional account, can capture the distribution of English plural modification in compounds.

5 Conclusions

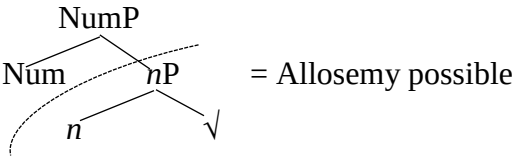
The present analysis is essentially a synthesis of two pre-existing analyses: compounding by incorporation and a bifurcated plural in the structure of nominals. With this combined analysis we can account for more of the empirical distribution of plurals on modifiers in English compounds than previous accounts, and more elegantly. We argue that there is no general ban on plural modifiers in compounds, but instead a ban on the individuation feature associated with the higher Num projection. This ban emerges as a straightforward outcome of the analysis following Harley (2009) and Jackson & Punske (2013) that the incorporation process of compounding targets a derivational phase, namely *n*P.

Other bans of specific forms such as **teethbrush* or **pant pocket* find an explanation in the ability of the head root of the compound to select for or against plural features in the modifier,

because the root and the modifier stand in a head-complement relation. The role of selection in these cases provides the mechanism for 'lexicalization' of preferences for certain forms. Crucially, roots are unable to select for individuated plurals, because of the structural ban on incorporation of the higher Num phrase. Thus, our account has the happy consequence of allowing some form of lexicalization, which appears appropriate given the data, but placing a clear constraint on how far this lexicalization can go. This constraint is borne out empirically, and it emerges as simply a natural consequence of our analysis.

Going beyond the consideration of English, we take the stance that Kramer's (2016) structure is universal and that linguistic variation is due to different featural specifications of the Num and *n* across languages. Thus, the feature [INDV] is associated with the position Num in English in 45 below, but each language may vary in the particular contentful features associated.

(45) Universal number spine



A generalized prediction of our account is that features in the higher Num cannot trigger allosemy on the root, in any language, because it is outside the cyclic domain. For English, this analysis predicts that an individuated plural should never trigger allosemy on a root. For other languages, there may be different features in the Num position, which may result in different restrictions on when allosemy is possible. For example, if no plural feature can associate with *n*, but only with Num, this would predict a total ban both on allosemy of plurals and plural forms in the modifier element of compounds.

Ultimately, we believe that one of the primary strengths of this analysis is the fact that the explanation of this recalcitrant pattern of data emerges from a straightforward synthesis of Jackson & Punske 2013 and Kramer 2016 (and others), with no additional machinery beyond the combination of assumptions. We take this to be good evidence that both of these lines of work are on the right path, and should continue to provide useful insights into the structure of nominals.

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Meaning and Use of Negative Inversions in Texan and African-American English

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1 Introduction

The negative-inversion construction as in (1) has received significant attention over the years in the syntax and sociolinguistics literature, beginning with Labov et al. (1968) in their discussion of African American Vernacular English.

(1) Can't nobody beat 'em.

The construction has been discussed extensively in Southern US Englishes and AAVE, and there is general agreement on its basic structure. Per the Yale Grammatical Diversity Project (YGDP):

> Negative inversion is a phenomenon in which a declarative sentence begins with a negated auxiliary or modal, such as *can't*, *ain't*, or *won't*, followed by a quantificational (or indefinite) subject, such as *nobody*.

Most research assumes this description as a starting point. Horn (2015) adds further that NIs signal negative force early in a sentence and so are a natural strategy for expressing wide-scope negation. With this cluster of facts as our own starting point, we make two further claims, both of which break significantly from all previous research and so invite reconsideration of the structure of this sentence type.

Firstly, we argue that while the negative inversions of vernacular Texas English and African American Vernacular English are very similar in terms of structure and meaning, they differ in important ways as well, and so likely will require two different analyses in the future.

Secondly, we show—pace the YGDP description above and almost all previous literature—that while indefinite subjects are certainly preferred in the construction, a range of

definite subjects is also possible if the pragmatic and information structural conditions are correct.

Finally, before proceeding to the body of the paper, we should note that from this point forward we refer to the sentences of interest in this paper as NEGATIVE AUXILIARY FIRST (NAF) constructions, rather than "negative inversion." The term "inversion" originated in the idea that the NAFs were derived syntactically from standard English structur3.1.1 The numeral es. In our opinion, even if in a small way, using the term "inversion" here perpetuates the stigma of the dialectal sentences as the "marked" or "inverted" forms, with the "non-inverted" forms of the standard dialect being the unmarked form or default. This is reminiscent to us of the way Lakoff (1975) describes the presentation of women's speech as "marked" compared to the default norm of men's speech. We have no desire to reinforce the negative stereotypes that already accompany Southern and African American Englishes, and so we adopt a more neutral term that does not implicate a marked/unmarked hierarchy of constructions across dialects.[1]

2 NAFs in Texan and African American Vernacular English

Much of the literature on NAFs since the 1970s assumes that the NAF in AAVE and other Southern Englishes are simply the same construction. This was very likely true in the past; however, we find significant differences in the structure and meaning of NAFs in AAVE and vernacular Texas English of today. As such, we emphasize here that our account is not meant to hold for NAFs in AAVE.

For example, Green (2014: 121) suggests that NAFs in AAVE do not allow expletive subjects. This is clearly not true of comparable Texas English sentences—nor, as Green notes, following Feagin (1979), is it true for non-AAVE Alabama English, such as in 2. Example 2, which is acceptable in Alabama English, is also acceptable in Texas English, but according to Green, would not be acceptable in African American English.[2]

[1] The term *negative auxiliary first* also speaks directly to the general tendency of negation to appear early in sentential syntax, as described in Jespersen (1917) and developed in more detail as Horn's (1989) Neg-First principle.

[2] Pace Green, however, it is possible to find such sentences in song lyrics by contemporary African American artists. For example, here is West Coast hip hop artist Brotha Lynch Hung, from Sacramento, from the 1993 song "Back Fade":

> I'm the so-called Devil that Brotha Lynch was talking bout

(2) I mean back in those days, they didn't nobody live up there.

This is an important difference between the AAVE and non-AAVE sentences, and it strongly suggests that the NAFs are not identical across the two dialects. We will mention four more differences.

Green (2014: 130) states that weak positive quantifiers such as *some* do not occur felicitously in the AAVE sentences. Green's example is seen below in (3) [Green's (28)].

(3) #Didn't some (of the students) show up.

Sentences such as 3 and 4 are acceptable in Texas English—possibly due to the negative implicature of *not all* generated by use of the partitive *some*.

(4) Teacher A: What's wrong? Why you lookin' so glum?
Teacher B: Well, didn't some of the students show back up from the field trip.

Another difference between the two varieties can be seen in the semantic interpretations of the NAFs. Green argues that in AAVE, NAFs have an absolute negative reading, which results in "a type of absolute negation or strong domain interpretation, in which cases there are no exceptions" (124). Essentially, the AAVE sentence pushes the interpretation to a scalar endpoint, which allows for no exceptions. Thus, Green provides examples such as 5 [Green's (20)], which are infelicitous in AAVE.

(5) #Don't nobody ride bus number 201—just the three people who live in the country. Most of the students in this class ride bus number 99.

---

you know **they can't nobody fade this**
this nigga packs his own people.
you know what I'm saying.

It is possible this represents dialectal variation in AAVE. Or, perhaps this is a result of contact with non-AAVE varieties that do allow expletive subjects.

Again, 5 is perfectly acceptable in Texas English, even with the exceptive clause. So it would seem that whatever strengthening might occur with the sentences, it is not to the same extreme or along the same dimension as that of its partner sentences in AAVE.

Relatedly, Green also suggests that AAVE NAFs have different truth conditions than their non-inverted counterparts.[3] As she writes:

> The inverted and non-inverted constructions differ in the position of the negated auxiliary, and this seems to be directly related to the possible meanings in the two types. […]. That is, there is some overlap, such that the two can be used in absolute negative contexts; however, the non-inverted constructions can also be used in contexts that refer to a very small number on a scale.

In vernacular Texas English, however, the NAF in 6a is in fact truth conditionally equivalent to its canonically ordered counterpart in 6b, resulting in yet another distinction between the TEV and AAVE constructions.

(6) a. Can't nobody lift that rock
b. Nobody can lift that rock.

Finally, NAFs in AAVE have been argued to require negative concord, as in 7. This is not required in the TEV NAFs as in 8.[4]

(7) Didn't nobody want no tea. [Green (2014: 117)]
(8) Didn't anybody want any tea.

It is very likely that a closer observation of NAFs in the two varieties would net further differences between the two constructions. This is beyond the scope of the present paper,

[3] Parrott (2000: 416) suggests, however, that AAVE NAFs do in fact have the same truth conditions as their non-inverted counterparts: "[An NAF] seems to have more emphasis than a non-inverted negative sentence. […]. However, this is a purely pragmatic difference. An [NAF] sentence and its non-inverted counterpart are identical in their truth conditional meaning." There is no support or argumentation offered for this claim in Parrott (2000), though.

[4] Feagin (1979) and Foreman (1999) also note that negative concord is not required in Appalachian English and Texan English NAFs, respectively.

however. Based on these five syntactic and semantic differences, we assume that the discussion with respect to the Texas sentences in the rest of this paper applies to NAFs in Texas English but not to the AAVE NAFs described in Labov (1972), Green (2014), and elsewhere. While the Texas NAFs might overlap with the AAVE construction in interesting ways, it is clear that these two constructions have ultimately taken different turns in the two languages and will require different syntactic, semantic, and pragmatic accounts.

This sort of variation across the constructions in the two languages should not be surprising. While it is likely that they share a common origin, over the years the constructions have evolved and changed, diverging from one another, as languages do. This is of course not limited to this particular construction with AAVE and other varieties of English. There are numerous other instances of lexical items and constructions which appear the same on the surface, but have different meanings or grammatical properties: that is, the phenomenon referred to as linguistic camouflaging.[5] To our knowledge, this has not been claimed for NAFs in the past, but it certainly seems to be the case today.

3 Definiteness effects and the NAF construction

The notion of "definiteness effects" for existential sentences was first noticed in Milsark (1974), who noted that definite NPs are not allowed as subject in existential sentences, such as 8.

(8) a. There is a dog in the yard.
b.*There is the dog in the yard.

With respect to NAFs, this definiteness effect seems to have been first noticed in Martin (1992), who used it as an argument in favor of his expletive-deletion account of NAFs. As discussed above, Martin argues that the form of the NAF is the result of a rule that stresses and deletes an

[5] According to Wolfram (2004: 114) "One type of sociolinguistic process associated with urban AAVE is linguistic *camouflaging*, in which a vernacular form resembles a standard or different vernacular form so closely that it is simply assumed to be identical to its apparent structural counterpart. However, this similarity may disguise the fact that the form carries a distinctive semantic-pragmatic meaning or is constructed in a subtly different way."

Wolfram goes on to list camouflage examples from AAVE such as *indignant "come*," and *counterfactual "call one's self."* See also Spears (1982) and Baugh (1984) for further discussion of the topic. See also Rickford and King (2016) on the need for recognizing the camouflage phenomenon and the attendant difficulties that can arise from not doing so.

expletive subject, with the syntactic effects of the expletive remaining. Essentially, then, what we see with the NAF on Martin's account is a *there*-existential, minus the expletive, but with the definiteness effect still in residence. Parrott (2000), with respect to AAVE, takes a related tack to Martin, but suggests instead that AAVE has a phonologically null expletive subject.

As we have maintained throughout the paper, the NAF is actually a good deal freer with definite subjects than has been assumed in all previous literature. As far as we know, there has been only one mention of a definite subject occurring in an NAF in any of the Southern Englishes or AAVE, and this is found in Green (2014), provided below as 9 [Green's (29)].

(9) Speaker A: Many old fraternity guys showed up for homecoming. I think even Vince Jackson was there.
Speaker B: No, didn't no Vince Jackson show up!

Green (131) describes the example like this:

> Although B's sentence can also have a nonreferential reading of *no Vince Jackson*, such that no one showed up by that name (reading 1), the [NAF] construction can indeed refer to the nonappearance of a specific old fraternity guy *Vince Jackson* (reading 2).
>
> There are obviously different flavors of [NAF], and I do not want to confound the issues here, where the focus is on negative concord (i.e. NegAux…Neg Quantifier) or what I have been referring to as canonical [NAF]. However, it is worth noting that the subject position in [NAF] is not limited to negative quantifiers or non-referential DPs.

We agree wholeheartedly with Green that the subject position is not as restricted as has been formerly assumed. As we illustrate below, the appearance of definites in the NAF are subject to pragmatic constraints, and so with additional context it is quite possible to see a range of definite subjects in the construction. We will note here as well before continuing that most of the NAF examples elsewhere in the literature are given without situating context, rendering the pragmatic effects much harder to see. Green's example above, however, contains sufficient context to license what would likely otherwise have received an ungrammatical rating in the literature.

In what follows below, we will provide several contextually situated, acceptable examples of definite subjects in NAFs. We will be following Ward and Birner's (1995) work on the acceptability of definite post-verbal NPs in *there*-existentials, in which it is argued that the "definiteness effect" of existential sentences is actually not a real effect, and is instead epiphenomenal.[6] According to W&B, subjects—or post-verbal NPs—in existential sentences are allowed to be grammatically definite as long as they are construable as being hearer-new, a concept they attribute to Prince (1992).[7] We argue that the definite subjects allowed in the NAF are constrained by the same pragmatic principles constraining definite post-verbal NPs in existential sentences. Here are W&B (728) on the pragmatic and cognitive constraints on definites in existentials:

> [For] an entity to be hearer-old entails that the speaker believe or assume it to be present within the hearer's knowledge store, while for an entity to be hearer-new entails that it not be assumed to be present within the hearer's knowledge store. As we will show, however, it is possible for an entity to be treated by the speaker as being hearer-old in one respect yet hearer-new in another. […] We will discuss a number of circumstances in which an entity may be both hearer-new and uniquely identifiable, supporting our claim that definiteness and postverbal position in *there*-sentences are subject to distinct discourse constraints. […]
>
> Specifically, we have identified five distinct cases in which formally definite yet hearer-new NPs may felicitously occur in *there*-sentences. In each case, the definiteness of the NP was found to be licensed by the unique identifiability of the referent, while the *there*-construction is licensed by the hearer-new status of the referent.

[6] It is worth mentioning too that Chapter 16 of Huddleston and Pullum (2003), which is dedicated to Information Packaging, and which is co-written by Ward, Birner, and Huddleston, essentially adopts the position of W&B (1995) on the acceptance of definite subjects in existential sentences as long as they represent hearer-new information.

[7] Quirk et al. (1985: 1404) write in a footnote "The rule that existential sentences should have an indefinite noun phrase as 'notional subject' prevents us from constructing sentences like **There's the money in the box* from *The money is in the box*. This limitation can be waived, however, where the definite noun phrase conveys new information, in answers to existential questions (actual or implied), such that the answer provides a specific (and hence definite) instance."

As mentioned in the quoted text, Ward and Birner divide the different kinds of acceptable definites into five classes. These are given below.

(i) Hearer-old entities treated as hearer-new
(ii) Hearer-new tokens of hearer-old types
(iii) Hearer-old entities newly instantiating a variable
(iv) Hearer-new entities with uniquely identifying descriptions
(v) False definites

We find definite subjects in NAFs that fit quite naturally into these classes. Let's consider them one at a time, with first an example from W&B to illustrate, followed by an example from TEV and representative NAF.[8]

For group (i), *hearer-old entities treated as hearer-new*, W&B include what are commonly referred to as "reminder *there*-sentences," with their example given below in 10 [W&B (14a)]. [9] The idea with these sentences is that the entity in question has been previously evoked, but "there are sufficient grounds for the speaker to believe that the entity has been momentarily forgotten" (730).

(10) Mr. Rummel: Well, didn't the designer of the orbiter, the manufacturer, develop maintenance requirements and documentation as part of the design obligation?
Mr. Collins: Yes, sir. And that is what we showed in the very first part, before the Pan Am study. **There were those other orbiter maintenance and requirement specifications**, which not only did processing of the vehicle, but in flow testing, pad testing, and what have you, but also accomplished or was in lieu of an inspection plan.

It is straightforward to compose NAFs with similar definite subjects and analysis, as in 11.

[8] Ward and Birner's data is taken from a corpus of 1.3 million words of "transcribed oral data drawn from transcripts of The Presidential Commission on the Space Shuttle Challenger Accident" (723).
[9] See Bolinger (1977), Hannay (1985), Lakoff (1987), and Abbott (1993) for discussion of reminder *there*-existentials.

(11) A: Man, of everything that coulda gone wrong today. Tire blows out. Phone's dead. Cold as hell outside.
B: Oh yeah. **Didn't that oil heater ever end up comin' on neither**. What a day ...

As W&B explain, "The use of the definite in conjunction with the *there*-construction reflects the treatment of the referent as simultaneously hearer-new and uniquely identifiable. Indeed, it is precisely this mixed marking that leads the hearer to infer that the utterance is a reminder" (731).

W&B's group (ii) consists of *hearer-new tokens of hearer-old types*. This includes NPs with a series of adjectives indicating that a type is known (such as, *same, usual, regular, traditional, obligatory, expected*, etc). As W&B note, the NPs in question have dual-reference: one to a type and one to a token. If the type is old or uniquely identifiable, this allows for the definite use, while at the same time, the new instantiation or token of the type, allows for the existential use in an example like 12 [W&B's (21)].

(12) There was **the usual crowd** at the beach today.

It is clear that "the usual crowd" could refer to the exact same group of people that is always at the beach; or, it could refer to the fact there is always a crowd of people, whatever their identity, at the beach. It is this dual reference, and dual dependence on the new and old/uniquely identifiable, that licenses the definite use. It is straightforward to find similar examples with the NAF; though, it should be mentioned that some of the adjectives W&B consider above (e.g. *obligatory*, *expected*, etc.) would cause a register clash in the NAFs, and so cause the locution to feel infelicitous. However, adjectives such as *same* and *usual* do not introduce this clash effect. Consider 13.

(13) A: Hey baby, y'all have a good time tonight? How was the bar?
B: Not too bad. **Couldn't the usual crowd get in there** 'cause of the cover charge, so there was plenty of room. Got the best table in the house.

The next group in W&B's typology is *hearer-old entities newly instantiating a variable*. This group is home to the most frequently discussed definite subject in existential sentences: that is, the "list reading," as in 14 [W&B's (30b)]. The idea here is that the rhetorical structure of the list renders entities who might be hearer-old as new; that is, they are new in the manner in which they are enumerated on the list.

(14) A: Who was at the party last night?
B: There was **John, Mary, Fred, Susan, Hilda, Xavier, and Ethel**.

Comparable list-reading examples with NAFs are straightforward.

(15) A: Hey man, how was y'all's meetin' last night? Y'all have a good turnout?
B: Yeah, it was pretty good. Bob and Mary, Jenny and Doug, was all there. **Couldn't Tommy, Darin, or little Mikey come out**, but we still had us a pretty good time.

In addition to the list reading, we believe that Green's (2014) "no Vince Jackson" example given above in 9 would also fit in this category. W&B further describe the category this way: "the individuals listed are uniquely identifiable; however, their membership in the set being enumerated is new to the hearer" (734). This describes the Vince Jackson example as well. In that example, the first speaker identifies Vince Jackson and locates him within a particular set (i.e. of those who showed up for homecoming). The second speaker then adds Vince Jackson to a different set (i.e. those who did not show up for homecoming). As such, Vince Jackson's "membership in the set being enumerated is new to the hearer."

W&B's group (iv) is composed of *hearer-new entities with uniquely identifying descriptions*. This group, as W&B note, does not "depend on the prior context for felicity" (735). Rather, the NP contains enough descriptive content to render it felicitous without a co-text or situation. Among other forms, this group includes superlatives and deictics, as in 16a-b [W&B's (38a-b)].

(16) a. There was **the tallest boy** in my history class at the party last night.
b. You can see the runway and the HUD that overlays the Edwards runway, and then **there**

is this line which comes out to the outer glide slope aim point.

We find that demonstratives are actually some of the most facile definite subjects in NAFs, with examples such as 17 and 18. These in-situation demonstratives clearly pick out hearer-new entities, but entities that are at the same time uniquely identifiable due to the demonstration in the context.

(17) [A man walks into a bar without paying, and gets caught by the bouncer. He quickly points at a man who walked into the bar right before him.]
Bouncer: Scuse me sir. It's $5 to get in see the band.
Scofflaw: Hell, didn't **that** ☞ **man there** pay!

(18) a. [Looking at the racing form, picking horses to bet on, pointing at each horse as she speaks.]
Won't **this** ☞ **one or that** ☞ **one** end up finishin' the race.
b. Shouldn't either one of **them** ☞ **guys** even be in the race.

As with the discussion of demonstratives in the linguistics and philosophy literature, it is not necessary for the accompanying demonstration to be an actual finger-pointing. A nod of the head or raise of the eyebrow can be sufficient, given a rich enough context, as in 19.[10]

(19) [Rude patron leaves the bar, forgetting his wallet on the counter top. Bartender picks up the wallet, looks at it, looks at the rude patron as he disappears out the door, drops the wallet in the trashcan behind the bar. He then winks at the patron sitting across from him, and glances briefly back at the door through which the rude patron has just passed.]

Well, won't **Jimmy's drunk ass** be goin' anywhere else tonight!

In addition to demonstrative examples, we find superlatives similarly straightforward in the NAF, as in 20.

[10] See Kaplan (1989), N. Salmon (2002), and W. Salmon (2010) for extensive discussion of the meaning and kinds of demonstrations.

(20) A: Hey man, how's that caulkin' job comin'? You get them cracks all sealed up 'round your basement?
B: Aw, you better believe it. That stuff's sealed up tight. **Cain't even the littlest mouse** get hisself in there anymore.

For this group also, W&B note that NPs with modifying relative clauses can be felicitous in existentials, in which "the relative clause serves to fully specify the referent […]" resulting in unique identifiability (737), as in 21 [W&B's (39)].

(21) There are **those who would claim** that computers will take over the earth within the next decade.

We similarly find straightforward NP-relative clause examples in NAFs.

(22) [Two friends talking about their dates from the previous night.]
Speaker A: What a sweetheart he was. He wouldn't let me pay for anything. Dinner. Movie. A ride on the riverboat. He covered it all. I tried, but he wouldn't allow it.
Speaker B: Well, I don't know where you found that one. **Couldn't the guy I was with be bothered to pay for anything.**

Finally for this group, W&B note that cataphoric references are allowed, as in 23.

(23) There are **the following reasons** for this bizarre effect … [W&B's (38c)]

Cataphoric references are similarly allowed in NAFs, as in 24.

(24) [In a military boot camp setting. The sergeant comes into the barracks to share the results of a field test. Everyone snaps to attention. The sergeant barks:]

Okay, listen up, you maggots! Didn't **the following losers** pass the exam! Park, Salmon, Turner! Get your butts outside. Now!

The last group W&B identify are the FALSE DEFINITES. These are forms which are grammatically definite but are cognitively indefinite, and introduce or "refer to a specific entity that the speaker believes is unknown to the hearer."[11] W&B provide examples such as those in 25a-d [W&B's (43) and (44)].

(25) a. One day last year on a cold, clear crisp afternoon, **there was this huge sheet of ice** in the street.
b. There are **all sorts** of other false definites.
c. There is **the most curious discussion** of them in our paper.
d. There is **every reason to study them.**

As W&B note, there is no expectation that the hearer will be aware of the huge sheet of ice in 25a, nor would anyone take the speaker to believe the discussion of false definites in the paper is the most curious of a set, as a literal superlative. As such, these forms are only grammatically definite, but they are cognitively indefinite.

These introductional definites are somewhat more difficult to locate in the NAFs, undoubtedly due to the practical oddness of introducing an entity with the intention of denying it. It is possible, however, to find "superlative" examples of the sort in 25c, which are not literal superlatives but have other functions such as intensification.

(26) [Police officer A is watching an interrogation through the one-way interrogation mirror at the police station. The person being interrogated refuses to talk, and the interrogating officer stands up quickly, spilling his cup of coffee on his lap in the process. Officer A turns to Officer B, who has not been paying attention.]

Officer A: Well, cain't **the best discussion** be goin' on in THERE.
Officer B: Huh? What? What you mean?

[11] See Prince (1992).

Similar to W&B's description of the false definite superlative in 25c, there is no sense in which *the best discussion* should be interpreted as the best discussion out of a set of them. This is similarly true in a positive sentence such as 27.

(27) Man, me and Marley just had the best discussion last night!

Here, Marley and the speaker's discussion is merely described as one that rates really positive along some scale. It is unlikely that the speaker is ranking the discussion alongside other discussions that rate less positively.

Thus, it is evident that a wide range of definite subjects are allowed in the NAF, pace all the literature since Labov et al. (1968). Further, it is clear that the definites that are allowed in the construction are constrained by information structural and pragmatic considerations similar to that of English existential sentences. This latter observation is unsurprising, given the apparent diachronic relation between the NAF and the existential construction. See Salmon (2017) for further discussion of this relationship.

4 Conclusion

This paper has shown that two common assumptions about the structure of negative inversion constructions are quite wrong. As such, there is room and need for a great deal of further work on the construction. Much previous research has simply assumed that the inversion constructions in African American Vernacular English and in various Southern US Englishes are simply the same construction and can thus receive a unified account. This paper shows that the constructions are in fact quite different across these language varieties. Further, this paper has shown that the very narrow assumption since the 1960s about what can fill the subject slot of this construction is also incorrect. Almost all previous literature on this construction assumes that subjects must be quantificational or indefinite, and a good deal of theoretical work has been assembled based on this assumption. The fact that definite subjects are readily allowed if the pragmatic context is correct, however, invites a deep reconsideration of the structure, meaning, and use of these sentences.

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Possessive preproprial determiners in North-West British English

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1 Introduction

In North-West British English (NWBE), personal names are commonly preceded by a possessive pronoun, as in (1).

(1) Our John came to visit yesterday.

This paper aims to characterise, analyse, and typologically situate this phenomenon. In outline, §2 demonstrates that possessive pronouns with personal names in NWBE are restricted to kin, non-contrastive, and exclusive and "royally" plural in the first person. The analysis in §3, framed in terms of Matushansky's (2008) theory of proper names, treats NWBE possessive pronouns with personal names as preproprial determiners – special forms of the definite article particular to personal names, as in Catalan. The person of the possessive pronoun varies according to kinship, with the availability of third person restricted by the requirement to be anteceded by a logophoric perspective centre (Sells 1987). §4 considers the typological place of NWBE, whose possessive preproprial determiners evade the predictions of Longobardi's (1994) theory of reference. §5 concludes.

2 Characterisation

This section details the empirical subject matter of the paper: possessive pronouns with personal names in North-West British English (NWBE). We begin in §2.1 by defining the dialect area for NWBE. §2.2 provides examples of possessive pronouns with personal names from popular culture. With help from one of these examples, §2.3 characterises the meaning of possessive pronouns with personal names. Finally, §2.4 notes a general restriction to first and second person.

[*] As a speaker of Standard Southern British English, I am very grateful for judgements on North-West British English to Carole Spry, Lauren Holmes, and Chris Hicks' mum. Thanks to Tim Stowell for advising, and to attendees of UCLA SynSem and BLS 43 for comments and questions. All errors are mine. This research was supported by a Graduate Summer Research Mentorship award from the University of California, Los Angeles.

2.1 Dialect area

This paper assumes a dialect area for NWBE that covers parts of the North-West of England and Northern Ireland. In England, it comprises the urbanised south of the historic county of Lancashire – now the metropolitan counties of Merseyside, dominated by Liverpool, and Greater Manchester. Also included is Belfast in Northern Ireland. Strong ferry-based contact justifies considering these English and Northern Irish areas as one dialect area, despite the intervening Irish Sea.

2.2 Examples from popular culture

Elements of popular culture associated with the North-West exemplify the phenomenon of possessive pronouns with personal names.

(2) Liverpool
Our Cilla – Cilla Black, the late singer and *Blind Date* host.

(3) Bolton
R Wayne – talent show entrant in Peter Kay's *Britain's Got the Pop Factor… and Possibly a New Celebrity Jesus Christ Soapstar Superstar Strictly on Ice*.[1]

(4) Belfast
"Did you hear about our John? He's a gay man now." – catchphrase of comedienne Catherine Tate's character, John Leary's mum.[2]

(5) Greater Manchester
Peter Kay's Car Share, Episode 4:[3]
[John and Kayleigh are colleagues. John recently began giving Kayleigh lifts to work as part of a workplace car-share scheme. Last night Kayleigh went to a Beyoncé concert. Kelly is Kayleigh's cousin, whose emigration to Australia has been discussed before, but who John has never met.]

[1] Thanks to Chris Hicks for pointing me to this one.

[2] For many iterations of this catchphrase, see https://www.youtube.com/watch?v=ooWIoSwEsZo [last accessed 13/04/2017]. A particularly clear example is at 3'51'' – 3'58''.

[3] A preview of this episode, containing the quoted passage at 1'09'' – 1'18'', can be found at: https://www.youtube.com/watch?v=TNorQgFCkWM [last accessed 13/04/2017].

Kayleigh: Our Kelly'll be well jeal[ous] when she finds out. She's always wanted to see [Beyoncé] – she loves her.

John: How is your Kelly getting on in Australia? Has she settled in yet?

2.3 Meaning

This subsection characterises the meaning of possessive pronouns with personal names in NWBE. We will see that they are (i) restricted to kin; (ii) not contrastive; and (iii) exclusive and "royally" plural in the first person. For elucidation, reference will be made to the transcript in (5).

First, the kin restriction: only the names of family members and very close friends (e.g. childhood friends, boyfriends and girlfriends) qualify to be preceded by a possessive pronoun. In (5), Kayleigh uses *our Kelly* to refer to her cousin Kelly. She could also have used *our Kelly* if Kelly was her aunt, sister, mother-in-law, best friend since childhood, etc. Equally, John uses *your Kelly* to refer to the kin of his interlocutor, despite not knowing Kelly himself. But as colleagues and car-sharers, Kayleigh and John would not speak of each other using *our*/*your*. Overall, possessive pronouns with personal names have some affective semantic content. That said, using a possessive pronoun is the default when referring to kin; pragmatic connotations arise far more from their absence. If Kayleigh referred to her cousin as simply *Kelly*, John would infer that she and Kelly had fallen out. Equally, if John referred to Kelly without *your*, then he would appear disengaged from the conversation. In sum, possessive pronouns with personal names are restricted to kin, but are also the default for kin, to the extent that they are more pragmatically powerful in their absence than their presence.

Second, possessive pronouns with personal names in NWBE are not contrastive.[4] In NWBE, a possessive pronoun does not alter the direct and unique reference of a proper name. The context in (5) contains no other Kelly, against whom Kayleigh's cousin Kelly is being contrasted. This is very different from standard English, where *our John* is strongly contrastive, requiring the discourse presence of another John associated with the addressee – *your John*.

[4] Though the possessive pronoun may in part be spelling out the very weak contrast inherent in the direct reference of a name; i.e. the contrast between Kayleigh's friend Kelly, and all the other Kellys in the world.

Third, *our* can be exclusive and "royally" plural with personal names in NWBE. In 5, the sphere of kinship for *our Kelly* is limited to Kayleigh, to the exclusion of her addressee John, who has never even met Kelly.[5] Furthermore, first person plural *our* is not necessarily semantically plural – Kayleigh could be Kelly's only cousin. Thus the first person plural has a "royal we" flavour.[6] Indeed, an only child could refer to their mother Mary as *our Mary*. That said, first person singular is possible – and more commonly used – within the nuclear family; a father might refer to his daughter as *my Jane*, or a wife to her husband as *my John*.

In sum, possessive pronouns with personal names in NWBE are used only, and as a pragmatic default, with kin; are not contrastive, and are exclusive with a "royal we" flavour in the first person plural. The next subsection shows further that possessive pronouns with personal names are generally restricted to first and second person.

2.4 Person restriction

Possessive pronouns with personal names in NWBE are subject to a person restriction, as shown in (6). In general, the possessive pronoun may only be first or second person; third person is ungrammatical.

(6) a. i. My John is a fine husband.

ii. Our Mary is hosting tonight.

b. Has your Mary been to visit lately?

c. *His/*Her/*Their Mary came to visit yesterday.

However, third person possessive pronouns are more acceptable in certain circumstances, such as in (7).

(7) John_i said his_i Mary is coming at the weekend.

[5] The plural is inclusive only by circumstance when speaker and addressee have the same kinship circle with respect to the referent.

[6] The plural might not be "royal" to the extent that *our* claims kinship on behalf of the speaker's kinship group, rather than the speaker only – though NWBE speakers do not profess such an intuition.

The analysis developed in the next section will account for the general restriction to first and second person, and the nature of the third person exceptions, in terms of logophoricity (Clements 1975).

3 Analysis

This section analyses possessive pronouns with personal names in NWBE as logophoric preproprial determiners; that is, logophoric (Clements 1975) D forms anteceded by a logophoric perspective centre (Sells 1987) particular to personal names (Matushansky 2008). The analysis is framed in terms of Matushansky's (2008) definite description theory of proper names. As outlined in §3.1, the semantics of proper names involves a naming convention R (Recanati 1997). The R in proper names can be reflected in a special, preproprial form of D. I justify analysing NWBE possessive pronouns with personal names as preproprial determiners in §3.2 by showing them to have the same distribution as preproprial articles in Catalan. In §3.3, I argue that NWBE motivates two advances beyond Matushansky's theory: a finer-grained R_0, decomposed according to who bears responsibility for the naming convention R; and the logophoricity of R. §3.4 summarises.

3.1 Matushansky's theory of proper names

To analyse possessive pronouns with proper names in NWBE, I draw on Matushansky's (2006a, 2008, 2015) definite description theory of proper names. Proper names (8) most often appear in argument position (a), but can also appear in predicative position (b).

(8) a. Alice called this morning.

b. Call me Alice.

Taking names in predicative position to be basic, Matushansky argues that proper names are two-place predicates. In addition to the standard individual argument slot, they have a second argument slot for the naming convention R (Recanati 1997). R relates an individual with the phonological string of a name. Thus the lexical entry for a name, e.g. *Alice*, is as in (9) (Matushansky 2008:592,ex.58).

(9) $[[\text{Alice}]] = \lambda x \, \varepsilon \, D_e \, . \, \lambda R_{<e, <n, t>>} \, . \, R \, (x) \, (/\text{ælɪs}/)$
where n is a sort of the type e (a phonological string).

For names in predicative position, R is anaphoric on the naming verb. For names in argument position, the argument slot for R is satisfied by a free variable R_0. R_0 is the contextually salient naming convention in force between the speaker and the hearer; or, more strictly, the naming convention of the speaker presupposed to be shared by the hearer (cf. Recanati 1997:140). Thus the meaning of *Alice* in argument position is as in (10) (Matushansky 2008:592,ex.59).

(10) [[Alice]] (R_0) = $\lambda x \varepsilon D_e$. R_0 holds between x and the phonological string /ælɪs/

Matushansky (2006a) treats preproprial articles in these terms. Languages like Catalan (11) have a special form of the definite article before personal names – a preproprial article (a) – in contrast to the usual form of the definite article (b).[7]

(11) a. en Pere b. el gos (Longobardi 1994:656,ex.91)

the Peter the dog

Following Matushansky, preproprial articles reflect a relation between D and R_0.[8] I will analyse possessive pronouns with personal names in NWBE as preproprial determiners. The next subsection justifies this analysis on distributional grounds.

3.2 Distribution

This subsection demonstrates that possessive pronouns with personal names in NWBE have the same syntactic distribution as preproprial articles in Catalan.[9] Both Catalan preproprial articles (even numbers) and NWBE possessive pronouns with personal names (odd numbers) are: (i) only compatible with personal names; (ii) incompatible with restrictive modification; (iii) incompatible with plural names; and (iv) incompatible with the naming construction.

[7] Matushansky (2006:286,303) lists Tagalog, Malagasy, Maori, some Polynesian languages, and some Scandinavian dialects – in particular Colloquial Icelandic, Northern Norwegian, and Northern Swedish – as also having preproprial articles.

[8] Matushansky (2006a) implements the relation between D and R_0 as m-merger (Matushansky 2006b). I remain agnostic here as to whether this relation should be implemented as m-merger, or in terms of standard Agree (Chomsky 2000, 2001) – though see Stockwell (2016).

[9] Thanks to Afra Pujol i Campeny for help with the Catalan data.

First, Catalan preproprial articles and NWBE possessive pronouns are restricted to proper names of people (a). They do not extend more broadly to proper nouns, such as local town names[10] (b).[11]

(12) a. i. En Pere ii. Na Maria

b. (*En) Barcelona

(13) a. i. Our Peter ii. Our Mary

b. (*Our) Liverpool

Second, modifying a name with a restrictive relative clause disallows the special form (a), forcing the use of the standard definite article (b) (cf. Matushansky 2006a:303f.,ex. 44).

(14) a. *En Joan que coneixia ja no existeix. (Longobardi 1994:657,ex.93)

b. El Joan que coneixia ja no existeix.

(15) a. *Our John that I used to know no longer exists.

b. The John that I used to know no longer exists.

Third, when names are pluralised the special form is disallowed (a), forcing use of the standard generic article (b) – definite in Catalan (16b), null NWBE (17b).

(16) a. *Ens Peres són trempats. (cf. Longobardi 1994:656,ex.92)

b. Els Peres són trempats.

(17) a. *Our Peters are clever.

b. Peters are clever.

[10] The preproprial article is grammaticalised in some place names; e.g. Castellar de n'Hug, a municipality in Berguedà, Catalonia.

[11] Speakers of both Catalan and NWBE vary in their acceptance of the special preproprial form with pet names (i), probably correlating with their tolerance of its anthropomorphising connotations.

(i) a. % En Roc
b. % Our Fido

Fourth, when names are in predicative position in an explicit naming construction (recall 8b), the special preproprial form is impossible.

(18) Va resultar que *(en) Johnny el van anomenar (*en) Jonathan

go-3SG turn.out that the Johnny him go-3PL name the Jonathan

'It turned out that Johnny had been named Jonathan.' (Matushansky 2008:581,ex.21)

(19) It turned out that *(our) Johnny had been named (*our) Jonathan.

Overall, NWBE possessive pronouns with personal names exhibit the same distribution as Catalan preproprial articles. This shared distribution justifies analysing NWBE possessive pronouns with personal names as preproprial forms, reflecting a relation between D and R_0 (Matushansky 2006a). The next subsection explores two ways that NWBE prompts further development of Matushansky's theory.

3.3 Decomposing R_0, and logophoricity

NWBE motivates two advances beyond Matushansky's theory: first, a finer-grained R_0, decomposed according to who bears responsibility for the naming convention; and second, the logophoricity of R (Clements 1975).

First, I propose that possessive pronouns with personal names in NWBE motivate a finer-grained distinction in Matushansky's R_0 according to who bears responsibility, by virtue of kinship, for the naming convention in force between speaker and hearer. Recall from §2.4 that possessive pronouns with personal names in NWBE are generally restricted to first and second person. In (6), repeated here, the relation between D and R_0 has a different morphological reflex according to which discourse participant is responsible for R_0: speaker R_S (*my*/*our*) (a), or addressee R_A (*your*) (b). This decomposition of R_0 will be further refined to include third parties R_T (*his*/*her*/*their*) (c) as we reconsider the status of third person in terms of logophoricity.

(6) a. i. My John is a fine husband. ii. Our Mary is hosting tonight.

b. Has your Mary been to visit lately?

c. *His/*Her/*Their Mary came to visit yesterday.

Third person possessive pronouns are not outright ungrammatical with personal names in NWBE. Consider the minimal pair in (20). For sure, third person is ungrammatical out of the blue, as in (a); but (b) is vastly improved, where *his* has the overt antecedent *John*.[12]

(20) a. *His Mary came to visit yesterday. cf. (6c)

b. John$_i$ said his$_i$ Mary came to visit yesterday. = (7)

However, having an antecedent is necessary but not sufficient for third person to be acceptable. Consider further the minimal pair in (21). In (a), *speaking of* frames *Bill* as a topic, and the sentence is highly marked with *Bill* and *his* coindexed; whereas in (b), *according to* imbues *Adam* with perspective over the main clause, and the sentence is grammatical.[13]

(21) a. ??Speaking of Bill$_i$, his$_i$ Mary is visiting at the weekend.

b. ?According to Adam$_i$, his$_i$ Mary is visiting at the weekend.

Considering the minimal pairs across (20) and (21) together, the unacceptable (20a) and (21a) lack a (perspective-bearing) antecedent for the possessive pronoun, which the much-improved (20b) and (21b) have. In (20a) *his* lacks an antecedent altogether; while in (21a) Bill is available as an overt antecedent, but – as a topic – lacks perspective. By contrast, *his* in (20b) is anteceded by *John*, who takes perspective over the indirect statement; and in (21b) by *Adam*, from whose perspective the main clause is reported. In sum, third person possessive pronouns are grammatical with personal names only if a logophoric perspective centre (Sells 1987) serves as their antecedent.

Since third person possessive pronouns can be grammatical with personal names, third party kinship responsibility for the naming convention R_T (*his*/*her*/*their*) should be added to our

[12] The data in (20) and (21) have the same status with *her* and feminine antecedents. However, *their* is ungrammatical in (ii), on either a gender-neutral third person singular reading, or "royal plural" reading. *Their* is only grammatical with a plural, perspective-bearing antecedent, as in (iii).

(ii) *John$_i$ said their$_i$ Mary came to visit yesterday.

(iii) The Smiths$_i$ / [Angie and Bob]$_i$ said their$_i$ Bella came to visit yesterday.

I have no explanation for why the "royal we" reading should be possible with *our* + personal name, but an analogous "royal they" reading is impossible with *their*.

[13] For the contrast in perspectivisation in (21), consider the minimal pair in (iv) (Dubinsky and Hamilton 1998:688,ex. 15). *According to* makes *John* a perspective-bearer, which cannot serve as the antecedent for the antilogophoric epithet *the idiot*. *Speaking of*, by contrast, does not imbue *John* with perspective, leaving John free to serve as antecedent for *the idiot*.

(iv) a. *According to John$_i$, the idiot$_i$ is married to a genius.

b. Speaking of John$_i$, the idiot$_i$ is married to a genius.

decomposition of R_0. The fact that the grammaticality of third person is determined by logophoricity is easily reconciled with the grammaticality of first and second person: speaker and addressee are inherently logophoric as centres of perspective in the discourse. Overall, therefore, R is logophoric (Clements 1975): possessive pronouns are grammatical with personal names if they are anteceded by a logophoric perspective centre (Sells 1987).[14]

3.4 Summary

This section has analysed possessive pronouns with personal names in NWBE as logophoric preproprial determiners. In terms of Matushansky's (2008) definite description theory of proper names, preproprial forms reflect a relation between D and R_0 – the contextually salient naming convention in force between the speaker and the hearer. This treatment was justified for NWBE on distributional grounds, by comparison with Catalan. Further, NWBE motivated two advances beyond Matushansky's theory. First, R_0 can be decomposed into R_S (*my*/*our*), R_A (*your*), and R_T (*his*/*her*/*their*), according to who bears kinship responsibility for the naming convention. And second, R is logophoric (Clements 1975), since responsibility for R_0 must lie with a logophoric perspective-bearing antecedent (Sells 1987).

In analysing possessive pronouns with personal names in NWBE as preproprial determiners, we might expect to find typological similarities between NWBE and languages that allow definite articles in general, or preproprial forms in particular, with personal names. The next section identifies what those typological predictions might be, and considers why they are not borne out in NWBE.

4 Typology

This section considers how NWBE evades the typological predictions that arise from analysing possessive pronouns with personal names as preproprial determiners. §4.1 introduces Longobardi's (1994) theory of reference and the typological predictions it makes for languages that allow articles with proper names. In §4.2, we see that these predictions are not borne out for NWBE, whose preproprial determiners escape the parameters of Longobardi's typology.

[14] Taking "antecedence" literally would mean adopting a theory where speaker and addressee are syntactically represented – e.g. Speas and Tenny (2003), Wiltschko (2015).

4.1 Longobardi's theory of reference

Longobardi (1994, 2005, 2008) develops a Topological Mapping Theory (TMT) of reference – "topological" in being a theory of the interpretation of nominals that makes exclusive reference to their structural position in DP. Thus TMT distinguishes between proper names, common nouns, and generics in terms of different interactions between D and N. With common nouns, N defines a range for the variable introduced by a substantive, referential D operator. With generics, D is not a substantive operator, leaving N to refer generically to the class or kind, rather than any specific instantiation of the class. With proper names, D is also not a substantive operator. Rather, to achieve direct reference, N has the strongest possible relationship with D, raising and substituting for it.[15] N-to-D raising can occur either in the overt syntax, or covertly at LF.

The realisation of non-substantive D is parameterised. Since D comes to be identified with Person (Longobardi 2008), the parametric divide is between strong person languages and weak person languages.[16] In strong person languages like Italian, all interactions between D and N must be overtly realised. In addition to substantive definite articles appearing with common nouns, non-substantive D is realised as an "expletive article" in (22) with generics (a), both (i) plural and (ii) mass; and with proper names (b) also (i), unless (ii) the name raises to D overtly.

(22) a. i. *(I) castori sono mammiferi. (cf. Longobardi 1994:630,ex.39a,40a)
the beavers are mammals

ii. *(Il) vino è fatto di uve.
the wine is made of grapes

b. i. *(Il) mio Gianni (cf. Longobardi 1994:623,ex.28)
the my John

ii. Gianni mio

[15] That proper names originate in N makes the spirit of Longobardi's theory compatible with Matushansky's definite description theory of proper names from §3.

[16] And perhaps also languages in which Person is not grammaticalised at all, e.g. Japanese (Longobardi 2008).

In weak person languages like English, on the other hand, only substantive definite articles – i.e. those with common nouns – are overtly realised. Non-substantive D remains null in (23) with generics (a), both (i) plural and (ii) mass, and with proper names (b).

(23) a. i. (*The) beavers are mammals.

ii. (*The) wine is made out of grapes.

b. (*The) John telephoned.

In sum, strong person languages demand that non-substantive D be realised, requiring expletive articles with both generics and un-raised proper names; whereas weak person languages do not realise non-substantive D, and so lack expletive articles with both generics and proper names. The next subsection attempts to situate NWBE in this typology.

4.2 The typological evasiveness of NWBE

Longobardi (1994:631f., note 28) claims that "no dialect of English appears to admit anything like *il Gianni*" – i.e. expletive articles with proper names. However, NWBE *our John* does look somewhat like *il Gianni*. Moreover, §3 analysed possessive pronouns with personal names in NWBE as preproprial determiners.

Perhaps, then, possessive pronouns with personal names in NWBE are syntactically expletive, realising a non-substantive D. That would make NWBE a strong person language. In strong person languages, non-substantive D must always be realised, so we expect to find expletive articles with generics as well as proper names. Yet in NWBE (24), examples with generics (a), both (i) plural and (ii) mass, and other proper names (b) are ungrammatical.

(24) a. i. (*The/*Our) beavers build dams.

ii. (*The/*Our) milk is white.

b. (*The/*Our) Liverpool is a beautiful city. cf. (13b)

The data in (24) show that NWBE, despite having possessive preproprial determiners, is not a strong person language. This breakdown in the predicted correlation between articles with proper names and with generics cannot be attributed to the form of the articles – i.e. that Italian expletive

articles have the same form as substantive articles *il*, whereas NWBE has special preproprial articles *our* vs. *the*. Returning to Catalan (25), which has special preproprial articles (b), we also find expletive articles with generics (a), both (i) plural and (ii) mass.

(25) a. i. *(Els) tigres son mamifers.

the tigers are mammals

ii. *(La) llet es de color blanc.

the milk is of colour white

b. i. En Pere ii. Na Maria = (12a)

To summarise, if NWBE possessive pronouns with personal names were, in Longobardi's sense, expletive articles, we would have expected to find expletive articles with generics, as in Italian and Catalan. We are left needing to reconcile our analysis of possessive pronouns with personal names as preproprial determiners with NWBE not being a strong person language.

As an avenue to reconciliation, consider that for NWBE and Italian to be comparable along the strong/weak person parameter would be to say that *our* is, like *il*, an expletive article. However, *our* is not semantically expletive, since it carries possessive and affective semantic content. Syntactically, too, there are structural differences between *our* and *il*, assuming that English possessive pronouns straddle spec-DP and D (Abney 1987; Matushansky 2006b). Therefore NWBE possessive preproprial determiners are not expletive in the sense relevant to Longobardi's typology.

Overall, despite having possessive preproprial determiners, NWBE is not a strong person language. The prediction that languages that allow articles before proper names require articles with generics is not borne out for NWBE. NWBE's preproprial determiners escape the parameters of Longobardi's typology by being neither expletive, nor unitary heads.

5 Conclusion

This paper set out to characterise, analyse, and typologically situate possessive pronouns with personal names in NWBE. We characterised possessive pronouns as being used only – and as a pragmatic default – with kin; not contrastive; exclusive with a "royal we" flavour in the first person plural; and generally restricted to first and second person. We analysed NWBE possessive pronouns with personal names as logophoric preproprial determiners. Following Matushansky's (2008) theory of proper names, we treated NWBE possessive pronouns as preproprial forms, as in Catalan, reflecting a relation between D and R_0 (Recanati 1997) – the contextually salient naming convention in force between speaker and hearer. Further, NWBE motivated the decomposition of R_0 into R_S (*my*/*our*), R_A (*your*), and R_T (*his*/*her*/*their*) according to who bears kinship responsibility for it; with the logophoricity (Clements 1975) of R requiring responsibility to lie with a logophoric perspective-bearing antecedent (Sells 1987), limiting the availability of third person possessive pronouns. Lastly, we considered the typological place of NWBE as a language with preproprial forms, but lacking articles with generics. NWBE is not subject to the prediction of Longobardi's (1994) theory of reference that the two should pattern together, since NWBE possessive preproprial determiners are neither semantically expletive, nor syntactically unitary heads.

It is left to future research to consider the relationship between possessive pronouns with personal names and with common nouns. In NWBE, possessive pronouns are also used with common nouns such as *lad*, *mam*, or *kid* (26), though the kin restriction still holds.

(26) Manchester
Our kid – Oasis lead guitarist Noel Gallagher, with reference to younger brother and ex-bandmate Liam.

More broadly, it remains to explore links between NWBE and other English dialects. Possessive pronouns can be used with personal names in North-East English, where in Tyneside English the first person plural has the special form *wor* (Beal et al. 2012). Beyond possessive Ds with names, the definite article is more extensively used in extreme northern (Buchstaller and Corrigan 2015) and Celtic (Hickey 2007) varieties of English.

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There are more than a few argument structure constructions

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1 Introduction

Recent research has witnessed a growing interest in determining how much usage frequency explains language patterns and language processing (Bybee 2006; Pierrehumbert 2001; Jurafsky 2002). This paper focuses on the degree to which the relative frequency of verbs in syntactic frames (or valence alternations) may explain the acquisition of these frames (or these alternations). Valence alternations can be roughly defined as a set of verbs alternatively taking two or more sets of similar syntactic dependents with similar truth conditions. The English ditransitive alternation, one of the most widely discussed valence alternations, is illustrated in the sentences in (1).

(1) Ditransitive Alternation

a. John gave a book to Mary. (prepositional object frame)

b. John gave Mary a book. (double object frame)

(1a) illustrates the prepositional object (PO) frame, where an NP and a PP follow the verb, whereas (1b) illustrates the double object (DO) frame where the verb takes two NP complements. It has been argued that the existence of a verb that occurs particularly frequently in a syntactic frame or an alternation can facilitate the learning of that frame or alternation (Goldberg, Casenhiser & Sethuraman 2004). In other words, statistical skewing may facilitate language acquisition (hereafter, the statistical skewing hypothesis).

In this paper, we investigate further an underlying assumption of the statistical skewing hypothesis, namely that the lexical distribution of most syntactic frames (or valence alternations) shows the same kind of skewing as the ditransitive alternation. More specifically, we try to answer the following three questions.

(i) Is the statistical skewing characteristic of the ditransitive alternation representative of all valence alternations (from now on, except when explicitly noted, we do not distinguish

between individual syntactic frames and valence alternations, as the distinction is not relevant for our purposes)?

(ii) Is statistical skewing a plausible learning theory for all valence alternations?

(iii) What is the similarity in the distributions of verb frequencies between child speech, child-directed speech, and adult-directed speech?

To answer these questions, we performed a large-scale corpus study that investigated the frequency distributions of verbs that appear in five valence alternations. We collected data from naturalistic child-directed speech and adult-directed speech from two corpora, the British National Corpus (BNC) and the Child speech Data Exchange System (CHILDES, MacWhinney 2000). We then expanded and quantified researchers' intuitions about statistical skewing using information-theoretic and statistical measures to compare different alternations.

2 Previous studies

Traditional accounts of language development rely on abstractions over linguistic categories (Chomsky 1980; Pinker 1989). In contrast, usage-based or exemplar-based theories argue for the relevance of more concrete and fine-grained linguistic representations on grammatical knowledge. Robust frequency effects have been found in phonology, morphology, language comprehension, production and acquisition that attest of the relevance of concrete and fine-grained representations. To take but one example, frequent words are more likely to resist analogical leveling in historical changes and easier to undergo grammaticalization than low frequency words (Bybee 2006) and are accessed faster from long-term memory than infrequent words (Forster & Chambers, 1973; Garney et al. 1997); frequent words are also faster to undergo phonological reductions (Bybee & Scheibman 1999). (See Bybee 2006 and Jurafsky 2003 for summaries.)

More importantly for our paper, the learning of the ditransitive has been argued to be influenced by the relative frequency of occurrence of particular verbs in the ditransitive (Goldberg et al. 2004; Casenhiser & Goldberg 2005; Ellis & Larsen-Freeman 2009). Goldberg and her colleagues (Goldberg et al., 2004) performed a corpus study of the ditransitive construction (as well as the intransitive motion, caused motion, and resultative constructions), in both child speech (CS) and child-directed speech (CDS). They concluded that *give* accounts for the lion's share of the token frequency of all the verbs that appear in this construction and showed experimentally

that such skewed frequency distribution facilitates the learning of valence alternations (see Goldberg et al. 2004; Casenhiser & Goldberg 2005).

But is the ditransitive alternation (or the few other constructions Goldberg et al. discuss) representative of the fifty or so valence alternations Levin (1993) reports? This is an important question as psycholinguistic work on valence alternations almost disproportionately study the ditransitive and implicitly assume it is representative of all English valence alternations. Language production studies on valence alternations, especially structural priming studies, have a long tradition of focusing on the ditransitive alternation (Bock 1986; Pickering & Branigan 1998, among many others). The same is true of cross-linguistic or bilingual structural priming studies (Pappert et al. 2011; Hartsuiker, Pickering & Veltkamp 2004; Huttenlocher, Vasilyeva, & Shimpi 2004) or eye-tracking studies (Arai, Van Gompel, & Scheepers 2007; Thothathiri & Snedeker 2008). Psycholinguists explicitly or implicitly seem to assume that valence alternations all behave the same and that what is true of the ditransitive is true of all valence alternations.

3 Experiment setup

3.1 Target valence alternations

We investigated the verb frequency distributions from a total of five valence alternations: the conative, the causative-inchoative, the spray-load, the active-passive, and the ditransitive alternations.

(2) Conative Alternation

a. The child hit the toy. (transitive frame)

b. The child hit at the toy. (conative frame)

(3) Causative-inchoative Alternation

a. The boy broke the window. (causative frame)

b. The window broke. (inchoative frame)

(4) Spray-load alternation

a. The man sprayed the paint on the wall. (locative frame)

b. The man sprayed the wall with the paint. (instrumental frame)

(5) Active-passive alternation

a. The little girl ate the apple. (active frame)

b. The apple was eaten by the little girl. (passive frame)

We chose these alternations both because there is extensive work on each alternation and because these alternations differ both in the kind of differences in meaning or information structure that exist between the two alternative frames and the number of verbs that participate in these alternations.

3.2 Corpora

We collected verb frequency distributional data from two corpora. We collected child speech and child-directed speech from the Child Language Data Exchange System (CHILDES) (MacWhinney 2000). The CHILDES corpus is the product of the joint work of the language development community and consists of transcribed conversations. The other corpus is the spoken section of the British National Corpus (BNC, Leech 1992), from which we collected adult-directed speech. We recombined most of the English data from the CHILDES corpus which sum up to 4 million words to facilitate data collection.

3.3 Methodology

We combined automatic searching with manual filtering and participating verbs were extracted according to Levin's verb lists (Levin 1993). We first searched the BNC and the CHILDES corpora with part of speech search patterns. We then manually filtered the data that matched the search patterns.

3.4 Preliminary results

The general trends in verb frequency distributions are represented in Figure 1.

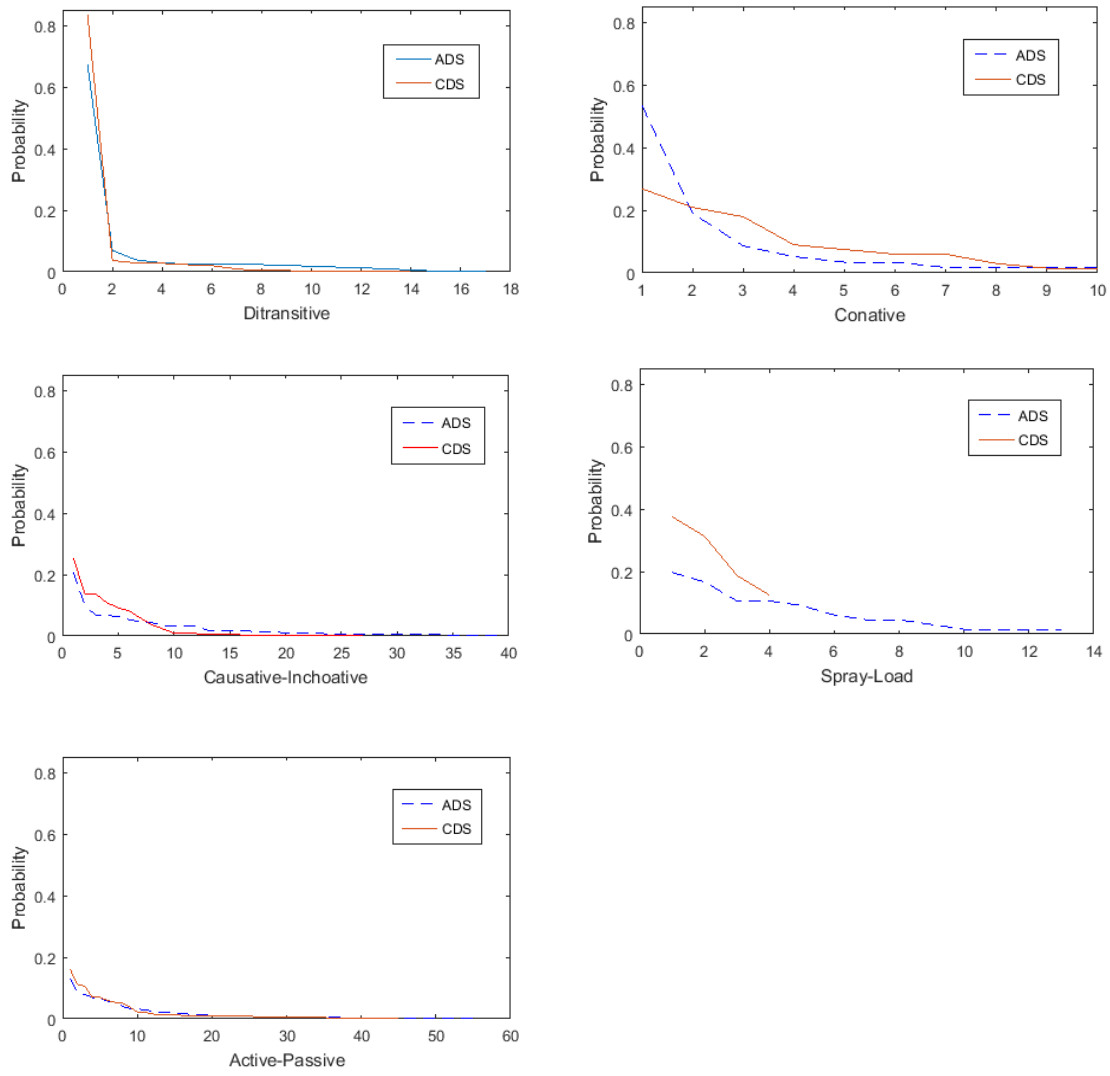

Figure 1: The frequency distribution of verbs that appear in each alternation in child-directed speech and adult-directed speech. The X-axis denotes participating verbs ranked by frequency. The Y-axis represents the probability of each verb occurring in the alternation. Verbs are ranked by decreasing frequency.

As Figure 1 shows, the frequency distribution of verbs in each alternation exhibits the long-tail distribution predicted by Zipf's law (Zipf 1934) according to which the frequency of a word is inversely proportional to its rank. For better visualization of the data, all verb frequencies are normalized to the range 0 to 1. The ditransitive stands out in Figure 1 as a single peak appears at the left of the graph (corresponding to the verb *give*). In contrast, other alternations display much

flatter frequency curves, although the data we collected for some alternations is very sparse, in particular for the spray/load alternation.

Alternation	Verb type inventory size	Token Frequency
Ditransitive	17/34	6289/12428
Spray-load	5/19	175/224
Causative-inchoative	33/39	8159/8151
Conative	10/10	1158/3373
Active-Passive	45/77	112046/179705

Table 1: Basic descriptive statistics of the type and token frequency of verbs that appear in the five valence alternations. Numbers on the left of the slash correspond to Child Directed Speech (CDS); numbers on the right of the slash correspond to Adult Directed Speech (ADS)

The type and token frequencies of verbs participating in each alternation are listed in Table 1. As can be seen, verb type inventory size varies a lot across alternation and corpora, and this has ramifications for our skewing and similarity measures. As will be discussed in the following sections, verb type inventory size has a large effect on measures of statistical skewing and cross-corpora comparisons of verb frequency distributions.

3.5 Age of acquisition

A prerequisite for the validity of the statistical skewing hypothesis is that the most frequent verbs that occur in an alternation should be acquired very early; otherwise, their frequent occurrence could not help acquisition. This section provides an indirect and partial test of this age-of-acquisition (prerequisite) prediction made by the statistical skewing hypothesis.

Alternation	Verbs
ditransitive	*give* (1), *bring* (4), *show* (2)
locative	*put* (1)
conative	*knock* (1), *bite* (2)
causative	*open* (1), *break* (3), *close* (2), *drop* (7)
active-passive	*break* (1), *close* (8), *finish* (6), *tear* (9)

Table 2: Verbs participating in five alternations that are among the first 100 verbs acquired by children (Fenson, et al. 1994). Verbs within each alternation are ordered in increasing age of acquisition. Numbers in parenthesis indicate the frequency rank of a verb in an alternation.

The data on the age of acquisition of verbs is based on Fenson et al., 1994, where English speaking children were tested on the comprehension and production of various words. The most frequent 5 verbs that participate in each alternation that are included in the list of the first 100 verbs acquired by 2-year-old toddlers (Fenson et al. 1994). Table 2 shows that the most frequent verbs in the ditransitive, the conative, and the causative-inchoative alternations are all acquired very early, namely before children are 2-years old, as predicted by the statistical skewing hypothesis.

4 Experiment 1: statistical skewing

In Experiment 1, we collected verb frequency distribution in the whole CHILDES data set as well as the spoken BNC data set.

4.1 Methodology

Two analyses were conducted on verb frequency distributions, one on each syntactic frame or argument-structure construction and one on each alternation. For the second analysis, the frequency of occurrence of a verb in an alternation was defined as the minimal frequency of occurrence of that verb in either frame.

4.2 Results and observations

	Child-directed speech			**Adult-directed speech**		
	Frame 1	Frame 2	alternation	Frame 1	Frame 2	alternation
ditran	*give* (DO)	*give* (PO)	*give*	*give* (DO)	*give* (PO)	*give*
spray	*mark* (loc)	*stick* (instru)	*load*	*wrap* (loc)	*load* (instru)	*load*
caus	*turn* (act)	*open* (pass)	*open*	*turn* (act)	*move* (pass)	*move*
con	*cut* (tran)	*beat* (con)	*beat*	*cut* (tran)	*shoot* (con)	*shoot*
pass	*do* (act)	*suppose* (pass)	*call*	*do* (act)	*do* (pass)	*do*

Table 3: The most frequent verbs that appear in the five valence alternations from child-directed speech and adult-directed speech. (ditran: ditransitive, spray: spray-load, caus: causative-inchoative, con: conative, act-pass: active-passive. DO: double-object, PO: prepositional object, loc: locative, instru: instrumental, tran: transitive.)

Table 3 lists the most frequent verbs that appear in the different frames in the child-directed speech and the BNC. We excluded *change* and *knock* from further analysis, because *change* and *knock* have very special meanings in child speech. Both the DO frame and the PO frame in our two corpora have the same verb *give* as the most frequent verb. In child-directed speech, *give* alone accounts for 68.47% and 84.48% of the verbs that appear in the dative frame and the ditransitive frame respectively. In contrast, there is more variation in the most frequent verbs that appear in other valence alternations, as in no other alternation is the most frequent verb in both frames the same.

It is also worth noting that resultative passives, in contrast to process passives are most frequent in child-directed speech and child speech, as is illustrated by the sentences in 6. This resultative passive bias is not present in adult-directed speech: Resultative passives are common in adult-directed speech but they are not the most frequent kind of passives.

(6) resultative passives that appear in child-directed speech

(a) They’re called cement mixers.

(b) Her school was closed.

The predominance of resultative passives in child-directed speech and child speech suggests that the acquisition of passives might initially involve learning resultative passives and then extending the passive frame to cover process passives at later stages of language development.

4.3 Measuring statistical skewing

We now present the results of two measures of statistical skewing, one that uses descriptive statistics and the other information entropy. We also report on the performance of two plausible probability measures of statistical skewing, skewing and kurtosis, and show that these two measures are not appropriate for capturing the intuition behind the statistical skewing hypothesis.

Statistical skewing can be defined, intuitively, as the minimal number of verb types needed to reach a specific probability threshold. We thus first ranked verbs that participate in a specific frame in a descending order of frequency and then used quartiles to capture this intuition. Here, quartiles are defined as the number of verbs required to reach 25%, 50% and 75% of the total probability mass.

	Child-directed speech			**Adult-directed speech**		
quartiles	0.25	0.5	0.75	0.25	0.5	0.75
ditran	1	1	1	1	1	3
spray	1	2	3	2	4	7
caus	1	3	6	2	5	12
conative	1	3	4	1	2	4
passive	2	5	11	3	7	15

Table 4: Three quartile measures of statistical skewing for verbs that alternate in child-directed speech and in adult-directed speech

As shown in Table 4, the ditransitive alternation requires fewer verbs to reach target thresholds in both child-directed speech and in adult-directed speech than other alternations and the causative/inchoative and the active/passive alternations need the most verbs to reach the threshold. Furthermore, alternations seem to be more skewed in child-directed speech than in adult-directed speech, something of relevance to the statistical skewing hypothesis (since it claims that the more skewed an alternation is, the easier it is to learn).

We also use information entropy to measure statistical skewing following previous treatments of statistical skewing (Gomez 2002; Ellis & Larsen-Freeman 2009) and reduce the effect of verb inventory size by computing entropy ratios against baselines. Entropy, an information theory term, measures the average information content in a series of events by measuring their uncertainty (Shannon, 1948). Intuitively, a series of predictable events contain less valuable information than a series of unpredictable events. As shown in Equation 1, entropy is defined as the average of information content.

$$H(X) = -\sum_i P(x_i) \cdot \log P(x_i) \qquad (1)$$

Here, we set the base of the logarithm to 2 for sake of simplicity, in which case entropy can be interpreted as the average number of bits needed to encode a sequence of verbs that participate in an alternation. It is worth noting that entropy is sensitive to the number of values of the variable under study: the entropy of a discrete variable *x* increases with the number of possible values of *x*. This is worrisome for us when measuring skewing of verb frequency distributions, as the number of verbs participating in an alternation varies by alternation and corpus. To eschew this issue, we provide baselines for each alternation from two corpora and measure to what extent the entropy of an alternation deviates from its baseline entropy by computing the ratio between a target entropy and a random baseline entropy. We used as random baseline entropy the average entropy of 100 random frequency distributions that involved the same number of verb types as the alternation under consideration.

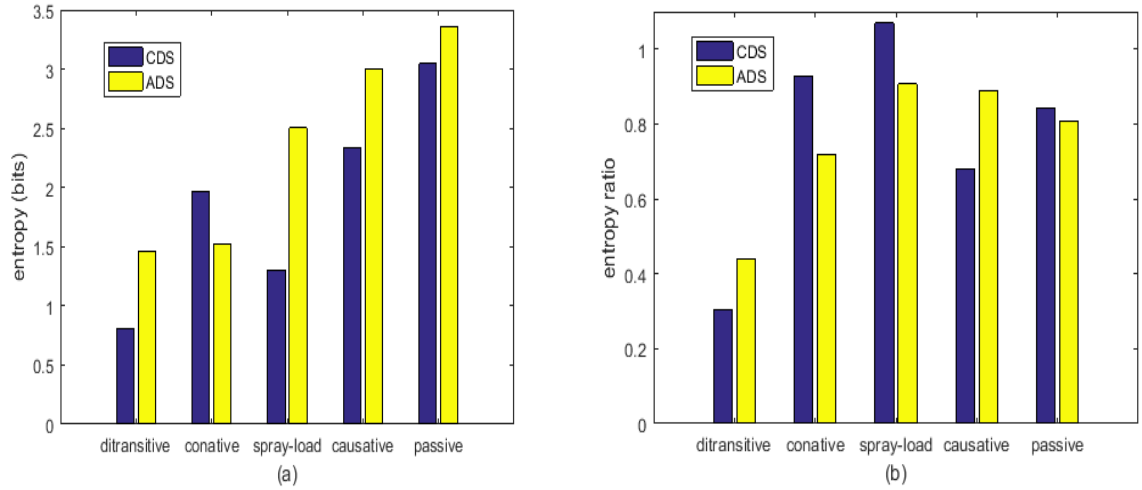

Figure 2: Entropy of the frequency distributions of verbs that alternate in child-directed speech and adult-directed speech: (a) entropy over actual frequency distributions (b) entropy ratios, computed as target entropies divided by corresponding baseline entropies

Figure 2 shows the result of entropy analyses of our five target alternations with Figure 2b teasing apart the statistical skewing effect from the verb type size effect. If a ratio in Figure 2b is below 1, the corresponding entropy is lower than its baseline. As Figure 2 shows, there is considerable variation in entropy across alternations and corpora. The ditransitive has the lowest entropy and entropy ratio among the five alternations, which suggests that the ditransitive is very skewed (regardless of verb inventory size). The active-passive alternation in Figure 2a has the highest entropy, which is due to its large participating verb type size, as shown by the fact that its entropy ratio is close to the entropy ratios of the conative, the spray-load and the causative-inchoative in Figure 2b. In Figure 2a, the entropy of child-directed speech is consistently lower than the entropy of adult-directed speech, but Figure 2b presents a more mixed result, suggesting that the skewing effect in child-directed speech is partly due to its small verb inventory size. Overall, the results of our entropy analysis agree with the more intuitive descriptive statistics analysis we reported in Table 4.

5 Experiment 2: cross-corpora similarities

In a second experiment, we tested the similarity of child speech to child-directed speech and adult-directed speech. This is important, as if the statistical skewing hypothesis is correct, children must pick up on regularities in the frequency distribution they are exposed to (in child directed speech).

We therefore expect the frequency distribution of verbs in children's productions to more closely resemble the frequency distribution of verbs in child directed speech than the frequency distribution of verbs in adult directed speech. Additionally, measures of cross-corpora similarities are of relevance to at least two classes of theories. First, child-directed speech is argued to be qualitatively different from adult-directed speech in terms of its lexicon, syntactic structures and sentence intonations. If true, we would expect child speech and child-directed speech verb frequency distributions to be more similar than child speech and adult directed speech verb frequency distributions. Second, language acquisition theories differ on the extent to which children imitate their language input.

5.1 Data and methodology

Data collection procedure was similar to Experiment 1. To measure similarity of verb frequency distributions, we used symmetric Kullback-Leibler divergence (KL-divergence) as our measure, another information-theoretic measure widely used in computational linguistics to assess cross-corpora distribution similarities, or more precisely distances.

$$KL(P||Q) = -\sum_i P(x_i) \cdot \log(\frac{P(x_i)}{Q(x_i)}) \qquad (2)$$

Empirically, KL-divergence measures the distance between two probability distributions *P* and *Q*, as shown in Equation 2. If two probability distributions *P* and *Q* are exactly the same, the KL-divergence between *P* and Q equals 0. The original KL-divergence is asymmetric; in other words, the distance from *P* to *Q* is not the same as the distance from *Q* to *P*. Here, we define a symmetric version of KL-divergence shown in Equation 3, where *P* and *Q* are interchangeable. The lower the symmetric KL-divergence, the more similar two frequency distributions are.

$$symmetricKL(P, Q) = KL(P||Q) + KL(Q||P) \qquad (3)$$

Similar to Experiment 1, the baseline condition was set to the average (symmetric) KL-divergence computed from 100 random frequency distributions. Because KL-divergence is also sensitive to verb inventory size, we divided the target symmetric KL-divergences by our baseline symmetric KL-divergences.

5.2 Results

The results from the computation of the symmetric KL-divergence of verb frequency distributions over the three pairs of corpora we analyzed are represented in Figure 3.

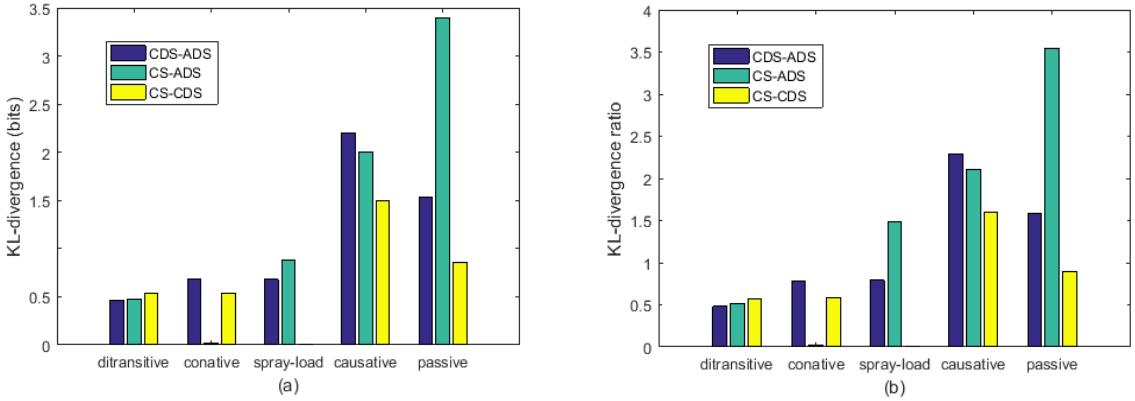

Figure 3: Symmetric KL-divergences between child speech and child-directed speech (CS-CDS), between child speech and adult-directed speech (CS-ADS) and between child-directed speech and adult-directed speech (CDS-ADS): (a) KL-divergence for (target) verb frequency distributions, (b) KL-divergence ratios, computed as target KL-divergence divided by the corresponding baseline KL-divergence.

Figure 3, overall, represents measures of distance between verb frequency distributions across corpora. Ratios below 1 in Figure 3b correspond to cases where the KL-divergence is lower than the random baseline divergence. At least three salient trends can be observed in Figure 3. First, the ditransitive has very consistent frequency distribution patterns across corpora and the divergence measure, around 0.5, is well below 1 in all the three comparisons. In comparison, the causative-inchoative and the active-passive have much larger symmetric KL-divergence. Second, the conative and the spray-load alternations suffer from data sparsity. Sparsity is probably the reason that child speech and adult-directed speech do not share any alternating verbs in the conative alternation. Third, there is variation among alternations across the three corpora. The largest KL-divergence appears in the active-passive alternation in the CS-ADS comparison, around 3.5, which supports our argument that passives in CS and in ADS are qualitatively different. More generally, the observation that child-directed speech deviates more from adult-directed speech than from

child directed speech is in accordance with previous corpus studies (Buttery & Korhonen 2005; Buttery 2006). In cases where there is enough data, CS-CDS shows consistently lower divergence scores than CS-ADS, suggesting that children's language productions relatively closely mirror their language input in terms of verb frequency distribution.

6. Conclusions and future research

In this paper, we conducted a large-scale corpus study of five valence alternations in English. We investigated verb frequency data on child-directed speech and adult-directed speech and compared the frequency distributions of participating verbs in the ditransitive alternation to four other valence alternations. Our results suggest that the ditransitive does not seem to be representative of all valence alternations. None of the other four valence alternations are skewed like the ditransitive alternation is in both child-directed speech and in adult-directed speech. Many psycholinguistic studies implicitly or explicitly assume that valence alternations are homogeneous, generalizing from properties of the ditransitive alternation to all English alternations. Our results suggest that such extrapolation might not always be warranted. The difference between the verb frequency distribution of the ditransitive alternation and other alternations further suggests that the statistical skewing hypothesis is more plausible as an explanation of the ease of learning for the ditransitive alternation than for other alternations. Finally, our study suggests that learning the adult-like active-passive alternation might follow a different path than learning other alternations, given the differences between the active-passive alternation in child directed speech and adult direct speech. As the most frequent verbs in the active-passive alternation used by children (and in child directed speech) are resultative passives for the most part, process passives (that form the bread and butter of adult passives) are acquired later.

The results of our second study where we used symmetric KL-divergence to compare verb frequency distributions across corpora show that the frequency distribution of verb uses roughly reflects the frequency distributions of their input in that child speech deviates less overall from child-directed speech than from adult-directed speech.

There remain two important questions for future research. The first question concerns the representativeness of the valence alternations we investigated, as we studied only about 10% of the alternations listed in Levin (1993). Other, less common alternations, might involve different

verb frequency distributions than the ones we discussed here or so few verbs that generalizing from the association of a very frequent verb and an alternation might not even be feasible. The second question pertains to the role that the various skewing patterns we found in our corpus study might play in valence alternation learning, in particular whether the reduced skewing we found in all but the ditransitive construction might still facilitate learning. We are currently devising an artificial grammar learning experiment to answer this question.

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Appendix A

Summary of CHILDES corpus data used in this corpus study

Data Source	Year	Age of children	Data Source	Year	Age of children
Bates	1988	1;8 and 2;4	Haggerty	1929	2;6
Berstein	1982	1;1–1;11	Hall	1979	4;6-5;0
Bloom	1970, 1974, 1975	1;9–3;2	Higginson	1983-1984	0;11-2;11
Bloom	1973	1;4.21–2;10	McCune	1970s	0;9-3;0
Bohonan	1976	2;8 and 3;0	Morisset	1990	2;6
Brent	2001	0;6-1;0	New England	1989	1;2-5
Brown	1973	1;6-5;1	Post	1986	1;7.5-2;8.7
Clark	1976	2;2–3;2	Rollins	2003, 2006, 2011	0;6-1;0
Demetra	1989	2;0–3;11	Sachs	1969-1973	1;1 -5;1.
Demetra	1989	2;1-2;9	Soderstrom	1998-2003	0;6-1;0
Evans	NA	First graders	Suppes	1972-1973	1;11-3;11
Hayes	NA	1;6–4;0	Tardif	1991-1992	2;0
Feldman	2001	1;2-2;3	Valian	1991	1;9.20–2;8.24
Garvey	1973	2;10–5;7	VanHouten	1986	2;0-3;0
Gathercole	1980	2;9–6;6	VanKleeck	NA	3;0

Gleason	1976-1979	2;1–5;2	Warren	1982	1;6–3;1 4;6–6;2

Table A1 Child-directed speech and child language data used in this study

Reduplicating verbal plurals cross-linguistically

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1 Introduction

It has been argued that a trigger outside of the verbal word may condition root suppletion for plural participant number (Bobaljik & Harley 2017, Toosarvandani 2016b*;* among others). However, there is cross-linguistic evidence that participant-number suppletion forms part of a broader phenomenon together with reduplication. In this paper, I investigate languages which have participant number suppletion as well as participant and event number (i.e. verbal number) reduplication. I propose that (i) the trigger for root suppletion is always a head in the complex X^0, and (ii) there is a verb-internal node that mediates an agreement relationship between the argument and the root in the syntax.

The analysis I propose is in contrast to Bobaljik and Harley (2017) who argue that Vocabulary Insertion (VI) of a suppletive verb is directly conditioned by plurality of internal arguments in Hiaki. In 1a, the singular verb occurs in conjunction with the singular object, but in 1b, the plural verb occurs with the plural object.[1]

(1) a. Aapo/Vempo uka koowi-ta **me'a**-k
3SG/3PL the.SG pig-ACC.SG kill.SG-PRF
'He/They killed the pig.'

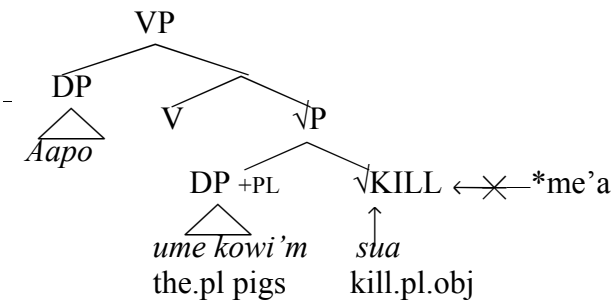
b. Aapo/Vempo ume kowi-m **sua**-k
3SG/3PL the.PL pig-PL kill.PL-PRF
'He/They killed the pigs.' (Bobaljik & Harley 2017: 5)

[*] Thank you to Jonathan Bobaljik, Andrea Calabrese, Susanne Wurmbrand, Heidi Harley, and the BLS 43 participants for their comments on this project.

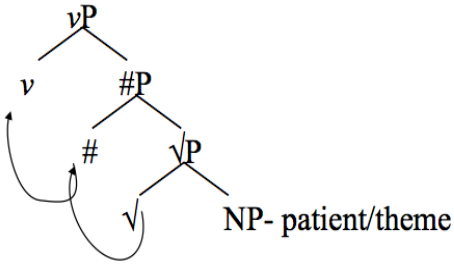
[1] I use the following abbreviations in this paper: 1 = first person; 3 = third person; ABS = absolutive; ACC = accusative; APPL = applicative; ERG = ergative; FUT = future; INCL = inclusive; IPV = imperfective; NOM = nominative; PL = plural; PFV = perfective; PRF = perfect; PST = past; RED = reduplication; SG = singular; TNS = 'general tense' (see Toosarvandani 2016b who references Toosarvandani 2016a)

Bobaljik and Harley (2017) argue that these examples provide evidence for word-external suppletive triggers. Since the plural internal argument is a sister to the root, it may trigger verbal suppletion of the root as in 2a from Bobaljik & Harley (2017: 7). In my proposed structure in 2b, on the other hand, there is a verb-internal number head. This number head in the complex X^0 is specified with a plural feature which conditions suppletion of the root.

(2) a. BOBALJIK & HARLEY'S PROPOSAL



b. MY PROPOSAL



Cross-linguistic evidence from reduplication for plural participant and event number shows that plural can be expressed as an affix. Bobaljik & Harley's analysis is limited to root suppletion and does not extend to plural marking on the verb word via affixation. Thus, they cannot provide a unified account of suppletion and reduplication.[2] The locality of the argument, therefore, is insufficient for describing participant number suppletion.

The outline of this paper is as follows. In the next section, I provide background arguments describing word-external triggers on suppletion, and I argue that these analyses do not account for reduplication. In Section 3, I propose that there is a verb-internal number node that mediates an agreement relationship with the argument and the root. I contend that this node is in the same domain as the root, and is therefore, able to condition VI of the plural suppletive allomorph of the root. I follow this proposal with cross-linguistic morphophonological evidence for this number head in Section 4, and I discuss implications of this analysis in Section 5. Section 6 concludes the paper.

[2] However, see Thornton (2017) for discussion of analyses which do not treat reduplication as an affix (i.e. Raimy 2000) and an additional argument for the #-node from languages which mark participant and event number overtly.

2 Background

In this paper, I focus on participant number suppletion. Participant number has been previously analyzed as marking the plurality of the absolutive argument on the verb. That is, participant number suppletion marks the plural object of transitives or the plural subject of intransitives on the verb (Durie 1986; Veselinova 2006). I next describe Bobaljik and Harley's (2017) and Toosarvandani's (2016b) analysis of participant number suppletion where they argue for different locality conditions in order to account for word-external suppletive triggers. Then I show that in addition to suppletion, reduplication also marks plural participant and event number. I follow this with a proposal for a unified structural account of participant number reduplication and suppletion.

2.1 Word-external suppletive triggers

Bobaljik and Harley (2017) present the first analysis of word-external triggers on verbal suppletion for participant number. They found that in Hiaki, the intransitive verbs which supplete for plural participant number are unaccusatives. Hence, Bobaljik and Harley argue that it is the internal argument that conditions participant number suppletion. Since the plural internal argument is a sister to the root, and a phrasal projection does not intervene between the root and the argument, they argue that the internal argument is sufficiently local to directly condition insertion of the suppletive verbal root.

Toosarvandani (2016b), on the other hand, challenges Bobaljik and Harley (2017) by showing that in Northern Paiute, the plural applicative argument in 3 and the plural external argument (or, agent) of an unergative verb in 4b,[3] may also trigger VI of the suppletive root.

(3) Su=nana **iwa-ggu** **momoko'ni** **abbiga**-ggi-ti.
NOM=man many-ACC **women** **talk.PL**-APPL-TNS
'This man is talking for many women' (Toosarvandani 2016b: 251)

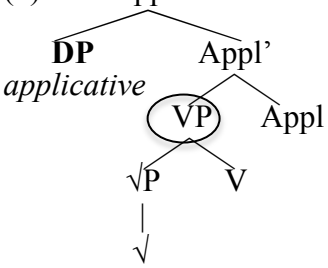
[3] Toosarvandani (2016b) argues that these verbs are unergative since the verbs can be passivized, but unaccusative verbs cannot be passivized.

(4) a. Su=nana **yadu'a.**
NOM=man **talk.**IPV.SG
'The man is talking.'

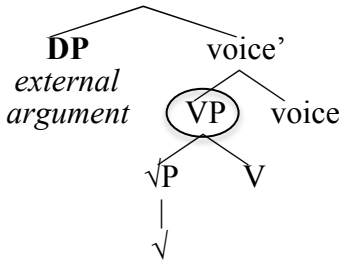
b. Iwa-'yu **naana abbika.**
many-NOM men **talk.**IPV.PL
'Many men are talking.' (Toosarvandani 2016b: 249)

In 3, the agent is singular, and the applicative argument is plural, which conditions suppletion of the verb; and in 4b, the plural agent of an (intransitive) unergative verb triggers suppletion of the verb. This is unexpected under Bobaljik and Harley's (2017) analysis since these arguments are outside of the phrasal projection containing the root as in 5.

(5) a.



b.



The applicative argument in Spec, ApplP in 5a and the agent in Spec, voiceP in 5b are separated from the root by at least the VP. Since at least one phrasal projection intervenes between the plural applicative and the plural agent, participant number suppletion should not be conditioned by arguments higher than the VP.

Toosarvandani (2016b) shows that in Northern Paiute, suppletion of the verb can only be triggered by the plural applicative or the plural agent if the Patient/Theme is not present. He proposes the condition in 6 for word-external triggered suppletion.

(6) RELATIVIZED ADJACENCY: For any vocabulary entry of the form: *abc* $\longleftrightarrow$ X[F_1 : α] / Y[F_2 : β], the exponent *abc* can be inserted at a node with syntactic category X and feature [F_1 : α], **if there is no closer element of syntactic category Y** with feature [F_2 : β]. (Toosarvandani 2016b: 254)

Toosarvandani's rule of Relativized Adjacency in 6 states that suppletion is conditioned by the head of a given syntactic category with a certain set of features that is most local to the root. In Northern Paiute, the closest DP with phi features directly conditions VI of the suppletive root.

2.2 Reduplication and verbal number

In this paper, I argue, following Haji-Abdolhosseini, Massam, & Oda (2002), that suppletion for participant number is part of a broader category: verbal number. Veselinova (2006) and Corbett (2005) have argued that verbal number contains both participant and event number. Whereas participant number marks the plurality of the arguments, event number marks the plural event (Durie 1986).

Reduplication provides evidence that participant number overlaps with event number in its distribution. In Niuean, the plural patient or theme is marked by suppletion in 7b and by reduplication in 8b and in 9b.

(7) a. To **fano** a au
FUT go ABS 1
'I will go ... '

b. To **ō** a tautolu
FUT go.PL ABS 1PL.INCL
'We will go ... '

(8) a. Ne hoko mai a Sione
PST arrive there ABS Sione
'Sione arrived/came there.'

b. Ne **ho~**hoko mai a laua
PST PL~arrive there ABS 3PL
'They arrived/came there.'

(9) a. Kua hala e ia e lā akau
PFV cut ERG 3SG ABS branch tree
'He cut the branch.'

b. Kua **ha**~hala e ia e tau lā akau
PFV PL~cut ERG 3SG ABS PL branch tree
'He cut the branches.' (Haji-Abdolhosseini, Massam, & Oda 2002: 476)

In 7b, the plural intransitive subject triggers suppletion of the root, and in 8b, the plural intransitive subject triggers reduplication on the root. Following the absolutive pattern described in Section 2, reduplication of the root also occurs with the plural transitive object as in 9b. These examples show that in Niuean, suppletion and reduplication for participant number pattern together.

In addition to marking plural arguments, Haji-Abdolhosseini, Massam, and Oda (2002) provide evidence that reduplication marks iterative aspect in Niuean. They argue that plural event marking by reduplication makes the plural argument interpretation available depending on the lexical aspectual semantics of the verb. Evidence for this comes from reduplication that marks plural events with a singular argument as in 10 from Haji-Abdolhosseini, Massam, & Oda (2002: 483).

(10) Ne **noko**~noko e ia e gutuhala
PST PL~knock ABS 3SG ABS door
'She knocked on the door (many times)'

Therefore, in Niuean, reduplication marks plurality of events, plurality of arguments, or both.

Following Haji-Abdolhosseini, Massam, and Oda's (2002) analysis of Niuean, I propose that suppletion for participant number overlaps in its distribution with reduplication for participant and event number. Assuming reduplication is an affix (Marantz 1982, cf. Raimy 2000), this suggests that there is a *v*P-internal number node that marks plurality of arguments and events. I will next outline this proposal and argue that there is a number node that mediates an agreement relationship between the argument and root. I propose that the number features on the number node can be valued by the closest c-commanding argument in the syntax and prior to

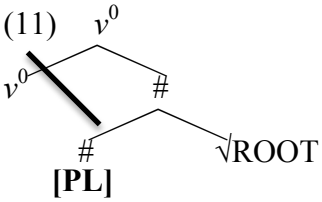
Vocabulary Insertion. I will propose that this head allows for a stricter locality condition on root suppletion for participant number where the trigger for root suppletion is always a head in the complex X^0.

3 Proposal: a more local analysis

3.1 Locality and morphological domains

In earlier work, I have argued that there is a node internal to the verbal word that marks plural arguments and events as in 11 (Thornton 2015).

(11)



Although Haji-Abdolhosseini, Massam, and Oda (2002) treat plural event marking by reduplication as iterative aspect in Niuean, I treat this head as number. I focus on the morphophonological effects of this #-node, and therefore, its specific identity is not relevant to the point of this paper.

I also follow Bobaljik (2012) who argues that there is a strict locality condition on heads which trigger suppletion. In his study on universals in comparative and superlative suppletion, Bobaljik (2012: 68) gives the locality condition in 12 for suppletion.

(12) Locality:
β may condition α in (a), not (b):
a. α ...]X^0...β
b. *α ....]XP...β

12a states that the suppletive trigger and target must be contained in the same word, and 12b states that the suppletive trigger cannot be separated from the target by a maximal projection.[4] Hence, I argue that one can maintain the narrower assumption that that the trigger for suppletion

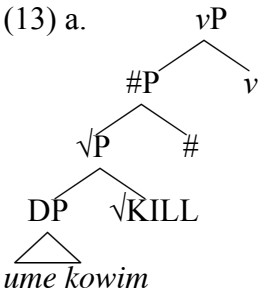
[4] While Bobaljik and Harley (2017) interpret 12b as allowing the root's syntactic sister (i.e. the verb's internal argument) to govern suppletion, I follow the conservative approach described here.

cannot be outside of the morphological word.

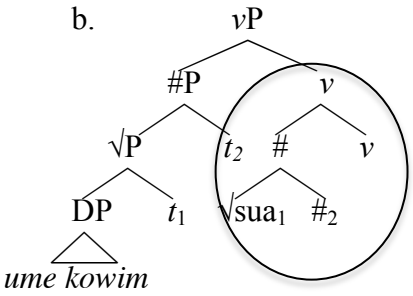
In addition to Bobaljik's (2012) locality condition, I also assume that there are domains within words. I follow Marantz (1997, 2007) who argues that roots are category-less until they combine with a category-defining head (*n, v, a)*. Embick (2010) proposes that the category-defining head delineates a domain in morphophonology, and like phases in syntax (Chomsky 2001), triggers 'spell out' of its complement. That is, when the root combines with the category-defining head, the category-defining head will trigger Vocabulary Insertion (VI) of the root, and affixes higher than this head cannot interact with those internal to the category-defining domain.

I provide a derivation in 13. First, I assume that syntactic operations occur prior to VI in the Morphological Structure (Halle & Marantz 1993). In 13a, a [PL] feature is inserted on the #-node in the syntax. In 13b, head movement occurs in the syntax, which creates a complex X^0, or morphological word, as shown in the circle. Once the root and number combine with *v,* the category-defining head triggers VI of its complement, and # will be realized as a reduplicative affix or will trigger suppletion of the root as shown in the rule give in 14a.

(13) a.



b.

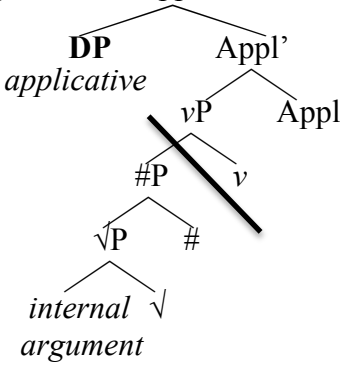


(14) a. √KILL ---> sua / ____#[+pl]
b. √KILL ---> me'a /

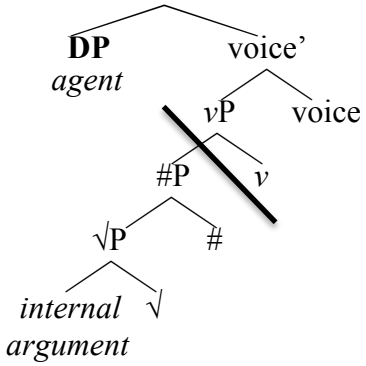
In 14a, plural form of the verb is inserted in the context of the plural feature specified on the #-head. Otherwise, the root is realized as the elsewhere form as indicated by the rule given in 14b.

An implication of this analysis is that the root cannot be phonologically affected by affixes higher than *v* since VI has already occurred in category-defining domain (Thornton 2015). This is shown in 15 where the applicative argument is above the category-defining head in Spec, ApplP and the agent is in Spec, voiceP.

(15) a.



b.



The line below the category-defining *v* in 15 shows that the suppletive root should only be conditioned by heads internal to the category domain. Heads and arguments higher than this domain should not be able to trigger VI since Vocabulary Items internal to the category-defining domain have already been inserted.[5] However, as shown in examples 4 and 5 in the previous section, Toosarvandani (2016b) shows that the applicative argument and the agent are also able to trigger VI of the plural suppletive verb in Northern Paiute.

3.2 Agreeing with the #-node

Toosarvandani (2016b) notes that it is the number features on the argument most local to the root which conditions suppletion in Northern Paiute. That is, if the Patient/Theme is singular, the verb will also be singular regardless of the number features of the applicative argument as shown in 16b. This is consistent in constructions without a Patient/Theme argument. If the applicative argument is singular, the verb will be singular regardless of the number features of the external argument as shown in 17b.

(16) a.	Su=nana	ka=mogo'ni	ka=**iwa**-ggu	**tihidda**	**koi**- ggi-ti.
	NOM=man	ACC-woman	ACC=**many-** ACC	**deer**	**kill.PL-APPL-TNS**

'The man killed the many deer for the woman.'

[5] Embick (2010) argues that v^0 in English is pruned in the context of T[past] in order to account for English *go~went*. Calabrese (2014) also argues that pruning of the TV as well as the category-defining head is also relevant for subject-person/number governed suppletion for the Italian perfect verb, *misi,* "put."

b. *Su=nana ka=**momoko'ni** ka= **tiɬidda** **koi**-ggɨ-ti.
NOM=man ACC=women ACC =deer **kill.PL-APPL-TNS**
'The man killed the deer for the women' (Toosarvandani 2016b*:* 253)

(17) a. Su=nana **iwa-**ggu **momoko'ni** **abbiga**-ggɨ-ti.
NOM=man **many-**ACC **women** **talk.PL-APPL-TNS**
'This man is talking for many women.'
b. ***Iwa-**'yu **nanaana** ka=mogo'ni **abbiga**- ggɨ-ti.
Many- NOM **men** ACC=woman **talk.PL-APPL-TNS**
Intended: 'Many men are talking for the woman.' (Toosarvandani 2016b*:* 251)

In 16a, the internal argument triggers VI of the plural verb. However, in 16b, the applicative argument is plural, but the plural form of the verb cannot be inserted since the internal argument is singular. Similarly, when a plural applicative argument is added to an unergative verb, the plural verb is inserted as in 17a. If the agent is plural but the applicative is singular, the plural verb cannot be inserted as shown in 17b. Toosarvandani (2016b), therefore, argues that the most local argument in the structure is able to condition VI of the suppletive verb.

I have argued that there is a head internal to the verbal word which marks plural arguments and events. I propose that this #-head in 10 agrees with – or is valued by -- the number features of an argument which it is c-commanded by. I follow Wurmbrand (2011) who proposes REVERSE AGREE as in 18.

(18) A Feature F:____ on a head α is valued by a feature F: val on β, iff
i. β c-commands α
ii. There is no γ with a valued interpretable feature F such that γ commands α and is c-commanded by β
iii. α is accessible to β[6] (Wurmbrand 2011:3)

Therefore, I propose that the number features of an argument that c-commands the #-head may value the number features on the #-head as in 19.

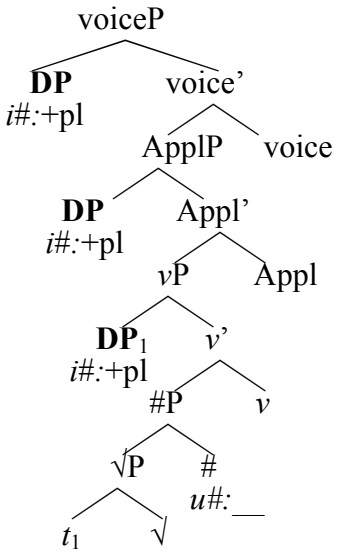
(19) *Agree:u#__* valued by closest c-commanding DP

[6] Roughly in the same phase. See Wurmbrand (2011:17) for discussion of anaphor binding across a phase.

I assume that agreement between # and the argument happens in the syntax prior to VI. Hence, the closest c-commanding DP values the #-head's features, but VI of the suppletive root is triggered by the #-head itself.

A derivation proceeds as follows. The closest c-commanding DP determines the features on # in the syntax. If [+pl] is the interpretable number feature on this argument, [+pl] values the features on # as indicated in the maximal structure in 20.

(20)



After the number head is valued in the syntax, the root and number combine with the category-defining head, *v*, which triggers VI. The number head will be realized as a reduplicative affix or will trigger VI of the suppletive root. An example of Hiaki's VI-rules is given in 21, and examples of Northern Paiute's VI rules follow in 22 and 23. Hence, if [+pl] is specified on the most local argument, this feature values #. After head-movement of the root and # to *v*, the [+pl] feature on # will be realized as the suppletive root as in 21a, 22a, and 23a. If [+pl] is not valued on number by the most local argument, the elsewhere Vocabulary Item is inserted as in 21b, 22b, and 23b.

(21) *Hiaki*

a. √KILL ---> sua / ____#[+pl]

b. √KILL ---> me'a /

(22) *Northern Paiute*

a. √KILL ---> koi / ____#[+pl]

b. √KILL ---> patsa /

(23) a. √TALK ---> abbika / ____#[+pl]

b. √TALK ---> yadu'a /

Therefore, the features of the number head may be valued by the closest c-commanding argument, but VI is triggered by the number head itself. Hence, the difference between Hiaki and Northern Paiute can be reduced to a difference in the locality conditions of agreement between the argument and the #-node. This will be further elaborated on in Section 5.

4 Cross-linguistic morphophonological support

Next, I will provide cross-linguistic morphophonological support for the number node from languages that mark both plural participant number and plural event number with both suppletion and reduplication. Reduplication is considered to be root-affecting when the reduplicative affix is realized internal to the root or surfaces as gemination internal to the root. I will focus on providing further evidence for this node with additional data from Hiaki as well as data from Koasati (Muskogean) and Samoan (Austronesian).

4.1 Hiaki (Uto-Aztecan)

Like Niuean, Hiaki also has reduplication. Harley & Leyva (2009) and Haugen (2011) show that there are several forms of reduplication in Hiaki: *CV-, CVC-, CVCV-, CVG-* (where there is gemination of the following consonant), and root-internal gemination of a mora. Reduplication in Hiaki yields the interpretation of habitual, emphasis, progressive, and it also marks plural arguments (Harley & Leyva 2009). However, the reduplicant's form is not predictable from its semantics nor from the phonological form of the root (Harley & Leyva 2009; Haugen 2011).

Harley and Leyva (2009) note that like suppletion, reduplication for participant number follows an absolutive pattern. They provide the example in 24 which requires reduplication to

mark the plural subject of the intransitive verb, *koche* 'sleep.'

(24) a. Aapo/*Vempo koche
3SG/*3PL sleep
'He is sleeping'/ *'They're sleeping'
b. Vempo **ko**~koche
3PL PL~sleep
'They're sleeping' (Harley & Leyva 2009: 254)

In 24a, the third singular pronoun can appear with the unreduplicated verb, but the third plural pronoun cannot. On the other hand, in 24b, the third plural pronoun is able to appear with the reduplicated verb. Hence, like Niuean, reduplication in Hiaki also marks the asbolutive argument.

In addition to this, gemination internal to the root marks habitual events as shown in 25.[7]

(25) a. ha**h**ame ha**hh**ame 'catch up'
b hi**m**a hi**mm**a 'toss, discard, divorce, leave (behind), throw'
c. ka**k**ae ka**kk**ae 'be sweet'
d. ko**k**o ko**kk**o 'dying (PL)'
e. ma**v**eta ma**vv**eta 'receive, accept'
f. ka**p**oonte ka**pp**oonte 'castrate' (Harley & Leyva 2009)

25 shows that a consonant internal to the root is reduplicated in order to mark plural events. In addition to this, 25d appears to be marking the plural argument. Therefore, like Niuean, it appears that Hiaki suppletion facts overlap with reduplication as Hiaki reduplication is able to mark plural arguments and plural events.

[7] I focus on medial consonant gemination here although Haugen (2011) shows that a vowel is also able to vowel lengthening can also occur in the same medial position internal to the root.
(i) y**e**p.sa y**ee**p.sa 'arrive' (Haugen 2011:9)
Thank you to Jeff Punske for reminding me of this paper.

4.2 Koasati (Muskogean)

In Koasati, suppletion and reduplication mark participant and event number. Veselinova (2006) and Kimball (1991: 322-323) show that Koasati suppletion makes a distinction between the singular, dual, and plural in 26, the singular/dual and plural in 27, and the singular and plural in 28.

(26)

Singular	Dual	Plural	Gloss
átal	alísw	í:san	'to dwell'
haccá:lin	hikkí:lin	lokkó:lin	'to stand'

(27)

Singular/Dual	Plural	Gloss
íllin	hápkan	'to die'
óntin	ilmá:kan	'to go'

(28)

Singular	Plural	Gloss
walíkan	tółkan	'to run'
acapílkan	askáhlin	'to release something'

Veselinova (2006) notes that these examples mark (i) the number of times the action is performed, or (ii) the number of arguments most affected by the action. Thus, suppletion in Koasati appears to be marking both plural participants and plural events.

In addition to suppletion, reduplication in Koasati also marks the plural event. Kimball (1991: 325) describes reduplication as marking the repeated event occurring in 'discrete segments' for active verbs and as marking 'multiple, separate occurrences of state' in stative verbs. Examples of reduplication in Koasati are given in 29.

(29)

a.	a**ló**:tkan	alot.**ló**:.kan	'to be full'	
b.	**co**fóknan	cofok.**có:.**nan	'to be angled'	
c.	**la**pátkin	lapat.**ló:.**kin	'to be narrow'	(Kimball 1991: 325)

29 shows that the reduplicative affix copies the first consonant of the root onto a *Co*-template which is then infixed between the ultimate and penultimate syllable. Reduplication provides evidence for a number node in the verbal structure. Since reduplication is root-affecting by infixation, the #-head must be low in the structure of the verbal complex.

4.3 Samoan (Austronesian)

Veselinova (2006) also describes participant number suppletion in Samoan.[8] In addition, Mosel and Hovdhaugen (1992) show that plural participants and events are marked by reduplication in Samoan. Furthermore, verbal reduplication is realized as either an affix or an infix**.** A partial reduplicative affix copies CV from the penultimate syllable (which bears stress, Zuraw et. al 2014), which is shown in 30.

(30) a.	‘emo	**‘e‘**emo	‘blink’	.	
b.	goto	**go**goto	‘sink, set’		
c.	ālofa	**ālo**lofa	‘love’	(Mosel & Hovdhaugen 1992: 220)	

These examples show that reduplication is a prefix when the root is bisyllabic in 30a, b but surfaces as an infix in the root when it is composed of three syllables as in 30c.

Reduplication in Samoan, therefore, syllabifies before the penultimate syllable and surfaces as an affix or infix depending on phonological form of the root. This provides evidence that a reduplicative affix must be inserted at a #-head in the verbal structure. Hence, Samoan provides further evidence that reduplication and suppletion have overlapping distribution for participant number and can be marked at a #-node.[9]

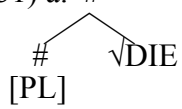
[8]However, Veselinova (2006) does not provide examples of these suppletive verbs. Pratt (1911) provides examples of ‘irregular verbs’ that mark plurality in Samoan as in (ii).

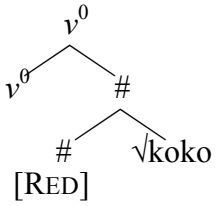
(ii)	Singular		Plural	
(a)	sau	‘to come’	o	
(b)	alu	‘to go’	o	
(c)	momo’e	‘to run’	taufetuli/femo’el	
(d)	nonoa	‘to tie’	palasi	
(e)	pālasi	‘to drop down’	noatia	(Pratt 1911: 33)

[9] Further evidence that participant number is marked at a head node comes from *s*-infixation in Koasati and overt affixation of *fe-* (pl. events) and *ta-* (pl. participants) in Samoan. See Thornton (2017) for further details.

4.4 Root-affecting reduplication at a #-node

In earlier work, I have argued that root-affecting reduplication must be inserted low in the verbal structure since it changes the root's syllabification. (Thornton 2015). The structure in 31a shows the morphological complex of the root and number prior to VI. In this structure, a [PL] feature is inserted on #, which is realized as a reduplicative affix ([RED]) in 31b. A derivation for the verb in 25d follows in 32.

(31) a. 

b. 

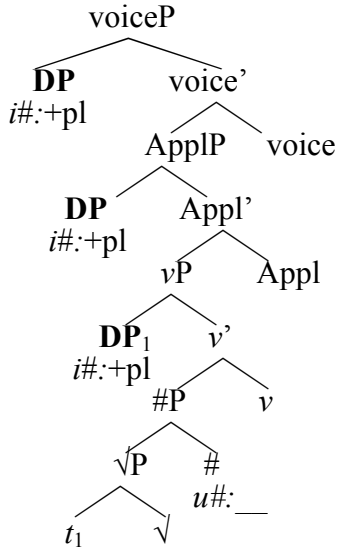
(32) a.	[√ koko]	V.I. @ √
b.	[#RED [√ koko]]	V.I. @ #
c.	[v^o[# [√ kokko]]]	Resyllabification: Gemination

In 32b, the reduplicative affix is inserted at number. This is followed by resyllabification in 32c where the reduplicative affix is syllabified internal to the root. Reduplication, therefore, is able to phonologically affect the form of the root via infixation since the number head is low in the morphological structure. Since this head is internal to the category-defining domain, it is able to phonologically affect the form of the root by both suppletion and reduplication.

5 Locality conditions on agree

I have argued that the trigger for participant number suppletion in both Northern Paiute and Hiaki is the #-head. In Hiaki, only internal arguments agree with the #-head, and in Northern Paiute, the closest c-commanding argument agrees with the #-head. I repeat 20 as 33 here.

(33)



The difference between Hiaki and Northern Paiute's patterns of participant number suppletion is a difference on the locality conditions of agreement. Referring back to 33, Hiaki's locality condition on agreement is internal to the *v*P, but in Northern Paiute, arguments internal and external to *v*P agree with the number head.

This analysis suggests that the category-defining domain plays a privileged role internal to the morphological word. That is, features may agree with those of higher heads in the syntax; however, VI is only triggered by a head within this domain. Thus, the head which conditions suppletion is in the complex X^0, but its features can be valued in the syntax prior to VI.

6 Conclusion

In conclusion, I have argued that there are no word-external triggers on suppletion, and the trigger is always in the complex X^0 (i.e. morphological word). I have provided cross-linguistic evidence from reduplication for participant number that there is a number node internal to the verbal word. I have argued that this number head may agree with a word-external head during syntax and prior to Vocabulary Insertion. Differences in Hiaki (Bobaljik & Harley 2017) and Northern Paiute (Toosarvandani 2016b) can, therefore, be accounted for by differences on the locality conditions of agree between the argument and the #-head. Thus, participant number

suppletion is triggered by a verb-internal #-head during spell-out of the category-defining domain.

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The interaction between scalar particles and illocutionary force in imperatives

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1 Illocutionary restrictions on particle elements

In many languages, focus particles double as so-called discourse particles (also: modal particles), which are also focus-sensitive and often diachronically derived from focus particles (Zimmermann 2011). Discourse particles are richly attested in Germanic, Slavic, and South East Asian languages (Biberauer et al. 2014, Grosz 2016b, Zimmermann 2011). It is controversial whether discourse particles are functionally and/or lexically articulated in Romance (e.g., Cardinaletti 2015, Manzini 2015).

It is well known that the occurrence of discourse particles is restricted by the illocutionary potential of the clauses that contain them. Since the particles make a semantic contribution by codetermining the illocutionary force of an utterance, they are geared to certain clause types (declarative, polar interrogative, *wh*-interrogative, exclamative, imperative, etc.) and arise mainly in root clauses. Observe the following contrast, showing that the particle *denn* (lit. 'then') can only occur in interrogatives (1a,b) and not, for instance, in imperatives (1c):

(1) a. Wo fährt er denn hin?
where travels he PART to
'Where is he traveling to? (I am wondering.)'

b. Ist er denn nach Berlin gefahren?
is he PART to Berlin traveled
'Did he travel to Berlin? (I am wondering.)'

c. * Fahr denn nach Berlin!
travel PART to Berlin
'Travel to Berlin!'

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The particle *denn* expresses an attitude of wondering and being concerned on the part of the speaker (for semantic details on *denn*, see, e.g., recent work by Csipak & Zobel 2014). According to the literature, one component of expressing this attitude is that *denn* indicates that the reason for posing the question can be found in the current discourse context. To illustrate, let us look at König's (1977) famous example ('#' indicates systematic pragmatic deviance):

(2) A weckt B und fragt ('A wakes up B and asks')
Wie spät ist es denn?
how late is it PART
'What time is it? (I am wondering.)'

The example in (2) illustrates that questions featuring *denn* are infelicitous when the addressee lacks a context in which to interpret the question; in other words, the particle *denn* is pragmatically deviant in out-of-the-blue questions. This already indicates that discourse particles are not only confined to different clause types and their general illocutionary potential. Rather, the use of discourse particles is also restricted to certain illocutionary subtypes within the same clause type.

One illustrative case that brings out this property even more clearly and that will play a central role in this paper is the (in)compatibility of particle elements with different types of imperative speech acts. There is some work on the felicity of particle elements in imperatives in the domain of discourse particles (see Schwager 2010, Grosz 2011a on German, and Davis 2009 on Japanese). Consider the following examples featuring the German discourse particles *ruhig* (lit. 'quiet') and *bloß* (lit. 'only'); paraphrases of the particles' meaning contributions are adopted from Schwager (2010) and Grosz (2011a):

(3) a. Fahr ruhig nach Berlin! Keine Sorge!
travel PART to Berlin no worries
'Just travel to Berlin, no worries!'
b. # Hörst Du? Fahr ruhig nach Berlin! Sonst wirst Du bestraft!
hear you travel PART to Berlin or.else will.be you punished
'Do you hear me? Travel to Berlin! Or else you'll be punished.'

(4) a. # Fahr bloß nach Berlin! Keine Sorge!
b. Hörst Du? Fahr bloß nach Berlin! Sonst wirst Du bestraft!

While the particle *ruhig* can be used in PERMISSIONS or RECOMMENDATIONS (3a), it is infelicitous in COMMANDS or WARNINGS (3b). The reverse holds for the particle *bloß*, as illustrated in (4).

As already mentioned at the outset of this section, many discourse particles (e.g., *bloß* above) have homophonous counterparts in the inventory of focus particles. However, focus particles, in contrast to discourse particles, do not display illocutionary restrictions like the ones we illustrated above for discourse particles (e.g., König 1991, Beck 2016). However, it is fair to say that no systematic attention has been paid so far to the occurrence of focus particles in different kinds of speech acts (Iatridou & Tatevosov 2016 is a recent exception). In what follows, I will focus on the use of focus particles in imperatives and deal with the new observation that the occurrence of scalar focus particles associated with so-called emphatic focus is subject to constraints at the level of illocutionary force. Let us first turn to the English particle *even*.

2 Imperatives and the particle *even*

The literature on *even* is one of the richest in the field of research on focus particles (for comprehensive overviews, see Crnič 2011, Giannakidou 2007). However, the following observation has not been discussed so far: the particle *even*, in contrast to other focus particles (see the examples below), seems to be pragmatically deviant in imperative speech acts like the following (capitals indicate focal stress):

(5) # Come even to the JAZZ event! I know you don't like jazz, but all concert events at Davies Symphony Hall are great!

But why is that the case? Note that in principle all other kinds of clause types and speech acts, respectively, are compatible with the reading of *even* intended in (5):

(6) a. Keith even played *Over the RAINbow*!

b. Why are you coming even to the JAZZ event? I know you don't like any sophisticated music, and Jazz can be very experimental.
c. Has Keith even played *Over the RAINbow*? He hasn't played that song for years!
d. (My,) What beautiful music Keith even composes NOwadays!

Before we look at the presuppositions of both the particle *even* and the imperative in (5) in more detail, let me already highlight at this point that the data given above suggest that the incompatibility of *even* with imperatives is not due to a general factuality/evidentiality implicature associated with *even*.

To see this, consider (6c) again. The use of *even* in this example implicates that the speaker has evidence that Keith played the song *Over the Rainbow*.[1] It is well known that factual/evidential elements cannot occur in imperatives because they express that the speaker has evidence for the prejacent proposition *p*, while, at the same time, the speaker wants *p* to come about. Observe, for example, the case of evaluative adverbs:

(7) # Come surprisingly to the JAZZ event!

However, such factual/evidential elements are claimed to be ruled out also in questions (e.g., Ernst 2007). Here is the classical example by Bellert (1977: 343):[2]

(8) # Has John surprisingly arrived?

Accordingly, there must be another reason for why *even* is pragmatically deviant only in imperatives.

To approach an explanation, let us now turn to the two presuppositions of *even* in (5). First, we can disregard the hypothesis that the oddness of (5) is due to the existential presupposition

[1] Since I consider the following question coherent, I claim that the prejacent proposition is implicated by the use of *even* and not presupposed:
(i) Has Keith even played *Over the RAINbow*? Or did I mishear?

[2] I am aware of the fact that there is some recent discussion on the acceptability of such examples, especially in Romance languages (Mayol & Castroviejo 2013). However, as for the languages to be discussed in this paper (English and German), I take examples such as (8) to constitute a quite robust pattern. Further cross-linguistic verification of my claims must await future research.

triggered by *even* (Karttunen & Peters 1979). This presupposition requires that at least one focus alternative in the domain of *even* that is not identical to the alternative expressed by the original sentence holds true.[3]

(9) a. Keith even played *Over the RAINbow*!

b. $\exists$ x [x ≠ Over the Rainbow $\wedge$ C(x) $\wedge$ played (Keith, x)]

The existence of alternatives is the contribution of focus (Rooth 1985). Since the presupposition in (9b) also holds for other additive particles like *also*, we can exclude that the deviance of (5) is caused by (9b). Imperatives with particles like *also* are perfectly acceptable:

(10) Come also to the JAZZ event!

The second presupposition triggered by *even*, also mentioned in the seminal work by Karttunen & Peters (1979), distinguishes *even* from other additive focus particles:

(11) a. Keith even played *Over the RAINbow*!

b. $\forall$ x [x ≠ *Over the Rainbow* → likelihood (Keith playing x) > likelihood (Keith playing *Over the Rainbow*)]

According to the scalar presupposition in (11b), the value of the *even* phrase is to be placed at the lowest end on a scale of likelihood. In other words, the *even* phrase picks out the least likely individual from the given set of focus alternatives. Note that other readings of *even* ([12]; 'weak' *even*) also feature a scalar presupposition (see Crnič 2011 on weak *even*). However, we observe that this reading is compatible with imperatives:

[3] I should point out that this presupposition is not uncontroversial. For instance, Collins (2016: 7) gives the following example in a recent paper: 'A dog food company is developing a new dog food. The product is ready for testing. No dog has ever tasted it before. Now, I have a dog named Rover. I decide to feed the new product to him to see if he likes it. When I feed it to him, he gobbles it up. This is strange to me, since Rover is very picky. He doesn't like any food at all really.' Collins points out that in this situation one could say:

(i) I predict this dog food will be very popular. Even Rover likes it.

There is no existential presupposition in this case because no dog other than Rover has ever eaten this dog food. However, since the reasoning of this paper does not hinge on this particular presupposition, I will disregard these complications.

(12) Come even to ONE event! I know you will probably not make it to all events of the jazz festival, but it would be great if you would come at least once!

Crucially, in contrast to *even* in (5), *even* in (12) does not express that the value of the *even* phrase is to be placed at the lowest end on a scale of likelihood. The reverse is true: *even* in (12) presupposes that the prejacent is to be placed at the upper end on a scale of likelihood. That is, the proposition that the addressee comes at least to one jazz event is not the least likely, but rather the most likely proposition, given the alternatives that he would come to some or all events of the jazz festival. This meaning contribution can be summarized as in (13):

(13) $\exists$ n [n ≠ one $\wedge$ Hearer goes to n events] $\wedge$ $\forall$ n [n ≠ one → likelihood (Hearer goes to one event) > likelihood (Hearer goes to n events)]

All in all, the felicity of other scalar readings of *even* suggests that we can disregard the hypothesis that scalarity per se excludes *even* in contexts such as (5). Rather, it is the unlikelihood presupposition that seems to be at odds with imperative speech acts like (5).

With the presuppositions of *even* in place, let us now turn to contexts where *even* is perfectly acceptable in imperative speech acts. Look at the following case, one possible use of *even* in imperatives:

(14) A: I'll try to get a ticket at the box office tonight. I think I'll go to Davies Symphony Hall one hour before the performance.
B: Be there even TWO hours before it starts! Keith Jarrett is famous – a lot of people will ask for remaining tickets!

In (14), Speaker B is correcting Speaker A's expectations that he has regarding purchasing a ticket.[4] In an advice use of imperatives such as (14B), the speaker is an epistemic authority on

[4] Note that one could argue that *even* in (14B) operates on a specific scale of numbers only and is thus not a propositional operator as in our key example (5). Ever since Jacobs' (1983) discussion, this is a hotly debated issue. However, one could also come up with sequences like *Go to the FOLK event! Go to the ROCK event! Go even to the JAZZ event!* to illustrate that *even* can be used in imperatives, given the appropriate information structural conditions (to be elaborated in the next paragraphs below). The choice of example in (14) is motivated by my impression that this information structural dependence of *even* is best exemplified by narrow-focus constellations as in (14).

ways to achieve a certain goal, and, in our case, Speaker B knows perfectly well that one has to be two hours earlier at the venue to get some tickets. Accordingly, Speaker B does not rank this fact as particularly unlikely or surprising to himself (actually, the opposite is true). The reason for using *even* in advices like (14) is that the speaker updates the belief state of the addressee by providing a particular information and that this information is taken to be surprising to the addressee only.

Crucially, *even* can only be used in imperatives when the goal to be achieved by acting according to the imperative is in the interest of/is preferred by the hearer. Consider the following example:

(15) Child: OK, mom. If you really insist, I'll clean one corner of my room today.
Mother: # Clean up even {TWO/the other three} corners of your room! Your grandma is going to visit us tomorrow, and I don't want her to see this mess!

We thus see that the felicity of *even* in imperatives depends on discourse-anaphoric factors, insofar as (i) the speaker needs to correct the belief state of the addressee and (ii) the goal to be achieved by carrying out the required action is in the interest of the hearer. Note that these pragmatic restrictions are not only due to the additive semantics of the particle in examples like (14). For instance, the additive particle *also* is perfectly acceptable in imperatives even if the goal of the imperative goes against the preferences of the hearer:

(16) Child: OK, mom. If you really insist, I'll clean one corner of my room today.
Mother: Clean up also the other three corners of your room! Your grandma is going to visit us tomorrow, and I don't want her to see this mess!

This indicates that not additivity, but rather the scalar unlikelihood presupposition (which is not expressed by particles like *also*) is the reason for the pragmatic restrictions illustrated above.

To be sure, the additivity of the particle *even* is a crucial component of the felicity of examples such as (14). By means of this semantic component, the speaker adds to what is already assumed by the hearer (e.g., 'To get some tickets, it is necessary to be at Davies Symphony Hall one hour before the show'). In other words, the imperative with *even* in (14) is contradicting only the false belief about a putative upper bound, and it is not denying what Speaker A has asserted: if

it is true that one has to be at the venue two hours before the event, then it is also true that one has to be there one hour before the event. In the next section, we will turn to cases where the scalar particle lacks this additive component, but nevertheless expresses the unlikelihood presupposition.

3 Imperatives and emphatic focus

As already stated above, the aspect of *even* in our key example (5) that seems to be incompatible with imperatives is the unlikelihood presupposition. In the literature, and in a broader perspective, this presupposition has also been analyzed as association with so-called 'emphatic focus'.

Krifka (1995: 227) has argued that "[t]he function of emphatic focus is to indicate that the proposition that is actually asserted is *prima facie* a particularly unlikely one with respect to the alternatives." He argues that this meaning effect represents a general type of focus that is made explicit with particles like *even* or idiomatic constructions like *of all persons* (examples by Krifka 1995: 227):

(17) a. Mary knows every place on earth. She has (even) been to BORneo!
b. People expected that John would win the election, followed by Bill, with Mary as a distant third. But then the election was won by MARY (of all persons)!

(17a) exemplifies the same reading of *even* as given in (5) and explicated by the unlikelihood presupposition in (11b) above. While *even* in this sense is the lone exemplar in the inventory of English particles associated with emphatic focus, languages other than English have many more focus particles associated with the expression of unexpectedness.

German can express the meaning of constructions like *of all persons*, *of all things*, etc. (see [17b] above) by the focus particle *ausgerechnet* (*even* in [17a] would be lexically expressed by the focus particle *sogar*). There is a crucial difference between *even* in (17a) and *ausgerechnet*. While *even* (or the German equivalent *sogar*) is additive/inclusive in (17a), *ausgerechnet*, like the expression *of all persons* etc., is exclusive in (17b). In other words, inclusive *even* presupposes that all focus alternatives are true, while exclusive *ausgerechnet* presupposes that all focus alternatives are false.

Let me hasten to add that, as is the case with *even* (see FN3 above), one could come up with examples showing that not all cases of association with *ausgerechnet* are exclusive in this sense and that the exclusive component of *ausgerechnet* is in fact much weaker than that of, for example, *only*.[5] However, the seminal literature on this topic draws this distinction (e.g., König 1981), and it is certainly fair to say that the prototypical use of these particles is inclusive on the one hand (*even/sogar*) and exclusive on the other hand (*ausgerechnet*).

To formalize this distinction and, at the same time, to capture the common presuppositional core of these particles (i.e., they both express emphatic focus), Krifka (1995) has proposed an emphasis operator 'Emph.Assert', and Eckardt (2001), adopting his approach, has suggested two different emphasis operators for these different forms of association with emphatic focus ('$p <_c q$' stands for 'p is less likely than q, given the information in the common ground c'; focus alternatives are formalized according to Rooth 1985, i.e., 'o' is the ordinary semantic value and 'f' labels the focus semantic value), see Eckardt (2001: 394):

(18) **Additive.Emph.Assert** ($[\![S]\!]^o$, $[\![S]\!]^f$) in context c

Assertion: $[\![S]\!]^o$

Presupposition: (i) $\forall p \in [\![S]\!]^f \backslash [\![S]\!]^o: [\![S]\!]^o <_c p$

(ii) $\forall p \in [\![S]\!]^f \backslash [\![S]\!]^o: p$

(19) **Exclusive.Emph.Assert** ($[\![S]\!]^o$, $[\![S]\!]^f$) in context c

Assertion: $[\![S]\!]^o$

Presupposition: (i) $\forall p \in [\![S]\!]^f \backslash [\![S]\!]^o: [\![S]\!]^o <_c p$

(ii) $\forall p \in [\![S]\!]^f \backslash [\![S]\!]^o: \neg p$

[5] Consider the following example:

(i) Hans ging zu einer Party und hat neben vielen alten Freunden ausgerechnet (auch) seine Exfreundin getroffen!
Hans went to a party and has among many old friends of.all.guests (also) his ex-girlfriend met
'Hans went to a party and, among many old friends, he met his ex-girlfriend (of all guests)!'

While it would be impossible for exclusive *nur* ('only') to associate with the focus constituent *seine Exfreundin* ('his ex-girlfriend') in this example, *ausgerechnet* is perfectly acceptable in this context.

What is crucial in our context is that the particle *ausgerechnet*, like its additive counterpart *even* (or German *sogar*), is not compatible with imperatives:

(20) # Komm ausgerechnet zum JAZZkonzert!
come of.all.places to.the jazz.concert
'Of all places, come to the jazz concert!'
Ich weiß, Du magst keinen Jazz, aber Jazzkonzerte sind das einzige, was sich in der Davies Symphony Hall wirklich lohnt!
'I know you don't like jazz, but jazz concerts are the only thing that's worth a visit at Davies Symphony Hall!'

This shows again that the incompatibility of certain scalar particles with imperatives is not due to additivity (or upward and downward monotonicity as discussed by Beaver & Clark 2008: 70-79), but rather due to association with emphatic focus – the common presuppositional core of *even* and *ausgerechnet*.

Note now that *ausgerechnet* is perfect in negated imperatives. Observe the following example from Poźlewicz (2006: 180), based on a corpus of German newspapers:

(21) Nimm nicht ausgerechnet den schwarzen Pulli mit!
take not of.all.things. the black pullover with
'Of all things, don't take the black pullover with you!'

The same holds for English *even*:

(22) Don't take even the black pullover with you!

However, in the case of *even* and *ausgerechnet* in negated imperatives, the prejacent proposition is not the least likely, but rather the most likely alternative:

(23) $\forall$ x [x ≠ *black pullover* → likelihood (Hearer takes black pullover with him) > likelihood (Hearer takes x with him)]

Thus, according to the notion of emphatic focus introduced above, these examples do not express emphatic focus.

Given the different presuppositions of *even* and *ausgerechnet* in (18) and (19), I will now show that the advice-type use of *even* we saw in Section 2 (example [14]) is not possible with exclusive *ausgerechnet*. In other words, there is no way to use this particle in imperatives, no matter what the information structural precontext looks like. This is due to the following semantic feature: In contrast to *even*, the exclusive particle *ausgerechnet*, due to its presupposition (19/ii), does not monotonically add to what is already assumed. While the particle *even* is upward monotonic in that it allows for still stronger statements, exclusive particles like *ausgerechnet* are downward oriented in the sense that they set a limit on the upper bound that additive particles like *even* remove. This is why *ausgerechnet* cannot be used in imperatives, whatever the information structural context is (24), whereas other exclusive particles such as *nur* ('only') can be used in imperative speech acts (25):

(24) Child: I'll use a broom and the vacuum to clean my room.
Mother: # Nein, nimm ausgerechnet einen feuchten Lappen! Auch wenn Du das nicht
no use of.all.things a damp cloth even if you that not
glaubst, aber das ist die beste Lösung!
believe but that is the best solution
'No, use a damp cloth (of all things)! Even if you don't believe it, it's the best solution![6]

(25) Child: I'll use a broom and the vacuum to clean my room.
Mother: Nein, nimm nur einen feuchten Lappen! Auch wenn Du das nicht
no use only a damp cloth even if you that not

[6] The particle *ausgerechnet* can only be used if the imperative is used insincerely as in the following example (see Section 4 below on details of such insincere uses):
(i) Klar, nimm ausgerechnet einen feuchten Lappen! So verschmierst Du
of.course use of.all.things a damp cloth this.way smear you
dann den Dreck! Ganz toll!
then the dirt totally great
'(Ironic:) Of course, use a damp cloth (of all things)! This way, you'll smear the dirt around! Well done!'

glaubst, aber das ist die beste Lösung!
believe but that is the best solution
'No, use only a damp cloth! Even if you don't believe it, it's the best solution!

Since other exclusive particles like *only* are perfectly acceptable in imperatives, and since additive *even* can only be used in an advice-type use as illustrated in Section 2, we may still conclude that what restricts the occurrence of scalar particles in imperatives is association with emphatic focus – the meaning component shared by *even* and *ausgerechnet*. In the next section, we will see that this restriction is not due to the clause type of imperatives, but rather due to imperative force. In this context, we will identify which pragmatic presuppositions of imperative force are incompatible with the unlikelihood presupposition expressed by emphatic focus.

4 Scalar particles and imperative force

Let us now turn to the incompatibility of imperatives and emphatic focus in more detail. First, note that declaratives where modal verbs are used performatively are also pragmatically deviant with both *even* and the German cases of association with emphatic focus discussed above. The following examples should be understood as actual directives and not as a report of something that has previously been said:

(26) a. # You should even come to the JAZZ concert!
b. # Du sollst {ausgerechnet/sogar} zum JAZZkonzert kommen!
you should of.all.events/even to.the jazz.concert come
'You should (even) come to the jazz event (of all events)!'[7]

[7] There is a felicitous reading of these configurations where the modal verb receives heavy stress, and the scalar particle takes narrow scope over the modal:
(i) A: Darf ich zum Jazzkonzert kommen?
may I to.the jazz.concert come
'May I come to the jazz concert?'
B: Nein, Du SOLLST sogar zum Jazzkonzert kommen!
no you should even to.the jazz.concert come
'No, you even should come to the jazz concert!'

These data suggest that the restriction sketched in the previous sections is not due to the clause type of imperatives, but rather due to directive force as realized by adding a modal proposition to the common ground.

Modal verbs can of course also occur in descriptive contexts. On its descriptive use, a sentence like in (26a) above conveys information about a present state of affairs. That is, the speaker informs the hearer of an already existing advice or obligation, which may or may not have come about by means of a prior speech act performed by the speaker or by someone else. In this case, the use of *even* (and also of the German cases) is felicitous:

(27) You should even come to the JAZZ concert. [That's what your girlfriend said.]

On the performative use of modals, on the other hand, the ADVICE, COMMAND, etc. is brought about by the speaker in the act of uttering the sentence. Accordingly, imperative sentences behave in crucial ways just like performatively used declaratives with the respective modals. The main difference is that imperatives cannot be used descriptively.

The analysis of imperatives by Kaufmann (2012, 2016) builds on these connections between imperatives and modalized declaratives and aims at modeling the force of imperatives. To this end, Kaufmann suggests a set of (pragmatic) presuppositions that are uniquely associated with imperatives qua clause type. In a nutshell, these presuppositions serve as felicity conditions preventing imperatives from being used in contexts in which corresponding modalized declaratives would be used descriptively, as in example (27) above.

Since Kaufmann's account thus formulates pragmatic properties that imperatives and the performative usage of modalized declaratives have in common, and since we saw that emphatic focus is pragmatically illicit exactly in these two domains, I will refer to her approach in order to identify the presuppositions that are incompatible with emphatic focus (for overviews of other prominent approaches to imperatives, see Han 2011, Portner 2016).[8] Let us thus look at the relevant

Again, this use can be analyzed as a (corrective) advice that is in the interest of the hearer (see our key example [14] in Section 2). Accordingly, no such use would be possible with exclusive *ausgerechnet* or in cases where the hearer does not prefer to come to the jazz concert (i.e., where the advice would be against the hearer's preferences).

[8] The choice of this particular theory is also motivated by other issues. On the one hand, Portner's (2007, 2016) account makes essential reference to the addressee and has thus been criticized for disregarding wish-type uses that have no addressee (*Please, stop raining for once!*). As far as I can tell, these cases fare no better with emphatic focus (# *Please, stop even raining for once!*), and hence they should be included in our explanation (see also example [34a] below). On the other hand, Han (1998 et seq.) does not provide an account of how the modal component and the force

presuppositions carried by imperatives in more detail (Kaufmann 2012: 155-163) and, in doing so, find out why these presuppositions and those of emphatic focus discussed in the previous sections cannot be satisfied simultaneously.

The first constraint that is relevant for our discussion is the *Epistemic Uncertainty Constraint* (EUC). Observe that issuing an imperative ϕ! is infelicitous if the speaker is sure that ϕ is going to happen or will not happen, as shown in (28); example and judgments by Kaufmann (2012: 156):

(28) # Ich weiß, dass du das auf {jeden/keinen} Fall tun wirst, also tu's auch.
I know that you that in any no case do will so do.it too
'I know that you are going to do this no matter what, so do it also.'

EUC refers to the speaker's expectations prior to his use of the imperative. This constraint does not rule out that a speaker is convinced that his imperative will be obeyed, and that the epistemic uncertainty is thus removed by the use of the imperative. This state of expectations is captured by the presuppositional details of EUC (Kaufmann 2012: 157; '*Bel*' maps the speaker *S* and a world *w* to the set of worlds constituting the speaker's belief set in *w*; *Bel'* is a version that also takes into account a time argument *T*):

(29) The precontext *c'* of *c* is such that for all $w \in CS(c')$:
$(\exists w' \in Bel'_{cS}(c'_T)(w))(\exists w'' \in Bel'_{cS}(c'_T)(w))[\neg p(t)(w') \,\&\, p(t)(w'')]$
(= the speaker believes that both $\neg p$ and p are possible).

However, in this context Kaufmann (2012) points out felicitous uses like the following example:

(30) a. Be home at 5!
b. Those alternatives that are *most plausible according to what I take to be the usual course of events*, are such that you are at home at 5.

component interact in discourse, and thus her account is lacking a definition of the pragmatic properties of imperatives that are of interest to us in this paper.

In this case, it is absolutely coherent that the speaker believes that both *p* and ¬*p* are possible (EUC), while, at the same time, he believes that *p* is a necessity with respect to what is most plausible or the usual course of events. Given examples of this kind, Kaufmann concludes that what is additionally involved when (30a) is uttered felicitously is a non-empty ordering source in the sense of Kratzer (1991, 2012), and that this ordering source is usually modeled according to preferences and goals, respectively, in imperative cases. This is captured by the second constraint, the *Ordering Source Restriction* (OSR); see Kaufmann (2012: 160):

(31) Either (i) in *c* there is a salient decision problem $\Delta(c) \subseteq \mathcal{P}(W)$ such that in *c* the imperative provides an answer to it, *g* is any prioritizing ordering source, and speaker and addressee consider *g* the relevant criteria for resolving $\Delta(c)$;
or else, (ii) in *c* there is no salient decision problem $\Delta(c)$ such that the imperative provides an answer to it in *c*, and *g* is speaker bouletic.

Kaufmann discusses examples demonstrating that in many cases the ordering source is mutually accepted by both the speaker and the addressee (hence the notion of a common salient decision problem). However, crucial in our context is that OSR expresses that either the ordering of preferences/goals (= *g*) is mutually shared by speaker and hearer, or *g* is only accepted on the part of the speaker (i.e., wish-type uses). Accordingly, it is never possible that the ordering of preferences is determined by the hearer only.

In the case where *g* is determined from the perspective of the hearer only, and the speaker thus does not share *g*, we observe a pragmatically deviant form in the sense that this constellation results in an insincere way of speaking, often featuring 'a confrontational flavor', as Kaufmann (2012: 161) puts it. Consider example (32):[9]

(32) Dann geh eben auf diese verdammte Party. Ich kann dich ja eh nicht
then go PART to this damn party I can you PART PART not

[9] The following German example contains the discourse particles *eben*, *ja*, and *eh*. These particles all convey that the proposition is rather uncontroversial or even self-evident. In contexts like (32), the speaker can use these particles to additionally emphasize both the resignation and frustration of his utterance (i.e., he already takes it as uncontroversial and unchangeable that his and the hearer's preferences/goals diverge considerably and that he will have no real impact on the hearer's actions).

hindern.
impede
'Well, then go to that damn party. I cannot keep you from doing so anyways.'

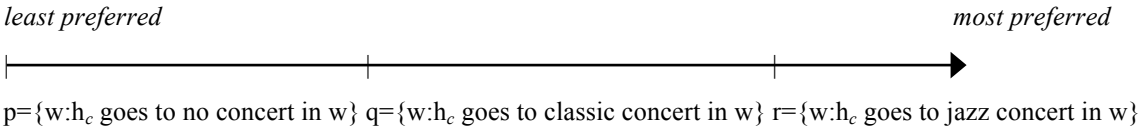
The OSR thus ensures that a felicitous and sincere use of the imperative excludes cases where the orderings of preferences/goals of the speaker and the hearer considerably diverge, and the imperative operates on the ordering determined by the hearer only.

With both the EUC and the OSR in place, we can now return to our infelicitous cases of imperatives containing particles associated with emphatic focus. By using *even* and the German particles discussed above, the speaker expresses that he considers it very unlikely that *p* would come about. Only if *even* associates with a focus constituent that corrects the hearer's expectation or belief state, the unlikelihood presupposition does not refer to the speaker's belief state (as in our example *Be there even two hours in advance!*, see above). In these corrective statements, we obtain a felicitous reading of *even* in imperatives. In all other cases where the speaker expresses that he considers it very unlikely that *p* would come about, *even* and related German particles are infelicitous in imperatives. To explain this infelicity, we must hence look at the likelihood scale from the speaker's perspective.

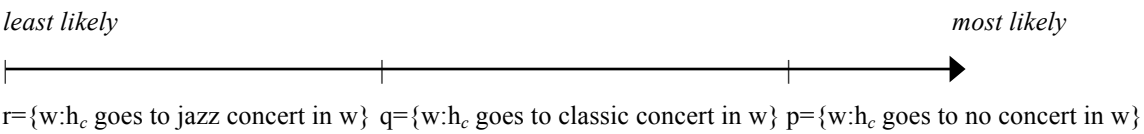
As for the semantics of the imperative, we can take the perspective of the speaker concerning the ordering of preferences. That is, while the ordering of preferences need not be shared by the hearer, there is no sincere use of imperatives where the ordering is against the goals/preferences of the speaker (see the OSR above). Accordingly, both concerning the likelihood scale and regarding the preference scale, we can take the perspective of the speaker to explain the infelicity of *even* and related particles in imperatives.

To illustrate, let us assume that the speaker prefers a world where the hearer is going to a jazz concert over a world where the hearer is going to a classic concert. However, at the same time he prefers a world where the hearer is going to a classic concert over a world where the hearer is going to no concert at all. To clarify this constellation, let me adopt an illustration used by Grosz (2011b: 88) in a different context (h_c = hearer in context *c*):

(33) a. *sample preference scale*



b. *sample likelihood scale*



The reversal scheme expressed by the scales in (33) makes clear that uttering an imperative containing *even* means that at least the speaker prefers the proposition *r* (according to the OSR), which, at the same time, he considers most unlikely to become true. Of course, one can prefer something very unlikely to become true. This is in fact the point of many wish-type uses of imperatives (see also FN 5 above). However, by using *even*, which conventionally encodes the property of unlikelihood, a speaker explicitly states that *p* is most unlikely. The use of *even* is thus on a par with explicit statements that something is very unlikely as in the following sequence of utterances (34a), which is also pragmatically deviant. (34b), on the other hand, is perfectly acceptable if the modal is not used performatively.

(34) a. # Please, stop raining for once! Although it is most unlikely that the rain will stop.
b. It should stop raining, although it is most unlikely that the rain will stop.

In the previous literature, we only find the observation that "it is infelicitous to follow an imperative with a sentence that expresses the speaker's belief that the situation described by the proposition of the imperative will not be realized" (Han 1998: 168). Consider the following example from Han (1998: 168):

(35) # Eat this fish! But you won't.

Accordingly, speakers who sincerely utter imperatives seem to presuppose that *p* expresses a state of affairs that might be realized (see the EUC above). Ninan (2005: 161) puts this in Bayesian

terms. In general, it is rational for the speaker to undertake an action A in order to achieve a goal G only if the speaker's probability for G given A is non-zero. In particular, I would only ask someone to go to a jazz concert if the possibility is not categorically excluded that he is (e.g., physically) able to go.

Crucially, the case of particles associated with emphatic focus in imperatives now shows that the threshold for acting rational in the context of uttering an imperative actually lies somewhat above zero. That is, uttering an imperative can also be infelicitous if the speaker considers it most unlikely that G will be achieved. This suggests that the epistemic condition expressed by the EUC can also be violated on the basis of a likelihood threshold.

This likelihood threshold may be passed when the imperative is used insincerely – and in this case additionally violates the OSR, like in the following example:

(36) Du willst Präsident werden? Dann versuch es doch! Ich halte es für sehr
you want.to president become then try it PART I consider it for very
unwahrscheinlich!
unlikely
'You want to become president? Well, then go ahead (I don't care)! I think it's very unlikely!'

In (36), the speaker expresses that he does not consider the ordering source used by the hearer as the relevant criterion for resolving the decision problem $\Delta(c)$. The use of the imperative in (36) parallels the insincere use in (32) above. Again, the flavor of frustration and disinterest of such utterances can be emphasized by dedicated discourse particles (in [36] by German *doch*).[10]

In sum, we saw that the presuppositions of imperatives and emphatic focus cannot be satisfied simultaneously. A speaker cannot perform the imperative speech act felicitously without violating the presupposed preference scale of the imperative (OSR) and violating the epistemic condition of the EUC, which seems to be sensitive to a pointing to the lowest end on a scale of

[10] Note that this use of *doch* in imperatives is not mentioned in the comprehensive analysis of *doch* in imperatives by Kaufmann & Kaufmann (2012). Like the other epistemic particles mentioned in FN 6, this particle is often used in 'defiant' discourse moves expressing the speaker's resignation and frustration. Since the investigation of this common effect of these particles would require an in-depth discussion of the individual semantics of the particles in question, I leave it at the paraphrases given above.

likelihood as expressed by association with emphatic focus. As a consequence, we saw that some particles associated with emphatic focus can only be used in a subtype of imperatives (e.g., *even*), while other particles are excluded from imperative speech acts altogether (e.g., *ausgerechnet*).

5 Conclusion

This paper presents the new observation that the occurrence of scalar focus particles associated with so-called emphatic focus is subject to constraints at the level of illocutionary force. Specifically, in the domain of imperative speech acts, these particles are either confined to a subtype of imperatives (e.g., *even* in advice uses) or cannot occur in imperative speech acts at all (e.g., German *ausgerechnet*). Given that emphatic focus is a means to signal that a proposition is a particularly unlikely one with respect to its alternatives, the data in this paper thus demonstrate that the felicity conditions of imperative speech acts are sensitive to a likelihood threshold that has not been observed in the previous literature.

As for research on particles, it is interesting to note that in languages like German, focus and discourse particles are closely related categories. Discourse particles are also focus-sensitive and often double as focus particles (e.g., Grosz 2016a). In addition, discourse particles, when they are stacked, exhibit ordering restrictions (e.g., Thurmair 1989), which is also the case for focus particles (*Peter even also only drank water* vs. **Peter only also even drank water*; see Zimmermann 2011). This paper sheds new light on the closeness of the relationship between these two categories. Specifically, the data above demonstrate that it is worth exploring to what extent discourse-anaphoric requirements of focus particles like *even* restrict the particular use of speech acts – a pattern we also observe in the domain of discourse particles, which also restrict the use of an utterance at the illocutionary level on the basis of their discourse-anaphoric semantics. Accordingly, focus and discourse particles appear even more closely related than previously thought.

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The morphosyntax of exclusives and the underspecificity of *just*

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1 Introduction

1.1 Overview

This paper provides a new framework for describing the degree of variability in a cross-linguistic family of adverbs, often exemplified with English *only*, that can be grouped together under the category of exclusive, or scalar, operators. This family of exclusives can be described by a common core meaning as well as some degree of variation among the particular lexical items. I present a morphosyntactic framework representing this variation among exclusive operators in terms of a core exclusive meaning, [EXCL], which can be separated from the additional requirements each operator is subject to. These are represented morphosyntactically as compositional restrictors on various aspects of the argument of the exclusive. The more of these restrictions present in the lexical item for a given operator, the more constrained it will be in terms of the range of contexts in which it can be used. I will be specifically focusing on the variation between *only*, *merely*, and *just*; however, the framework is extendable to both other English exclusives, as well as to exclusives cross-linguistically.

Within this framework, *merely* will contain a morphosyntactic presupposition [M] that restricts its use to contexts where the alternative set for its prejacent is ordered by some nonentailment scale. Other operators, like *only* and *just*, have no such requirement, and are therefore not subject to that constraint. I argue that we see a parallel issue arise between *only* and *just*, where *only* is subject to constraints on its distribution that *just* is not. In particular, *just* can be used as an exclusive operator in contexts where it does not associate with focus. As a result, I maintain that *just* is the least morphosyntactically complex of the English exclusives, as it is not subject to the scale restriction or the focus restriction. Viewing *just* as underspecified in this way helps us account for its wide range of polysemous uses without overburdening the lexicon with a multitude of similar entries for *just*.

One of these uses of *just*, which I am calling the UNEXPLANATORY use of *just*, will serve as the primary source of new data in this analysis. This is seen in contexts where the speaker uses the word *just* to diminish the importance of or outright deny the existence of a cause or explanation for the eventuality described in the modified sentence. A few examples of unexplanatory *just* are provided in 1 below.

(1) Unexplanatory *just*

a. I was sitting there and the lamp just broke!

b. I walked into the store, saw the necklace, and just took it. I don't know what came over me.

c. He just stopped texting me. (I don't know why).

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This paper will provide an account of uses like those in 1 for *just* as an exclusive operator utilizing the same basic semantic entry as *only* and *merely*. Accounting for such a wide range of uses of *just* requires that we broaden our notion of what kinds of objects can trigger alternative sets. It also will require re-examining the view of operators like *only* and their relationship with prosodic focus as basic and universal. I ultimately argue that mandatory association with focus is one parameter that may be encoded in this morphosyntactic framework, and that it is precisely the lack of this requirement that allows *just* to quantify over such a wide array of alternative sets.

1.2 Organization

In this paper, I will first lay out in §2 some of the existing observations regarding the distributional differences between various exclusive operators, as well as some of the conclusions that have been drawn in the literature based on those observations. In §3 I will give an overview of the ways that *just* fits into the developing exclusive typology and introduce the new data for unexplanatory *just*. Then, in §4, I will introduce my morphological framework. In §4.1, I will demonstrate how it can descriptively account for the scale parameter discussed in §2, and then in §4.2 I will explain how it can account for the data involving unexplanatory *just*. This will involve broadening some of the standard assumptions about the nature of alternative sets as well as the relationship between exclusive operators and prosodic focus. I will then use §5 to conclude and offer some remarks on future directions for research on the typology of exclusives and the structure of alternative sets.

2 Previous observations & analyses

In general, exclusive operators encode a meaning that can be paraphrased as 'x and no more than x'. The prototypical example of an exclusive is usually English *only*, the semantics of which have been quite extensively examined (Horn 1996; Beaver & Clark 2003; Ippolito 2008; Roberts 2011). Exclusives consistently exhibit a two-part meaning consisting of the prejacent proposition and the negation of the relevant alternative propositions to that prejacent. This paper will focus on the negation of alternatives, or the quantificational part of the meaning, as this is the main source of variation among exclusives. The prejacent will largely be ignored in this analysis. However, the question of the at-issue status of the prejacent and how to best formally capture it has been widely debated in the literature. I do not take a formal position in this debate, though where relevant I will assume that the prejacent is presupposed.[1] However, the derivation of the prejacent does not affect my formal treatment of the negative quantification of exclusives. I will generally shorten the lexical entries to only the quantificational part of the meaning, which is demonstrably part of the at-issue content (Beaver & Clark 2003: 214).

2.1 Ordering on the alternative set

One of the primary sources of variation is linked to the set of alternatives over which exclusive operators quantify. Specifically, exclusive operators can differ in how they allow their alternative sets to be related to the prejacent. One

[1] There are some complications with this view, which I am leaving aside for the purposes of this analysis. In fact, the presuppositional content of unexplanatory *just* discussed in §3 is an important question for future research.

way of capturing this is to describe this as a constraint on the ordering or 'scale' on the alternative set (Beaver & Clark 2008; Coppock & Beaver 2011a; Orenstein 2015).

In the classic literature on exclusive operators and alternative semantics, the basic assumption has been that alternative sets are sets of propositions that are ordered by entailment (Rooth 1985, 1992). The prototypical use of *only* exemplifies this type of scale quite neatly, as shown below in 2.

(2) Bill only has 2 dogs. → 'Bill has 2 dogs and no more than 2 dogs.'

In the above example, the prejacent would be the proposition that Bill has two dogs, and assuming focus on the numeral, the alternative set would be composed of propositions involving other numerals, as in 3.

(3) $C = \{\text{Bill has 1 dog, Bill has 2 dogs, Bill has 3 dogs, } \dots\}$

The quantificational part of the meaning of *only* in 2 is usually analyzed as the assertion that every proposition in the alternative set C that is not entailed by the prejacent is false. So here, every proposition about Bill's number of dogs that is not entailed by 2, namely all those involving numerals greater than two, is negated. This behavior can be accounted for with the following lexical entry in 4 for the quantificational assertion of *only*, which is a simplified variant of previous accounts of the semantics for *only*.

(4) $[\![\text{only}]\!] = \lambda C.\lambda p.\lambda w.\forall q[(q \in C \wedge w \in q) \rightarrow p \subseteq q]$ (Rooth 1992; Chierchia 2013)

This entry accounts for a large portion of the uses of exclusives like *only*, specifically any where the alternative propositions can be ordered by an entailment lattice. Some examples of these uses are given in 5 and 6 below, with corresponding paraphrases of the relevant quantification.

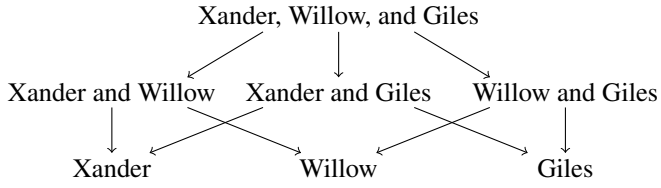
(5) Mary only introduced [Bill]$_F$ to Sue. (Rooth 1992: 3)
→ Mary did not introduce anyone other than Bill to Sue.

(6) It was only Xander at the door.
→ There was no one besides Xander at the door.

Note that *only* is a focus-sensitive operator, and thus the alternative set is constrained to vary according to the realization of prosodic focus in the prejacent (Rooth 1985, 1992; Beaver & Clark 2008). Therefore, in an example like 5, we would get a different set of truth conditions if the focus were on *Sue* rather than *Bill*. This is an important feature of existing accounts of exclusive operators, which I will discuss in more detail in §3.

For a sentence like 6 above, the intended interpretation is that Xander was the only person at the door, i.e. that all propositions in the alternative set not entailed by *It was Xander at the door* are false. The alternative set is the set of propositions of the form 'It was X at the door', varying over contextually salient individuals. This is derived via focus semantics according to standard Roothian alternative semantics (Rooth 1992). The entailment lattice for the propositions involving a model consisting of three such salient indivdiuals is shown below in 7.

(7) Entailment Scale for alternatives varying over individuals:



(adapted from (Rooth 1992: 9))

Following Rooth 1992, we can view the conjunction *Xander and Willow* as the mereological sum $\oplus$ of individuals *Xander* and *Willow*, which entails each conjunct individually. With the interpretation stated above, the entailment relationship shown in 7 can account for the quantificational denial of stronger alternatives of exclusives like *only*.

However, the same sentence could be used to assert a slightly different quantificational meaning. Rather than a statement about the number of people at the door, 6 could be used as a statement about, for example, the importance of the person at the door, represented in 8, with its intended quantificational paraphrase.

(8) It was only Xander at the door.
$\rightarrow$ There was no one more important than Xander at the door.[2]

Under this interpretation, the asserted content we get from the exclusive is that the person at the door was not more important than Xander.[3] For this reading, the entailment lattice is not sufficient to capture the full meaning, as this makes direct reference to a normative ordering over individuals that does not automatically follow from entailment. Though, as will be discussed shortly, some normative orderings can correspond to entailment orderings, which explains cases of ambiguity like this one.

This phenomenon has been observed in the literature, and has been described as the scalar or evaluative use of exclusive adverbs (Beaver & Clark 2008; Coppock & Beaver 2011a; Orenstein 2015). Rather than assuming that exclusives automatically negate alternatives that are not entailed by the prejacent, we can say that exclusives generally negate alternatives that are stronger, given some ordering on the alternative set. As such, for these cases, we will need to formulate a slightly different quantificational denial for exclusive operators. As such, I will modify the semantics to broaden it to any ordering relationship, and not just the $\subseteq$ entailment proposed initially for *only*.

Beaver & Clark 2008, among others, argue that in these cases the alternatives are ordered according to a nonentailment scale, or 'evaluative scale' that is provided by the context. This explains why, unlike with the entailment uses, the ordering relationship among the alternatives can be flipped around in certain contexts. For example, both 9 and 10 are felicitous utterances depending on whether the context values linguists over philosophers or philosophers over linguists, respectively.

(9) I'm only a philosopher. I'm not a linguist.

(10) I'm only a linguist. I'm not a philosopher.

[2]This again disregards the prejacent statement itself. It is clear that we also get the entailment that Xander himself was at the door. Again, this is assumed to be a presupposition for exclusives for the sake of this analysis. See footnote 11 for some discussion of how the analysis presented could be used to derive this presupposition for some scales.

[3]The fact that this is a scale of importance in this example is not crucial. It could just as easily be contextually a scale of, e.g. scariness, as long as Xander is ranked low on that scale.

If this were a pure entailment scale, it could not be flipped in this way, as the low end of an entailment scale is always by definition mathematically the same.

While the examples provided above with *only* can often be used with either the entailment or the evaluative interpretation, some exclusives are restricted to one type of scale (Coppock & Beaver 2011a; Orenstein & Greenberg 2010; Orenstein 2015). In English, we can see this with the adverb *merely*, shown below in 11 and 12.

(11) Mary merely introduced [Bill]$_F$ to Sue.

(12) It was merely Xander at the door.

In both of the above examples, the intuition is that the speaker is minimizing the importance of the prejacent, which is not required with the use of *only*. Furthermore, in 12, for example the asserted content is this minimization, rather than the denial of the existence of someone else at the door.[4] Beyond the intuitive differences in the inferences available, we can also see that *merely* and *only* exhibit different distributions. Specifically, because *merely* requires an evaluative scale rather than an entailment one, when the context values the low end of a scale that could otherwise correspond to entailment, *merely* is not felicitous. *Only*, on the other hand, can be used regardless of which end of the scale is valued; though, when the low end is valued, the scale must be understood as an ordinary entailment scale. This is shown below in 13 and 14.

(13) Colleges will only look at people who have fewer than five disciplinary infractions, which is great for me, because I #merely/✓only have two![5]

(14) Those guys will only let you join their club if you have more than five disciplinary infractions, which is bad for me, because I ✓merely/✓only have two.

This kind of distinction has been observed cross-linguistically as well. Orenstein & Greenberg 2010 and Orenstein 2015 discuss the exclusive variability in Hebrew, and among the distinctions they discuss is that between *rak* 'only' and unstressed *stam* 'merely'/'just'. While not perfect correlates of their English glosses, these two operators pattern very similarly to *only* and *merely*.[6] They argue that *rak* can quantify over entailment or nonentailment scales, as we have observed with *only*, while *stam* is restricted to these evaluative scales. An example from Orenstein 2015 is provided in 15 below.

[4]Importantly, the addition of *merely* in 12 results in the assertion that no one higher on the relevant evaluative scale than Xander was also at the door. It says nothing about whether someone lower than Xander was at the door as well. But this is not to say that there is not an implication that Xander is the only person at the door. However, this implication can be derived easily as a quantity implicature, much the same way that an example like that in the example below in (i) can.

(i) It was Xander at the door

[5]This does hinge on the scale being based the 'good' result for the speaker in this context, such that the low values are the bad options. It does seem possible to construct scales that place the negative worlds higher on the ranking than the positive worlds; however, I suggest that each scale is constrained by the context to pick out the salient strong option. For example, we could get a different reading here if the salient result were a negative one.

(ii) I'm afraid I won't get in to college, but at least I won't be ruled out for disciplinary reasons. They rule out everyone with five or more infractions, so I'll be okay because I merely have two.

Here, the speaker's use of *merely* relies on a scale of importance of relative disciplinary infractions, wherein the speaker's is valued low on that scale. These are highly context dependent, but the important takeaway is that *merely* is only available when the low end of the ordering of the alternatives is also valued as low.

[6]Though, as I will discuss in §3, *stam* is actually more of a hybrid between *merely* and *just*. It patterns with *merely* with respect to the scale parameter currently under discussion, but patterns with *just* in terms of allowing covert elements to trigger its alternative set.

(15) hu rak/#stam zaxa [be-pras Nobel]$_F$
he only/stam won [in.prize Nobel]$_F$
'He only/stam won the Nobel Prize.' (Orenstein 2015: 101)

As 15 demonstrated, *rak* can be used to indicate that the subject won no prize other than the Nobel Prize. *Stam*, however, is infelicitous here, as the Nobel Prize is ranked at the top of any plausible evaluative scale involving prizes. We see exactly the same behavior with English *only* and *merely*, as shown below in 16.[7]

(16) He only/#merely won the [Nobel Prize]$_F$

Following Coppock & Beaver 2011a, Orenstein & Greenberg 2010, and Orenstein 2015, I argue that *only* is free to quantify over alternative sets ordered by either entailment or a contextually-provided normative ordering. Like Hebrew *rak*, *only* seems to have a preference for entailment scales, but it does not appear to be as strong a preference as that of *rak*. *Merely* and *stam*, on the other hand, are required to combine with an alternative set associated with a normative ordering, and cannot combine with entailment scales.

I will formalize the restriction to evaluative scales as a morphosyntactic presupposition present in the lexical entry of *merely* but not *only* in §4. In order to implement this restriction, I need to specify that alternative sets must be tied to their ordering. So, rather than taking an alternative set C as an argument, exclusive operators take the pair $\langle C, \leq \rangle$, where C is the set of alternatives and $\leq$ is the ordering over C.[8] In the case of entailment scales, the ordering is the usual $\subseteq$ relation,[9] while nonentailment scales must be defined separately.

I will define an evaluative scale as follows in 17.

(17) An ordered alternative set $C_{\leq}$ is an evaluative scale if the set is ordered such that given a relevant question in the context, for every $\psi_1, \psi_2 \in C_{\leq}$ such that $\psi_1 \leq \psi_2$ (where $\psi_1 \neq \psi_2$), ψ_1 is valued as more relevant than ψ_2 according to a ranking of worlds modelable as an ordering source in the sense of Kratzer 2002.

Merely, as well as Hebrew unstressed *stam*, will be restricted to these evaluative scales. Given this, I posit the following entry as the core exclusive meaning shared between *only* and *merely*, referred to henceforward as [EXCL]. I abbreviate the ordered pair $\langle C, \leq \rangle$ as $C_{\leq}$.[10]

(18) $[\![\text{EXCL}]\!] = \lambda C_{\leq}.\lambda p.\lambda w.\forall q[(q \in C_{\leq} \wedge w \in q) \rightarrow p \leq q]$

The main difference between 18 and the preliminary semantic entry for *only* in 4 is that this requires that every alternative set C be indexed to an ordering, and the exclusive has access to that ordering as an object for later modification

[7] Despite the apparent infelicity of *merely* here, it is certainly possible to use *merely* in a sarcastic way in examples like this. In such cases, the speaker is using irony to highlight the oddness or ridiculousness of using a diminunizing adverb like *merely* with an evaluatively maximal element like the Nobel Prize. Even the variant with *only* can be used to express this sarcastic content. But I take this to be a playful use of language that violates some semantic selectional requirements for rhetorical effect.

[8] I assume that $\leq$ must be a partial ordering on C.

[9] It seems plausible that we could even posit that in the absence of a clear scale in the context, $\subseteq$ can be filled in as the default. This would obviously not be available for operators like *merely*, which require a nonentailment scale. However, I leave the question of a default scale value to future research.

[10] Note that the $\leq$ symbol is now used as a variable over orderings, and should therefore in general be read as 'is stronger than'. This maps neatly onto the mathematics of the subset relation for entailment scales, but is slightly less intuitive for evaluative scales. It is true that if $x \subseteq y$, then x is stronger than y, and therefore higher on the entailment scale. Likewise for any scale $\leq$, if x is higher on an evaluative scale than y, then $x \leq y$, which unfortunately runs counter to ordinary intuitions about the $\leq$ symbol. I choose to use it despite this complaint, as it provides a unified view of entailment and nonentailment scales as abstract orderings on sets.

or restriction. So, theoretically, the same set C could be interpreted with several different orderings, each resulting in a different quantificational assertion.[11] This fact explains the ambiguities in interpretation of *only* described earlier; they are the result of different scales ordering the (possibly identical) set of alternatives.

In summary, with respect to the scale parameter, *merely* is restricted to nonentailment scales, while *only* may quantify over alternative sets ordered by entailment or nonentailment. In the next section, I will discuss another source of variation that has been observed. Then in §3 I will show how *just* patterns with respect to these two parameters.

2.2 Non-Roothian alternative sets

Besides the scale parameter differences between operators like *only* and *rak* on one hand *merely* and unstressed *stam* on the other, Orenstein 2015 has identified several other parameters of variation among Hebrew exclusives. Most relevant to this paper is the parameter regarding whether alternatives are 'external' or 'internal' to the prejacent. Orenstein describes external alternatives as the standard Roothian alternatives that vary according to a focused element in the prejacent. Internal alternatives, on the other hand, are described as modifications of the prejacent itself. Orenstein gives Hebrew accented *STAM* as an example of an operator that combines with these internal alternatives, shown below in 19.

(19) kibalti Saon, ha-beaya hi Se-ze *STAM* Saon!
Got.I watch the.problem she that.it *STAM* watch
'I got a watch. The problem is that it's *STAM* a watch!' (Orenstein 2015: 103)

As Orenstein explains, here the alternatives are not the usual Roothian alternatives varying over types of objects. Rather, the assertion in 19 is that the gift was just an ordinary watch, and not a more special or expensive watch. Orenstein argues that the actual representation of the prejacent in 19 includes a covert modifier of *Saon*, which can be understood as 'standard' or 'plain'. Once we have this representation, the quantification from *STAM* negates all alternatives involving a stronger or higher ranked modifier. This is importantly different from standard Roothian alter-

[11] I actually think that this variation in ordering can shed some light on the presuppositional behavior of the prejacent that I mentioned earlier. For example, if we assume that rather than the prejacent itself being presupposed that there is an existential presupposition that *some* element in the alternative set is true, then we can easily see why entailment scales so often come with a strong presupposition of the prejacent and evaluative scales do not. For example, Coppock & Beaver (2011a) point out for *mere* that the prejacent is not presupposed in all cases. A modified version of their example is provided in (iii) below.

(iii) This is merely a pointless "shoot-em-up" movie. (Coppock & Beaver 2011a: 8–9)

As they point out, sentences like these do not presuppose that the movie in question is a pointless "shoot-em-up", as this inference does not survive negation.

But it is easy to see that an evaluative scale that does not necessarily involve any entailment relationship between its members would not lead to presupposition of the prejacent, assuming exclusives come with a presupposition that some element in the ordering is true. Since for any distinct values x and y in an evaluatively ordered alternative set, it is not true that either entails the other, the presupposition that one of them is true will not guarantee the truth of any value in particular. This contrasts with entailment orderings, where the presupposition that some element is true does guarantee that all elements lower on the entailment scale are true.

This by itself does not fully account for the presuppositional behavior of *only*—for one thing it does not rule out that an element that is not *directly* ordered in an entailment relation with the prejacent is true. However, I believe that the existential presupposition could be modified to include only the subset of the alternative set that forms a direct chain of entailment with the prejacent proposition. One way of encoding this is with the following presupposition, notated as such with ∂, following Beaver 2001.

(iv) $\lambda C_{\leq} \lambda p.[\partial(\exists q.q \in C_{\leq} \wedge (q \leq p \vee p \leq q) \wedge w \in q)]$

If we posited such a presupposition for [EXCL], this would account for the presupposition of the prejacent with entailment scales, and give an explanation for why evaluative scales sometimes presuppose the prejacent and sometimes do not (this would correlate with whether the evaluative scale was overlayed on top of a set that already contained an entailment relationship.)

natives, which are derived via focus machinery and Rooth's (1992) $\sim$ operator.[12] The idea that there are other sources of alternatives beyond those derived through focus semantics is not new. There are a number of other implementations of alternative semantics that do not involve prosodic focus, including scalar implicatures related to negative polarity items, as well as free choice and disjunction, as in Aloni 2003, 2007; Alonso-Ovalle 2006, and lexical alternatives, as in Abusch 2002, 2009. This distinction drawn between these external and internal alternatives provides a lens with which to view some of the uses of *just* that are not transparently exclusive.

To sum up, it has been observed that exclusive operators can vary in the ordering of their alternative set, as in the distinction between *only* and *merely*, as well as in the type of alternatives, as we see in the difference between unstressed *stam* and accented *STAM* in Hebrew. In the next section, I will detail how some of the uses of *just* fits into this existing typology. I will argue that *just* in English can be analyzed in a similar way to Hebrew *STAM*, and that its ability to quantify over so many different kinds of alternative sets accounts for its wider range of meanings.[13]

3 The distribution of *just*

Just is one of the most ubiquitous and varied adverbs in English, and as such has often been described as highly polysemous (Lee 1987, 1991; Kishner & Gibbs 1996). However, I aim to show that at least some of the meanings and uses *just* exhibits can be analyzed as underspecificity for the kinds of parameters discussed in the previous section. First, I will outline some of the uses of *just* that have been identified in the literature previously, and how they bear on the current analysis. I will then introduce some new data where *just* can easily be viewed as an exclusive over non-Roothian alternatives.

Lee 1987 lays out a number of uses of *just*, which he categorizes into four categories: restrictive, depreciatory, emphatic, and specificatory. Kishner & Gibbs 1996 add exact and comparative to this list of polysemous meanings for *just*. Restrictive and depreciatory *just* are clearly exclusive uses, and differ according to the scale parameter discussed in §4.1. The other categories, emphatic, specificatory, exact, and comparative, are not obviously exclusive uses; however, I do believe that they too can be reduced to the core exclusive semantics provided for [EXCL] in 18. I discuss some of these uses briefly in §5—incorporating these uses into this framework is the topic of ongoing work on this subject. For this paper, I will focus on another use of *just*, which I have identified as unexplanatory. It patterns somewhat like the emphatic use described in Lee 1987, but is much more clearly used as a quantificational denial, which typifies exclusive operators.

What Lee 1987 calls restrictive *just* parallels the behavior of *only* when operating on an alternative set ordered by an entailment scale. An example given in Lee 1987 is shown in 20.

(20) I just notice it when I get like this (Lee 1987: 384)

[12] Orenstein (2015) hints that the accent present on *STAM* is the realization of focus, which cannot be realized on a covert element. This is a possible explanation; however, I will explore the idea that focus machinery is simply one way of generating alternatives through over association. All covert correlates to focus-bearing elements must generate their alternative set by a different but parallel mechanism. This is discussed further in §4.2.

[13] Orenstein (2015) maintains that *STAM* still requires a nonentailment scale, which seems correct. However, as I will discuss, I argue that these two parameters are completely independent—in fact, this is exemplified quite clearly in the distribution of *just*.

The example in 20 could easily be replaced with *only*. The intended interpretation that the speaker only notices it in one circumstance and not others is easily captured through an entailment scale varying over salient circumstances. Lee's depreciatory use of *just* corresponds to the meaning of *merely*, as well as *only* when it operates on an evaluative scale. Another example from Lee 1987 is provided below.

(21) They're not serious, just a nuisance. (Lee 1987: 379)

Here, it is clear that an evaluative scale is at play which ranks 'serious' more strongly than 'a nuisance'. While works like Lee 1987 and Kishner & Gibbs 1996 have analyzed the differences between restrictive and depreciatory *just* as a kind of polysemy, I argue that this is better captured as underspecificity for the scale parameter. Essentially, these two uses of *just* are captured the same way as *only*, in that both *just* and *only* are free to quantify over alternative sets ordered by either entailment or nonentailment scales.[14] This can be shown in the ambiguity between examples like those in 22 and those in 23.

(22) a. Bill just has 2 dogs, so he won't need to pay the fee for 3 or more dogs.

b. It was just Xander at the door. (No one else was with him.)

(23) a. Bill just has a small dog, so the dog will fit on the plane.

b. It was just Xander at the door. (There's nothing to worry about/no reason to get excited/etc.)

Based on this distribution, *just* is not subject to the restriction to evaluative scales that *merely* and *stam* are. Furthermore, if we were to posit polysemy for *just* between these two uses, then we would need to do the same for *only* and *rak*, and likely many other exclusives cross-linguistically. Capturing both uses as different instances of the same underlying semantics avoids the resulting conspiracy that exclusive operators are so often polysemous along predictable variables like scale type. So, thus far, the semantics for *only* and *just* should be roughly identical. However, there are quite a few uses of *just* that are not available to *only*. Among these are the other categories mentioned above, examples of which are provided below.

(24) Specificatory *just*

a. I'm just finishing my homework.

b. I've just heard that you are leaving us. (Lee 1987: 390, ex. 72–73)

c. You have something just below your eye.

(25) Exact *just*

a. Just where do you think you're going? (Kishner & Gibbs 1996: 19, ex. 5)

b. I want to know just how he got in here.

(26) Comparative *just*

a. I love cookies, just as you love cake. (Kishner & Gibbs 1996: 19, ex. 6)

[14] Unlike *only*, however, it seems that the default interpretation for *just* is the evaluative reading—though it certainly can quantify over entailment scales. This is perhaps evidence against positing $\subseteq$ as a default value for alternative set orderings, but this remains an open question.

b. Just like the previous example, this is an example of comparative *just*.

(27) 'Emphatic' *just*

a. I just love your necklace!

b. I had so much milk it was just incredible.

c. The sisters just couldn't believe it.

d. It was just impossible. (Lee 1987: 393–4)

While each of these uses shares some common meaning with exclusives, I will focus instead on another use that to my knowledge has not been discussed in the literature. I have called this the unexplanatory use of *just*, as it seems to deny an explanation or cause for its prejacent. I will highlight this use of *just* throughout the rest of the analysis, as it provides the clearest case for a non-traditional exclusive use of *just*. However, while I use unexplanatory *just* as an expository tool for my morphosyntactic framework, I am not claiming that every use of *just* in similar constructions should be analyzed as unexplanatory—I argue that the domain of quantification for *just* is highly context-dependent, which I will discuss in §3.2

3.1 Unexplanatory *just*

Unexplanatory *just* occurs in contexts where the speaker denies or distances herself from the explanation for the eventuality described in the prejacent.[15] I will analyze this in a very similar way to Orenstein's account of accented *STAM*, though I will also attempt to provide a mechanism for deriving this use through the morphosyntactic framework in §4. A fairly typical example of this use is provided in 28 below, taken from a television scene where a girl has been pushed down a flight of stairs by some unseen force.

(28) Snyder: . . . What happened?
Cordelia: She fell! She, she, we were standing at the top of the stairs and **she just fell**! All by herself! (*Buffy the Vampire Slayer*, S1E11)

As demonstrated by the follow-up statement *all by herself*, the contribution of the word *just* in this utterance is to indicate lack of explanation or apparent cause. This can be used to indicate suddenness or unexpectedness in a narrative context like that in 28, and can also be used for an array of other discourse effects, including denial of fault. Some more examples of unexplanatory *just* are given below.

(29) Unexplanatory *just*[16]

a. I was sitting there and the lamp just broke!

[15] I phrase this as the eventuality described by the prejacent, rather than simply the prejacent, because I reserve the term 'prejacent' for the object with which [EXCL] combines. My analysis takes the actual prejacent for this use to contain elements that are not overtly represented in the sentence. Thus, the actual overt material is the description of the event or situation that is contained in the true prejacent.

[16] Note that in most of these examples, there are multiple ways of interpreting *just* besides the unexplanatory one. A competing possible interpretation will often be the specificatory use, where *just* is used to denote temporal proximity. This reading is mitigated by inclusion of more linguistic context like *I was sitting there and . . .* in 29a. While interesting, the existence and analysis of this temporal reading of *just* really has no bearing on the current discussion.

b. I walked into the store, saw the necklace, and just took it. I don't know what came over me.

c. He just stopped texting me. (I don't know why).[17]

d. A: Why does Anya hate bunnies so much?
B: She just does!

Importantly, this use is unavailable with other English exclusive operators like *only* and *merely*.

(30) a. # I was sitting there and the lamp only broke!

b. # I walked into the store, saw the necklace and only took it.

c. # He only stopped texting me.

d. A: Why does Anya hate bunnies so much?
B: #She only does!

As shown above, the use of *only* in an example like 30a cannot be read with the interpretation that the lamp broke for no apparent reason. Instead, it must mean either that nothing besides breaking happened to the lamp (entailment), or that nothing worse than breaking happened to the lamp (evaluative scale), both of which can be represented with 'external' alternatives. However, while other exclusives cannot be used this way, there is strong evidence that this use of *just* is indeed exclusive, and can be represented with the same semantics for [EXCL] given in 18. But instead of ordinary Roothian alternatives, these uses need to be analyzed as alternatives triggered by a covert modifier of the prejacent, in this case, a covert cause or explanation.

It should be noted that while most of the examples of unexplanatory *just* given in this paper have involved eventive predicates; however, this use is also available with statives, as shown below in 31.

(31) a. I'm just uneasy. (I don't quite know why.)

b. I just feel like it's going to rain.

For simplicity, consider the abbreviated version of 29a shown below in 32, with the unexplanatory interpretation.[18]

(32) The lamp just broke!

Under the unexplanatory reading, the asserted content of the utterance in 32 is that the speaker is unaware of the cause of the lamp breaking.[19] This can be shown to be the at-issue content, as it is what is negated, questioned, and anaphorically referred to in those contexts. To show that this lack of explanation inference is the part of the sentence that is negated, consider the following exchange in 33, where a parent (A) has walked into a room and discovered a broken lamp on the floor and asks the child (B) about it.

[17] Thanks to Dorit Abusch for this example.

[18] This abbreviation is simply a tool for the sake of exposition, as the unexplanatory reading is quite difficult to get in a sentence like this with no situtational or linguistic context. When a sentence like 32 is used in 'out-of-the-blue' contexts, most listeners are prejudiced toward the temporal interpretation of *just*. For the sake of this discussion, I am disregarding that interpretation, which would have a different underlying representation.

[19] Obviously, this can be used in contexts where the speaker is not being fully truthful. As such, these kinds of constructions are often used to shift blame away from the speaker or to express that the speaker is refusing to provide that information.

(33) A: What happened here?
B: The lamp just broke!
A: The lamp didn't just break, Timmy. Did you break the lamp?

It is clear in this example that in A's reply in the third line, the parent is denying the implication that the lamp broke for no reason. Another even more striking example of this is shown in 34, taken from a television scene where several characters are discussing a recent tragedy.

(34) Willow: ...It just happened.
Xander: Things don't happen! I mean, they don't [just]$_F$ happen. (*Buffy the Vampire Slayer* S5E16)

This is a particularly interesting example, as it shows *just* being used to modify a proposition already entailed by the context (that the event in question happened). This indicates that *just* is doing some meaningful work, and again the intuitive meaning of Willow's claim is that the event happened without a particular identifiable cause. This exchange also shows that negating the prejacent of Willow's statement without including *just* does not suffice for a full negation of the content expressed by her utterance. In order to avoid uttering an obviously false claim, namely that things don't happen, Xander is forced to reiterate the use of *just* in his correction. And again, what is being negated in Xander's correction is the proposition that things happen for no apparent reason. We can see similar contrast in the use of *just* as an answer to questions involving *why*, as shown below in 35.

(35) a. A: Why did Alison walk backwards all day?
B: She just did!
b. A: Why do you like Buffy the Vampire Slayer so much?
B: I just do! (I don't care to tell you/I don't know)

The responses in 35 seem to not contribute much semantic meaning to the discourse, but they do express a lack of willingness or ability to answer the question. Importantly, these answers contrast strongly with those in 36 in terms of their felicitousness.

(36) a. A: Why did Alison walk backwards all day?
B: #She did!
b. A: Why do you like Buffy the Vampire Slayer so much?
B: #I do!

While those in 35 may not give an actual answer to the question, those in 36 are completely uninformative and uncooperative as an answer to a *why*-question. I argue that the answers in 35 are actually informative, as they provide the information that the answer is minimal in some way, either because the speaker does not know the answer, or for some reason does not want to provide it. This information is not conveyed in the responses without *just*, which accounts for the infelicity and uncoorperativity of the responses in 36.

The lack of explanation inference can also be targeted by propositional anaphora. Consider the following sentence in 37, where the speaker is an employee at an electronics store talking to a customer.

(37) If the electronic device just stops working, bring it back and we will repair or replace it. Otherwise, you'll have to buy a new one.[20]

Otherwise serves as a propositional anaphor that picks out a proposition ϕ and sets up the hypothetical context of $\neg\phi$. In 37, *otherwise* is referring to the proposition *the electronic device just stops working*, which includes the unexplanatory inference that the device stopped working for no reason. The resulting statement is that if $\neg\phi$, i.e. if there is a discernible reason (implying customer fault) for the device ceasing to function, then the customer will need to buy a new one.

Given the empirical evidence discussed above, I argue that the at-issue content of examples involving unexplanatory *just* is a quantificational denial of causation relationships between the eventuality expressed and potential causes. This will require utilization of Orenstein's notion of internal alternatives, as these causes are not overtly represented in the utterance.

As such, I posit that the representation for the prejacent with which *just* combines includes a covert cause, CAUSE_0 which can be understood as a minimally necessary cause. The alternative set will then be triggered by this covert cause, resulting in a quantificational denial of all causal relationships that are stronger or more informative than the minimal covert one in the prejacent itself.

The exact nature of this minimal cause is not immediately clear, as by definition it is covertly expressed. However, there are examples of overtly expressed causes that can give us a clue about what kinds of minimal causes might be good candidates for CAUSE_0. Uses very similar to what I have called unexplanatory *just* are used in contexts where there is an overtly expressed cause that triggers the alternative set through ordinary focus semantics. One such example was uttered in a political discussion on an online news program, shown below in 38.

(38) '*When it comes to Americans' voting behavior, often times they'll vote on party lines, because they don't necessarily know a lot about the issues, right? So, they identify more with the Democrats, they don't know too much about the policy ideas...* **I'm not just saying this because I'm saying it. There's evidence behind it.**' (TYT, 02:37–02:54)[21]

Note that the overtly expressed cause *because I'm saying it* is propositionally equivalent to the eventuality it is being used to explain. This is an essentially uninformative baseline cause, used simply for the purposes of setting up the alternatives for *just* to quantify over. As such, it does not seem like a stretch to suggest that the covert causes in unexplanatory cases should be minimal; it is even possible that CAUSE_0 could be viewed as a completely uninformative duplicates of the prejacent eventuality, as in 38. It should be noted that uses like that in 38 are by necessity uses where the alternative set is external and can therefore be covered by a standard Roothian derivation. However, the contributed meaning of a sentence like 38 is all but indistinguishable from a modified variant like 39 without the overtly represented *because*-clause.

(39) I'm not just saying this. There's evidence behind it.

[20] Thanks to Mats Rooth for this example and relevant discussion.

[21] The Young Turks. 4/19/2016. *Voting for the Lesser of Two Evils*. Youtube. https://www.youtube.com/watch?v=KrzS0Wb5eYg. Web. Accessed 4/22/16.

In both 38 and 39, the contributed content is that the speaker is not making her claim without cause; rather, she has a reason in the form of evidence. In 38, this is overtly expressed in the form of a *because*-clause, while in 39, it must be expressed covertly. To account for the semantic equivalence between 39 and 38, I propose a very similar structure between the two. As Orenstein posited a 'standard' modifier in uses of accented *STAM* in Hebrew, I argue that in cases like 39, *just* combines with a prejacent that has been internally modified with a *because*-clause, interpreted as minimal.

However, rather than a bare cause, I include an epistemic necessity modal operating on the causation relationship, which I will justify shortly. The prejacent with which *just* combines for the lamp breaking example in 32 is therefore represented as 40 below.

(40) The lamp broke $\Box\text{CAUSE}_0$

The resulting alternative set for 40 contains propositions that vary over these causes, as shown below in 41.

(41) $C = \{$The lamp broke $\Box\text{CAUSE}_0$, The lamp broke $\Box$(because the cat knocked it down), The lamp broke $\Box$(because the wind knocked it over), $\dots\}$

Just quantificationally negates all alternatives in this set that are stronger than 40, namely all alternatives involving non-minimal causes. An entailment ordering over this set C would adequately cover the truth conditions of a sentence like 32, but it would also be possible to construct an evaluative scale; I remain agnostic regarding which type of scale is at play in this example. However, in all the examples of this construction I have looked at, an entailment scale seems to suffice. It is certainly not restricted to evaluative scales the way that *STAM* appears to be (Orenstein 2015).

There are several reasons why we need to modify the representation of the causation relationship with an epistemic necessity modal. One is to avoid positing that the use of unexplanatory *just* nearly always results in an obvious contradiction. It seems counterintuitive to say that an utterance of 32 would actually indicate that there is unequivocally no cause for the lamp breaking beyond this minimal one. Rather, it seems to be a statement about the speaker's lack of awareness of any such cause. Another, related, reason is that there is empirical evidence that these unexplanatory constructions can be followed up with proposed explanations, which would have resulted in contradictions if there were no modal present in the representation. An example of this is shown below in 42.

(42) He just stopped texting me.
Maybe it's because I made that quip about his mother.

Note that the inclusion of the possibility modal *maybe* in the proposed explanation makes this much better than a version without the modal, as shown below in 43.[22]

(43) He just stopped texting me.
??It's because I made that quip about his mother.

[22] I discussed this in my 2017 presentation at the LSA, but the infelicity of follow-ups like that in 43 is definitely overridden in certain contexts. Specifically, these follow-ups are felicitous in narrative contexts where there is a shift in perspective (e.g. from past point of view to present/omnicient narrator point of view). If the discourse provides enough information to interpret this as a shift to a more robust information state, then it is perfectly felicitous to follow up with an actual cause. This is completely in line with my analysis, as the *just* is applicable only in its context, which is required to be the ignorant/past context in the narrative example.

The addition of the necessity modal in the representation of the prejacent accounts for why a modalized follow-up like that in 42 is felicitous, but the version without the modal is not. The assertion made with the first sentence in 42 is essentially that for all reasons or causes beyond some minimally necessary one, it is not (epistemically)[23] necessary that the subject stopped texting for that reason. We can see a full derivation of this for the lamp breaking example below in 44, utilizing the core exclusive semantic entry [EXCL] as the semantics for *just*.

(44) Utterance: The lamp just broke.

e: the event of the lamp breaking

$C = \{e \,\Box\text{because } x \mid x \text{ is a contextually salient potential cause for } e\}$

$\phi = e \,\Box\text{because CAUSE}_0$, where CAUSE_0 is some "minimal cause"

$[\![\text{EXCL}(\phi)]\!] = \lambda w.\forall q(q \in C \wedge w \in q) \rightarrow \phi \leq q]$

Resulting Paraphrase: 'For all explanations *q=The lamp broke necessarily because* x that are not entailed by *φ=The lamp broke necessarily because* CAUSE_0, $q \notin w$.'

As shown above, the actual proposition that the alternative set is based on is represented as ϕ, which includes the covert CAUSE_0 in combination with the event being described. This is the prejacent with which *just* (assumed to be represented by [EXCL]) combines. So, given this new representation of the prejacent and corresponding alternative set, we can derive the correct truth conditions for unexplanatory *just* using the same core semantics we have been using for other exclusive operators like *only* and *merely*. The difference seems to be that while *only* and *merely* are restricted to traditional Roothian external alternatives, *just* is able to quantify over these internal alternatives involving causation relationships.

As I mentioned earlier, however, these causation relationships are not the only kinds of covert modifiers available for *just*. In fact, there are examples of utterances that could be interpreted as, for example, a negative quantification over consequence or result relationships. An example of this is given below.[24]

(45) You can't just hit someone.

[23] It has been pointed out to me that the use of an epistemic modal here yields some problems of grounding to the speaker, especially when the inference is subsequently denied by an interlocutor. However, this is an ongoing problem with indexing and modality more generally—as such, I will not attempt to resolve it here. But, it is also possible to view this necessity modal as non-epistemic, as long as it can be associated with available information in some way. A possible alternative candidate for the modal flavor is a circumstantial modal base. For the sake of developing this framework, however, I assume that the modal here is epistemic.

[24] There are quite a few quantificational denials that *just* is able to contribute. It was pointed out to me that the example in 29c could also be used in a slightly different context with a reading where *just* indicates that the subject didn't provide a sufficient explanation (Mats Rooth, personal communication). This is shown below.

(v) He started seeing an ex-girlfriend and just stopped texting me.

Unlike the similar example where the proposition *he just stopped texting me* indicated a lack of apparent cause, in (v) it seems to be more about a lack of social propriety or observation of social norms that *just* is indicating. It is possible to argue that the cause being negated in (v) is simply more immediate than the one in 29c; however, there are numerous other examples that seem to contribute this 'improper manner' inference (thanks to Todd Snider for discussion about these examples).

(vi) John got a phone call during the meeting and he just got up and left!

(vii) The priest gave Charlotte her communion wafer and she just ate it!

In all three of these examples, what *just* contributes is that the agent of the action did not fulfill the socially required prerequisites to that action. I would argue that in these constructions, the covert source of the alternatives is something like a MANNER_0, where the subject performed the action described in some minimal way. The social impropriety inference can then be derived in a direct way in contexts where there is a salient non-minimal manner for performing an action (e.g. apologizing for leaving a meeting or following the proper steps in a religious service). Formalizing this covert MANNER_0 is the subject of ongoing research, but it is important to highlight that the covert quantification of *just* is certainly more broad than the unexplanatory uses this paper focuses on.

a. You can't just hit someone for no reason.

b. You can't just hit someone and get away with it.

An utterance of 45 could easily be followed as in 45a or 45b. The interpretation for 45a is the unexplanatory use this paper has been concerned with, but 45b is better thought of as referring to consequences of the action described, rather than the causes. I do not think it a coincidence that relationships like cause and consequence are available for quantification. It seems that existing notions of discourse coherence map quite nicely on to the kinds of available covert relationships that adverbs like *just* can quantify over.[25]

However, this brings up some issues regarding the construction of alternative sets in general; as they have been formalized, alternative sets are required to be subsets of focus alternatives. However, as will be discussed in the next section, this unexplanatory use of *just* does not require association with focus, and thus we cannot directly compute focus alternatives in the standard way.

3.2 Interaction with focus and context

In standard literature on alternative semantics, alternative sets are constrained by the Focus Interpretation Principle, which states that the domain of quantification for exclusives must be subsets of the set of focus alternatives (Rooth 1992: 11–12). By necessity, focus alternatives are the alternatives derived through a computation involving a focused element in the prejacent of the exclusive adverb. When *just* patterns like *only* and *merely*, as we saw with Lee's restrictive and depreciatory uses, it neatly follows the expected behavior regarding association with focus. However, as noted in the previous section, despite its similarity in compositional meaning to standard exclusive operators, unexplanatory *just* (and the other uses of *just* mentioned) does not associate with a focused element in the sentence.

In fact, if we include standard focus intonation in the examples provided earlier for unexplanatory *just*, we actually force a different meaning. We can see the difference in meaning by comparing the standard intonational pattern for unexplanatory *just* to one with a traditional focus intonation, which forces the ordinary *only*-like interpretation for *just*. This is shown below, where the subscript F represents focus intonation.

(46) The lamp just [broke]$_F$.[26]

→ Nothing else/worse happened to the lamp.

(47) The lamp just broke!

→ The lamp broke unexpectedly/for no apparent reason.

It should be noted that there is an identifiable prosodic structure to the unexplanatory construction as well, and it is quite distinct from the association with focus prosody represented in 46 and present in sentences involving exclusives like *only* more generally. A common prosody for unexplanatory *just* involves de-emphasizing *just*, often to the point

[25] This idea was discussed in more detail at my 2017 LSA presentation. Handouts are available at http://conf.ling.cornell.edu/miawiegand/LSA2017_Handout.pdf.

[26] Admittedly, this is an odd thing to say, considering that breaking is a fairly bad and final thing to happen to a lamp in most contexts. However, the point here is that prosodic focus cues can force this reading, despite its oddness.

of eliminating the vowel entirely, so that it is realized more like [ʤst], or even [ʧst]. It is also in rapid speech realized as part of the following word.[27]

Importantly, despite the fact that unexplanatory *just* does not associate with focus and thus cannot be subject to the Focus Principle as originally stated, there is clear evidence that the alternative set with which it combines is subject to constraints on discourse context. Specifically, the use is only available when the relevant question in the discourse involves a *why* question about the event involved. This matches intuitions about the examples in 35, where answers to *why* questions were felicitous with *just* present, but not when it was absent.

Note that this requirement that a *why* question be active in the discourse does not mean that these questions must be overtly present in the discourse, or that unexplanatory *just* is only available as an answer to a question. Instead, any context where the question of causation or reason is a reasonable addition to the conversation is one where unexplanatory *just* may be licensed. This follows very neatly when adopting a Question Under Discussion (QUD) framework for discourse coherence (Roberts 2012). I describe elsewhere some of the discourse constraints on the use of unexplanatory *just*.[28] However, for the purposes of this paper, I simply argue that the formal representation of covert internal modifiers like CAUSE_0 are restricted to contexts where they are immediately at-issue, i.e. at the top of the QUD stack.

This is evident in examples of unexplanatory *just* where the question at hand is evident from the structure of the discourse. There is evidence that unexplanatory *just* can be used in contexts with existing topic and focus structures (Büring 2007). An example of this is given below in 48, where we have an existing contrastive structure between items being damaged and the cause of the damage. As such, it is clear from the immediately preceding discourse that the cause of the lamp breaking is currently under discussion.

(48) I damaged the [space heater]$_T$ [by spilling water on it]$_F$. The [lamp]$_T$ [just broke]$_F$.[29]

Here, we see an overtly represented cause of damage in the first sentence, while the second sentence expresses lack of cause for the damage to the lamp. Examples like this show that despite the fact that *just* can be sensitive to focus, the main factor in determining its interpretation is the question being addressed by the discourse. In a context like 48, the question involves a pair-wise set of answers of item and its cause of damage. Given this, the minimal cause can easily be filled in for the compositional semantics with *just*, yielding the expected 'for no apparent reason' inference for 48.

The inclusion of the QUD framework and how to derive alternative sets without focus will be discussed in more detail in §4.2.

[27] Note that this is a general tendency and not a strict rule, as there are also examples of intonational emphasis on *just* with similar propositional and rhetorical content. Strong emphasis on *just* is sometimes used to emphasize the unexplanatory emphasis itself, especially after it has been challenged in the context. An example of this is shown below in (viii).

(viii) A: What happened?
B: The lamp just broke!
A: Really? What actually happened?
B: The lamp JUST broke.

[28] Handouts available at http://conf.ling.cornell.edu/miawiegand/LSA2017_Handout.pdf.

[29] Thanks to Mats Rooth for pointing out examples like this one.

4 Framework

In order to capture the behavior of the exclusive operators, both in terms of their common meaning and their differing selectional requirements, I propose that we can represent the differences in terms of morphosyntactic restrictions on top of the basic core meaning, [EXCL], repeated below.

(18) $[\![\text{EXCL}]\!] = \lambda C_{\leq}.\lambda p.\lambda w.\forall q[(q \in C_{\leq} \wedge w \in q) \rightarrow p \leq q]$

This is the baseline semantic entry that I take to be common to all exclusive operators, including less traditionally exclusive uses of operators like *just*. Operators that are restricted to particular types of scales, as we saw with *merely*, will contain additional restrictions, represented morphosyntactically. I will formulate the difference between *only* and *just* in terms of the requirement for association with focus, again represented as a morphosyntactic object constraining the structures available for *only*. It is the lack of these additional restrictions that allows *just* to exhibit such a wide array of uses and meanings.

4.1 Encoding the scale parameter

Recall that operators like *merely* and Hebrew unstressed *stam* are only licensed in contexts where the alternative set with which they combine is ordered by an evaluative scale. The definition of an evaluative scale makes use of the fact that alternative sets in this framework are required to be ordered. This definition is repeated below.

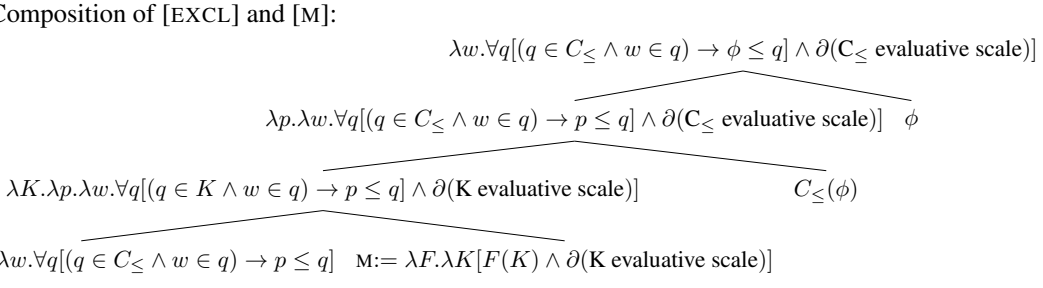
(17) An ordered alternative set $C_{\leq}$ is an evaluative scale if the set is ordered such that given a relevant question in the context, for every $\psi_1, \psi_2 \in C_{\leq}$ such that $\psi_1 \leq \psi_2$ (where $\psi_1 \neq \psi_2$), ψ_1 is valued as more relevant than ψ_2 according to a ranking of worlds modelable as an ordering source in the sense of Kratzer 2002.

I argue for a morphosyntactically represented presuppositional requirement constraining the alternative set, which may be present or absent for a given exclusive operator. I label this [M], which is represented below in 49.

(49) $[\![\text{M}]\!] = \lambda F.\lambda K[F(K) \wedge \partial(\text{K is an evaluative scale})]$[30]

This morphosyntactic presupposition [M] combines with the core exclusive semantics to constrain the scale on the alternative set to be evaluative. So, the semantic contribution of an operator like *merely* can be viewed as the composition of [M] with [EXCL], resulting in the constraint to evaluative scales we see with *merely*. The composition of these two components is depicted in the tree below in 50.

(50) *Merely*: Composition of [EXCL] and [M]:



[30] I use the ∂ notation from Beaver 2001 to represent presuppositional content.

As both *only* and *just* are free to combine with alternative sets of either ordering type, both are underspecified for this restriction, so neither will contain the [M] morpheme as part of their lexical entry. With respect to this parameter, they can be represented with the core meaning contributed by [EXCL] alone.

4.2 Encoding the Focus Principle

However, as discussed in §3, while *just* patterns with *only* with respect to the scale parameter, *just* departs from both *only* and *merely* with respect to the type of alternatives, i.e. whether the trigger for the alternative set is overt or covert. This distinction corresponds to whether the alternative set is required to adhere to the focus principle, as only overt elements can bear prosodic focus.

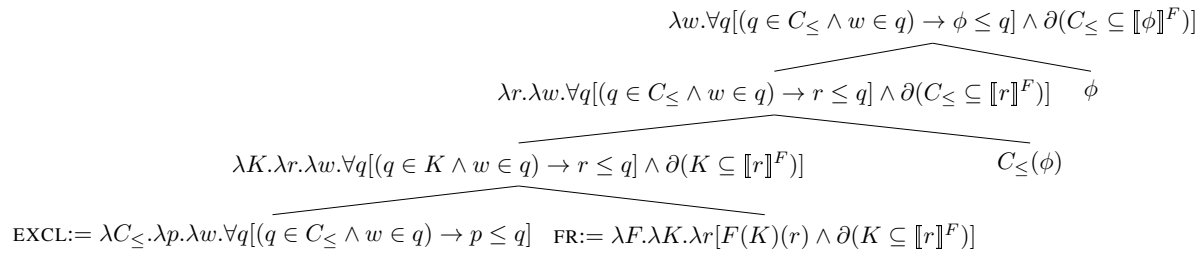
Unlike *only* and *merely*, *just* may quantify over externally derived alternative sets, but is not limited to these kinds of alternative sets. As noted, internal alternatives cannot carry prosodic focus, so exclusives that allow internally-derived alternatives like *just* cannot be subject to the Focus Principle as such. So, parallel to the presence or absence of the [M] operator, I propose another morphosyntactic object that enforces the focus principle as part of the lexical entry for operators that are required to associate with focus. *Just* thus remains underspecified for both scale type and focus sensitivity.

Both *only* and *merely* are required to quantify over alternative sets that are subsets of focus alternatives, which are derived in the standard way using Rooth's $\sim$ operator. I formalize this requirement as a focus restriction (FR), which reformulates the focus principle as a requirement of specific exclusive operators. The semantic entry for [FR] is given below in 51.

(51) $[\![\text{FR}]\!] = \lambda F.\lambda K.\lambda q[F(K)(q) \wedge \partial(K \subseteq [\![q]\!]^F)]$

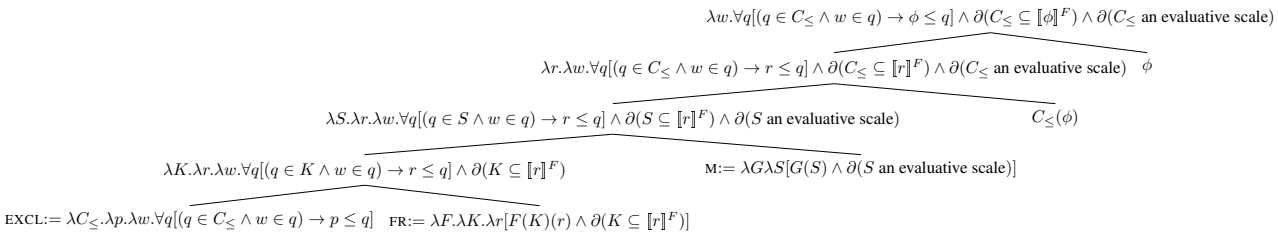
This restriction combines with the exclusive core in much the same way as [M], but is present for both *only* and *merely*. So the semantic contribution of *only* is the composition of [EXCL] and [FR], represented in the tree below.

(52) *Only*: Composition of [EXCL] and [FR]:



Since *merely* is subject to both [M] and [FR], its full semantic contribution can be represented by adding [M] to the composition of [EXCL] and [FR], as shown in the tree below.

(53) *Merely*: Composition of *only* and [M]:



There is no *a priori* evidence for whether [FR] or [M] should compose with [EXCL] first. With *only*, it is clear that [FR] may compose directly with [EXCL]. However, I would argue that we also have evidence of [M] composing directly with [EXCL], from Hebrew *stam*. While it is possible to view the stressed and unstressed variants as different operators, in this framework the most logical solution is to say that *stam* is restricted to evaluative scales, but is not subject to the focus restriction.[31]

So, typologically, we see that these two morphosyntactic restrictions seem to be independent of one another. We have examples of exclusives subject to just [M], as with *stam*, to just [FR], as with *only*, to both [M] and [FR], as with *merely*, and to neither, as with *just*. This is captured in the table below in 54.[32]

(54) (Some) instantiations of [M] and [FR] operators:

	[M]	−[M]
[FR]	*merely*	*only*, *rak*
−[FR]	*stam*	*just*

The [FR] morpheme accounts for why *only* and *merely* must quantify over traditional Roothian alternatives that are derived via focus. However, without the focus machinery in place, we still need some mechanism through which alternatives for unexplanatory *just* (and other uses with internal alternatives) can be derived.

I argue that we can generalize the notion of constructing and constraining an alternative set that was provided in Rooth 1992, with a minor modification. Rooth introduces the $\sim$ operator that enforces constraints on alternative sets as anaphoric to an antecedent provided in the sentence or discourse. I argue the the phenomenon of alternative sets that vary according to a single distinguished element is broader than focus, and as such, we can generalize the complements of exclusive operators to include a prejacent with a distinguished element, from which can be extrapolated a set varying over that particular element. To do this, I propose that we include a constructive operator $\sim_2$ that provides the alternative set according to the following constraint. Here S_ϕ represents the syntactic object whose semantic denotation is the proposition ϕ, and $[x/y]$ is read as 'substituting y for x' in the syntax.[33]

[31] With the further stipulation that when *stam* does not associate with focus, it must bear prosodic stress. This is a very interesting line of inquiry, as *just* also exhibits some interesting prosodic behavior when it combines with internal alternatives, though it does not bear accent the way that *stam* does. It is likely that there are some language-dependent prosodic requirements that would account for the different prosodic behavior between *stam* and *just*, but this is beyond the scope of the current inquiry.

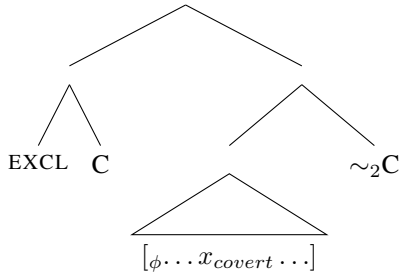
[32] Note that this is not intended to be in any way an exhaustive list of exclusive operators. Rather, it merely demonstrates that [M] and [FR] appear to vary independently.

[33] This obviously assumes some degree of isomorphism between the syntax and the semantics for a given utterance.

(55) Given a proposition ϕ with syntactic form S_ϕ and distinguished element $x \in S_\phi$,
$C \subseteq \{q \mid S_q = S_\phi[x/y] \wedge y \text{ is the same category and type as } x\}$

Given this constraint, we can use a similar schema as in Rooth 1992 for the ordinary $\sim$ operator for association with focus to derive the alternative sets triggered by covert elements.

(56) Schema for introduction of covert elements



Once the generation of alternative sets is properly defined, there remains the issue of constraining the kinds of covert elements that are available, both in general and in particular contexts. It seems possible to account for the appearances of covert elements in particular contexts as congruence to the QUD, where the covert elements are licensed and distinguished in this way when they address the QUD. In fact, it seems correct to say that ϕ is constrained by Relevance to adhere to the QUD; however, it also seems that these covert elements can give rise to new information that was not previously at-issue, essentially both raising and answering a new question in the discourse. This is probably modelable in terms of accomodation, though I leave the specifics to future work.

In terms of general availability, I argue that these minimal covert elements correspond to existential entailments of eventualities and propositions. Intuitively, every event has a cause and manner, every attribute has a degree of precision, etc. So, this includes the causes we see for unexplanatory *just*, but also other elements like minimal consequences, and degrees, in the sense of Kennedy & McNally 2005. For Hebrew *STAM*, we see that this should also include default 'ordinary', or 'standard' modifiers. Second, despite the fact that the existence of these minimal elements is always entailed by these assertions, they are not always formally represented in the compositional semantics. However, they can be targeted and included when they correspond to a relevant question in the discourse. I propose that these elements must thus serve as the distinguished element from 55 when they are represented in the formal semantics, since their inclusion is only licit when the corresponding alternative set is relevant to the conversation.

So alternative sets triggered by covert elements are available for quantification by exclusive operators, and it is only the [FR] constraint that prohibits *only* and *merely* from combining with these sets. We still need the $\sim$ operator or something like it to enforce anaphoric relationships within focus structures. However, this gives us an insight into how to build a varying alternative set from covert modifiers.

5 Conclusions & future work

5.1 Summary

In this paper, I have introduced a framework for representing the variability among exclusive operators as morphosyntactic restrictions that can be added to the core shared exclusive semantics. This framework can be used to capture previously discussed variation like the difference between *only* and *merely*, through introduction of operators like [M] on the ordering of alternative sets. That move required modifying the definition of an alternative set to include both the set itself and a specified ordering on that set. Given the new definition of alternative sets, the core [EXCL] meaning can make reference to an ordering over the alternative set without specifying the exact nature or source of that ordering, which allows the ordering to be determined or constrained by the context, and for different exclusives to be sensitive to different orderings.

Beyond capturing existing variation, the framework provides a mechanism by which we can analyze 'polysemous' uses of adverbs like *just* and *stam* as single lexical entries that are underspecified for some of these morphosyntactic restrictions. Specifically, we can now view availability of quantification over internal alternatives as simply a lack of mandatory association with focus.

I utilized the morphosyntactic framework to encode part of the focus interpretation principle as a lexical restriction on certain adverbs. This was used to explain how *just* can be analyzed with the same core semantics as *only* if we allow it more flexibility with respect to its alternative set.

Once the obligatoriness of utilizing focus machinery was relegated to particular adverbs, it was necessary to rely more heavily on discourse coherence constraints, specifically adherence to the QUD. This congruence requirement enforces the idea that covert elements present in the prejacent are always distinguished, and therefore always serve as the trigger for their alternative set via the new $\sim_2$ operator.

One of the benefits of this analysis is reducing the amount of complexity in the lexicon for highly polysemous operators like *just*. It allows us to view uses like unexplanatory *just* as simply another implementation of the core exclusive meaning. Indeed, this framework suggests that operators like *just* are the realization of [EXCL] when it is left unrestricted, at least with respect to the parameters discussed in this paper.[34]

5.2 Remaining questions & directions for future research

There are a number of issues brought up by this paper. One of these is how to extend this analysis to the full range of exclusive operators across natural languages. Even in English, there are operators that exhibit behavior that is not immediately covered in the framework presented. Other exclusives like *solely* and *simply* do not map directly on to any of the exclusive distributions of those discussed here. It is therefore likely that additional parameters will be necessary to fully cover the distributions of these and other cross-linguistic operators.

Simply, for example, patterns with *just* in many of its uses, but is less felicitous in contexts appropriate for *only*.

[34] Orenstein (2015) argues for other parameters in Hebrew. In this framework, these would each be implemented as another morphosyntactic restriction that is present or absent depending on the specific exclusive.

Solely, on the other hand, seems to contribute a meaning even more restricted than *only*, which would likely require an entailment scale, along with possibly other restrictions (Coppock & Beaver 2011b). This indicates that there may be other variants of the parameters I have posited that restrict in the other direction.

The broader range of exclusive uses is even evident in the other uses of *just* briefly mentioned in §3. However, given the framework and resulting availability of covertly triggered alternative sets for *just*, there are some natural ways of extending the analysis to these other uses. For example, what has been called specificatory *just*, where *just* specifies proximity in either time or space, could be analyzed as quantifying over minimal spacial or temporal degree modifiers.

Additionally, there is a good deal that remains to be said about the so-called emphatic use of *just*, which has been analyzed recently as a kind of discourse marker or metalinguistic operator, with a variety of rhetorical effects (Lindemann & Mauranen 2001; Tagliamonte 2005; Kiesling 2011; Morzycki 2011; Beltrama 2016). There are several ways that this use could be incorporated into the framework discussed here. One would be to introduce degrees of precision or pragmatic slack (Lasersohn 1999), which, when quantified over for extreme predicates, would yield pragmatic emphasis regarding the applicability of the predicate used. An alternative, which is perhaps independently necessary, is to say that *just* can operate over discourse relations like elaborations (Asher & Lascarides 2003), resulting in the equivalent of a quantified speech act (cf. Cohen & Krifka 2011). Much remains to be worked out here, but the framework and analysis I have provided for unexplanatory *just* can provide a groundwork for analyzing the more pragmatic uses of exclusive operators.

I hope to ultimately provide insight into the relationship between the proposition-level uses discussed in this paper with those arguably at the discourse or speech act level. There seems to be a spectrum of use from the more concrete truth-conditional uses to more abstract and pragmatic uses, which could actually give us some degree of insight into the diachronic development of discourse uses of truth-conditional operators in general.

Lastly, an open question is whether we will see any emergent typological predictions about which exclusives will carry which restrictions and corresponding available interpretations. Additionally, it remains to be seen whether formulating the variability morphosyntactically makes useful predictions about the distributions of exclusives in languages with a richer morphology than English and Hebrew. Regardless, the framework presented here provides a way of isolating the shared and variable content of members of the family of exclusives, and allows us to reduce the amount of redundant stored semantic information in favor of greater reliance on context and discourse.

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LANGUAGE CONTACT

The morphological rise of *fuckin'*-insertion in Montréal French

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1 Introduction

Expletive insertion in colloquial English adds emphasis with the help of a usually vulgar word, like *bloody*, *freaking*, or *fucking*. Thus, *Manitoba*, *irresponsible*, and *Ontario* can respectively become *Mani-freakin'-toba*, *irre-fuckin'-sponsible*, and *On-bloody-tario*. In most cases, the insertion precedes the main stress of the word and is followed by at least a foot, but there are exceptions, like *un-fuckin'-believable*, where the stress does not immediately precede the stressed syllable (*-liev-*). McCarthy (1982) suggested that such exceptions are best handled by assuming a different prosodic structure.

In Montreal French (MF), we have noticed a relatively recent phenomenon of expletive insertion, specifically *fuckin'*-insertion (F-I). In this paper, we look at the facts of F-I in MF from a comparative perspective, to see whether similar assumptions to McCarthy's on the prosodic structure could account for the facts of this French dialect, using a corpus consisting of a webseries[1] of three seasons and thirty episodes. As we shall see, MF F-I can occur within a compound and between object clitics and a verb, something impossible for any other French morphological item known to us. However, our corpus does not provide cases where *fuckin'* interrupts a morpheme, something that would make it a true infix in the sense of Yu (2003).

We shall argue that the situation of F-I in MF indicates a prefixing status, which, we propose, chronologically precedes infixation status in the stages of grammaticalization. In turn, if English followed a similar path, there is no reason to think that the prefixing insertion did not survive after the introduction of the newer infixing insertion, just like adjectival/adverbial *fuckin'* still exists. If that is the case, the exceptional English cases like *un-fuckin'-believable* can be analyzed as instances of prefixing, rendering McCarthy's assumption of its diverging prosodic structure unnecessary.

[*]The authors thank the audiences at BLS43 and at the phonology meeting group at UC San Diego for their comments.

[1]We thank Stephanie Michelet, who first brought our attention to this webseries and its potential for our purposes.

2 Prefixation vs. Infixation

2.1 True infixation

As we hope the reader has noted, we use the word INSERTION as a cover term, more general than INFIXATION. In order to determine when infixation status is achieved, we follow Yu's (2003:2) definition:

> The term INFIX is defined as an overt continuous morph that appears within a derived discontinuous morph that exists in a continuous form independent of the infixed form, and the individual parts of this resultant discontinuous morph must not be continuous morphs themselves.

Tagalog *um*-infixation is a textbook example and we repeat the examples below from Yu (2003:95). The examples show that the infix *-um-* is inserted immediately before the first rhyme of the word.

(1) Tagalog focus construction

a. aral > um-aral	'teach'
b. sulat > s-um-ulat	'write'
c. gradwet > gr-um-adwet	'graduate'

In English also, we are faced with true infixing in the sense of Yu. Specifically, the examples 2b and 2c below show interruption of a morph that leave two discontinuous parts, each of which is not a morph on its own. This is not the case in 2a, however, but notice that for Yu's definition to apply, it is sufficient that an infixation example exists; it is not necessary that all cases correspond to the definition. One might say that 2a below is ambiguous between prefixation and infixation.

(2) Infixing in English

a. New Brunswick > New-fuckin'-Brunswick

b. Ontario > On-fuckin'-tario

c. Manitoba > Mani-fuckin'-toba

As we mentioned in the introduction, English *fuckin'*-infixation occurs immediately before the main stress of a word, and this main stress must at minimum head the foot following the infix (McCarthy 1982). This is why the examples below are ungrammatical. Examples 3a, 3c and 3d are stress-initial, which means the infix precedes a stressless syllable, while example 3b is stress-final, which means the infix is not followed by a foot.

(3) Ungrammatical examples

a. *Pa-fuckin'-ris

b. *Que-fuckin'-bec

c. *ha-fuckin'-ppiness

d. *Ar-fuckin'-kansas

2.2 Infixation or something else?

Of course, in English, *fuckin'* can also be used as an independent word; it doesn't have to always be an infix. Thus, we can see below that it can be separated from the noun by another adjective as in 4b, that the order of the two adjectives can be reversed as in 4c, and that there can even be an adjective on both sides at the same time as in 4d, whether or not the prosodic structure of the word lends itself to infixation.

(4) Other uses of *fuckin'* in English

a. His fuckin' car / delivery.

b. His fuckin' new car / delivery.

c. His new fuckin' car / delivery.

d. His new fuckin' {black car} / {long-distance delivery}.

We conclude then that English *fuckin'* can indeed also occur as a (syntactically independent) modifier, in this case an adjective, though the reading of 4b above can also be adverbial. As we alluded to in the introduction, there is another ambiguity in cases like *un-fuckin'-believable*, where the insertion does not respect the prosodic requirements observed in other cases. It is important to note that the expected *unbe-fuckin'-lievable* is also attested (a simple Google search reveals thousands of hits). We may wonder then whether 5b below represents a third (prefixal) use and that only 5a represents true infixation, or whether there is something special to the prosody of *unbelievable* that allows the unusual pattern, as proposed by McCarthy (1982). We shall see how the MF facts can enlighten us in a moment.

(5) A problematic case in English

a. Unbe-fuckin'-lievable

b. Un-fuckin'-believable

3 Traditional expletives in Montréal French

Before presenting the facts of F-I in MF, it is necessary to cover basic facts about more traditional expletives in MF. As we shall see, there is a significant divergence between the traditional expletives and F-I. The MF F-I facts mimic the English facts closely and the divergence with the traditional MF facts allows us to conclude that the usage of MF F-I is calqued on its English source. In other words, it is not just a simple lexical borrowing; it comes with certain grammatical properties.

First, we notice that the traditional expletives apply to a noun within a PP structure with *de*. This is obviously not the case for *fuckin'* in English.

(6) [NP [PP]] Type

a. Fermez vos [**crisses** [de gueules]].

'Close your EXPL mouths.'

b. Il s'est acheté un [**câlisse** [de beau char]].

'He bought a EXPL nice car.'

c. Ces [**hosties** [de vacances]], je m'en fous.

'These EXPL vacations, I don't care (about them).'

Second, when traditional expletives are made into adverbs, they take on the *-ment* adverbial suffix of French:

(7) Adverbialized *Xment* examples

a. Elle courait **crissement** vite.

'She was running EXPL-ly quickly.'

b. Ils vont **câlissement** bien ensemble.

'They go EXPL-ly well together.'

Finally, some traditional expletives can be made into a verb and they then take all the inflectional morphology of French verbs (1st conjugation). As we can see in 8b below, they can also be compounded in the process of being turned into a verb:

(8) Verbalized examples

a. Elle lui a **câlissé** une gifle.

'She EXPL-ed him a smack.'

b. Il s'en **contre-crisse**.

He counter-EXPL

'He doesn't care.'

In the MF corpus we used, we found no example of *fuckin'* used within a PP structure, no adverbial example with the *-ment* suffix and no verbal example. Before detailing the facts we did find attested, let us turn to a description of the corpus and our methodology. We refer the reader to Dostie (2015a, 2015b) for additional examples of the traditional kind.

4 Methodology

Ces gars-là is a webseries written by and featuring Sugar Sammy and Simon-Olivier Fecteau, with additional script credits to India Desjardins, consisting of three seasons of ten episodes each that aired on the V network in Quebec in 2014, 2015, and 2016 (total of 30 episodes). The series is considered both a critical and commercial success and was taboo-breaking in its use of English dialogues within a predominantly French-language series.

For our purposes, the webseries provided us instantly with several examples of *fuckin'* used in MF. The scripted nature of the text did not however make it seem relevant to compute statistics as one could with spontaneous discourse. Nevertheless, the success of the series guarantees to some extent that the attested usages were in line with what is produced by contemporary native speakers. To confirm this impression, we had the students of an undergraduate linguistics class[2] each listen to one episode from the first two seasons and note each instance of *fuckin'* they heard. The examples were then all presented to the class and the students were asked whether any of the examples struck them as odd or ungrammatical. No example was judged ungrammatical or odd by the students who were native speakers of Quebec French. We have to mention that most of the speakers were not from Montreal, but from an area 300 miles from Montreal; yet the agreement in judgements was completely uniform. We could thus probably have replaced 'Montreal' in the

[2]The class was taught at UQAC and titled *Grammaire systématique* (Fall 2015). We thank the students: Stéphanie Ahern, Caroline Boisvert, Michèle Bouchard, Érika Brassard, Frédérique Côté, Jeanne Coulibaly, Mélyssa Gagnon, Emmanuelle Melançon, Jessica Normandin, Claudie Ottawa, Isabelle Pâquet, Mathieu Perron, Julien Renaud, Joséphine Simard, Nicolas Thibeault, Emmanuel Trotobas.

title of this talk with 'Quebec', but, since the corpus was a Montreal corpus, we opted for the more modest claim.

We then listened to the 30 episodes ourselves and transcribed all sentences containing an occurrence of *fuckin'*. We established a classification of the uses of *fuckin'* in MF, which is detailed in the following section. We established a plausible chronology of the stages, in function of known grammaticalization stages (Hopper & Traugott 2003).

5 *Fuckin'*- facts in Montréal French

In this section, we detail and classify the attestations of *fuckin'* we found in our corpus. We do not list all the examples found, but illustrate with a representative sample from each category we came up with.

Much like in English, MF *fuckin'* can occur as an adjective modifying a common noun or a proper noun. Notice here the absence of the PP structure present in the traditional expletives.

(9) *fuckin'*- as an adjective

a. Un fuckin' asshole.
'A fuckin' asshole.'

b. C'est quoi ton fuckin' nom encore ?
'What is your fuckin' name again?'

c. J'vais la payer moi-même la fuckin' fenêtre.
'I'll pay it myself the fuckin' window.'

d. Ça veut dire que ma patience a des fuckin' limites.
'It means my patience has fuckin' limits.'

e. C'est une fuckin' vieille.
'It's a fuckin' old (lady).'

f. OK, vos gueules ! Vos fuckin' gueules!
'OK, your mouths! Your fuckin' mouths!' (= 'Shut up')

(10) Adjective modifying a proper noun

a. ...des billets pour fuckin' Broue.

'...tickets for fuckin' Broue.'

b. Al a un poster de fuckin' Parizeau d'sus sa toilette.

'She has a poster of fuckin' Parizeau on her toilet.'

c. D'habitude c'est fuckin' Seigneur des anneaux.

'Usually, it's fuckin' Lord of the Rings.'

As in English again, *fuckin'* can be used as an adverb, modifying an adjective or a verb. Notice here again the lack of parallel with the traditional expletive, which, unlike *fuckin'*, take the *-ment* suffix.

(11) Adverb on adjective

a. Je suis fuckin' sérieux ok ?

'I am fuckin' serious ok?'

b. Y est fuckin' brillant.

'He is fuckin' brilliant.'

Semantically, *fuckin'* amplifies the adjective, but the effects on a verb are more opaque. The semantic function seems to carry more of a general negative attitude on the statement as a whole. The use of fuckin' in the example below also seems more natural to us as native speakers than their replacement with traditional *Xment* expletives, but we have to admit that we have not verified this intuition with other native speakers.

(12) Adverb on verb

a. Y a fuckin' mangé.

'He has fuckin' eaten.'

b. Peux-tu juste fuckin' arrêter ?

'Can you just fuckin' stop?'

c. De quoi tu fuckin' parles ?

'What are you fuckin' talking (about)?'

d. C'est ça qui va fuckin' arriver.

'That's what's gonna fuckin' happen.'

(13) Other examples

a. Là t'en parles plus à fuckin' personne.

'Now you don't talk about this to fuckin' anyone anymore.'

b. Tu sais-tu ç'a couté combien faire le plein ? Deux et vingt-cinq. Deux et fuckin' vingt-cinq.

'Do you know how much it cost to tank up? Two (dollars) and twenty-five (cents). Two and fuckin' twenty-five.'

In the next example, we enter an interesting domain. Prenominal adjectives in French form a tight domain with the following noun that is subject to semantic idiosyncrasies (Bouchard 1995) and is one of the known domains of obligatory liaison (Morin & Kaye 1982). Unfortunately, our single example did not lend itself to liaison. Here again, traditional expletives would require a PP structure.

(14) Between an adjective and a noun

a. C'est un bon fuckin' burger, ça !

'That is a good fuckin' burger!'

Within a complex noun now, we have examples that would be completely impossible with the traditional expletives. We included in this category several examples consisting of a first and last name 15a, but also a compound example where a plural liaison [z] curiously appears, even though the compound without *fuckin'* never has liaison! It is striking that no native speaker judged this example unacceptable and attention needed to be brought to speakers each time that the liaison [z] was never part of the original compound. It would be outside the scope of this paper to attempt to explain this single fact, we simply want to point out how it shows that *fuckin'* is now entangled in the morphology of MF, thus qualifying as F-I.

(15) Within a complex noun

a. Martin fuckin' Côté, Ariane fuckin' Côté, Claude fuckin' Meunier, Tiger fuckin' Woods

b. Des boucles de fuckin' z-oreilles
Rings of fuckin' PLUR-ears
'fuckin' earrings'

Our final example is another crucial one in demonstrating the morphological character of MF F-I. French object pronouns are by all accounts closer to the verb than any other word. For example, they are treated as clitics moved by head movement in Tellier (1998). Auger (1994) and Miller & Sag (1997) go further in treating them as bona fide prefixes of French. Whatever the correct analysis may be, it is striking that no other word of French known to us can interrupt the sequence of an object pronoun and its verb.

(16) Between a clitic and a verb

Tu me fuckin' niaises?
You me fuckin' kidding
'You're fuckin' kidding me?'

6 Implications for historical change and for the analysis of English facts

6.1 The status of *fuckin'*- in Montréal French

The data from our corpus shows that the uses of *fuckin'* in MF are closely calqued on English. They diverge from more traditional expletives in the lack of the PP structure and the lack of the *-ment* suffix in adverbial uses. The verbal modifying uses of *fuckin'* also seem more acceptable

than their equivalents with traditional expletives, though this claim requires further confirmation. Finally, we have found no example of a verbal use of *fuckin'* in MF, whereas this is possible with several traditional expletives. These factors allow us to conclude that, as a syntactically independent modifier, MF *fuckin'* is largely influenced by its English uses and was probably introduced via bilingual speakers.

We also find that *fuckin'* sometimes exhibits a behaviour that brings it closer to morphology. Thus, we have attested examples of F-I within a first-last name sequence, within a compound word and between an object pronoun (which has variously been analyzed as a clitic or a prefix) and its verb. MF F-I has then reached affixal status, if we follow Auger (1994) and Miller & Sag (1997). Even under Tellier (1998), F-I has to be intertwined with head movement, which gives it less syntactic independence than a head with full phrasal projections.

We have not, however, found cases where *fuckin'* interrupted a continuous morph and we cannot therefore conclude that it has reached infix status in the sense of Yu (2003).

6.2 Historical change

We have just concluded that speakers of MF (at least those scripting the webseries) have not reached the infixal stage with the borrowing that is *fuckin'*, even though other uses seem to be so closely calqued on English. Anecdotal examples have been reported to us of what appear to be true infixal cases, but we cannot come to this conclusion following our methodology. It is possible that our corpus isn't large enough or simply that most speakers have not reached this stage yet.

In grammaticalization theory, affixal status often follows wordhood status chronologically. Thus, French *-ment* was originally an independent word, as were the future suffixes of French (see Hopper & Traugott 2003 and references therein for historical details). It would be in line with these facts about grammaticalization if the the independent word uses of *fuckin'* were more ancient than the morphological uses. We take the fact that true infixal uses of *fuckin'* are unattested in our corpus to also indicate that they come later in the grammaticalization stages. We therefore propose the following historical progression:

syntactically independent word > prefix(ation) > infix(ation)

MF represents the second stage, while English is at the third stage. It is possible that the prosodic nature of French blocks the third stage, though anecdotal reports suggest they are not impossible.

6.3 English

If the grammaticalization stages above are correct, it becomes plausible then that English *fuckin'* exists as a prefix, in addition to its infixal and adjectival/adverbial incarnations. If so, examples such as *un-fuckin'-believable* are probably earlier than examples such as *unbe-fuckin'-lievable*. Some of them may even be lexicalized as such. There is no reason to think that the prefixal uses were lost once the infixal uses came about, no more than there is reason to think that the independent syntactic word was lost.

Hence, positing a different prosodic structure to account for such examples (as did McCarthy 1982) becomes unnecessary. The argument that *fuckin'* cannot interrupt certain prefix-stem sequence (like *irresponsible*) is not compelling to us. It could very well be that the morphophonology assimilating the prefix *in-* to *ir-* makes the prefixation sound unacceptable.

6.4 Open questions (prosodic and sociolinguistic) and conclusion

Beyond the scope of this paper, we find that future research could try to answer whether the rise of *fuckin'* correlates with a decline of religious swear words in MF. It would also be interesting to investigate whether the use of *fuckin'* is different in the Montréal urban center than it is in other cities and regions of Québec (and Canada), or whether other languages in contact with English behave differently[3]. Other types of corpora are necessary to answer such questions.

Another interesting question would be to analyze the prosody of MF F-I. Our impression is that *fuckin'* receives initial stress (trochaic) when it precedes a monosyllable, but that it receives final stress (iambic) when it precedes a disyllabic word. Because French is a stress-final language, we can't help but think there might be stress clash avoidance going on. Obtaining reliable measures of these facts and determining what happens when *fuckin'* precedes longer words would be interesting.

For now, we hope to have convinced the reader that MF F-I has reached a morphological stage without being truly infixational as it is in English. We take this evidence to indicate that prefixation is a plausible intermediate stage in the path of grammaticalization from an independent word to an infix and that English may still bear traces of this stage in its contemporary morphology.

[3]For example, McCloskey (2017) describes what looks like a very similar distributional pattern for the same borrowing in Irish.

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Contact effects and semantic extension in Jejueo dative case

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1 Introduction

The purpose of this paper is to discuss current phonological and semantic innovations in the production of dative suffixes in Jejueo, the indigenous language of Jeju Island, South Korea. I will discuss the phonological contact effects of the Korean dative suffixal system on the Jejueo spoken on Jeju Island and in a diasporic enclave in Osaka, Japan. My second aim will be to argue that the locative postposition *api* 'in front of' underwent semantic extension as a dative suffix 'to' in archaic Jejueo, but this suffix appears to have been lost in the Jejueo spoken on Jeju Island. Jejueo speakers in Osaka, however, maintain use of *api* as a dative suffix. Although*api* 'to' is frequently produced with borrowed phonological material from Korean, semantic extension of the Korean cognate *ape* 'in front of' has not occurred in Korean. This paper will discuss theoretical bases for the sharp differences in dative case production in Jeju compared to Osaka, examining the linguistic and extralinguistic factors motivating the phonological changes and clines of shift toward Korean.

In short, I have found that the typological congruence between Jejueo and Korean, long-term intensive contact with Korean, and favorable attitudes toward Korean as the prestige code have motivated significant phonological borrowing into Jejueo dative suffixes. Dative suffixes that are cognate appear to be most vulnerable to phonological borrowing from Korean, and on

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Jeju, where the contact with Korean is significantly more intensive, the Jejueo dative suffixes, along with the language overall, are being replaced entirely by Korean forms. In the case of the Jejueo dative suffix *-api* 'to', whereby the Korean cognate *-ape* 'in front of' has not undergone semantic extension, speakers on Jeju Island may have replaced native *-api* 'to'/ 'in front of' with the Korean locative postposition *-ape* 'in front of', assimilating to the semantic value of the Korean cognate suffix.

In §2 I give information on the geographic, historical and linguistic context of Jejueo and its position in the Koreanic language family. In §3 I explain my methodology for data collection in this study and give a brief discussion of the motivations and limitations of the methodology. I provide the elicitation prompts in this section and include the image prompts in the appendix. In §4 I describe Jejueo's locative and dative suffixal systems, and give a brief outline of the cognate suffixes in Korean. I review Kang's (2005) analysis of Manchurian locative and dative morphemes borrowed into Jejueo, and discuss the resulting introduction of semantic features into Jejueo's existing case system. In §5 I address Park and Lee's (2006) explanation of the grammaticalization of dative markers that occurred in Middle Korean, and argue that a similar process has taken place in the Osakan variety of Jejueo, implicating a possible cline for all varieties of Jejueo. In §6 I describe the overall patterns of phonetic contact interference from Korean into Jejueo dative suffixes in the Jeju and Osaka Jejueo speech communities. In §7 I present a theoretical discussion of possible linguistic and extralinguistic motivations for the differences in borrowing patterns and semantic innovations in the two speech communities. Finally, in §8 I offer preliminary conclusions based on the discussion, and address possibilities for future studies, in particular examining methods for

avoiding accommodation effects in testing contact interference from Korean. Additionally, I look at possibilities for developing a clearer picture of the cline of change and frequency of use for *-anti*, *-sinti* and *-api* 'to' in Jeju and Osaka.

2 Jejueo language context



Figure 1. Areas where Jejueo is spoken

The Koreanic language family consists of at least two languages, Jejueo and Korean. Several regional varieties of Korean are spoken across the Korean peninsula, approximately divided along provincial lines. Jeju Island is a medium-sized volcanic island located roughly 60 miles southwest of the Korean peninsula. Jejueo has approximately 5,000 to 10,000 speakers living throughout the islands of Jeju Province and in a small, diasporic enclave in Osaka, Japan. Originally an independent kingdom called Tamna, citizens of Jeju Island struggled through many centuries of a tributary relationship with mainland Korea and

subsistence farming, only to become the top tourist destination of South Korea in the 21st century. Shifts in population in the late 20th century, tourism and repressive language policies have made Korean the dominant language of Jeju Island. With fluent speakers of Jejueo all over the age of 75, and with speakers amounting to 1% of the population of Jeju, Jejueo was classified as critically endangered in 2010 (UNESCO).

Typologically, Korean and Jejueo share a majority of their features. Koreanic languages are morphologically robust, with many grammatical functions marked by affixation, compounding and reduplication. The languages are primarily suffixing. Nouns are marked for case, plurality, conjunction, reflexivity and honorific status, and verbs are marked for tense-aspect-mood, negation, quotation, register, voice and causation. Koreanic languages do not mark gender or agreement and do not have articles. Some prefixing is permitted, including negation on verbs and adnominal modification of nouns. Koreanic languages can be classified as fusional-agglutinative, as verbs may attract a series of grammatical morphemes and discourse markers, but these units may undergo morphophonological assimilation and lose their one-to-one relationship with meaning. Koreanic languages have a primarily SOV word order, featuring postpositions and adjective-noun constructions. Going against type, the Koreanic languages also feature noun-genitive and noun-numeral-classifier orders. Koreanic languages are nominative-accusative, and have frequent pro-drop for both subjects and objects. Subject-object scrambling is permitted when arguments are marked for grammatical roles. The languages feature a six-way distinction in honorific status, expressed by sentence-final particles, pronominals, postpositions and a small set of lexical items. A distinctive feature of

the Koreanic phonemic inventory is a three-way distinction between voiceless aspirated, unaspirated and fortis [-strident] obstruents.

Jejueo and Korean are, however, not mutually intelligible, owing mainly to Jejueo's distinct lexicon and grammatical morphemes. Jejueo's vowel inventory is also larger than that of Korean, because Jejueo maintains the two Middle Korean phonemes /ɔ/ and */z/ (Stonham 2011). In Korean the phoneme /ɔ/ has merged with the two phonemes /a/ in initial syllables and /ɨ/ in non-initial syllables (Lee & Ramsey 2000:287). While in modern Korean /z/ underwent deletion, in Jejueo the phoneme /z/ underwent devoicing, and is realized phonetically in modern Jejueo as [s]. Jeju's history of relative isolation from mainland Korea allowed Jejueo to conserve many Middle Korean terms, such as Middle Korean *pɨzʌp* : Jejueo *pusʌp* 'charcoal burner' and Middle Korean *kokoli* : Jejueo *kokoli* 'ear of grain' (Stonham 2011: 97). Furthermore, the Mongolian colonization of Jeju in the 13th and 14th centuries, Japan's annexation of Korea and occupation of Jeju between 1910 and 1945, along with centuries of trade with Manchuria and Japan, have led to significant lexical and morphological borrowing in Jejueo (Martin 1993, Lee & Ramsey 2000). Many place names in Jeju come from Japanese, e.g. Tamna, the original name for Jeju Island (Kwen 1994:167), along with names for indigenous fruits and vegetables in Jeju, e.g. *miⱪaŋ* 'orange'. It is possible that Japonic influence on Jeju place names is the result of Japonic speakers inhabiting Jeju before Koreanic speakers migrated into the area (Vovin 2013). Mongolic speakers left the lexical imprint of terms relating to livestock, particularly horses and cows (Changyong Yang 2014, p.c.). Morphologically, Jejueo has many contracted forms that are absent in Modern Standard Korean (MSK), such as vowel deletion in the accusative morpheme *-ɨl* after a vowel, as in

sondʑil grandchild.ACC 'grandchild'. The Jejueo TMA system also has morphological conflating of tense and aspect, e.g. *-m* declarative-progressive, a feature that is absent from the Korean TMA morphological system. Example 1 below shows a Jejueo construction with declarative mood and progressive tense conflated. Example 2 shows the corresponding construction in Korean.

(1) Jejueo

miⁿkaŋ -ɯl t^ha -m -su -ta

orange-ACC pick-IND-FO[PRS]-DECL

'[he] is picking oranges'

(2) Korean *kjul -ɯl ⁿta -ko i -su -ta*

orange-ACC pick-PROG EXIST-FO[PRS]-DECL

'[he] is picking oranges'

Finally, Jejueo pitch accent is distinct from Korean; for example, Jejueo is characterized by a verb-final rising pitch marking declarative mood, whereas most varieties of Korean have a neutral sentence-final pitch. The examples below offer some evidence of the degree of overlap in the production of typical simple declarative constructions in 3 Jejueo and 4 Korean.

(3) Jejueo

harmaŋ =hʌkok-jaŋ sontɕi -ka jaŋ miⁿkaŋ pat^h -ti -kaŋ

grandmother=CONJ-DM grandchild-NOM-DM orange field-LOC-go.PURP

t^ha -su -ta

pick-FO[PST]-DECL

'The grandmother picked oranges with her grandchild in the orchard.'

(4) Korean

harmʌni =hago sonjʌ =hago pat -esʌ kjul -ɯl ʨa -ʂ -ʌjo

grandmother=CONJ grandchild=CONJ field-LOC orange-ACC pick-PST-FO

'The grandmother picked oranges with her grandchild in the orchard.'

3 Methodology

This study includes 25 native speakers in Jeju and 25 native speakers in Osaka. Both genders are represented, but women make up approximately 75% of those interviewed in Osaka, as there are fewer male speakers of Jejueo in that community. Age ranges from 30 to over 85 and the range is equally distributed in both groups. The visual and written elicitation tools used in this study were of my own design. Participants were shown two picture prompts, and for each picture participants heard four Korean constructions related to the image, in declarative, interrogative, hortative and imperative moods. After each Korean construction was read by a native Korean-speaking assistant, participants were asked to give a similar construction that described the image in Jejueo. The two picture prompts were designed to elicit a ditransitive verbal construction and a possessive marker, as well as honorific lexical items and morphemes for both agent and goal roles. Although Jejueo and Korean share about 20-25% their lexicons (Yang 2013), the picture prompts in this study were intended to elicit only Jejueo items not shared by Korean.

Using this type of structured elicitation creates a clear possibility for accommodation effects in the data. If the elicitation tasks were understood by consultants to be translation tasks

from Korean to Jejueo, accommodation effects are likely to be present in the data. One possible source of inconsistency in the methodology was a divergence between my two native Korean-speaking assistants in their adherence to the Korean elicitation script. In Jeju my assistant presented each consultant with the same Korean constructions based on the elicitation script. Conversely, my assistant in Osaka sometimes veered slightly from the script to create a more natural description of the picture prompts in Korean. Specifically, in the Jeju elicitation sessions the Korean dative marker *ɘke* was consistently used, while in Osaka, the Korean dative marker *ɦante* was used approximately 20% of the time. One likely effect of this divergence is the clear preference among speakers in Jeju for the dative marker *ɘke* , which is normally used in the written register of Korean. If the collected data simply showed a general shift to Korean, *ɦante* would more likely be preferred. A final point is that it is entirely possible that the Jejueo dative suffix *ɑpi* is still used to some extent on Jeju Island. As I will address in §8, future studies are needed to more accurately determine the frequency of use of Jejueo dative markers on Jeju.

4 Jejueo dative suffixes

As in Korean, Jejueo's dative suffixes are fossils grammaticalized from locative postpositions. The Jejueo dative suffixes are *ɕinti, -ant^{h}i* , *ʈɯre, sintɯre* and *ɑp^{h}i* 'to' (Ko, et al 2014, Kang 2005). As I explain below, speakers produce several of the locative/ dative suffixes in complementary distribution, where the suffixes are locative when suffixed to [-animate] NPs and dative when suffixed to [+animate] NPs.

Contemporary Jejueo has three locative case markers: *-ti, -i and -tɯre/-re* 'at, to', compared with Korean's two locative case markers *-e* and *-ɯro/ro* 'at, to'. Until the 15th century Jejueo's locative case marker was *-tɔ* 'at, to'. In the early Joseon period of the 15th and 16th centuries Jejueo borrowed the locative morpheme *te* 'at, to', and the directional/allative morpheme *-dere* 'to, toward' from the Tungusic language Manchurian (Kang 2005). The native Jejueo locative marker *tɔ* 'at, to' and the borrowed Manchurian locative morpheme *-de* were produced in free variation by Jejueo speakers in approximately the 14th century, and according to Kang (2005) they later underwent phonetic change to become *-ti* 'at, to' and *-i* 'at, to', which are produced in free variation in contemporary Jejueo. The borrowed Manchurian allative morpheme *-dere* underwent phonetic change conforming to Jejueo's phonological constraints, to become the directional-dative case markers *-tɯre* 'to, toward' following a consonant, and *-re* 'to, toward' following a vowel, in contemporary Jejueo (Kang 2005). Today *-ti/-i* and *-tɯre/-re* have overlapping but distinct semantic features as the set of locative morphemes in Jejueo. While *-ti, -i, -tɯre,* and *-re* all function as dative markers when suffixed to [+animate] NPs, the Korean locative and directional markers *-e* 'at, to' and *-iro/ro* 'toward' do not have a dative function.

The locative morpheme *-ti* enjoys robust productivity in Jejueo. The suffix *-ti* occurs as a locative marker on [-animate] NPs, and as a dative marker on [+animate] NPs. The suffix *-ti/i* is also frozen as the first element of the locative-ablative case suffix *tisʌ/ isʌ* 'at, in, from' 5 and as the second element of the dative suffixes *-sinti* 'to' 6 and *-ant^{h}i* 'to' 7.

(5) *harmaŋ -jʌŋ sontɕi -jʌŋ pat^h -**ti**sʌ miᵑ̈kaŋ t^{h}amtɕʌ*

grandmother-COM grandchild-COM garden-LOC orange pick.DECL[PRS]

'The grandmother and grandchild are picking oranges in the garden.'

(6). *sʌnsiŋ -nim -i haksɛŋ-sinti tɕʰɛk-ɨl tɕuʌm-su -goa*

teacher-HON-NOM student-DAT book-ACC give -FO[PRS] -Q

'Is the teacher giving a book to the student?'

(7) *sʌnsiŋ -nim -i haksɛŋ-antʰi tɕʰɛk-ɯl tɕuʌm -sin -ge*

teacher-HON-NOM student-DAT book-ACC give -PRS-Q

'Is the teacher giving a book to the student?'

The dative postposition *-tɨre* 'to, toward' corresponds to the dialectal variants: *-tɨre*, *-tere*, *-tʰire*, *-tʰɨre*, and *-rɨre* (Kang 2005). The suffix *-tire* marks directional-allative case on [+location] NPs and dative case on [+animate] NPs. In example 8 below *-tɨre* is fossilized in the dative suffix *-sintɨre* 'to'.

(8) *hɔksɛŋ -i sʌnsɛŋ -nim -sintɨre tɕʰɛk aneʌm-su -ta*

student-NOM teacher-HON-DAT book give -POL[PRS]-DECL

'The student gives books to the teacher.'

(9) *dʑib -tɨre ka-su -goaŋ?*

house-ALL go -POL[PST]-Q

'Are you going toward the house?'

5 Grammaticalization in Korean

Middle Korean, spoken throughout the Korean peninsula from the 12th through the 15th century, did not have a set of dative case suffixes. Before the Early Modern Korean period began in the early 16th century, dative case was marked by postpositional phrases. Park & Lee (2006) present a convincing case that *hant^{h}e* 'to', along with other Korean dative markers such as *eke* 'to', grammaticalized from these postpositional phrases. Ko, et al. (2014) note that *-toi* 'to' is attested as a locative suffix attached to NPs in Middle Korean documents. According to Park & Lee (2006) in 15th-century Middle Korean documents *hʌn t^{h}oi* 'one place' is attested as a phrase with full semantic transparency. The cline of grammaticalization began with *hʌn t^{h}oi* 'one place' undergoing constructional constraints, following an NP and preceding one of a closed set of VPs. Production of **hʌnt^{h}oi* 'one place' in fixed constructions generally took the form in example 10 below.

(10) NP-*oa* *hʌn-t^{h}oi* *iss-ta/* *o* *-ta/* *ka-ta*

NP-COM one-LOC be-INF/ come-INF/ go-INF

'Be/ come/ go to the same place with...' Park & Lee 2006

Through the 17th and 18th centuries, beginning in the Early Modern Korean period, **hʌnt^{h}oi* 'one place' was produced in fixed constructions with growing frequency. In the 19th century, **hʌnt^{h}oi* 'one place' underwent phonological reduction to become *hant^{h}e* in MSK (Park & Lee 2006) and *ant^{h}i* in Jejueo. The forms also underwent semantic bleaching and adopted further syntactic constraints, becoming the dative markers *-hant^{h}e* 'to' and *-ant^{h}i* 'to', which suffix to [+animate] NPs in Korean and Jejueo, respectively.

The data presented in this paper suggests that the Jejueo locative postposition *-ap^h-i* front-LOC 'in front of' has undergone a similar cline of change to become a dative suffix *-ap^{h}i* 'to' produced by the Osakan Jejueo speech community. The two postpositional forms **hʌn-t^{h}oi* 'one-place' and *ap^h-i* 'in front of' share a similar morphological construction, however, in that both feature a place adverbial head followed by the suffixal locative morpheme **-t^{h}oi/ -(t)i* 'to, at'. The postposition which provided the base for the *-ap^{h}i* 'to' semantic extension did not undergo semantic bleaching, and so the two homophonous suffixes *-ap^h-i* front-LOC 'in front of' and *-ap^{h}i* 'to' are produced in complementary distribution, suffixing [+/- animate] NPs in contemporary Jejueo. Although Korean has a cognate locative postposition *ap^h-e* front-LOC 'in front of', Korean *ap^h-e* has not undergone semantic extension to mark the dative case and cannot suffix to [+animate] NPs. Examples 11 and 12 show *ap^{h}i* used in Jejueo as the dative case marker 'to' and the locative marker 'in front of', respectively.

(11) *sʌnsiŋ -nim -i haksɛŋ -ap^h**i** t͡ɕ^{h}ɛk t͡ɕom-su -gaŋ*

teacher-HON-NOM student -DAT book give -FO[PRS] -Q

'Is the teacher giving a book to the student?'

(12) *tol -harɯbaŋ ap -i i -t̻͡ɕʌ*

stone-grandfather in.front.of-LOC EXIST-[PRS]DECL

'[It] is in front of the stone grandfather.'

6 Contact interference from Korean into Jejueo

During my fieldwork sessions in 2013, Jejueo speakers in both communities showed a tendency to borrow Korean phonetic material into dative case markers. The resulting blended particles are highly variable in their construction and frequency of use, depending on speakers' fluency in Jejueo and the etymology of the particle, and on the degree of semantic symmetry between genetically related morphemes. Borrowing from the Korean into the Jejueo case markers typically consists of replacing the first or last segment of a Jejueo case suffix with a segment borrowed from the cognate Korean case suffix, which differs minimally in form. One example is the variable production of the Jejueo dative case particle *ant^{h}i* 'to' as *hant^{h}i* or *ant^{h}e*, based on interference from the Korean dative marker *hant^{h}e* 'to'. The data collected for this project suggests that speakers produce Jejueo cognate particles with blending from Korean more often than they produce Jejueo particles without such interference. Cognates are highly vulnerable to phonetic influence from Korean, and for semi-speakers, the shift to the Korean cognate is usually complete. Particularly in Osaka, where Jejueo has undergone less lexical attrition than on Jeju, borrowing into Jejueo dative markers generates a robust inventory of blended forms containing elements from both Korean and Jejueo, often with individual speakers using more than one variant. Speakers in both Osaka and Jeju produced Jejueo *ant^{h}i* 'to' as *hant^{h}i,* and in Osaka also as *ant^{h}e*, borrowing the final segment from Korean *hant^{h}e* 'to'. Although the Jejueo dative suffix *ap^{h}i* 'to' was used only by the Osaka community, speakers used the blended form *ap^{h}e* 'to' more often than the native Jejueo suffix. Jejueo speakers in Osaka produced *ap^{h}i* as blended suffixes *hap^{h}i* and *ap^{h}e,* again suggesting borrowing from Korean dative suffix *hant^{h}e*. For the blended form *ap^{h}e,* it is possible that speakers borrowed

the final segment from Korean locative marker *hant^{h}e* 'to', or the full Korean locative postposition *ap^{h}e* 'in front of', suggesting theoretical implications that I will discuss in the following section.

In both the Osaka and Jeju communities the Korean-Jejueo blended dative suffix *hant^{h}i* 'to' occurs more frequently than the native Jejueo dative marker *ant^{h}i* 'to'. The data collected here suggests a borrowing pattern where forms in the substrate that are etymologically related to forms in the superstrate show more rapid shift to the superstrate's cognate form. In this case speakers may be more likely access the /h/ phoneme shared by the MSK cognate *hant^{h}e* 'to' under contact pressure from the superstrate. By contrast, the Jejueo dative marker *sin(t)i* 'to', which is not cognate with a Korean dative suffix, is comparatively quite stable in both communities and invulnerable to phonetic interference.

In the examples below, 13 shows borrowing of the first syllable of the Korean dative marker *hant^{h}e* into the Jejueo dative marker *ant^{h}i,* creating the blended dative suffix *hant^{h}i* 'to'. Example 14 shows borrowing of the second syllable of *hant^{h}e* into *ant^{h}i,* to form *ant^{h}e.* Korean forms are marked in bold.

(13) ***sʌnsɛŋ -i*** ***tɕ^{h}ɛk-ɯl*** *hɔksɛŋ-**hant^{h}i*** ***tɕu -ko*** ***iʂ*** ***-ta***

teacher-NOM book -ACC student-**DAT give-PROG EXIST.PLN[PRS]-DECL**

'The teacher is giving the student a book.'

(14) ***haksɛŋ-i*** ***sʌnsɛŋ-nim*** *-ant^{h}e* ***tɕ^{h}ɛk-il*** ***tɕuʌ***-m *-su* *-koa*

student-NOM teacher-HON-DAT **book-ACC give**-IND-FO[PRS]-Q

'Is the student giving the teacher a book?'

Figures 1 and 2 below show speakers' production of the Jejueo dative suffix *ant^{h}i* 'to' in Jeju and Osaka, respectively. Both 1 and 2 show that speakers produce the native Jeju particle *ant^{h}i* with less frequency than either the Korean cognate dative suffix *hant^{h}e* or the blended dative suffixes that contain elements from both Jejueo and Korean, *hant^{h}i* and *ant^{h}e*. While less-fluent Jejueo speakers in Jeju produce the Korean form and blended form with almost equal frequency, a shift to the Korean form is taking place, and is replacing the native Jejueo form. In Osaka, as in Jeju, about half of speakers produce the Korean form *hant^{h}e*. However, in this community, where speakers have less contact with Korean, Jejueo is slightly better preserved, with 17% of speakers producing the Jejueo suffix *ant^{h}i*.

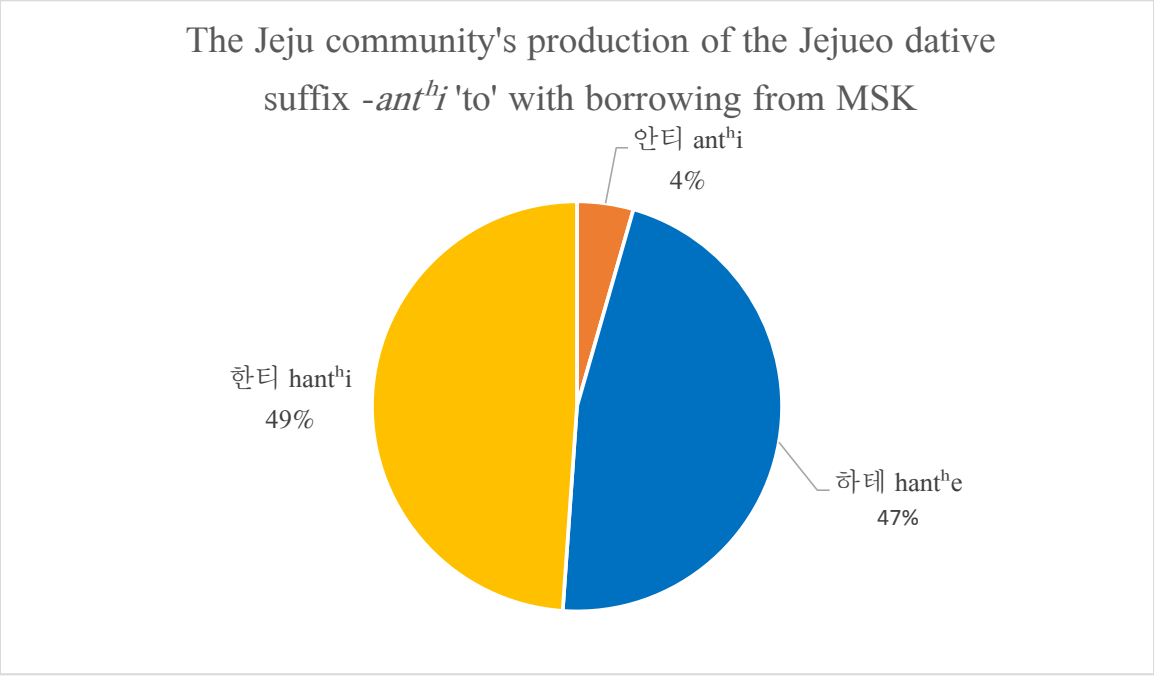


Figure 1. Production of Jejueo dative suffix ant^{h}i with evidence of phonetic transfer from MSK dative suffix hant^{h}e and complete shift to hant^{h}e.

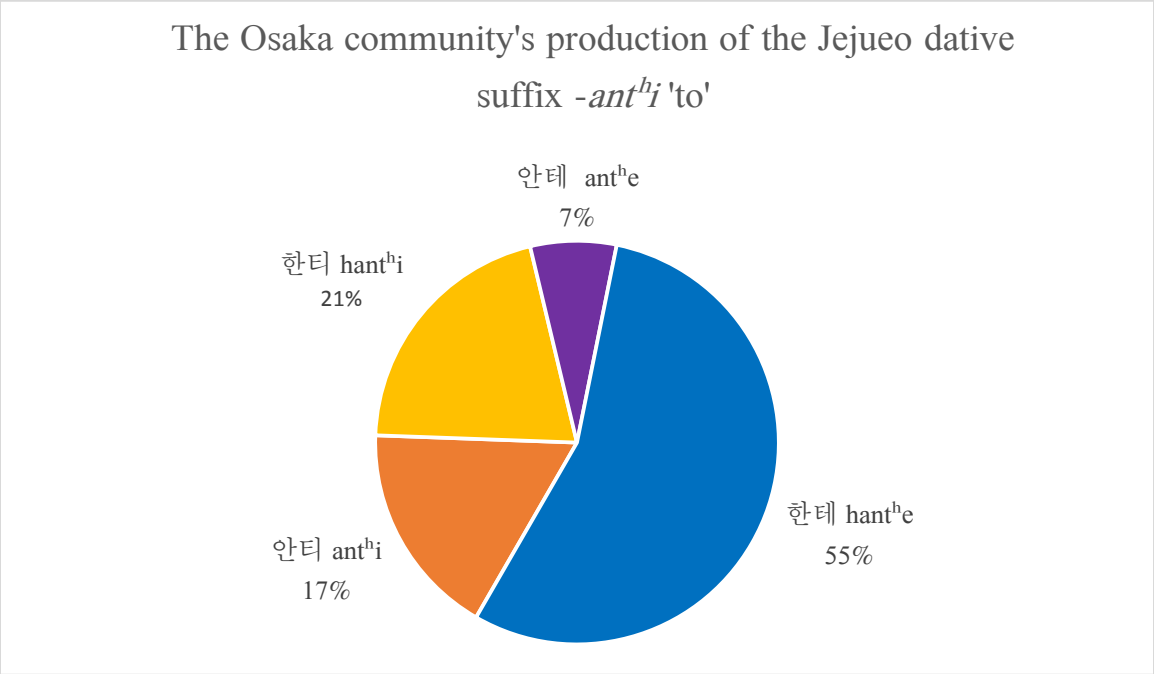


Figure 2. Production of Jejueo dative suffix ant^{h}i with evidence of phonetic transfer from MSK dative suffix hant^{h}e and complete shift to hant^{h}e.

The blended dative suffixes based on *ap^{h}i* 'to', which contain elements from both Korean and Jejueo, are shown in examples 15 and 16. These productions of *ap^{h}e* 'to' and *hap^{h}i* 'to' demonstrate the link between the borrowing patterns of the two Jejueo dative markers, *ant^{h}i* and *ap^{h}i*. In 16 the speaker borrows the first syllable from *hant^{h}e* into *ap^{h}i* to form the blended suffix *hap^{h}i*, showing an analogy to the Korean dative suffix *hant^{h}e.* Korean forms are marked in bold.

(15) *minho-ja* ***sʌnsɛŋ-ap^{h}e*** ***tɕu*** *-muun* *ʌ̟tʌŋ-ha* *-na*

Minho-VOC **teacher-DAT give**-COND how-do[PRS]-PLN.Q

'Hey Minho, how about giving the teacher a book?'

(16) *tɕʌ* *hɔksɛŋ-i* ***sʌnsɛŋ-hap^{h}i*** *tɕ^{h}ɛk-ɯl* *annеʌ-m* *-k̟unai*

DIST.DEM student-NOM **teacher-DAT** book-ACC give -IND-PLN[PRS]TAGQ

'That student is giving the teacher a book, isn't he?'

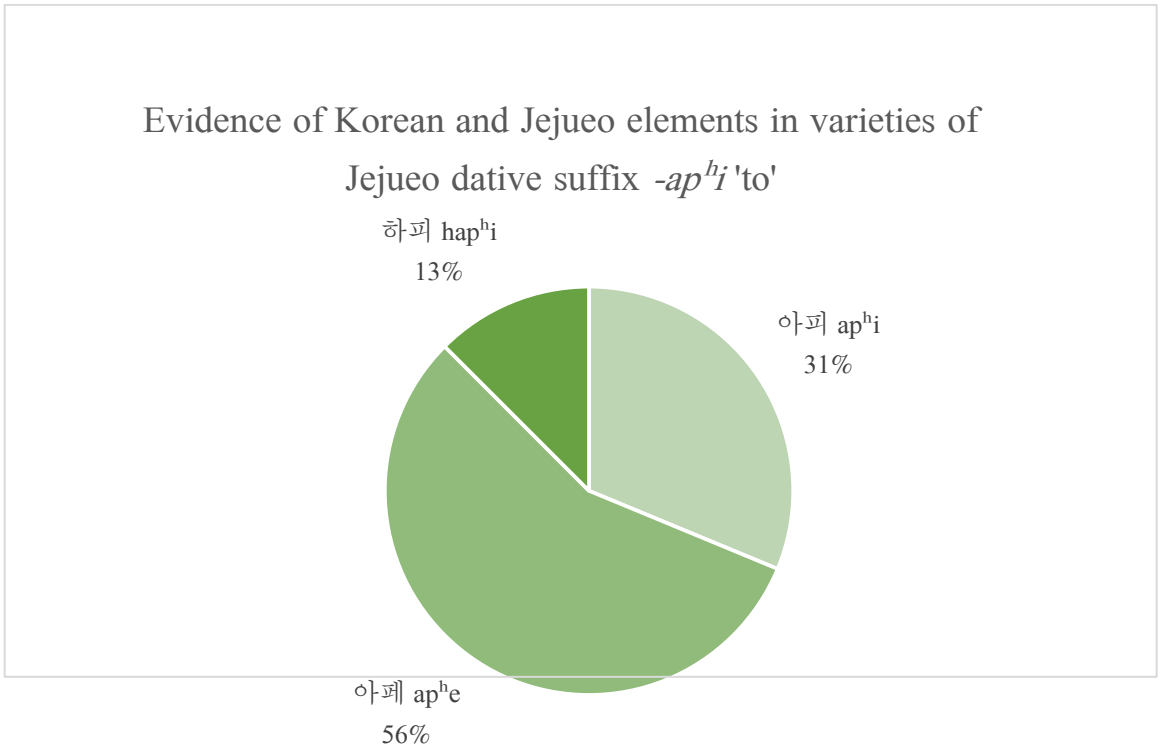


Figure 3. Production of Jejueo dative suffix *-ap^{h}i* with evidence of phonetic borrowing from MSK dative suffix *-hant^{h}e*.

Figures 4 and 5 show the repertoire of dative suffixes collected from Jejueo speakers in Jeju and Osaka, including native Jejueo dative suffixes, borrowed Korean dative suffixes, and blended dative suffixes featuring elements from both Jejueo and Korean. The two communities stand in sharp contrast to one another in that the less-fluent Jeju community demonstrates a

high level of shift to the most common Korean dative suffix, -*eke*, which is unrelated to any Jejueo form. Ihe Osaka community shows a preference for -*hant*^{h}*e,* the Korean variant of the Jejueo dative suffix *ant*^{h}*i*, which, as discussed previously, is a shift that may be predicted when two varieties of a related form come into contact through a superstrate-substrate contact situation. It is also apparent in Figures 4 and 5 that Jejueo dative suffix -*sinti* 'to' remains relatively productive in both communities, and is less vulnerable to internal shift due to its etymological independence from Korean. Figure 4 suggests that Jejueo in Osaka is undergoing shift to Korean, but speakers are actively using Jejueo in a situation of language contact: Jejueo forms are more likely to be blended with Korean forms, but the blending generates a robust inventory of dative suffixes, rather than replacing Jejueo forms fully with Korean forms. Figure 5 suggests that Jejueo in Jeju is undergoing a radical shift to Korean, with several Jejueo dative suffixes preserved by speakers over age 70.

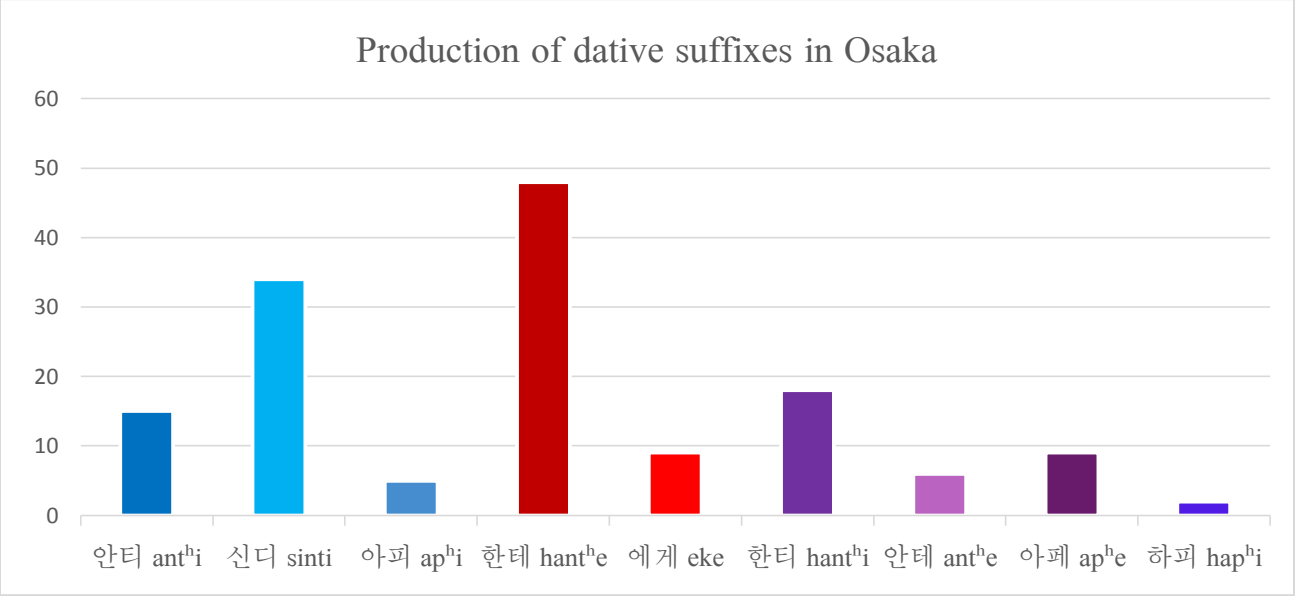


Figure 4. Production of Jejueo dative suffixes with 6 forms demonstrating full or partial borrowing from Korean. Blue: Jejueo items, red: Korean items, purple: items taking elements from Jejueo and Korean.

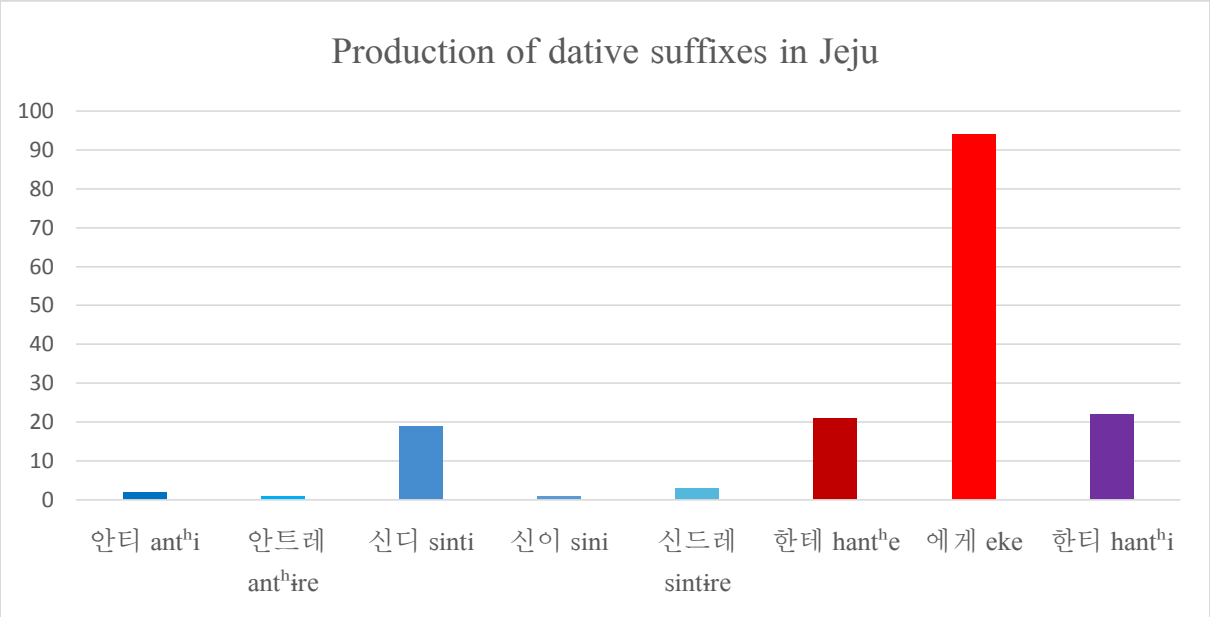


Figure 5. Production of Jejueo dative suffixes with 4 forms demonstrating full or partial borrowing from Korean. Blue: native Jejueo forms, red: Korean forms, purple: forms taking elements from Jejueo and Korean.

7 Theoretical discussion

The majority of contact linguistics research has reported that inflectional morphology is among the least likely of the linguistic subsystems to be borrowed, as bound grammatical morphemes are expected to belong to larger paradigms that cannot be borrowed in full (Weinreich 1953, see van Hout and Muysken 1994 for an explanation of paradigmacity) and inflectional morphology is predicted to be less semantically salient to speakers of the borrowing language (Mithun 2012). For closely related languages like Jejueo and Korean, the theoretical borrowing hierarchies (Moravcsik 1978) cannot accurately predict which features are most or

least likely to be borrowed. Thomason (2015: 30) argues that morphological transfer is particularly common in closely related languages, because the congruent typological systems do not create any barrier against borrowing. This appears to be the case for Jejueo, particularly for dative suffixes that are etymologically related to Korean forms. Given the bilingualism and favorable language attitudes toward Korean on Jeju Island, this high level of congruence between Jejueo and Korean suffixes may create a path for unidirectional convergence to Korean. Data on the Korean community in Osaka's language attitudes suggests that Korean in Osaka, holds a significantly lower prestige value than it does on Jeju Island (Kang 2005). The majority of Jejueo speakers in Osaka are also fluent in Korean and Japanese. The prestige language in Osaka is Japanese, and accommodation effects, while possible, are less likely to occur with a language far less closely related to Jejueo. Moreover, the Jejueo speech community in Osaka is a dense, multiplex network, unlike the Jejueo speech community for younger generations. This may in part allow for the more robust maintenance of Jejueo morphemes in the Osaka community.

The Jejueo dative suffix *-api* 'to' appears to only be preserved in the Osakan variety of Jejueo. Ko, et al. (2014:97) list the native Jejueo dative suffixes as *sintɯi, ant^{h}ɯi* and *ap^{h}ɯi* 'to'. The Middle Korean locative suffix was *-*t^{h}ɔi/t^{h}ʌi* (Ko, et al. 2014, Park & Lee 2006, Choi 1993), which became *-ti/i* in modern Jejueo and *-e* in modern Korean. The Jejueo inventories of dative suffixes, demonstratives and locative postpositions (e.g. *sinti* 'to', *jʌti* 'here', *uti* 'over') all contain the locative *-di*, which likely fossilized before the *-i* locative/dative suffix evolved following borrowing from Manchurian in the 13th century (Kang 2005). Park and Lee (2006) do not list *-ape* as among Korean's inventory of dative suffixes in

either the pre-modern or modern era. It is possible, then, that Jejueo borrowed the Middle Korean locative postposition **ap^{h}ʌi* 'in front of' (Park & Lee 2006), which underwent phonological change and semantic extension in pre-modern Jejueo to be used in complementary distribution as -**ap^{h}ɯi* 'to' following animate NPs and -**ap^{h}ɯi* following inanimate NPs. Without more historical data it is premature to assume a diachronic path for the development of Jejueo dative marker *-ap^{h}i.* Jejueo could just as well have had a phonotactic constraint against following a plosive with a plosive, e.g. *apdi,* and so preferred to attach the *-i* locative suffix, given the innovation occurred after the phonological change in the locative suffix. It seems very possible, however, that the dative suffix *-ap^{h}i* developed from a semantic extension from the locative postposition, given the syntactic position of the locative postposition *-ap^{h}i,* its semantic value, and what is known of the etymology of dative markers in Korean and Jejueo. As the data presented here shows, *-ap^{h}i* 'to' allows phonological borrowing from Korean, even when semantic extension has not occurred in the Korean cognate *-ap^{h}e* 'in front of'.

8 Conclusions and future directions

The Jeju diaspora over the past 60 years has led to two separate clines of morphological change in the varieties of Jejueo on Jeju Island and in Osaka. The Jeju data suggests morphological attrition and unidirectional convergence to Korean. In Osaka, however, Jejueo is significantly more stable, and Jejueo suffixes incorporate phonological borrowing without complete replacement by Korean dative suffixes. To better estimate the frequency of use of the

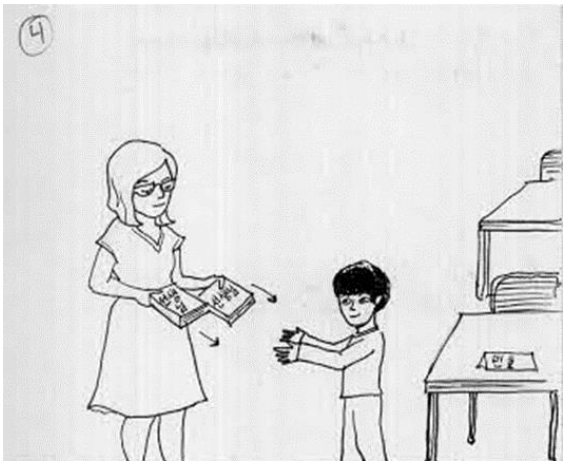
Jejueo dative suffixes in either community, additional field work is necessary, particularly in the form of less structured elicitation. Moreover, philological research is needed to understand the diachronic development of the Jejueo dative suffix *-ap^{h}i* 'to', and its relationship to the Jejueo locative postpostion *-ap^{h}i* 'in front of' and the Korean cognate *ap^{h}e* 'in front of'. Although data is available on the diachronic development of the modern Korean dative suffixes, no previous research is available on the development of Jejueo dative suffixes, and the etymology of forms like *-sinti* 'to' is unknown. Whether the initial syllable in *-sinti* had evolved from a form with semantic transparency could shed light on the possible cline of grammaticalization or semantic extension of Jejueo dative markers.

Appendix: Tools

Elicitation prompt 1:

The teacher gave her books to the student.

1. 선생님이 학생에게 그녀의 책을 주고 있습니까?
   Did the teacher give her books to the student?
2. 선생니므 선생님 책을 학생에게 주죠.
   The teacher should give her books to the student.
3. 선생니므 선생님 책을 학생에게 주세요.
   Teacher, give your books to the student.



Elicitation prompt 2:

1. 학생은 선생님에게 그의 책을 주고 있다
   The student gave his books to the teacher.
2. 학생은 그의 책을 선생님에게 주고 있습니까?
   Did the student give his books to the teacher?
3. 학생, 너의 책을 선생님에게 드리자.
   Student, you should give your books to the teacher.
4. 학생, 너의 책을 선생님에게 드려라.
   Student, give your books to the teacher.



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Past tenses in contact in 18th and 19th century French and Spanish

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1 Introduction

In this paper, I use a corpus of private family letters from the 18th and 19th centuries to explore the effects of language contact on parallel structures, specifically competing past tense forms, in closely related languages. The simple and complex past tenses in French and Spanish are structurally analogous, but during this period the distribution of the two tenses in French changed much more rapidly than in Spanish. I look at the speech of bilinguals to determine whether bilinguals pattern with monolinguals in their usage of the past tense in French and Spanish.

If we understand the locus of contact-induced change to be the bilingual speaker (Weinreich 1953, Matras 2009), examining the linguistic behavior of bilingual individuals and communities allows us to access potential changes which may or may not then spread to the larger speech community. The bilingual speaker is constantly managing multiple linguistic structures from different languages, which may have overlap in some areas but not others. There is consequently a tension between the use of context-appropriate structures (as determined by, for example, language-specific norms) and a speaker's desire to use his or her entire repertoire for efficient and effective communication, which may lead to contact-induced change (Silva-Corvalán 1994, Matras 2009).

This is perhaps particularly relevant when applied to typologically similar or related languages, where parallel structures outnumber divergent ones. Although the idea that typological similarity is a **necessary** factor for contact-induced change appears unfounded, this does not mean that typological similarity has no effect on contact influence (Thomason and Kaufman 1988; Epps et al 2013). In fact, as Schulte (2012:331) puts it, 'if unrelated, often typologically very different languages influence each other and are subject to transfer of linguistic structures, then it stands to reason that there is even more morphosyntactic influence or transfer between sister languages that

[*] My thanks to Mairi McLaughlin, the members of the UC Berkeley Romance Linguistics Working Group, and BLS attendees for their helpful comments. Archival research for this project was supported by an RLL Block Grant/Rodriguez Fellowship.

share a comparatively similar structure'. That is, the typological similarity of languages like French and Spanish, when combined with social factors favoring bilingualism and tight-knit communities, would lead us to expect increased instances of contact-induced change. Of course, our classification of contact-induced changes need not be limited to new structures (that is, not possible from internal developments). As Heine and Kuteva (2005:46) argue, 'replication is not necessarily a dramatic process, frequently consisting simply of a higher frequency and/or a more extensive use of an existing pattern.' A change in frequency, distribution, or meaning is still a change, and in typologically similar or genetically related languages, this type of change is particularly likely.[1]

Here, I will be focusing on frequency changes in one set of structures: past tenses in French and Spanish. In Section 2, I discuss the historical development of complex and simple pasts in Romance. I introduce the corpus I use to discuss these questions in Section 3. Sections 4 and 5 discuss frequency results and specific examples; I conclude in Section 6.

2 Simple and complex past tenses in Romance

Romance languages as far back as Vulgar Latin make use of two (or more) tenses to express a range of PERFECT and PERFECTIVE meanings[2]. Because these functions are separate from the form of the past tenses and change over time, I will avoid using perfect or perfective to designate a specific tense, instead reserving them for the readings or functions of a given verb form. Similarly, because this is a comparative study, I will not use language-specific tense names, and will instead use a morphological classification to distinguish them. That is, the periphrastic Romance perfect (French PASSÉ COMPOSÉ; Spanish PRESENTE PERFECTO) is a COMPLEX past tense because it is formed by combining an auxiliary verb with a past participle, whereas the synthetic, or SIMPLE past tense (French PASSÉ SIMPLE, Spanish PRETÉRITO), uses inflectional morphemes to mark tense and aspect. The complex and simple pasts derive from the Latin resultative and aorist pasts respectively, as shown in Table 1.

[1] See McLaughlin (2011, 2013) for a similar approach to French and Italian in contact with English.

[2] Where 'perfect' is used to refer to events with present relevance, and 'perfective' describes a temporally bounded situation (without reference to another time point) (Comrie 1976).

Table 1: Evolution of Latin past tenses into French and Spanish.

	COMPLEX ('I have sung')		**SIMPLE** ('I sang')	
LATIN	**resultative**	*cantatum habeo*	**aorist**	*cantavi*
FRENCH	**passé composé**	*[j']ai chanté*[3]	**passé simple**	*[je] chantai*
SPANISH	**presente perfecto**	*he cantado*	**pretérito**	*canté*

2.1 The perfect

The readings of each form have not, however, remained static since Vulgar Latin. The exact classification of the PRESENT PERFECT (as the prototypical perfect tense, aligning most often with the complex past described above) and its functions is a hot topic both cross-linguistically and specifically in Romance. Most analyses pull out four or five possible readings of the present perfect (Bybee et al. 1994, Comrie 1976, Dahl 1985, Howe 2013, Schwenter 1994b)[4]: (i) RESULTATIVE (perfect of result); (ii) EXPERIENTIAL (perfect of experience); (iii) CONTINUATIVE/DURATIVE (perfect of persistent situation); (iv) HOT NEWS (perfect of recent past). The fifth, CURRENT RELEVANCE is proposed in many analyses as an additional reading, but as Howe (2013:25) argues, this is rather circular, since 'relevance to the ongoing discourse topic is characteristic of all uses of the perfect and arises via the satisfaction of a relevance presupposition conventionally associated with the meaning of a perfect.' The first three readings are fairly easy to identify; as we will see below it is the fourth and fifth that appear to drive the extension to new contexts.

While the complex past tense in most varieties of contemporary Spanish allows all of the above readings, the contemporary French complex past tense does not fit many of the criteria of a prototypical present perfect despite being morphologically analogous. The resultative and experiential meanings appear to hold even in contemporary varieties of French, and the complex past can still function as an anterior past punctual when contrasted with the present tense. However, the continuative reading is incompatible with the French complex past and need not indicate any present relevance (Howe 2013:18; 28-9). As for the 'hot news' reading, as the complex past becomes more and more of a narrative tense the periphrasis *venir de* has arisen as a marker of recent

[3] A small set of verbs in French use the auxiliary *être* 'to be'.

[4] Although see Ayres-Bennett and Carruthers with Temple (2001) for a discussion of other conceptualizations as regards French.

past[5] (Ayres-Bennett and Carruthers with Temple 2001:181; Riegel, Pellat and Rioul 1994:453). Historically, however, this was not the case.

2.2 The evolution of the Romance past

The evolution of the simple and complex past tenses in Romance has been schematized by Harris (1982) as a process whereby the complex past takes on more and more prototypically 'perfect' meaning—that is, it encroaches on the sphere of usage of the simple past, eventually reaching a stage where there is no difference (except that of style and/or medium) between the simple and complex pasts (see Table 2). This process has been termed 'aoristic drift' by Squartini and Bertinetto (2000). While there are problems with Harris' neat four-stage framework (Squartini and Bertinetto 2000), it does give us a starting point from which to compare varieties.[6] According to this framework, contemporary French would be at Stage IV, Mexican and most Latin American varieties of Spanish would be at Stage II, and Castilian Spanish at Stage III. As the complex past begins to be used in ever more contexts, it also increases in frequency relative to the simple past.

Table 2: Stages of aoristic drift in Romance, adapted from Harris 1982, Howe 2013, and Schwenter 1994a.

STAGE	COMPLEX	SIMPLE
I	Present states resulting from past actions	All past perfectives
II	Past events with current relevance, durative or repetitive	Most past perfectives
III	Archetypal 'present perfect' value of 'past action with present relevance'	Past situation without current relevance
IV	Distinction between complex and simple past is neutralized	Used only in formal or written registers

Schwenter (1994b) describes the last two stages of this grammaticalization pathway in the following manner: because the perfect often occurs in a time that is recent to the utterance, it gains an added meaning of 'recency'—i.e. the 'hot news'—but is still seen as relevant or continuing to the

[5] Harris (1978:151) sees this as part of a cycle of typological change.

[6] Alarcos Llorach (1947) posits a very similar framework for Spanish which traces the development of the periphrastic past as it gains functions, from (1) resultative (present states resulting from past actions), to (2) continuative (including durative or iterative), (3) 'hot news' (punctual actions occurring immediately before the present), and (4) 'extended present' (current relevance).

present moment. The 'hot news' perfect interpretation could then lead to a simply perfective meaning as the 'recentness' or 'presentness' erodes, leaving a perfective past interpretation and available at increasing temporal distance from the present.[7] From this point is not a great leap to reach the point of contemporary French, where the simple and complex pasts can be used to describe perfective events and are differentiated by constraints of genre and medium rather than temporal or aspectual considerations.

The simple past was used extensively in French up through the 16th century despite an increased use of the complex past. It is in about the 17th century that the complex and simple past begin to be used more and more interchangeably in contexts which previously had only admitted the simple past, although the simple past continued to be used as the prototypical narrative tense. It is also during this century that the frequency of use of the complex past surpasses that of the simple past (Caron and Liu 1999:39; Labeau 2015, Ayres-Bennett and Carruthers with Temple 2001). The situation at this time appears to correspond to Harris's stage II/III. At this point, however, the rate of change increases rapidly. Grammarians in the 18th century note that the simple past had fallen out of popular usage,[8] and it is at this point that the complex past lost its current relevance reading (Degtes and Waltereit 2016:644). Despite the fact that the simple past continued to be used in certain written contexts (dramatic dialogue, narration) or geographic areas (the south of France), by the 19th century it had more or less been replaced by the complex past in oral usage (Labeau 2015:176-77).

In Spanish, on the other hand, while there was some development during this time (especially in the Peninsular varieties), there was nowhere near the same rate of change we see in French. In a corpus of plays, Copple (2013) found that the use of the complex past increased from 26% to 37% between the 15th and 17th centuries, and from there to 49% in the 19th century.[9] That is, although the complex past does slowly gain in frequency—and is extended beyond resultative meaning to being used in very recent or unspecified pasts, even appearing alongside the simple past—by the 19th century it is used at approximately the same frequency overall as the simple past, in contrast to the French pattern of a sharp decline by this point.

[7] See Schwenter 1994a for a description of a current instantiation of this process in the dialect of Alicante.

[8] See Ayres-Bennett and Carruthers with Temple (2001:174) and Labeau (2015:175) for a discussion of the role of morphological complexity in the loss of the *passé simple*.

[9] Copple's study looks at a corpus of plays, which is a slightly different genre from both Caron and Liu's (1999) study and my corpus. Both genres have been used for historical sociolinguistic analysis, although not unproblematically (Schneider 2002). I will treat them as more or less comparable in the absence of other data.

One context where this difference is particularly apparent is the PREHODIERNAL context, that is, events occurring prior to the day of the speech event.[10] Caron and Liu (1999), in a study of a French epistolary corpus from the 17th-19th centuries, find that the correlation of the prototypical prehodiernal adverb *hier* 'yesterday' with the simple past is broken, and the increase of the complex past in this context is particularly rapid in the second half of the 18th century. By the 19th century, *hier* patterns almost categorically with the complex past (Table 3); the same pattern appears, if less strongly, for other adverbials including *le lendemain* 'the day after' or *la veille* 'the day before'.

Table 3: Percent use of complex (C) and simple (S) past tenses in prehodiernal contexts in French ('yesterday', epistolary corpus, Caron and Liu 1999) and Spanish (theater corpus, Copple 2013), 17th-19th centuries.

	17th		**18th**		**19th**	
	C	*S*	*C*	*S*	*C*	*S*
FRENCH	1.59	98.4	51.75	48.25	97.84	2.16
SPANISH	2	98	--	--	8	92

In Spanish, however, Copple (2013) found that, although the use of the complex past increased to 49% in HODIERNAL (today) contexts by the 19th century, the correlation of the simple past with prehodiernal contexts remained quite strong (Table 3). This context underscores the greater difference between Spanish and French during this time period. Although use of the complex past was indeed increasing in both languages, in French the change accelerated through the 18th and 19th centuries, whereas the simple past was still robust in Spanish at this time.

Given the changes detailed above in monolingual usage, the question arises as to whether bilingual language use might show the same patterns. In this context, bilinguals are dealing with two past tense systems which, while formally analogous, are getting farther and farther apart in terms of distribution patterns. It is this question which I examine in the following sections.

[10] In histories of French this is often termed the '24-hour rule' (use of the complex past for events occurring less than 24 hours before the time of speech and the simple past in more distant temporal contexts) and it is frequently discussed prescriptively in the sixteenth and seventeenth centuries, although it seems unlikely that it was actually followed (Labeau 2015: 176; Ayres-Bennett and Carruthers with Temple 2001:172-3).

3 The corpus

The corpus examined here is a collection of about 110 personal letters written to and from the Bouligny family and acquaintances in New Orleans, France, and Spain between 1748 and 1867. Francisco I Bouligny, the central figure in the corpus, was a Spanish soldier born in Spain to French parents who married a Francophone Creole woman after being stationed in New Orleans.[11] Most of the authors represented in the corpus were bilingual in French and Spanish, including some who wrote in both languages, and the corpus is evenly split between documents in the two languages. Documents were transcribed from the originals in the archives of the Historic New Orleans Collection[12] and the Rosemonde E. & Emile Kuntz Collection (Louisiana Research Collection, Tulane University).

4 Frequencies

We can imagine several ways in which the diverging situation in French and Spanish past tenses might manifest itself in the Bouligny letters, which can be grouped into two categories: (i) contact effects on **form** and (ii) contact effects on **usage.** The former encompasses auxiliary use and agreement of the past participle, and is unfortunately outside the scope of this paper. I will instead focus on the latter, which deals with changes in both frequency and meaning. To examine these effects, I pulled out all instances of complex and simple past tenses in the corpus, a total of 811.

We saw above that in the 18th and 19th centuries use of the simple past in French was dwindling, especially when correlating with prehodiernal adverbs, once the clearest triggering factor for a simple past. In Spanish, however, the simple and complex past are used in about equal amounts, and for prehodiernal contexts the use of the simple past is almost automatic.

The difference between these two systems could be expected to affect the comparative frequencies of the complex and simple past in the speech of bilinguals in two ways: (i) an increased use of the simple past in French as compared to monolingual usage, which as we have noted shows a marked and increasing preference for the complex past, and/or (ii) an increased use of the complex past in Spanish, at odds with monolinguals who use simple and complex pasts at about the

[11] See Din 1993 and Martin 1990 for historical and biographical information on the Bouligny family.

[12] Bouligny-Baldwin (MSS 171), Bouligny-Genin (MSS 361), and Dauberville-Bouligny (MSS 103) family papers.

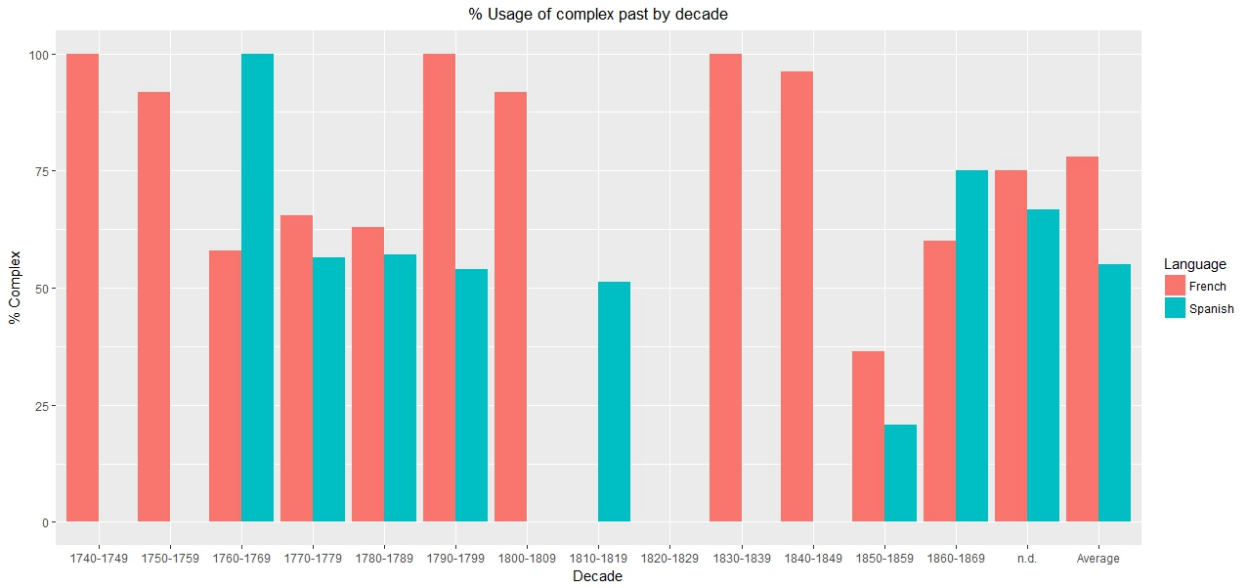
same frequency. The first would reflect a use of the simple past more in line with Spanish convention. The latter effect would show contact effects in the opposite direction, where because the complex past is available for the expression of almost every perfect in French, these same uses are extrapolated to Spanish.

4.1 Frequencies by decade

Let us first examine the frequency across the corpus over time. We have seen that the relative frequencies of the complex and simple past changed greatly over the 18th and 19th centuries in monolingual French, especially in the prehodiernal context. The frequency of the complex past in Spanish also increased during this time, if not nearly as drastically.

Figure 1 breaks down past tense usage in the corpus by decade of composition of the text.

Figure 1: Usage of the complex past by decade of composition[13]



Across the corpus, speakers choose to use the complex past instead of the simple past more frequently in French (78% of past tense usage) than in Spanish (55%), matching what we might expect given the above discussion of overall frequencies. However, we do not see, particularly in French, a constant rate of use for the complex past, nor, as we might expect, a constant increase

[13] The corpus does not include past tense tokens in French from 1810-1829 or Spanish from 1740-1759 or 1820-1849. The following cases show n<10 for total past tense tokens: French 1830-1839, 1860-1869, Spanish 1760-1769.

over time as the simple past falls out of use. It seems clear that date of composition (or speaker generation) is not the conditioning factor for use of the complex past in this corpus.

Because of the nature of the corpus, the documents are not evenly distributed over time, and individual authors will have outsize effects on the decade in which they were the most active. Given that fact, it is clear from Figure 1 that there are a few periods, and thus presumably individuals, whose verb usage runs contrary to the (monolingual) trends observed above: 1760-1789 and 1850-1869 in particular. Texts from these decades show lower than average percentages of complex past tense use in French: between 57% and 65% for the period from 1760-1789, 36% from 1850-1859, and 60% from 1860-1869. They also, in some cases, show extremely frequent or infrequent usage of the complex past in Spanish, such as 1850-1859 where the rate of use of the Spanish complex past was only 21%. The individuals writing during these decades are behaving differently than their correspondents and family members.

4.2 Frequencies by individual

We will therefore turn to examining verb use by individual. Figure 2 shows the use of complex and simple past tenses by each individual in the corpus, in both Spanish and French. The individuals are grouped by linguistic proficiency according to sociohistorical context and which language(s) they wrote in.[14]

We note first that monolingual French speakers use the complex past at rates of between 75% and 100%. On the other hand, use of the French complex past by bilinguals ranges from 36% (Luis II) to 100%. The individuals with the lowest percentage usage (50% or below) of the complex past in French are bilingual speakers, and specifically Spanish-dominant bilinguals. This large range of variation shows that individuals are using the past tenses in very different ways, but that some bilinguals are not following the same pattern as the monolinguals attested in this corpus and others (e.g. Caron and Liu 1999). They are in fact using a larger proportion of verbs in the simple past than their peers.

[14] Degree of bilingualism is clearly difficult to determine precisely and we are limited to the sociohistorical and documentary evidence available; those sorted into the dominant groups therefore show a range of proficiencies, from balanced bilinguals (as attested by their writing) to those who most likely understood their second language but may not have been comfortable writing in it.

Figure 2: Usage of the complex past by individual, grouped by language proficiency.[15, 16]



For the most part, the use of the Spanish complex past patterns with Copple's (2013) findings—that speakers are using the complex past as frequently as the simple past. Those who have very extreme (high or low) frequencies of use of the complex past in Spanish are also often those who have anomalous usage of the past tenses in French: Luis II or Prudencia, for example.[17] Note also that French-dominant speakers use the simple past in Spanish either very frequently or very infrequently. These same individuals are the reason we see extreme frequencies for particular time periods in Figure 1. That is, the corpus data from 1760-1789 comes from letters written by Juan I, Joseph, Francisco I, Francisca, Alejandro O'Reilly, Theresa, Juan II, and Elena; and from 1850-1869, the letter-writers were Luis II, Prudencia, and Joaquin. The ways these individuals use the complex past accounts for the extreme numbers seen during these decades.

Based on frequency, we can posit the influence of the Spanish pattern on bilingual speakers. There are other elements that could be at work here, including archaism and formality, especially since the simple past is at this time becoming more and more associated with particular

[15] n<5 verbs in the past tense for the following speakers: Countess Galvez, Juan I Bouligny (Spanish), Mariano and Gaspar Herreros, Theresa Bouligny, Joseph Bouligny (French), Francisca Bouligny, Elena Bouligny, Alejandro O'Reilly. No bar means no past tense verbs overall, with the exception of Theresa, who has one simple past and zero complex past verbs in Spanish.

[16] Alejandro O'Reilly was an Irishman, here classified as Spanish monolingual because he has no proficiency in French, but knowledge of English may add yet another factor.

[17] Other speakers simply have very few tokens (see note 13).

discourse contexts such as history and literature. However, it appears that monolinguals and bilinguals are in fact behaving differently—bilingual speakers are using more of the simple past in French because their linguistic system includes a robust simple past in contrast with the complex past. This is particularly evident in Spanish-dominant bilinguals. The reverse pattern, that bilingual speakers might show an increased use of the complex past in Spanish, is seen in a few speakers, but there are an equal number of bilingual speakers who use an unexpectedly low number of complex past tense verbs. We do not see this extreme swing in French; only Luis II uses the complex past less than 50% of the time. Although this could be affected by low numbers of tokens, it appears that the effect is slightly different depending on the direction of contact influence (language dominance). In French, the effect is to slightly depress the frequency of the complex past as compared to monolingual speakers, with a result that is closer to the Spanish average. However, in Spanish, those speakers showing unusual frequencies are not using it at the same rate as in their French, but rather much higher or lower frequencies.

5 Discussion

In this section, I discuss examples drawn from those speakers with the lowest usage of the complex past in French. Luis II, born in New Orleans but probably taught to speak, read, and write both languages, uses the complex past very infrequently in both French and Spanish, although he does use it more frequently in French. His letters are for the most part discussions of family history, which could be a contributing factor to the low rate of the complex past, since the simple past is associated with historical and narrative genres. However, as seen in 1 and 2, Luis II does not exclusively use the simple past in this context, but rather vacillates between the simple and complex forms even in narrative lists, apparently treating them as equivalent.

(1) De los quatro hijos suyos que **fueron** todos casados, ~~el Mayor **se murio**~~ dos **se murieron** uno ~~él no~~ <de ellos no> **dejo** mas que dos hijas que ultimamente estaban en Paris con Sus madre <(donde **murio** ella)> y a quienes **ha conocido** D^{n} Theophilo de Bouligny en esta ciudad (1859, HNOC MSS 171 F 135)[18]

[18] I have rendered a faithful transcription, including strikethroughs, abbreviations (e.g. q^{e}. for 'que') and insertions (marked by < >). **Emphasis** mine. References to archival sources are in the following format: Source (Historic New Orleans Collection (HNOC) or Kuntz Collection at Tulane University (KCTU), Manuscript collection (MSS), Folder (F).

‘Of the four children of his who **were.**SIMPLE all married, ~~the oldest **died.**SIMPLE~~ two **died.**SIMPLE one ~~he did not~~ <of them did not> **leave.**SIMPLE more than two daughters who recently were in Paris with their mother <(where **died.**SIMPLE she)> and whom Theophilo de Bouligny **met.**COMPLEX in that city’

(2) un des descendants **passa** en Espagne à l’époque où le Bourbon **monta** sur le trône d’Espagne_ Le dernier des Bouligny, en France, **est mort** au service de Louis XVIII (1854, HNOC MSS 171 F 133/MSS 103 F 24)

‘One of the descendants **passed.**SIMPLE into Spain at the epoch where the Bourbon **ascended**.SIMPLE on the throne of Spain_ The last of the Bouligny, in France **died**.COMPLEX in the service of Louis XVIII’

In the Spanish example in 1, the only use of the complex past—also the only Spanish complex past example from Luis II in this corpus—is the verb *conocer* ‘to meet’, leading to a present relevance reading. In 2, in French, Luis II also uses more simple past tense forms than complex past forms. However, the verb that appears in the complex past is *mourir* ‘to die’, which usually lends itself to a very punctual reading, especially if, as in this case, the death did not occur very recently. Ayres-Bennett and Carruthers with Temple (2001:177-8) note that while at this time the simple and complex past could be used to refer to the same time period, combining the two tenses can serve discourse-pragmatic functions—one of the tenses can be used to open the text or narrative, setting the limits of the text, which then continues with the other tense. Perhaps Luis II is using this technique in 2 and 3, although in reverse—the former ends with the complex past; in 3, he uses the complex *est né* ‘was born’ for his father’s birth, but goes on to describe the rest of the events with the simple past. Even 1, in Spanish, could be said to fit this pattern, as he finishes a narrative segment in the simple past with a final verb in the complex past.

(3) Mon père Dominique François **est né** à Alicante, Royaume de Valence, Espagne… et **entra** jeune au service… et **passa** en Amérique (1854, HNOC MSS 171 F 133/MSS 103 F 24)

‘My father Dominique François **was born**.COMPLEX in Alicante, Kingdom of Valencia, Spain…and **entered.**SIMPLE young into the service… and **passed**.SIMPLE into America’

There is the additional concern of morphological complexity here which might be encouraging the use of the complex past. The simple past tense forms used in these examples are all regular verbs (*monter* 'to ascend', *entrer* 'to enter', *passer* 'to pass'), whereas *mourir* and especially *naître* 'to be born', both irregular, are conjugated in the complex past. This argument holds more for the latter than the former; in other places in the corpus he uses the simple past form of *mourir*.

Luis II has a marked preference overall for the simple past tense terms, appearing to use the complex past in both Spanish and French for foregrounding or pragmatic functions—that is, to mark present relevance or to bound narrative passages. Although he does use more of the complex past in his French letters overall, he does not use it as the unmarked narrative perfective tense as monolinguals are beginning to do.

Luis II's father, Francisco I, a career soldier in the Spanish army, was born in Spain to French parents. He uses the complex past just as frequently as the simple past (50%) in French, and as we see in 4 he switches from one to the other.

(4) J'**ay veu** avec plaisir par la Letre que vous **aves eu** La bonte d'ecrire a ma femme en date du 22^{e}. Abril dernier …En date du 24^{e}: Septembre 1784: J'**eus** l'honneur de recevoir une Letre de Madame votre Soeur Mad^{me}. de Milleville Le Clerc a la quelle Je **fis** reponce par Duplicat inmediatement. Mon Epouse vient de recevoir en date du 1er. Marz dernier de la dite Dame de Milleville reponce de la Letre qu'elle luy **ecrivit** et come nos deux Letres **partirent** ensemble (1789, HNOC MSS 103 F 12)

'I **saw.**COMPLEX with pleasure by the letter which you had the goodness to **write.**COMPLEX to my wife on the date of 22 April …On the date of 24 September 1784: I **had.**SIMPLE the honor of receiving a letter from Madame your sister Madame de Milleville le Clerc to which I **made.**SIMPLE reply by duplicate immediately. My wife has just received on the date of 1 March last from the said Lady de Milleville response to the letter which she **wrote.**SIMPLE to her and as our two letters **left.**SIMPLE together'

In this example, Francisco I uses the complex and simple past to refer to two different time periods: the complex is used for events in the past year, whereas for events four years prior he chooses the simple past forms. The first instantiation of the complex past is used for an event taking place in the very recent—although temporally unspecified—past. However, the second event described

using the complex past took place about six months before Francisco I writes his letter. The subsequent verbs are all in the simple past. Here, Francisco I contrasts the more recent events, expressed using the complex past, with the more temporally distant events described in the simple past. Note, however, that he includes also the periphrasis *vient de* 'has just' to add a third, more recent, temporal dimension. For Francisco I, the complex and simple past tenses are used to distinguish recent events from more distant ones, an extension of the prehodiernal/hodiernal pattern.

This use of the complex and simple pasts to temporally distance two events also appears in a letter from Francisco I's brother Joseph (also signed by their brother Juan II), example 5.

(5) Nous **recumes** avec La plus grande satisfac^{on}. La nouvelle de l'heureux engagement de notre cher frere avec vous, & vous y metez le comble par votre obligeante Lettre que nous **avons recüee**. (1771, HNOC MSS 171 F 37)

'We **received**.SIMPLE with the most great satisfaction the news of the happy engagement of our dear brother with you, & you top it off with your obliging letter which we **received**.COMPLEX'

In 5, Joseph uses both the complex and simple forms of the same verb, *recevoir* 'to receive'. The difference in these two uses could again be seen as a slight temporal distinction which is used as narrative organization to put the events in chronological order. Again, although the timing of these events is not specified, it does not seem that the reception of the letter in 5 happened within the last day. In these examples, bilinguals are not sticking to using the simple past in prehodiernal contexts, just like monolingual speakers. However, they are still using the simple and complex past for temporal contrast.

Prudencia, Joseph's granddaughter, also uses the complex rather than the simple past to relate the fact of a relative's death a month or two prior in both French and Spanish. This could be tied to the temporal distinction mentioned above or to a 'hot news' reading. However, she prefers to use the simple past in her narration in French, as she does in Spanish, as seen in 6 and 7.

(6) las noticias q^{e}. **tuvo** la bondad de darnos nuestro respetable Tio D^{n}. Luis (1866, HNOC MSS 103 F 20)

'the news that our respected uncle Don Luis **had**.SIMPLE the goodness to give us'

(7) le Cadet d'ápres unne chutte qui lui **manqua** de perdre unne jambe **fut** obbligé de prendre son congé. (1867, HNOC MSS 103 F 22)
'the youngest after a fall in which he **missed**.SIMPLE losing a leg **was**.SIMPLE obliged to take time off.'

As we have seen from these examples, although bilinguals are using the complex past to also refer to past events outside the 24-hour window, they choose for the most part to narrate in the simple past—or with some alternation between the complex and simple pasts. This is in contrast to monolinguals, who use the complex past most of the time.

6 Conclusion

Based on the frequency data, we have seen that bilingual speakers in this corpus were using the complex past differently—or at least at a different rate—than monolingual speakers. This was particularly pronounced in French, where several bilingual speakers showed lower-than-average frequencies of the complex past in contrast to monolingual speakers, who used the complex past 75% or more of the time. This would lead us to conclude that the Spanish pattern is affecting the way that some bilingual speakers use the simple and complex pasts. The case of bilinguals' Spanish past tense usage, however, is a bit murkier, with some bilingual speakers showing extremely high or low use of the complex past. The French case can be explained by a transfer of the Spanish pattern onto French usage, that is, bilinguals are using the simple and complex past in ways, or at least at the same frequency, that they might in Spanish. We saw in the examples discussed above that it might actually be that bilinguals, when faced with a simple past which is falling out of use by monolinguals, are using the opposition between the complex and simple pasts to instead create temporal contrast or mark discourse contexts such as narration. The scope of this paper did not allow for an in-depth examination of the Spanish case, but we might imagine that bilinguals may be using less of the simple past because they are transferring the more aorist readings of the French complex past onto the Spanish analogue, or they may be using the simple past more often in order to avoid an 'incorrect' use of the complex past. In both cases, it is the extension of the complex past in French, without concurrent extension of the analogous tense in Spanish, that creates a situation where the bilingual speaker must use similar structural forms in distinct contexts. Further investigation should include a discussion of the prehodiernal context, especially the correlation of

simple and complex pasts with specific time adverbials, given the fact that Spanish and French monolingual speakers act very differently in this context.

For this family network, there is a great deal of individual variation as regards linguistic behavior, even among bilinguals. Even those bilinguals who are acting differently from monolinguals pattern in variable and sometimes opposite ways. If, as Matras (2009:5) argues, 'contact-induced language change is ... ultimately the product of innovations that individual multilingual speakers introduce into discourse in a multilingual setting,' examining private letters in the context of a tightly knit bilingual family group can give us insight into which individual speakers innovate, and in what contexts, even if those innovations do not ultimately take hold in the language as a whole.

CORPUS

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LANGUAGES OF THE AMERICAS

Diagnosing Impersonal "Passives" in Unangam Tunuu (Aleut)

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1 Introduction

Impersonal passives are constructions in which the underlying subject becomes suppressed (or demoted) and the underlying theme remains the grammatical object. On the other hand, objects in canonical, so-called personal passives move to be in the structural subject position.[1] In some cases, while impersonal 'passives' behave functionally like passives, syntactically, they behave more like actives. The ambiguous nature of these passive-like impersonals therefore raises the following questions: are these constructions truly passives with a thematically empty null subject, or are they perhaps actives with a phonologically null, but syntactically active implicit subject argument? The categorization of these syntactic structures as either actives or passives at first glance appears to be a trivial issue. Yet as O'Connor & Maling 2014 and Maling & O'Connor 2015 point out, there are widespread disagreements among linguists on the proper analysis of these inherently ambiguous constructions across a wide array of languages: the autonomous construction in Irish (passive: Stenson 1989, Noonan 1994; active: McCloskey 2007), the "New Transitive Impersonal" in Icelandic (passive: Eythórsson 2008, Jónsson 2009; active: Maling & Sigurjónsdóttir 2002, henceforth M&S 2002, and subsequent works; active-passive: Sigurðsson 2011; grammatical object passive: Legate 2014), and the *-ya* construction in Northern Pomo (passive: O'Connor 1992; active: O'Connor & Maling 2014), an indigenous language of Northern California.

The purpose of this paper is to add to the discussion described above by introducing similar constructions from an unrelated language, namely Unangam Tunuu (also referred to as Aleut), a highly endangered language in the Aleut branch of the Eskimo-Aleut family spoken across the Aleutian, Pribilof, and Commander Islands in Alaska. This language has both personal passives and passive-like impersonals, and these two constructions appear to be based on the same subject-removing morpheme. In what follows, I employ a handful of syntactic tests used by M&S (2002)

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[1]The terminology for these types of constructions vary throughout the literature depending on one's analysis: passive-like impersonal constructions are sometimes referred to as non-promotional passives or unspecified subject constructions, and personal passives are also termed canonical, regular, or promotional passives.

to determine whether or not an active subject resides in the syntax of these constructions. Based on these results, I argue that impersonal constructions involving the morpheme *-lga-* in Unangam Tunuu are in fact actives with a PRO null subject.

This paper is organized in the following way. In Section 2, I provide a brief overview of Unangam Tunuu syntax relevant to the discussion, and then describe in greater detail the syntactic and semantic properties of personal passives and passive-like impersonals in the language. In Section 3, I employ the diagnostics proposed by M&S (2002) on the subject-removing morpheme *-lga-* to determine whether the impersonal construction is a passive or an active. Section 4 typologically contextualizes the properties of the implicit agent in the Unangam Tunuu impersonals, and the final section concludes.[2]

2 The problem space

In this section, I present a basic overview of a number of syntactic properties of Unangam Tunuu, including the so-called anaphoric reference marking system, a typologically unusual agreement system that, according to some scholars, emerged from an ergative system. I then describe the personal passive and passive-like impersonal in Unangam Tunuu, and the ambiguities that arise from these two constructions.

2.1 Unangam Tunuu syntax

In general, Unangam Tunuu displays a relatively fixed SOV word order, and verbs inflect for mood and exhibit agreement in person and number with the subject. In addition, when the core arguments are expressed, as given in (1), they receive the so-called absoutive case marker.[3] When the subject is known beforehand and left out of the sentence with a transitive verb, absolutive case is also marked on the overt argument, as in (2).[4]

[2]The data come from existing documentation including the *Atkan Unangam Tunuu School Grammar* (Bergsland and Dirks 1981) abbreviated as AASG, *Unangam Tunuu Dictionary* (Bergsland 1994) abbreviated as AD, *Unangam Tunuu Grammar* (Bergsland 1997) abbreviated as AG, and from handouts kindly provided at the Unangam Tunuu practicum during CoLang 2016 by Anna Berge and Moses Dirks, cited as Berge & Dirks 2016.

[3]Although 'case' is used here to refer to these markers, they are not actually case in the traditional sense; I follow the terminology used throughout the literature on the language, which is due to historical and comparative reasons.

[4]The following abbreviations are used in the glosses: 1: first person, 2: second person, 3: third person, ABL: ablative, ABS: absolutive, ACC: accusative, AN: anaphoric; AUT: autonomous, AUX: auxiliary, CAUS: causative, CESS: cessative, CONJ: conjunctive, DAT: dative, ENCL: enclitic, F: feminine, FUT: future, GEN: genitive, HAB: habitual, IMPERS: impersonal; IND: indicative, INTEN: intentional, M: masculine, NCBR: non-clause-bounded reflexive, NEG: negation, NOM: nominative, OBJ: object, OBL: oblique, OPT: optative, PART: participial, PASS: passive, POS: possessive, PL: plural, PST: past, REFL: reflexive, REL: relative; SG: singular, TR: transitive. The dialect (i.e. Atkan, Eastern, or Attuan) and/or year elicited for each data are provided, where available.

(1) Asxinu-s hla-x̂ kidu-ku-s
girl-ABS.PL boy-ABS.SG help-IND-3PL
'The girls are helping the boy.' (Atkan; AASG:9)

(2) Hla-x̂ kidu-ku-s.
boy-ABS.SG help-IND-3PL
'They are helping the boy.' (Atkan; AASG:9)

Unlike the languages in the Eskimo branch, which have an ergative-absolutive case system, Unangam Tunuu is unusual in having a so-called anaphoric reference marking system, a remnant of an originally ergative system (Bergsland 1997, Berge 2012).[5] According to Bergsland (1997:126), when the third person 'complement or a subordinate part of it is left out as known from context or the situation', the subject is marked with relative case, and the verb receives the anaphoric ending shown in (3) – this phenomenon is sometimes referred to as the ALEUT EFFECT (see Sadock 2000, Merchant 2011). In (3), the object is unexpressed and the subject receives the plural relative case marker, which is analogous to the plural absolutive case marker. The anaphoric ending *-u* on the verb in (3) agrees in number with the unexpressed argument and in person with both the subject and the unexpressed argument.

(3) Asxinu-s kidu-ku-u.
girl-REL.PL help-IND-3SG.AN
'The girls are helping him.' (Atkan; AASG:10)

2.2 Personal passives and impersonal constructions

There are six subject-demoting strategies in Unangam Tunuu which are displayed in Table 1.[6]

Table 1: Passivizing suffixes (Berge 2012, Berge & Dirks 2016, adapted).

Removal of subject: Passives	
-lga-	passive of all sorts of verbs, including intransitive ones
-ĝa-	passive of continuous state *-(x̂)ta-* 'to have as'
-ula-	passive of applicative *-usa-* 'to V with, toward, along, by'
-(a)ĝi-	'to be V-ed, to be in state of having V-ed'
-naĝi-	'to be V-ed' (have a V-er)
-qa-	functions also as the anaphoric participial mood marker

[5] Bergsland (1997:346) speculates that the reduced case system of Unangam Tunuu is due to 'the loss of the oblique cases of nouns.'

[6] The actual number of passives in Unangam Tunuu depends on the analysis; for instance, Golovko (1988, as cited in Berge 2012) does not consider the *-(a)ĝi-* morpheme a passive, whereas Berge (2012) does.

This paper focuses on the general subject-removing marker *-lga-* (realized also as *-sxa-*), which can function as a personal passive (4) and as a passive-like impersonal (5).[7] Despite the fact that the personal passive and the impersonal construction bear similar valence-shifting morphology, the two constructions exhibit distinct agreement properties. In (4), the morpheme *-lga-* demotes the external argument and promotes the object to subject position, and subject-verb agreement occurs with the promoted object. The morpheme *-lga-* in (5) appears to also suppress the external argument, but unlike (4) in which the underlying object is promoted to subject position, the object in (5) does not move to be in the subject position and the verb receives default third person singular agreement regardless of the number of the implicit agent; in contrast to (4), the overt argument in (5) does not show agreement on the verb. In addition, according to Bergsland (1997:167), 'the zero subject may be general ... [o]r a reference to the speaker and his companion(s) is implied.' In other words, the unexpressed subject in an impersonal construction may be understood as an arbitrary third person or as an inclusive first person plural.[8]

(4) Personal passive

a. Hla-s kidu-lga-qa-s.
boys-ABS.PL help-PASS-PART.AN-3PL
'The boys were helped.' (Atkan; Berge & Dirks 2016)

b. kidu-lga-qa-q.
help-PASS-PART.AN-1SG
'I was helped' (Bergsland 1997:170)

(5) Impersonal construction[9]

a. Hla-s kidu-lga-qa-x̂.
boy-ABS.PL help-IMPERS-PART.AN-3SG
'Someone helped the boys.' / 'We helped the boys.' (Atkan; Berge & Dirks 2016)

b. ting kidu-lga-qa-x̂.
1SG.OBJ help-IMPERS-PART.AN-3SG
'one helped me' (Bergsland 1997:170)

In many cases, personal passives in Unangam Tunuu were translated into English as passives, whereas impersonals tended to be translated into English as actives either with (a) singular or plural impersonal third person subjects (e.g. 'someone', 'one', 'people', 'they') or (b) first person plural subjects.

[7] At least three other subject-demoting morphemes, *-ĝa-*, *-ula-*, and *-qa-*, appear to also function as impersonals.

[8] Readers may have noticed that this phenomenon is similar to the French pronoun *on* which may also refer to an impersonal third person 'one' or a first person plural 'we'.

[9] Several people have suggested that the impersonal construction in Unangam Tunuu is perhaps an antipassive construction. Due to the complex agreement system of the language, particularly the anaphoric reference marking system, I argue that Unangam Tunuu impersonals cannot be analyzed as true object demoting constructions.

2.3 Inherent ambiguity

The impersonal construction in Unangam Tunuu is subject to two kinds of ambiguities. The first kind is structural ambiguity that results from the two functions of the verbal morpheme *-lga-*; that is, *-lga-* may function as a personal passive or as an impersonal. When there is an overt third person singular argument in an impersonal and the verb receives third person singular ending, the construction becomes completely ambiguous with a personal passive, as in (6). In the personal passive reading of (6), the overt argument is a subject (or promoted object) and agrees with the verb. In contrast, the overt argument in the impersonal reading is a thematic object, and because the subject has been demoted, the verb simply receives default third person singular agreement.

(6) Hla-x̂ kidu-lga-qa-x̂.
boy-ABS.3SG help-PASS/IMPERS-PART.AN-3SG
'The boy was helped.' / 'Someone helped the boy.' / 'We helped the boy.'
(Atkan; Berge & Dirks 2016)

The second kind of ambiguity relates to the proper analysis of these impersonal constructions, which has resulted in debates among linguists across a handful of languages (O'Connor & Maling 2014, Maling & O'Connor 2015). Specifically, are these Unangam Tunuu constructions impersonal passives (7) with a thematically empty null subject, or are they impersonal actives (8) with a phonologically null, but syntactically active PRO?[10] In order to better elucidate the differences (and similarities) between the personal passives and passive-like impersonals in Unangam Tunuu, resolving these issues is an important step.

(7) Ø Hla-x̂ kidu-lga-qa-x̂.
boy-ABS.3SG help-PASS-PART.AN-3SG
'Someone helped the boy.' / 'We helped the boy.'

(8) PRO Hla-x̂ kidu-lga-qa-x̂.
boy-ABS.3SG help-IMPERS-PART.AN-3SG
'Someone helped the boy.' / 'We helped the boy.'

3 Diagnosing impersonal constructions

In this section, I present data to support the claim that the impersonal construction in Unangam Tunuu behaves syntactically more like an active than a passive. To identify whether the impersonal

[10]Due to the lack of agreement shown on the verb, I follow Šereikaitė (2017) in the choice of an arbitrary big PRO, rather than little *pro*, as the null subject in the Unangam Tunuu impersonal. However, as will be discussed in section 3.3, there are divergent properties in the syntactic features of the null subject between the arbitrary reading and the 'we' reading of the impersonal that may provide arguments for little *pro*; the latter reading contains person and number features, whereas the former does not.

constructions of Unangam Tunuu are passives or actives, I employ four syntactic tests that have been used by M&S (2002). The diagnostics are displayed in Table 2.

Table 2: Diagnostics for impersonal constructions.

Syntactic Property	**Active**	**Passive**
Agentive *by*-phrase	✗	✓
Control of subject-oriented adjuncts	✓	✗
Binding of anaphors	✓	✗
Non-agentive (”unaccusative”) verbs	✓	✗

According to these tests, impersonal actives would not allow an external argument to be re-introduced via a *by*-phrase, but would allow the null subject to control subject-oriented adjuncts and to act as antecedents to anaphors. In addition, unaccusative verbs may also form impersonal actives. On the other hand, diametrically opposite results would suggest an impersonal passive construction since a thematically empty null subject would not be able to exhibit such properties as binding of anaphors or control of subject-oriented adjuncts. Using these tests on Polish and Ukrainian, two closely related languages, M&S (2002) found that the impersonal construction in Polish patterns more like an active, whereas impersonals in Ukrainian pattern like a passive.[11] The results of M&S (2002) are given in Table 3.

Table 3: Results of diagnostics for Polish and Ukrainian impersonal constructions.

Syntactic Property	**Polish (=Active)**	**Ukrainian (=Passive)**
Agentive *by*-phrase	✗	✓
Control of subject-oriented adjuncts	✓	✗
Binding of anaphors	✓	✗
Non-agentive (”unaccusative”) verbs	✓	✗

3.1 Agentive *by*-phrase

In Unangam Tunuu, the external argument may be re-introduced in personal passives with either *ilaan* (9) in the Eastern dialect or *hadagaan* (10) in the Atkan dialect (Bergsland 1997). In (10), the morpheme *-qa-* appears to function as both a passive and a participial mood marker. While the translations given in (9) and (10) date back to the mid- to late 19th century, they have also been attested in modern Atkan. Furthermore, Bergsland suggests that *by*-phrases in Unangam Tunuu

[11] See also Lavine (2003, 2005) and Legate (2014) on analyses of passive-like impersonals in Polish and Ukrainian.

may have been a recent innovation, perhaps due to calque translations of the Bible from Russian into Unangam Tunuu.[12]

(9) Amaligan Amaya [...] quga-m ilaan ungaya-lga-qa-x̂
there He devil-REL.SG by tempt-PASS-PART.AN-3SG
'There He was tempted by the devil...' (Eastern 1870; AG:167)

(10) Hamangus [...] chugdukaaya-m hadagaan Haman suglaya-qa-x̂
there devil-REL.SG by He tempt-PASS.PART-3SG
'There He was tempted by the devil...' (Atkan 1860; AG:167)

While *by*-phrases may occur with personal passives in Unangam Tunuu, impersonals with *by*-phrases are absent from my data. Because the present study is based on existing documentation, and subsequently mainly on positive evidence alone, this test is inconclusive. That being said, the results presented here are so far consistent with an active analysis.

3.2 Control of subject-oriented adjuncts

Subject-oriented adjuncts may appear in subjectless clauses if the null subject can act as an appropriate controller for these adjuncts. For example, the Polish impersonal construction allows for subject-oriented adjuncts (11), whereas the Ukrainian impersonal does not (12). In these cases, the null subject in the former construction may control into subject-oriented adjuncts, whereas the null subject in the latter construction is unable to do so. These distinct syntactic properties have been used to argue that the passive-like impersonal in Polish is actually an active while the cognate construction in Ukrainian is a passive (see Table 3).

(11) Jan-a obrabowa-no po pijanemu.
John-ACC robbed-IMP while drunk
'They robbed John while (they were) drunk' (Polish; M&S 2002:104, Ex.10c, adapted)

(12) *Povernuvšys' dodomu, hroši bulo znajde-no.
returning home money was found-PASS
Intended: Having returned home, the money was found.
(Ukrainian; Lavine 2000:90, Ex.5b, as cited in M&S 2002:105, Ex.12c)

In Unangam Tunuu, intentional mood markers are used to form purpose (or intentional) clauses; that is, clauses that express purpose or intent. As a subordinate clause, the purpose clause may behave

[12]Kinsui (1997) argues that the *niyotte*-passive in Japanese was a result of a calque (or the so-called *kanbun*-style) translation of a Dutch grammar in the 19th century. Specifically, these constructions allowed for transitive verbs to introduce the agent in *by*-phrases (via the particle *niyotte*) without changing the thematic roles of the arguments, which was not previously possible. For Kinsui, the emergence of this construction was therefore to fill some gap in the language.

like an adverbial (Berge 2016). Morever, in his 1997 grammar of Unangam Tunuu, Bergsland writes, on numerous occasions, that the subject of the purpose clause with an intentional mood marker is coreferential with the subject of the main clause, as in (13).

(13) imyaĝ-iiĝan ayuxta-na-x̂
fish-INTEN.3SG go.out-PART-3SG
'he went out (in his boat) in order to fish' (Atkan 1977; AG:238)

In the event that the subject of a subordinated purpose clause is different from the subject of the matrix clause, then the optative mood marker is used in the formation of the purpose clause. In (14), the matrix clause contains a third person singular subject, but the purpose clause, formed with an optative mood marker, contains a first person singular subject.

(14) ma-aq ngus kyax̂taasa-qa-a
do-OPT.1SG DAT.1SG force-PART.AN-AN.3SG
'he forced me to do it' (Atkan 1952; AG:239)

I claim that purpose clauses, formed via intentional mood markers (like in (13)), are subject-oriented adjuncts with PRO null subjects that are controlled by subjects of main clauses. By employing these purpose clauses as a diagnostic, I test whether an active subject resides in the impersonal construction of Unangam Tunuu. Specifically, if impersonal constructions are found to contain purposes clauses, then this suggests that these passive-like impersonals are active constructions with PRO null subjects. In other words, the null subjects of these impersonals may act as appropriate controllers for subjects within these adjuncts. Otherwise, if no such constructions are found, then there are two possibilities. Either impersonals with purpose clauses are uncommon among the existing documentation records, or these constructions are simply non-existent, maybe due to their ungrammaticality.

In the data, I find instances of impersonal constructions containing purpose clauses, supporting the claim that impersonals in Unangam Tunuu behave like actives with implicit subject arguments. I provide two examples in (15) and (16). In these constructions, the matrix and purpose clauses function as impersonals.[13] Furthermore, the main clauses of these constructions contain the intransitive verb *waaĝa-* 'to come'. In (15), the purpose clause contains the reflexive verb *kanax̂t-* 'to worship' accompanied by a first person plural reflexive pronoun, which will discussed more explicitly in section 3.3. In (16), the verb *iqidgu-* 'to cut' and the thematic object *aniqdux̂* 'child' appear within the purpose clause.

[13]The fact that the intentional clauses in (15) and (16) also function as impersonals, I believe, is a trivial issue. That being said, it would be interesting to find whether an impersonal with an intentional clause requires the matrix clause to also be an impersonal.

(15) PRO_i [PRO_i ngaan tuman kanax̂(t)-sxa-aĝan-aan] waaĝa-lga-ku-x̂
DAT.3SG REFL.1PL BOW-IMPERS-INTEN.3SG=ENCL COME-IMPERS-IND-3SG
'we came to worship (lit. bow ourselves to) Him' (Eastern 1870; AG:241)

(16) PRO_i [PRO_i aniqdu-x̂ iqidgu-lga-aĝan-aan] waaĝa-lga-qa-x̂
child-ABS.SG cut-IMPERS-INTEN.3SG=ENCL COME-IMPERS-PART.AN-3SG
'one came to circumcise the child' (Eastern 1870; AG:241)

3.3 Binding of anaphors

Unangam Tunuu has a large set of reflexive verbs, which are accompanied with reflexive pronouns. According to Bergsland (1997:173), 'removal of the subject naturally entails removal also of the coreferential object pronoun.' While the active construction in (17a) displays a reflexive verb with a reflexive pronoun, the reflexive pronoun is missing in the impersonal construction with an implied impersonal third person argument, as in (17b).

(17) a. txidix haaĝani-ku-s
REFL.3PL stop-IND-3PL
'they stopped' (Atkan 1909; AG:173)

b. il(an) chugi-lga-lakan haaĝani-lga-ku-x̂
in be.not.silent-IMPERS-NEG.CONJ.3SG stop-IMPERS-IND-3SG
'when they were (lit. one was) silent in there and stopped' (Atkan 1910; AG:173)

At first blush then, it seems that the absence of reflexive pronouns in impersonal constructions suggests that these constructions do not have a suitable antecedent to bind onto reflexives. However, impersonal constructions with reflexive verbs display variation in terms of their syntactic behavior. Whereas the reflexive pronoun is unexpressed in an impersonal third person agent reading, as in (17b), the reflexive is retained in an impersonal when the referent is interpreted as first person plural 'we'. The active constructions in (18) contain the third person singular reflexive *txin* which appear alongside the verb. The impersonal counterparts of (18) are given in (19), and both sentences in (19) refer to first person plural agents. We find that not only are the reflexives retained, but the reflexives are in the first person plural form, *tuman*. Therefore, in principle, if the construction in (17b) were to have a 'we' reading instead, then we might expect the reflexive pronoun to appear. Similarly, if the subject of the impersonals in (19) are understood as an impersonal third person subject, then we might expect the reflexives to unexpressed.[14]

[14]I speculate that the difference in binding facts in the impersonal constructions in Unangam Tunuu is not influenced by the class of the reflexive verb (i.e. inherently or naturally reflexive). In (18a) and (19a), the predicate *iq(y)aĝi-* 'to paddle' is an inherently reflexive verb (see Bergsland 1994:210-211). In other words, the only argument it takes is a reflexive pronoun. The predicate in (18b) and (19b) is a naturally reflexive verb and may also take a non-reflexive NP object (see Bergsland 1994:429). The impersonal with a 'we' sense therefore does not appear to differentiate between these two classes of reflexive verbs. Nevertheless, much more work is needed than has been presented here.

(18) a. ngaan txin iq(y)aĝi-ti-ku-u
DAT.3SG REFL.3SG paddle-CAUS-IND-AN.3SG
'he paddles to it' (Eastern 1910; AG:173, adapted)

b. ilaan txin ukudiga-ti-x̂
ABL.3SG REFL.3SG become.safe-CAUS-3SG
'he gets safe(ly away) from it' (Eastern 1910; AG:173)

(19) a. ngaan tuman iqaĝi-sxa-lix
DAT.3SG REFL.1PL paddle-IMPERS-CONJ.3SG
'we paddle to it' (Eastern 1910; AG:173, adapted)

b. ilaan tuman ukudiga-sxa-da-x̂
ABL.3SG REFL.1PL become.safe-IMPERS-HAB-3SG
'we get safely away from it' (Eastern 1910; AG:173, adapted)

The differences in syntactic behaviors observed for the two readings, where agents may refer to either an impersonal third person or a first person plural, highlight the divergent properties of null subjects within impersonal constructions in Unangam Tunuu. In particular, what exactly about these properties determine the variation between the two readings of the impersonal construction? In Irish, reflexive pronouns are not permitted in impersonal constructions, which are referred to as autonomous impersonals. On the other hand, the invariant reciprocal pronoun, which has a single form no matter what form the antecedent takes, are allowed in these constructions (McCloskey 2007). McCloskey argues that the unexpressed subject in the autonomous construction lacks the necessary person and number features to bind onto reflexives, which are formed by combining the reflexive with a personal pronoun. He adds that because reciprocal pronouns do not require these features, reciprocals are permitted in impersonal constructions.

Like in Irish, I argue that reflexive pronouns in Unangam Tunuu require an antecedent with matching person and number features. This follows that the null subject of an impersonal construction in Unangam Tunuu referring to an arbitrary third person lacks the necessary person and number features to bind reflexives. Conversely, the unexpressed subject of an impersonal with a 'we' sense do contain matching person and number features, motivating the appearance of the reflexive pronouns in the first person plural form.

Additional support for the claim that null subjects with a first person plural referent contain person and number features is provided in (20) where the verb of the main clause (i.e. *isuĝnaaĝ-* 'to go sealing') receives the optative mood marker *-iix̂tan*, which is used to express a wish or a command. Importantly, the optative mood marker appears in the first person plural form. Furthermore, the purpose clause here, which is formed via the intentional mood marker and is also realized as an impersonal, contains the verb *qa-* 'to eat'. The subject of this clause refers to the subject of the main clause (i.e. first person plural) while the argument *isuĝim uluu* 'seal meat' is understood as the thematic object.

(20) isuĝi-m ulu-u qa-lga-aĝan isuĝnaaĝ-iix̂tan
seal-REL.SG meat-ABS.POS.3SG eat-IMPERS-INTEN.3SG go.sealing-OPT.1PL
'let us go sealing in order to eat seal meat' (Eastern 1910; AG:240)

In the previous section, I analyzed subordinated purpose clauses as subject-oriented adjuncts. Furthermore, in order for the subject of the purpose clause to refer to the subject in the superordinate clause, a controller is required. I claim that controllers of subjects within purpose clauses in Unangam Tunuu must also have matching person and number features with the subjects they control. Therefore, the first person plural form of the optative marker in the main clause in (20) is required in order to control the null subject of the purpose clause, which refers to a first person plural agent.[15] Since variation in binding properties can be explained by the differences in syntactic features of the null subject antecedents and anaphoric pronouns, I argue that the binding test for the Unangam Tunuu impersonal construction passes.

The binding test, however, is subject to several anomalies. In what follows, I briefly discuss two anomalies, drawing from data of impersonal constructions from two typologically distinct languages: German and Northern Pomo, an indigenous language of Northern California. Cross-linguistically, reflexive verbs tend not to passivize (Schäfer 2012) and reflexive verbs behave syntactically like intransitive verbs (Sells et al. 1987). One such language that allows reflexive verbs to form passives is German, as in (21).

(21) Hier wurde sich (von den Römern) gewaschen.
here became REFL (by the Romans) washed
'Here, the Romans washed' (Shäfer 2012:215, Ex.3b)

Schäfer (2013) argues that these impersonal constructions are 'true' passives based on three main properties that they exhibit. First, the addition of a *by*-phrase is completely grammatical unlike in Icelandic where they are generally dispreferred (Sigurðsson & Stefánsdóttir 2014). Second, no agreement is possible between the external argument, introduced via a *by*-phrase and the reflexive anaphor. Third, the invariant reflexive pronoun must be third person, even if the *by*-phrase introduces a first or second person, as in (22).

(22) Nur von uns wird sich / *uns hier täglich gewaschen.
only by us is REFL / us here daily washed
'approx.: Only we wash ourselves here everyday' (Schäfer 2013, Ex.12a)

Schäfer concludes that the German reflexive anaphor *sich* in these impersonals does not have any DP as its antecedent at all. He claims that the impersonal construction in German is actually an impersonal passive (see Schäfer 2013 for discussion). But if this is the case, then how are the

[15] While the construction in (15) contains a first person plural subject, both predicates receive third person singular ending; both the matrix and embedded clauses are impersonals and therefore appear to be exempt from this requirement.

reflexives licensed if not by a subject? If this same phenomenon exists in other languages, where certain anaphors do not require an antecedent, then the test for binding may be prone to providing false positives.

Like German, Northern Pomo also displays unusual binding properties. Northern Pomo has an invariant reflexive pronoun *k'aye* that must be controlled by the subject. However, its use does not appear to be allowed in impersonal constructions, which are formed with the *-ya* morpheme (O'Connor & Maling 2014). This phenomenon differs from Irish impersonals which allow invariant reciprocal pronouns. In addition, according to O'Connor (1992), non-clause-bounded reflexives (NCBR) in Northern Pomo are unable to be controlled by subjects in short-distance *-ya* clauses (23), but may be controlled by subjects in long-distance *-ya* clauses, as in (24). In other words, subjects cannot act as antecedents to NCBRs when both elements appear in the same impersonal clause. Conversely, subjects of impersonals can bind onto NCBRs that appear from outside the clause.

(23) *tiʔ dak^{h}e čano matu-ya
NCBR.OBL.SG about story tell-IMPERS
*'A story was told about herself.' (by her)

(O'Connor 1992:134, Ex.109, adapted)

(24) tiʔ diyi čima-ka-k^{h}e ma:dal mayuʔ-ya
NCBR.OBL.SG next sit-CAUS-FUT 3SG.F.ACC flirt-IMPERS
'Somebody$_i$ flirted with her to get her to sit with him$_i$/her$_i$'

(O'Connor 1992:295, Ex.36, adapted)

Despite these binding anomalies, O'Connor & Maling (2014) go on to suggest that the Northern Pomo impersonal *-ya* construction is not a passive, but an active since the impersonal constructions in Northern Pomo (a) do not allow *by*-phrases, (b) allow subject-oriented adjuncts to be controlled, (c) may be formed with unaccusative verbs, and (d) contain an unexpressed subject with properties similar to other impersonal actives like Irish, Polish, and Icelandic. In other words, their conclusion is based on the combination of these syntactic tests.

Yet it is important to consider what these exceptional cases mean for the binding test. In Irish, the unexpressed argument of the autonomous construction may act as an antecedent to the invariant reciprocal, but in Northern Pomo, the same is not true for the invariant reflexive pronoun. Feature mismatch has been used to explain the differences in binding properties surrounding the impersonals in Irish and Unangam Tunuu, yet the case with Northern Pomo remains unsolved. While there seems to be a great deal of cross-linguistic variation in the behavior of anaphoric elements, these issues are beyond the scope of this paper.

3.4 Non-agentive verbs

Traditionally, the absence of an external argument indicates that an external theta-role cannot be assigned to the passive morpheme (Baker et al. 1989). Because unaccusative verbs do not have external arguments, this class of verbs does not generally form passives (Perlmutter 1978). In Unangam Tunuu, according to Bergsland (1997:117), there are 'passives of all sorts of verbs ... including intransitive ones'. Moreover, citing Golovko (2007), Kiparsky (2013) writes, 'Aleut reportedly allows both impersonal or personal passives of all intransitives and transitives.' In fact, we find examples of canonical unaccusative verbs, such as *asx̂a-* 'to die' in (25) and *aĝa-* 'to arrive' in (26), within impersonal constructions suggesting that these constructions are actives.

(25) [...] asx̂a-lga-qa-gan
die-IMPERS-PART.AN-INTEN.3SG
'...people had (previously) died' (Eastern 1909; AG:295, adapted)

(26) [...] aĝa-lga-aka-qa-ĝ-ulux
arrive-IMP-able.to-PART.AN-3SG=NEG
'...one could not get [to]' (Eastern 1909; AG:168, adapted)

In his comprehensive 1997 grammar on the language, Bergsland makes no mention of unaccusative verbs directly. Therefore, future research is needed to distinguish the class of unergative verbs from unaccusative verbs in Unangam Tunuu through the use of syntactic tests.

3.5 Summary

The discussion so far considers each of the four syntactic tests shown in Table 1 as it applies to the impersonal construction in Unangam Tunuu. The results are displayed in Table 4.

Table 4: Results of diagnostics for Unangam Tunuu impersonal constructions.

Syntactic Property	**Active**	**Unangam Tunuu**
Agentive *by*-phrase	✗	**?**
Control of subject-oriented adjuncts	✓	✓
Binding of anaphors	✓	✓
Non-agentive ("unaccusative") verbs	✓	✓

First, no data was found with an agentive *by*-phrase in an impersonal and so the *by*-phrase test is inconclusive. Second, the null subject in an impersonal can control into purpose clauses, which I analyze as subject-oriented adjuncts. Third, unexpressed arguments of impersonals can act as binders of reflexive pronouns that accompany reflexive verbs; the variation between the 'we' reading, in which the reflexive pronouns are retained, and the impersonal reading, in which reflexives

are left out, is explained by the availability of syntactic features on the antecedent. Finally, canonical unaccusative verbs are permitted in these impersonal constructions. The results of these tests indicate that the impersonal construction in Unangam Tunuu exhibits syntactic properties that align more closely with actives than with passives.

4 Properties of the unexpressed subject

This section explores the properties of the implicit agent, notably animacy, number, and person, of the Unangam Tunuu impersonals, and typologically contextualizes them within the discussion on implicit agents in impersonal constructions across a handful of other languages.

4.1 Animacy

There is a strong cross-linguistic tendency for subjects of impersonals to be understood as either an individual or a group of people. In other words, humanness appears to play an important role in these constructions. For instance, Blevins (2003) notes that the English pronouns *they* and *one*, the French *on*, German *man*, and the null pronouns in Estonian and Finish impersonal actives have a [+human] feature; that is, pronouns of impersonals in these languages generally refer to an indefinite human agent. In Northern Pomo *-ya* constructions, unexpressed subjects must also be understood as human; if a speaker must refer to a non-human subject, then a non-*ya* construction must be used (O'Connor 1992). In addition, according to M&S (2002:131), 'in all Germanic languages, the understood agent of an impersonal passive can only be interpreted as a human.' In Icelandic, this restriction is even extended to personal passives, as in (27).

(27) *Húsið var eyðilagt í snjóflóðinu
the.house was destroyed in the.avalanche

(M&S 2002:132, Ex.43b)

The Irish subjectless autonomous constructions, argued to be impersonal actives, appear to be somewhat of an anomaly (McCloskey 2007). The autonomous constructions do not appear to be restricted to human subjects as they allow inanimate agents, particularly forces of nature, as in (28).

(28) Tháinig lá millteanach gaoithe móire agus rinneadh smionagair den
come.PST day terrible wind.GEN great.GEN and make.PST-AUT little-pieces of-the
ccholáiste adjmaid.
college wood.GEN
'There came a day of terrible storms and the wooden college was smashed to pieces.'

(McCloskey 2007:838, Ex. 32d)

It is difficult to tell whether the subject in impersonal clauses in Unangam Tunuu must refer to a human agent. For the 'we' reading, the [+human] feature is an intrinsic property of first person, but in most of the data used for this paper, the unexpressed subjects, when not referring to a first person, were translated as 'one', which in English must be understood as a human. Without much context, the data remain highly ambiguous. Thus, it is not possible to come to any adequate conclusion at this time. Hopefully, future fieldwork will help elucidate whether these null subjects can refer to non-humans or whether they must be human. Based on the strong typological tendency for the subject to refer to a human-like entity, I suspect the latter.

4.2 Number

In some languages, verbs inflect for number even when the subject is unexpressed. This is observed in several null subject languages, such as in the Spanish impersonal *se* construction (Suñer 1983, Otero 1986, Campos 1989, inter alia) and in the Italian *si* construction (Cinque 1988, Chierchia 1995, D'Alessandro 2004, inter alia). In Northern Pomo, subjects of impersonals are unspecified for number; the referent may be understood as an unknown individual or a group of people (O'Connor 1992). In Hidatsa, a Siouan language spoken in North Dakota, according to Park (2012), the so-called passive plural inflects a transitive verb with the third person plural ending, and the agent, when unexpressed, may also refer to an individual or a group of people.

In Unangam Tunuu, Bergsland (1997:167) notes that the 'zero subject may have the character of a general "one".' Throughout the data, we find examples in which the unexpressed subject has been translated as 'one' (29), 'someone' (30), 'they' (31), and 'people' (32) suggesting that in Unangam Tunuu the implicit subject is also unspecified for number. Even though the verb receives default singular ending, it appears that a group of people can still be implied. With a first person agent reading, it seems that the number must be plural. There are no instances in the data where the impersonal construction has been translated with a first person singular subject.

(29) ting kidu-lga-qa-x̂
1SG.OBJ help-IMPERS-PART.AN-3SG
'one helped me' (AG:170)

(30) Hla-s kidu-lga-qa-x̂
boy-ABS.PL help-IMPERS-PART.AN-3SG
'Someone helped the boys.' (Atkan; Berge & Dirks 2016)

(31) il(-an) chugi-lga-lakan haaĝani-lga-ku-x̂
inside(-LOC.3SG) not.silent-IMPERS-CONJ.NEG stop-IMPERS-IND-3SG
'when they were (lit. one was) silent in there and stopped' (Atkan 1909; AG:170)

(32) iĝilaĝi-lga-qada-qa-x̂
go.in.baidar-IMPERS-CESS-PART.AN-3SG
'one (the people) quit going in baidar' (Atkan; AG:167)

4.3 Person

The subject of an impersonal construction tends to refer to an arbitrary human agent. It goes without saying that an impersonal subject in these constructions often refers to a third person. Unangam Tunuu is somewhat unusual in allowing the null subject to also refer to a first person plural 'we' in addition to an impersonal third person, and as Bergsland (1997:167) indicates, the use of the 'we' impersonal appears be more frequent in certain dialects: 'quite frequently, especially in Eastern, [the zero subject] implies a reference to the speaker and one or more companions ("we").'

As readers may have noticed, the unexpressed subject of the Unangam Tunuu impersonal bears a strong resemblance to the French impersonal pronoun *on* 'one', which is quite commonly used as a first person plural pronoun in informal speech. The impersonal pronoun in French, which developed from the Latin *homo* 'person', has grammaticalized as the first person plural pronoun with singular inflection on the verb (Welton-Lair 1999). Building on Wales (1980), Welton-Lair (1999:150) suggests a 'cross-linguistic trend for indefinite pronouns like [French] *on* and [English] *one* to develop egocentric uses out of non-specific uses over time.' Whether this trend applies to Unangam Tunuu, whereby the use of the impersonal construction extended at one point to include a 'we' referent, remains a mystery and is an area of future research.

According to Bergsland (1997), we also find cross-dialectal variation in the use of the impersonal construction based primarily on the person of the arguments. In the Attuan and Eastern dialect of Unangam Tunuu, personal passives with a first person subject (33a) or a second person subject (33b) are completely acceptable. However, in the Atkan dialect, there is a preference to use the impersonal construction with first or second person objects over passives with first or second person subjects (Bergsland 1997). Constructions in (34a) and (34b) in the Atkan dialect are therefore preferred over (33a) and (33b), respectively.

(33) a. kidu-lga-qa-q
help-PASS-PART.AN-1SG
'I was helped' (AG:170)

b. kidu-lga-amis aĝ-na-x̂t
help-PASS-INTEN.2SG AUX-PART-2SG
'you will be helped' (AG:170)

(34) a. ting kidu-lga-qa-x̂
1SG.OBJ help-IMPERS-PART.AN-3SG
'one helped me' (AG:170)

b. txin kidu-lga-aĝan aqa-x̂
2SG.OBJ help-IMPERS-INTEN.3SG AUX-3SG
'one will help you' (AG:170)

Taken together, there seems to be a person-based hierarchy of (3 > 1, 2) on subject arguments in the personal-impersonal alternation in the Atkan dialect. This effect is, to some extent, similar to the findings reported by Murasugi (2014) on Inuktitut, an Inuit language, in which she observed person-based preferences in the use between the transitive and antipassive constructions in the language. Specifically, in a verb preference task, speakers most strongly preferred the use of the antipassive over the transitive when either (a) both arguments are third person, or (b) the subject is higher in person than the object. In other words, the language displays a person-based hierarchy of (3 > 2 > 1) in the use of antipassive over transitive constructions.[16]

Whereas the Atkan dialect in Unangam Tunuu and Inuktitut exhibit gradient person-based effects, Lummi, a dialect of North Straits Salish, has a categorical constraint in the use between active and passive voice that is based also on the person of the arguments. In Lummi, the subject argument must be lower in person than the non-subject (Bresnan et al. 2001). For example, as in (35), if this constraint in Lummi is violated in an active construction, then a passive must be used, and vice versa. I leave the differences (and similarities) in the effects of hierarchy in person across these kinds of cases for future investigations.

(35) a. *'The man knows me/you'
b. x̣či-t-ŋ=sən/=sx^{w} ə cə swəyʔqəʔ
know-TR-PASS=1SG.NOM/=2SG.NOM by the man
'I am/you are known by the man' (Bresnan et al. 2001, Ex.2a–b)

5 Conclusion

Applying four subjecthood tests on implicit subjects in Unangam Tunuu impersonal constructions suggests that these constructions are actives and not passives. The data presented here show that the null subject, specifically PRO, in the impersonal construction can control subject-oriented adjuncts and act as antecedents to anaphors. In addition, unaccusative verbs may also form impersonals. While there were no occurrences of *by*-phrases in an impersonal construction found in the data, the

[16]Yet a puzzling issue remains: why does Atkan appear to exhibit these person-based preferences, whereas other dialects of Unangam Tunuu do not (or at least to a lesser degree than in Atkan)? According to Bergsland (1997:170), 'the personal passive seems to have developed in Eastern Unangam Tunuu from the [impersonal] use by analogy of the [anaphoric reference marking construction] and have spread from there to later Atkan'; based on this, it seems that Atkan may have been on the tail end of the development. The motivations behind his claim are not clear, but if it is correct, the change may have involved the person constraint exhibited by the anaphoric construction in which unexpressed arguments cannot be first or second person (Merchant 2011); in other words, the unexpressed argument of the anaphoric construction must be third person.

results so far indicate that these tests are consistent with an active analysis.

Not only do these results pattern closely with the results reported for other languages with impersonal actives, but the properties of the null subject share many striking similarities. The main difference is that the implicit argument of the impersonal in Unangam Tunuu may also refer to a first person plural agent, similar to the French impersonal pronoun *on*. The implications of this study provide further support that these impersonal constructions, which exhibit such characteristics as agent defocusing, differ significantly from regular passives in terms of their syntactic behavior that appear to be consistent in a bevy of other unrelated languages, even if their surface morphology suggests otherwise. In addition, the complex agreement system and reduced case system of Unangam Tunuu present a unique case to the typological space of possible grammars that may allow these constructions.

There is yet an additional layer of complexity in Unangam Tunuu in which personal passives and impersonal actives may be completely ambiguous. But what exactly does this ambiguity reveal about the nature of the language? In Maling & O'Connor (2015), the authors argue that in some cases, constructional ambiguity leads to language change. They point towards the impersonal active constructions in Icelandic, Polish, and Irish, which they claim developed from originally passive constructions. In their words, speakers 'vacillate in their interpretation of such constructions, finally settling on one interpretation over time' (Maling & O'Connor 2015:114). Bergsland (1997) suggests that the personal passive developed from the impersonal construction, but the diachronic process was not due to reanalysis, but to analogy with another construction in the language, specifically the anaphoric construction. Certainly more research is needed to determine whether the personal passive is a result of change, and if so, whether the ambiguous nature of these constructions is the cause of this change. Nevertheless, the properties of the subject-removing morpheme in Unangam Tunuu support Maling & O'Connor's claim that morphology alone is not a reliable indicator of voice.

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There's no *mii* in Potawatomi: The diachronic nature of six discourse markers in the Ojibwe-Potawatomi branch

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1 Introduction

The Ojibwe particle *mii* has been the object of research for nearly four decades (Rhodes 1979, 1998; Fairbanks 2008, 2009, 2016), and so far, it has not shown up in any Algonquian language other than Ojibwe (Goddard 2003: 82). But its absence from the rest of the family has never been investigated from a diachronic perspective which leaves its origin unexplained. Is its source the result of some sound change, a borrowing from contact with a neighboring language, or a unique innovation on Ojibwe's part? We may not be able to completely determine the origin of *mii*, but we can take a first step toward this goal by looking at languages closely related to Ojibwe. I suggest here that we start with the neighboring language Potawatomi because it is the most closely related language to Ojibwe, and as such, it is likely to hold the key to our investigation. Specifically, this paper investigates the functions of the discourse marker *mii* in Ojibwe and its analogous functions in Potawatomi in order to determine the source of *mii*.[1]

I conducted a search of Potawatomi archival materials in order to investigate the source of *mii*. As it turns out, the particle *mii* is entirely absent in these materials. Its absence is not in-and-of itself surprising as it seems to confirm that *mii* is not present in any other Algonquian language than Ojibwe, but it is not total confirmation. There still remains a chance that *mii* was originally in Proto-Ojibwe-Potawatomi and lost in Potawatomi, which would rule out a unique innovation of *mii* on Ojibwe's part. Until we address this chance, a reconstructed proto form remains possible. The goal of this paper is then to answer whether Potawatomi lost a proto form of this particle or whether Ojibwe uniquely innovated it. The results suggest that Ojibwe uniquely innovated *mii*.

I claim that Ojibwe must have uniquely innovated *mii* because forms that Potawatomi uses for the parallel functions of Oji *mii* do not match, and moreover, these Potawatomi forms are cognate in Ojibwe in places other than where *mii* is used. Furthermore, there are no fossilized forms of *mii* present in Potawatomi, which suggests that Ojibwe innovated *mii* after it and Potawatomi separated.

This paper is organized as follows: In section 2, from archival materials, I explore the

*I am grateful for comments from Amy Dahlstrom, Anqi Zhang, participants at University of Chicago's Language Variation and Change Workshop, and participants at the 43rd Berkeley Linguistics Society Conference. The Potawatomi examples used in this presentation are taken from Hockett (1937, 1940) and his subsequent publications of those materials.

[1]Thomas Loftis pointed out to me that the late Potawatomi speaker Walter Cooper used *mii*. Unfortunately, there is no documentation of this point. And to make things more complicated, Walter Cooper comes from the Spear family that Charles Hockett worked with during his fieldwork. Those Spears did not use *mii*, as it is absent from Hockett's fieldnotes. It, therefore, is surprising that Walter used *mii*.

similarities and differences between the functions of the particle *mii* in Ojibwe and Potawatomi. Preliminarily, I showed that where Ojibwe uses one discourse marker, the particle *mii*, Potawatomi uses five unrelated discourse markers *i(w)*, *wi*, *wpi*, *me*, and *ma*. In section 3, I explore idioms and lexicalizations based on the particle *mii*. *Mii* does not show up as a fossilized form in Potawatomi. In section 4, I explore the similarities and differences between the form of the particle *mii* in Ojibwe and the five discourse markers found in Potawatomi. I find that *i(w)*, *wi*, and *wpi* are not related to Oji *mii* because the time depth of when Ojibwe and Potawatomi separated is too shallow to allow for such change given the other sound changes present in the languages, as well as the fact that, these forms are able to be reconstructed into Proto-Ojibwe-Potawatomi. Likewise, I find that *me* and *ma* are not related to Ojibwe *mii* because they are easily able to be reconstructed in Proto-Ojibwe-Potowatomi and they are not borrowed. These facts lead me to conclude that Ojibwe uniquely innovated the particle *mii* after it and Potawatomi separated.

2 Functions of *mii*

The particle *mii* is a discourse marker (Fairbanks 2016). In other words, *mii* relates its containing sentence to a previous discourse, cf. Schiffrin (1987). Moreover, it is a special type of discourse marker dubbed a discourse connective (Schiffrin 1987; Fairbanks 2016), which takes advantage of its sentential functions for discourse purposes. Sententially, *mii* performs deictic, aspectual, and veridical functions, and at the discourse level, it performs a deictic function. In what follows, each of the sentential functions of *mii* are discussed in turn.

2.1 Deictic

The core function of *mii* in Ojibwe is deictic in which deictic is unpacked into uses of anaphoric reference (including clefts), cataphoric reference, spacially locating, enhancing focus, temporal deictic, and discourse marker (Fairbanks 2008, 2016). This paper only considers the anaphoric reference, temporal deictic, and discourse marker functions of *mii*.

2.1.1 Anaphoric reference

Anaphoric reference shows that where Ojibwe uses *mii*, Potawatomi uses *i(w)*. (1a) illustrates that in Ojibwe, *mii* is used to refer back to a previous proposition. Potawatomi, instead, uses a demonstrative to fill this function as illustrated in (1b). Note that the demonstrative used in Potawatomi is shared in common with Ojibwe, albeit in Potawatomi it often takes a phonologically reduced form: *i(w)* 'that' Potawatomi; *iw*/*i'iw* 'that' Ojibwe (Nichols & Nyholm 1995).[2]

[2]I use the following abbreviations in glossing the examples: 1-first person; 2-second person; 3-third person; AN-animate; CL-clitic; CONJ-conjunct order; DISC-discourse sequencer; DIR-direct; DM-discourse marker; DP-discourse particle; EMPH-emphatic; FCT-factive; FUT-future; HAB-habitual; IC-initial change; INAN-inanimate;

(1) a. **Mii** gaa-ikidoyan.
DP what you said
'That is what you said.' (Fairbanks 2016: 67) Oji

b. **iw** é-zhdé'ayan neko.
that FCT-think.so.1 HAB
'That's what I think.' (Hockett 1940: 1.9) Pot

2.1.2 Cleft constructions

Cleft constructions show that where Ojibwe uses *mii*, Potawatomi uses *wi*. In Ojibwe *mii* is used for clefts (Rhodes 1998: 286-7) such as those in (2).

(2) a. Aanii-sh **mii** sa wi gii-ni-maajaad iidig wa. (R1, 4:43)
'So apparently what he did was leave.'

b. ... **mii** baamaa iw da-giishkwag aw mtig. (B T15:14)
'Then, later on, I shall cut down those trees.' Oji

Potawatomi, instead, uses the particle *wi* for clausal clefts as illustrated in (3) from (Thunder & Wensaut 1998: 46, 73). Note that the Potawatomi particle *wi* also appears in Ojibwe as *wii* (Rhodes 1985, 1993).

(3) a. oh, éshke'-ntawét, **wi**=yé i wthe wik'kwget.
oh IC.new-kill.3 wi=be that why have.a.feast.3
'Oh, he killed his first deer, that's why he's having a feast.'

b. Green Bay ... **wi**=yé zhi wathe=madabziygo i ktthe myéw 43.
Green Bay ... wi=be there FUT.IC.why=join.12 that big road 43
'Green Bay ... That's where we'll join up with interstate 43.' Pot

2.1.3 Temporal

A temporal function shows that where Ojibwe uses *mii*, Potawatomi uses *wpi*. In Ojibwe *mii* is used for a temporal function as illustrated in (4a). Potawatomi, instead, uses the particle *wpi* to refer to 'when' as illustrated in (4b). Note Ojibwe also has *apii* 'at the time; then; when' (Nichols & Nyholm 1995) as a counterpart for the Potawatomi particle *wpi*.

(4) a. **Mii** izhinizha'onang oodi mashkikiiwigamigong ji-izhaayang mii
DP when.they.send.us over.there to.the.drug.store for.us.to.go DP
gii-ozhibii'ang imaa mazina'igan awegonen dino mashkiki ge-miinigooyang.
that.he.wrote there paper what kind medicine that.we'll.be.given
'**That** is **when** they send us to the drug store with a prescription that the doctor wrote out for the appropriate medicine.' (Fairbanks 2008: 184) Oji

INDEP-independent order; INV-inverse; Mes-Meskwaki; NEG-negative; OBJ-object; OBV-obviative; Oji-Ojibwe; PL-plural; Pot-Potawatomi; PROX-proximate; PST-past; SG-singular; TA-transitive animate; VER-veridical; X-unspecified actor.

b. mine ode wa-gothek gises, **iw** **wpi** wa-nimédiwat neshnabék.
and this FUT.IC-hang.3 sun that when FUT.IC-dance.3PL Indians
'and this coming month, **that** is **when** the Indian's will dance.' (Hockett 1940: 1.22)
Pot

2.1.4 Discourse sequencer

The discourse sequencing function shows that where Ojibwe uses *mii*, Potawatomi uses *i*. The Ojibwe particle *mii* is used as a discourse sequencer. The Ojibwe particle *mii* is often used with the second position clitic *dash* to form the contraction *miish* (< *mii=dash*). *Miish* serves as a discourse sequencer meaning 'and then' (Valentine 2001: 1024). This discourse sequencing usage of *mii* is given in (5a). Potawatomi, instead, uses a demonstrative plus the second position clitic *the* to achieve a discourse sequencer as illustrated in (5b). The demonstrative *i* appears to be the same one that was used for anaphoric reference. Note Hockett calls *the* 'a biblical and' (1948: 217). Pot *the* is probably cognate to Oji *dash*.

(5) a. **Miish** oodi gaa-izhiwin-ind mii aw inini.
DISC over.there IC.PAST-take.there-X>3 DP that man.
'And so they then took that man (aforementioned, under discussion) over there.' (Fairbanks 2016: 179)
Oji

b. **i=the** gode mithbéyek égi-nme-yathmowat wa-nabdezwat.
DISC those animals FCT.PST-away-say.3PL FUT.IC-how.used.3PL
'**And** so these animals went around and said what they would be.' (Hockett 1940: 1.19)
Pot

2.2 Aspectual

The second function of *mii* in Ojibwe is an aspectual marker. The aspectual function might show a difference between Ojibwe and Potawatomi, but there is not enough evidence to make a claim at this time. The particle *mii* is used in conjunction with the plain conjunct verb order to form a type of aspect known as IMMEDIACY aspect, a term coined by Fairbanks (2008). This immediacy aspect usage is shown in (6b). Note in Northern Ojibwe dialects, *mii* + the independent verbal order may be doing the same thing as the *mii* + the conjunct verbal order (Rhodes 1998: 290). It is unclear whether Potawatomi has a parallel in either verbal order.

(6) (Fairbanks 2008: 198)

a. Iskigamide.
boil.down/INDEP
'It's boiling down.'

b. Mii iskigamide-g. (completive)
ASP boil.down-0/CONJ
'It's boiled down.'
Oji

2.3 Veridicality

The final function of *mii* in Ojibwe is to serve as a marker of nonveridicality, taboos, negative phrases, emotionally charged statements, and ribbings. This function shows that where Ojibwe uses *mii*, Potawatomi uses two evidential markers. Consider the nonvertical usage of *mii* in (7) where the addition of *mii* increases the uncertainty of the speaker.

(7) a. Namanj.
not.know
'I don't know.'

b. Mii-sago namanj.
VER-EMPH not.know
'I have absolutely no idea (after much thought).' (Fairbanks 2008: 200) Oji

Potawatomi, on the other hand, uses two evidential markers which show speaker certainty or uncertainty (i.e. *me* and *ma*). The particle *me* expresses speaker uncertainty as illustrated in (8a) from (Thunder & Wensaut 1998: 46). Note *me ni* is translated as 'must have' in (8a). The particle *ma* expresses speaker certainty, for example, first hand experience and general knowledge. The usage of *ma* for speaker certainty is illustrated in (8b) from (Buszard 2003: 309 glossing mine). Hockett does not translate these particles in his fieldnotes.

(8) a. Wgwesen **me** ni gi-ntawén.
son.OBV EVID 1SG PST-kill.something.3OBV
'His son must have killed something (deer).' Pot

b. gzhaté **ma**=zhe=na ode, noko.
be.hot.3INAN EVID=EMPH=EMPH this grandma
'It is hot here grandma.' Pot

2.4 Summary

The following table summarizes the forms of the particles which are used for deictic, aspectual and veridical functions in Ojibwe and Potawatomi.

Functions	Ojibwe	Potawatomi
Deicitic	*mii*	*i(w), wi, wpi*
Aspectual	*mii*	?
Veridical	*mii*	*me, ma*

Table 1. Six Discourse Markers in Ojibwe and Potawatomi

We can make a few observations about Table 1. First, there is no *mii* in Potawatomi. This is superficially true. There is no form in Potawatomi which exactly matches Oji *mii*. There

are a lot of phonological similarities however, especially labials. Yet, in spite of these similarities, there is no relation between Ojibwe *mii* and the forms in Potawatomi. In what follows I argue, from the pattern in Table 1, that Ojibwe innovated *mii*. In other words, it was not in Proto-Ojibwe-Potawatomi (hereafter Proto-Oji-Pot). Further evidence for this claim comes from section 3 on idioms and lexicalizations where I show there are no fosilized forms of *mii* in Potawatomi; and section 4 on deictics and evidentials. Deictics are ruled out by phonological disimilarities given the relatively shallow time depth for which Potawatomi and Ojibwe must have separated. Potawatomi evidential *me* comes from Proto-Oji-Pot **manj* and Potawatomi evidential *ma* comes from the Proto-Algonquian (PA) adverbial locative **maah*. Thus, Ojibwe, alone, uniquely innovated *mii*.

3 Idiomatic and lexicalized uses of *mii*

Idioms and lexicalizations can be great diagnostics to test historical reconstructions. If *mii* were an older form in Proto-Oji-Pot, then we should see fossilized forms of *mii* in Potawatomi. Evidence from idioms and lexicalizations show this is not the case.

3.1 Idioms

Many of the idiomatic uses of *mii* in Ojibwe are not present in Potawatomi. Ojibwe uses *mii* in the idioms in (9), among others.

(9) a. Mii iw.
DP that
'That's all (conclusory expression)' (lit. that is it) (Fairbanks 2008: 209)

b. Mii sa go minik (K 154:8)
'That'a all' (Rhodes 1998: 292) Oji

While Potawatomi, instead, uses *i(w)* for the same idioms in (9) as illustrated in (10).

(10) a. iw
'That's all (conclusory expression)' (Hockett 1940: 1.7)

b. i zhe na tso wi'i.
'That's all' (Hockett 1940: 1.6) Pot

The fact that Potawatomi does not use *mii* in idioms where Ojibwe does suggest that *mii* was not present in Proto-Oji-Pot because it was not old enough to be fossilized in the same idioms present in Ojibwe and Potawatomi.

3.2 Lexicalizations

Lexicalizations based on *mii* in Ojibwe are also absent in Potawatomi. Ojibwe uses *mii* in the lexicalization in (11), among others.

(11) Lexicalization based upon *mii* (Fairbanks 2008: 211)

a. miigwech
DP.sufficient
'thanks'

b. miigwechiwendam
thanks.in.thought.AI
'be thankful' Oji

These lexicalizations are missing from Potawatomi. In Potawatomi, there is *migwéch*, but it appears alongside *igweyen/igwiyen* 'thank you'. These forms are given in (12) from Forest County Potawatomi Community (2014) and (Thunder & Wensaut 1998: 41). Other lexicalizations with *mii*, which are present in Ojibwe, are not listed in Potawatomi dictionaries (Forest County Potawatomi Community 2014; Kansas Heritage Group 1997).

(12) a. migwéch
'Thanks'

b. i gwshe gweyen
'Thank you very much'

c. igwiyen
'I am grateful' Pot

The appearance of *migwéch* in Potawatomi is easily explained by an alternative source than shared reconstruction of *mii* in Ojibwe and Potawatomi. Potawatomi most likely borrowed *migwéch* from Ojibwe because *migwéch* is a trade word that shows up across the Algonquian family. That *mii* was borrowed then clearly explains why this is the only putative example of a lexicalization of *mii* in Potawatomi.

While we are on the subject of putative examples, I would like to note that it was pointed out to me that the Potawatomi verb *mikchéwi* in (13a) from (Forest County Potawatomi Community 2014) looks as though it contains *mii* (i.e. *mi-kché-wi*). Interestingly, Potawatomi *mikchéwi* is not present in Ojibwe. Instead, Ojibwe uses *anokii* 's/he works' (Nichols & Nyholm 1995). Note Potawatomi also has *noki* 's/he hires someone to have something done' (Forest County Potawatomi Community 2014: 102). Moreover, if *mikchéwi* really were to contain *mii*, it would come as a surprise for *mikchéwi* to remain in Potawatomi and not in Ojibwe which has a robust usage of *mii*. In fact, upon closer examination, it turns out that *mikchéwi* is a borrowing from the Fox Branch as illustrated in (13) from (Goddard & Thomason 2014: 391) alongside the Potawatomi form.

(13) a. mikchéwi
work.3SG
'He works' Pot

b. mîhkechêwî-wa
work-3SG
's/he works' Mes

The same individual, who raised *miktthéwi* as a possible lexicalization based on *mii*, also suggested to me that *mii* could have come from a Proto-Oji-Pot form **mii'iw*. This would essentially mean that Ojibwe uses the reduced form *mii* and Potawatomi uses another reduced form *(i)'iw*. This calls for a closer look at the demonstrative and deicitic system which I take up in the next section, but note that this etymology of *mii* would only explain the usage of *mii* in the idioms of conclusory expression.

4 Diachronic relation between Ojibwe *mii* and Potawatomi deictics and evidentials

This paper claims that Ojibwe innovated *mii*, but what sort of innovation was this? This section considers the relation of the Potawatomi deictics and evidentials to Oji *mii*. I first consider if Oji *mii* is related to the Potawatomi deictics. I show it is not, rather deictics are not related to Ojibwe *mii* because they are phonologically dissimilar given the relevant time depth is too shallow, and we can reconstruct them back to Proto-Oji-Pot. I second consider if Ojibwe *mii* is related to Pot *me* and *ma*. I show it also is not, rather Pot *me* comes from Proto-Oji-Pot **manj* and Pot *ma* comes from an adverbial locative. Moreover, Pot *ma* and Oji *maa* were not borrowed from the Fox branch, as they can be reconstructed to the Proto-Algonquian (PA) adverbial locative **maah*. I conlcude that the source of Ojibwe's innovation of *mii* is unclear.

4.1 Ojibwe *mii* is not related to Potawatomi deictics

The phonological structure of Ojibwe *mii* looks similar to Potawatomi deictics *i(w)*, *wi*, and *wpi*. But, we must consider the following when deciding if these deictics are related to Ojibwe *mii*. First, Potawatomi does not retain contrastive vowel length (Hockett 1942). Second, the time depth for which Ojibwe and Potawatomi separated is not great enough for us to posit any spreading of features. That is, except for the loss of labialization on velars (e.g. $k < kw$), no speading of features have been reported (Hockett 1942). Third, Ojibwe does have *i'iw* 'that', *wiin* 'contrastive particle', and *apii* 'when' (Nichols & Nyholm 1995); *wii* 'emphatic expressing unexpectedness' (Rhodes 1985, 1993). We must then rule out Potawatomi deicitics as being related to Ojibwe *mii* because of phonological distance to Ojibwe *mii* and the appearance of Potawatomi counterparts to Ojibwe *mii* with similar functions which allow us to reconstruct them back into Proto-Oji-Pot.

The same arguments that I just presented for the three deictics in Potawatomi hold for the Proto-Oji-Pot form **mii'iw* that was proposed to me, but we must also consider that segments could have been deleted from this form. Such a deletion analysis for the Proto-Oji-Pot form **mii'iw* does account for the daughter forms, Oji *mii* and Pot *iw* with a deleted glottal stop for both forms (or a deleted *h* as Potawatomi lost or changed almost all *h* segments to a glottal stop). However, as I mentioned in the previous section, the Proto-Oji-Pot form only accounts for the idioms of conclusory expression, and leaves other idioms and lexicalizations in Ojibwe that use only *mii* unexplained. This account also does not explain why other forms than *iw* are being used in Potawatomi for functions that Oji *mii* achieves. This account does have the merit of at least partially explaining the source of *mii* as coming from a Proto-Oji-Pot form **mii'iw*, but the reconstructed form would need to be demonstrated further and the differing non-Pot *iw* functions (i.e. *i*(w), *wpi*, *me*, and *ma*) would need to be explained before we should give this account more attention.

4.2 Ojibwe *mii* is not related to Potawatomi *me* and *ma*

One might think that *me* and *ma* come from a hypothetical proto form of the Ojibwe *mii* because of similar phonological forms and clause positions, but they do not. At first blush, the particles *me/ma* appear as the first enclitic in enclitic clusters which could be derived from a clause initial Proto-Oji-Pot **mii*. That is, it is commonly known that *mii* can contract with the second position clitic *dash* in Ojibwe to form *miish* (Valentine 2001). In Potawatomi, the particles *me* and *ma* come before other encltics. Potawatomi can have a string of enclitics. If *me/ma* are in the string they come first as show below:

(14) (Hockett 1937: 4.15) and (Hockett 1940: 1.18)

a. **Miish** oodi gaa-izhiwin-ind mii aw inini.
DISC over.there IC.PAST-take.there-X>3 DP that man.
'And so they then took that man (aforementioned, under discussion) over there.' (Fairbanks 2016: 179) Oji

b. i=**me**=se éwdodanwat neshnabék
that=DM=so FCT.be.town.3PL Indians
'There once was a town with Indians.'

c. o=**me**=the yé o yawet.
that=DM=and be that be.3
'That might be the one.' Pot

Unfortunately, the position of *mii* varies by dialect (Rhodes 1998: 287) as illustrated in (15). This data suggests that *me* and *ma* were not grammaticalized from *mii*.

(15) a. Walpole Island Ottawa
Gye go **mii** gii-aanzkonyeyaang ... (B T9:15)
'And then we changed clothes ...'

b. Manitoulin Island Ottawa
Mii gye go gii-bskaabnaashkwindwaa. (R2, 1:153)
'And then they were driven back.' Oji

And more importantly, any clause initial element could form an idiomatic clitic, so we should not necessarily look to *mii* exclusively. In fact, *me* and *ma* have other sources as I next show.

4.2.1 Potawatomi *me* comes from Proto-Oji-Pot **namanj*

Pot *me*, like the particles *(ne)metth*/*met*, comes from Proto-Oji-Pot **namanj*. Consider the Ojibwe particle *namanj* given in (16a) from (Fairbanks 2016: 106). The Potawatomi particles *nemetth* in (16b) from (Hockett 1940: 2.1), *metth* in (16c) from (Hockett 1940: 3.15), and *met* in (16d) from (Forest County Potawatomi Community 2014: 75).

(16) a. Mii-sa go namanj.
VER-DM.CL EMPH I.don't.know
'I have no idea.' Oji

b. nemetth=zhe=na=zhi ga-bme-zhewébzegwén.
not.know=EMPH=EMPH=where PST.IC-along-happen.DUB.3
'I don't know where what happened to him.' Pot

c. iw=se ibe égi-zhyat é-byat gete é-bmagzonet metth=bzhe ...
that=DM there FCT.PST-go.3 FCT-come.3 sure FCT-lay.out.3 not.know=EMPH ...
'So he went there he came sure enough he was laid out, guess ...' Pot

d. met=se=na
not.know=DM=EMPH
'I don't know.' Pot

Clearly all of these forms are expressing the same meaning of speaker uncertainty. Thus, I take the related meaning and forms to indicate the reconstruction of Pot *me* to Proto-Oji-Pot **namanj*. Note it is unclear whether the first syllable of *nemetth* was the first person marker. It appears only with first person usages in archival materials, but can be left off in reduced forms of the idiom as (16c) and (16d) illustrate.

4.2.2 Potawatomi *ma* comes from Proto-Oji-Pot **maa*

Pot *ma* likely was derived from a Proto-Oji-Pot adverbial locative. It bodes well that Potawatomi uses a different set of adverbial locatives in place of the Ojibwe counterparts (Hockett 1940; Nichols & Nyholm 1995; Rhodes 1985, 1993).[3]

[3]Hunter Lockwood suggested to me that *mii* looks as though it could been a folk etymologization of PA **maah* (or Proto-Oji-Pot **maa*) which undid initial change. I leave it to future research to see how explanatory this approach might be.

Ojibwe		Potawatomi	
(o)maa	'here'	shode	'here'
(i'i)maa	'there'	zhi	'there'
(i')iwidi	'over there'	ézhi/ibe	'over there'

Table 2. Ojibwe and Potawatomi adverbial locatives

Lastly, let us consider the possibility of *ma(a)* being borrowed.

4.3 Pot *ma* and Oji *maa* are not borrowed from the Fox branch

Ojibwe *mii* could still be historically reconstructed for Proto-Oji-Pot if Potawatomi borrowed *ma* or Ojibwe borrowed *maa* after they separated. The most likely source of a borrowing would have come from the Fox branch, but such a borrowing is ruled out by the shared reconstruction of Ojibwe *maa* and Potawatomi *ma* into Proto-Algonquian.

To start with, Ojibwe is not a big borrower. It may have borrowed a little from Cree but not the Fox branch. Furthermore, Ojibwe did not have a recent sustained period of contact with speakers of the Fox branch. So, it is unlikely that Ojibwe borrowed *maa*.

On the other hand, Potawatomi had been in recent sustained contact with the Fox branch and borrowed considerably from it. As Costa (2013) has aptly shown, Potawatomi has lexical borrowings which include numbers and many animal names, as well as grammatical borrowing of the negative/irrealis *bwa-*. Furthermore, Potawatomi had a sustained period of contact with the Fox branch after the Neutral tribe pushed Michigan Potawatomis into Wisconsin in 1642 (Edmunds 1978: 4). Therefore, it would not come as a surprise if Potawatomi also borrowed some of its discourse markers from the Fox branch. For at least one discourse marker, this may in fact be the case. The Fox branch uses the demonstrative *iini* 'that' for a discourse deictic function (Dahlstrom 2015: 182) in a similar fashion to Potawatomi using the demonstrative *i(w)*. The simmilar usage of the demonstrative as a discourse marker is illustrated in (17).

(17) a. **iini**=keehi wiih-in-enekehe
that.inan=moreover FUT-say.thus.to-X>2/irrealis
'and that is what you would have been told' (Dahlstrom 2015: 182) Mes

b. **iw** é-zhdé'ayan neko
that FCT-think.so.1 HAB
'That's what I think.' (Hockett 1940: 1.9) Pot

While Potawatomi may have borrowed this discourse marker function from the Fox branch, this is not the case for Pot *ma*. It can soundly be reconstructed as coming from PA **maah*. Meskwaki has *=maahi* 'you see' and *maahi* 'over there, over here (non-deictic)' (Goddard 2015: 111). Ojibwe has *maa* 'here, there, emphatic particle expressing cooperation or a request for cooperation' (Rhodes 1985, 1993: 210). Note there is a difference for at least Larry

Smallwood between *oma* and *omaa*. The latter is an emphasized form of the former (Fairbanks p.c.). And, Shawnee has *maa* locative oblique (Goddard 2015). So, we are not dealing with language borrowing when it comes to Pot *ma* or Oji *maa*, but rather shared reconstruction (see (Goddard 2015: 111) and citations within).

The history of PA **ma·h* appears to be a typical case of metaphoric abstraction followed by metonymy (see (Brinton 1996: 50) and citations within). First, metaphorically, the movement of discourse markers along the "grammaticalization chains" (propositional > textual > interpersonal) represents a movement from a purely locative demonstrative meaning (propositional) to a more textual meaning. Then, metonymy may have been used to grammaticalize the adverbial locatives into evidential constructions like (18a) that uses *mii imaa* for 'that's why'. Note Potawatomi makes use of the preverb *wje-* 'that's why', so it must have fully grammaticalized *ma* as an evidential.

(18) (Fairbanks 2008: 196) and (Thunder & Wensaut 1998: 41):

a. **Mii imaa** gii-wanitoo-waad noongom abinoojiin-yag.
DP there PAST-lose.it-3P now child-P
'That's why children these days have lost it.' Oji

b. oh, éshke'-ntawét, **wi**=yé **i** **wthe** wik'kwget.
oh IC.new-kill.3 wi=be that why have.a.feast.3
'Oh, he killed his first deer, that's why he's having a feast.' Pot

This is supported by the fact that some Ojibwe dialects still use *maa* as an adverbial locative and emphatic while other dialects have removed *maa* from their adverbial locative system and only use *maa* for an emphatic (Goddard 2003: 62). The latter is like Potawatomi.

Minnesota	Walpole	Golden L.	Potawatomi	Gloss
(o)maa	maa		shode	'here'
(i'i)maa	zhiw(i)		zhi	'there'
(i')iwidi	widi,wadi(i)	iindio, iindazhi	ézhi/ibe	'over there'

Table 3. Ojibwe, Odawa, and Potawatomi adverbial locatives

Lastly, other Fox discourse markers filling the functions of *mii* seem to be orthogonal in form, for example, *=ipi* marks hearsay (Goddard 2015: 80). Once again, in this paper, I am restricting myself to considerations of feature spreading. I leave it to future research whether a reconstruction of the labial segments exists when the time depth is exteded to when the Ojibwe and the Fox branches separated. This additional evidence corroborates my argument in this paper.

5 Conclusion

This paper provides the first diachronic description of discourse markers in the Ojibwe-Potawatomi branch. In section 2, from archival materials, I explore the similarities and differences between the functions of *mii* in Ojibwe and Potawatomi. Preliminarily, I showed that where Ojibwe uses one discourse marker *mii*, Potawatomi uses five unrelated discourse markers: *i(w)*, *wi*, *wpi*, *me*, and *ma*. In section 3, I explored idioms and lexicalizations based on *mii*. *Mii* does not show up as a fossilized form in Potawatomi. In section 4, I explored the similarities and differences between the form of *mii* in Ojibwe and the five discourse markers found in Potawatomi. *i(w)*, *wi*, *wpi* are not related to Oji *mii* because their time depth is too great and they are able to be reconstructed into Proto-Oji-Pot. Similarly, *me* and *ma* are not related to Oji *mii* because they are easily able to be reconstructed into Proto-Oji-Pot (even back into PA for **maah*) and not borrowed. The upshot of this paper is that Ojibwe appears to have uniquely innovated *mii*, but the source of this innovation is unclear.

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In Choctaw, everyone's a clitic

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1 Introduction

The form of a Choctaw verb varies with the ϕ-features of its subject and object, as in 1. There has been some disagreement, however, over whether these morphemes are agreement morphemes or clitic pronouns (Broadwell & Martin 1993, Woolford 2008, 2010).[1]

(1) a. Tachi **il**-apa-tok.
corn **1PL.I**-eat-PST
'**We** ate corn.'

b. Alikchi-at **chi**-folot-aachi.
doctor-SUBJ **2SG.II**-visit-FUT
'The doctor will visit **you**.'

In this paper I take up the issue once more, and use a mixture of old and new data to argue that all of the morphemes in question are in fact clitic pronouns (with the exception of a lone agreement form). The bulk of the evidence discussed rests on the idea that clitic pronouns have the syntactic properties of arguments in A-positions, and appear to be 'active' during the syntactic derivation, while agreement morphemes are mere ϕ-features (possibly inserted at a postsyntactic stage), and are syntactically 'inert'.

The paper is structured as follows. Section 2 lays out the theory of clitics and agreement morphemes that is assumed here, and section 3 introduces the morphemes in question. Section 4 introduces the first two arguments for the clitichood of the morphemes—their double lives as possessive determiners, and their phonological clitichood. The next

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[1] I mostly use the modified traditional orthography from Broadwell (2006): doubled vowels and doubled consonants are long, underlined vowels are nasalized, <'> represents [ʔ] and <lh> represents [ɬ]. Unlike Broadwell, I do not mark pitch accent, and I mark word-final glottal stops only where relevant. The following glosses are used. 1/2/3: 1st/2nd/3rd-person; AGR: agreement; COMP: complementizer; DET: determiner; DS: different-subject; DU: dual; FOC: focus; FUT: future; I/II/III: Class I/II/III; IRR: irrealis; JUSS: jussive; MOD: modal; NEG: negative; OBJ: object; PART: participle; PERF: perfect; PL: plural; PST: past; Q: question; SS: same-subject; SUBJ: subject; TNS: default tense.

two sections make more theoretically-involved arguments: section 5 shows that the markers in question (almost) all participate in clitic-climbing-like alternations, and section 6 shows that the markers can license a floating quantifier. Section 7 concludes.

2 Background on clitics

In this section, I outline the sense in which 'clitic' is used in this paper. Section 2.1 discusses the difference between phonological clitics and clitic pronouns, and section 2.2 lays out a theory of clitic pronouns and agreement.

2.1 Phonological and syntactic clitichood

The widespread use of the term CLITIC DOUBLING is perhaps unfortunate, as 'clitic' has its own meaning in phonology. In this section, I briefly survey previous work showing that syntactic clitichood and phonological clitichood often coincide, but do not have to.

In phonology, a clitic is an element that does not occupy a prosodic word of its own, and 'attaches' in some sense to an adjacent prosodic constituent. English function words are good examples of phonological clitics, which do not constitute phonological words of their own and adjoin to adjacent prosodic categories. For instance, Selkirk (1996) argues that English function words (except for weak object pronouns) form a minor phrase (ϕ) with the lexical item to their right:

(2) a. Mary ($_{\phi}$ [**kən**] ($_{\omega}$ help)).
b. Bill talked ($_{\phi}$ [**tə**] ($_{\omega}$ Mary)).

By contrast, a clitic (or clitic pronoun) in the syntactic sense is a pronoun that occupies a different syntactic position from the position that would be occupied by a full DP argument (a *special clitic*, in the terminology of Zwicky 1977). In French, for instance, a clitic pronoun precedes the verb, as in 3a, while an equivalent full DP follows it, as in 3b.

(3) a. Jean **les** adores.
Jean **them** loves
'Jean loves them.'

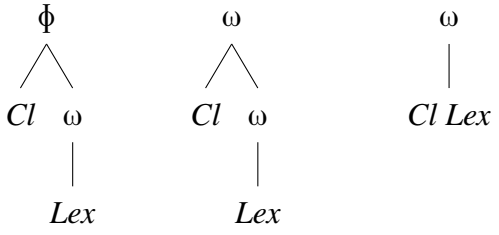
b. Jean adore **les chats**.
Jean loves **the cats**
'Jean loves cats.'

It's clear that phonological clitics need not be syntactic clitics. But what about the reverse implicational relationship? Are clitic pronouns necessarily phonological clitics? The answer is that while a lot of the time they are—the clitic pronoun *les* in 3b is indeed a phonological clitic—they do not need to be. This is supported by two arguments.

One argument is from the existence of counterexamples: syntactic clitics that occupy their own phonological word. Monachesi (1998) notes that the infamous Italian 3PL dative pronoun *loro* constitutes its own prosodic word, yet exhibits behavior characteristic of clitics in the language (e.g. it undergoes clitic-climbing, for more on which see section 5).[2] Another clitic pronoun of this kind is the Tagalog 1DU 2nd-position *tayo* 'we (dual)' as described by Anderson (2005).

The second argument is that if the prosodic status of clitic pronouns really was determined by their syntactic properties, we might expect to see uniformity in the prosodic status of clitic pronouns cross-linguistically, or at least within the same language. Yet this is not the case. Selkirk (1996) argues that there are three different levels at which a prosodic clitic can adjoin to an adjacent prosodic constituent, shown in 4.[3]

(4) a. free clitic b. affixal clitic c. internal clitic



Clitic pronouns do not uniformly fall into one of these categories, either cross-linguistically or within the same language. For instance, Haude (2009) shows that in Movima, an unclassified Amazonian language, clitics encoding the OBVIATE argument behave like external clitics, while clitics encoding the PROXIMATIVE argument behave like affixal clitics.[4]

[2] Although see Cardinaletti & Starke (1999) for arguments that *loro* should be considered a *weak pronoun*: a different class from both strong pronouns and clitic pronouns.

[3] *Lex* denotes the syntactic lexical word and *Cl* the clitic.

[4] Haude actually refers to the proximative clitics as being 'internally' cliticized, but her description makes them sound closer to Selkirk's affixal clitics, as there are certain processes that as reserved for prosodic words only, such as lengthening of the penultimate syllable.

Similarly problematic is the fact that the prosodic environment in a which a clitic pronoun occurs can determine its prosodic status. For instance, Jun & Fougeron (2002) show that French object clitics, which are typically unaccented, can bear phrasal accent when placed appropriately within a longer string of clitics. However it is that this happens, it must be the case the the stressed clitic pronoun is no longer a phonological clitic.[5]

To summarize, some clitic pronouns are phonological clitics, and some form their own prosodic words. Furthermore, 'phonological clitic' is a vague term that covers a number of possible prosodic configurations (cf. 4), and thus cannot be directly mapped from a particular syntactic element. Therefore we should not rely solely on phonological evidence to distinguish clitic pronouns from agreement morphemes, although it can be suggestive. Next, I lay out how clitic pronouns differ syntactically from agreement morphemes.

2.2 Clitics as determiners; agreement as bare ϕ-features

A widely-adopted analysis holds that clitic pronouns are determiner heads that do not project determiner phrases (Uriagereka 1995, Anagnostopoulou 2003, Franks & Rudin 2005, Nevins 2011, Kramer 2014). This analysis captures several properties of clitics. Firstly, their category as determiners captures the fact that they formally resemble determiners in many languages (Uriagereka 1995), and that they do indeed behave like pronouns in many languages: for instance, they affect binding possibilities (Suñer 1988, Alexiadou & Anagnostopoulou 1997, Cuervo 2003, Kramer 2014), and they may license floating quantifiers (Rezac 2010). Secondly, their status as heads captures the fact that they head-adjoin to their hosts. We can show this by noting that when the clitic's host undergoes subsequent head-movement, the clitic is necessarily dragged along with it. For instance, French weak object pronouns are clitics which adjoin to T^0. When the auxiliary in T^0 undergoes T^0-to-C^0 movement, as in a question, the clitic moves with the verb:

(5) a. Tu **l'as** vu.
you it.have seen
'You have seen it.'

b. **L'as**-tu vu?
it.have-you seen
'Have you seen it?'

[5]Instances of clitic pronouns that behave as internal clitics are, in fact, surprisingly hard to find. This may be because internal clitics are the easiest clitic type for the learner or researcher to reanalyze as agreement.

Turning to agreement, many authors have noted that it does not seem to be 'active' in the syntax in the way that clitics are (Benmamoun et al. 2009, Bhatt & Walkow 2013). For instance, Rezac (2010) notes that verbs bearing agreement do not license floating quantifiers in the same way that clitics do, and the presence vs. absence of verbal agreement does not affect the binding status of arguments in the clause.

This comparative lack of syntactic activity can be encoded in two ways. One way is to put (part of) the agreement operation into the post-syntax. Arregi & Nevins (2012) and Bhatt & Walkow (2013) argue that agreement features are copied onto their hosts at some stage of PF that follows the syntactic derivation. An alternative strategy, such as that taken by Kramer (2014), is to assume that both agreement and clitic-movement are syntax-internal operations. But while clitic-doubling involves copying (via Movement) of a determiner head, agreement involves copying (via Agree) of a bundle of ϕ-features. It is therefore the presence vs. absence of the determiner at the position of the Probe that leads to the syntactic differences between agreement and clitic doubling.

In this paper I remain agnostic as to which of these approaches to the syntax of agreement is correct. The crucial difference is between the pronoun-like properties of syntactic clitics and the relative syntactic 'inertness' of agreement. The next section introduces the morphemes whose clitic vs. agreement status is to be evaluated.

3 The morphemes in question

Before introducing the morphemes, I briefly provide some background on Choctaw. Choctaw is a Western Muskogean language spoken in Mississippi and Oklahoma. The 2010 census put the number of speakers at 10,400 (Siebens & Julian 2011), and Broadwell (2006) estimates that there are between 9,000 and 11,000 speakers. All original data in this paper come from one-on-one elicitation sessions with six native speakers of Mississippi Choctaw, all of whom grew up and continue to live on the Mississippi Choctaw reservation.

In terms of its structural properties, Choctaw is a uniformly head-final language, with default SOV order and pervasive argument drop. The sentence-final verb includes morphology that expresses tense, aspect, mood, negation, evidentiality and clause-type. A

typical transitive sentence with no argument drop is shown in 6.

(6) Alikchi-at alla pisa-tok-o?
doctor-SUBJ child see-PST-Q
'Did the doctor see the child?'

The verb also hosts morphemes that cross-reference arguments of the clause – these are the subject of this paper. The morphemes in question are shown in 7, with their traditional labels CLASS I, CLASS II and CLASS III (first used by Munro & Gordon 1982).

(7)

	Class I	Class II	Class III
1SG	-li	sa-/si-	(s)am-
2SG	ish-	chi-	chim-
1PL	ii-/il-	pi-	pim-
1PL+	ii-/il-	hapi-	hapim-
2PL	hash-	hachi-	hachim-
3/unmarked	–	–	im-

First, note that the paradigm is impoverished in the 3rd-person—it seems that only the Class III series has a 3rd-person form at all. In fact, following the analysis of Ulrich (1986), Broadwell (2006), Woolford (2008) and Tyler (2017), the Class III series can be decomposed into a Class II marker followed by an applicative morpheme *m-* (realized as nasalization on the preceding vowel in pre-consonantal contexts). This means that the apparent 3rd-person Class III form can be reanalyzed as a bare applicative form, with no preceding Class II marker, and we can make the simplifying assumption that there really are no 3rd-person clitic pronouns, hence the 'unmarked' label for *im-* in 7. The second thing to note is the exceptionality of the 1SG Class I marker *-li* which, unlike every other marker, follows rather than precedes the verb stem (see Tyler 2017 for more on the exceptionality of 1SG in Choctaw). I now turn to the functions of the Class I, II and III series.

Class I forms cross-reference agents, both of intransitive 8a and transitive 8b verbs.

(8) a. **Ish**-hilh-ahiina-h-o?
2SG.I-dance-MOD-TNS-Q
'Can **you** dance?'

b. Nani **ii**-hokli-tok.
fish **1PL.I**-catch-PST
'**We** caught the fish.'

Class II forms cross-reference non-agentive subjects, as in 9a, and objects of transitives, as in 9b.

(9) a. **Chi**-noktalha-h-o.
2SG.II-jealous-TNS-Q
'Are **you** jealous.'

b. Ish-**pi**-pisa-tok?
2SG.I-**1PL.II**-see-PST
'You saw **us**.'

And Class III markers cross-reference applicative arguments, as in 10a, and a lexically-determined class of non-agentive subjects, as in 10b.

(10) a. Bill-at nipi **chi**-hoponi-h.
Bill-SUBJ meat **2SG.III**-cook-TNS
'Bill is cooking meat **for you**.'

b. **A**-takoobi-h.
1SG.III-lazy-TNS
'**I** am lazy.'

In sections 4-6, I present arguments that these morphemes are clitic pronouns. Section 4 discusses two facts about the markers that would lead us to suspect that they are clitics rather than agreement morphemes; section 5 shows that all three series of markers participate in Romance-style clitic climbing, and 6 shows that the markers can license a floating quantifier—behavior that would be unexpected for an agreement morpheme.

4 Some suggestive facts

In section 4.1, we see that the Class II and III determiners lead double lives as possessive determiners. In section 4.2 we see that the Class I and III markers behave like phonological clitics. These both constitute evidence for the clitic pronoun analysis.

4.1 Class II and III markers as possessive determiners

Kramer (2014) notes that the Amharic object marker, which she argues to be a clitic pronoun, bears a striking similarity to the possessive pronoun. She argues that this is to be expected if both clitic pronouns and possessive determiners are determiners that express ϕ-features. In this section, I apply the same logic to the Choctaw Class II and III markers.

The determiner analysis of clitic pronouns outlined in section 2.2 holds that they are determiner heads that incorporate into their hosts. Since the clitic pronouns realize the ϕ-features of the argument they are associated with, we have to assume that they are equipped with the relevant ϕ-features by the point of VOCABULARY INSERTION. The representation of a clitic pronoun immediately prior to Vocabulary Insertion will therefore be as in 11.

(11) $D^0_{[\phi]}$

The element in 11 is also found in a quite different circumstance: when a possessive determiner realizes the ϕ-features of the possessor. It so happens, in fact, that possessive determiners in Choctaw are almost identical to the Class II and III markers. Class II markers lead double lives as markers of inalienable possession and Class III markers do the same with alienable possession:

(12)

Class II: inalienable possession.			Class III: alienable possession.		
sa-	shki	'my mother'	am-	ofi	'my dog'
chi-	shki	'your mother'	chim-	ofi	'your dog'
pi-	shki	'our mother'	pim-	ofi	'our dog'
i-	shki	'his/her/their mother'	im-	ofi	'his/her/their dog'

This data can be accounted for with an underspecified spellout rule that doesn't distinguish between pronominal and possessive determiners.[6]

4.2 Class I and III markers as phonological clitics

In this section, I use evidence from Broadwell (2006) to argue that Class I and III markers, with the exception of 1SG Class I marker *-li*, are phonological clitics.

We know that the prosodic status of clitic pronouns may vary across languages, but the prosodic status of agreement morphemes is less flexible—to my knowledge, it has never been argued that an agreement form may be anything other than incorporated into

[6]Note one difference between the canonical Class II markers in 7 and the inalienable possessive determiners in 12a: the inalienable possessive determiner paradigm has a 3rd-person form. In Tyler (2017), this is explained as a consequence of *i* being a default morpheme inserted at clitic hosts which lack a clitic, somewhat like Basque L-SUPPORT in the analysis of Arregi & Nevins (2012).

the minimal prosodic word containing the verb stem. What this means is that if we find an argument-referencing morpheme that shares a minimal prosodic word with the verb stem, its clitic vs. agreement status is unclear. But if we find a prosodic boundary between the morpheme and the stem, we have to conclude that it is a clitic pronoun. There is in fact evidence of a prosodic boundary between (most) Class I/III markers and the verb stem, providing evidence that they are clitic pronouns.

A Choctaw prosodic word can be identified as the domain over which *rhythmic lengthening* applies—a process by which even-numbered non-final syllables in a string of light syllables are lengthened (Nicklas 1974, Ulrich 1986). This is shown in 13.

(13) /salaha-tok/ → [salaːhatok]
slow-PST
'He was slow.' (Broadwell 2006:21)

When Class III or non-1SG Class I markers are attached to verbs that begin with a short vowel, rhythmic lengthening counts from the first syllable of the stem, and ignores the Class I/III marker, as shown in 14.

(14) a. /ish-achifa-tok/ → [ish-achiːfa-tok]
2SG.I-wash-PST *[ish-aːchifa-tok]
'You washed it.' (Broadwell 2006:22)

b. /im-achiifa-tok/ → [im-achiːfa-tok]
3.III-wash-PST *[im-aːchifa-tok]
'He washed it for her.' (Broadwell 2006:22)

This constitutes evidence for a prosodic boundary between the verb stem and the Class I/III marker. Class I and III markers must therefore be phonological clitics, and so, by the logic outlined above, must be clitic pronouns.

Class II markers, however, behave differently. Unlike Class I and III markers, Class II markers do indeed trigger lengthening of a stem-initial light syllable:

(15) /sa-salaha-tok/ → [sa-saːlaha(a)-tok]
1SG.II-slow-PST
'I am slow.' (Broadwell 2006:22)

It seems like there is no prosodic boundary between the Class II marker and the verb stem. If this is the case, prosody offers us no clues as to the clitic vs. agreement status of the Class II markers, but does not commit us to an agreement analysis.[7] As argued throughout this paper, there is sufficient evidence to suppose that the Class II markers are clitic pronouns.

Before continuing, the 1SG Class I marker *-li* merits a mention. Broadwell & Martin (1993) show that unlike the other Class I markers, it is indeed included in the domain of rhythmic lengthening. This suggests it is an agreement form rather than a clitic pronoun.

In this section, we have seen two pieces of evidence that the Class I-III markers are clitic pronouns rather than agreement markers.[8] In the next two sections, I present two further arguments, from clitic climbing and from licensing FLOATING QUANTIFIERS.

5 Clitic climbing

In this section I show that all members of the Class I-III series (except *-li*) participate in an alternation that resembles Romance-style clitic climbing alternations. Section 5.1 details the difference between a clitic-climbing alternation and a multiple agreement pattern, section 5.2 provides the relevant data for each of the Class I-III markers, and section 5.3 provides an interim summary and a comment on *-li*.

[7] An alternative analysis is that there is a prosodic boundary between the Class II marker and the verb stem, but unlike with the Class I and III markers in 14, no resyllabification is required in order to derive a sequence of light syllables in 15, allowing rhythmic lengthening to 'count' the syllable of the Class II marker. Rhythmic lengthening in this scenario would apply at the level of the maximal prosodic word. I lack the data to distinguish between the two options.

[8] Broadwell & Martin (1993) report a possible further piece of evidence for the clitichood of Class I markers: they may be omitted in the presence of an overt pronoun, except 1SG *-li*, which cannot be omitted. They use this to support their claim, which I also adopt, that all Class I markers except *-li* are clitic pronouns. However, I was unable to replicate their consultants' judgments, and for the speakers I asked, all Class I markers were obligatory regardless of the presence or absence of a corresponding overt pronoun. Nonetheless, the judgments reported in Broadwell & Martin, to the extent that they hold, only strengthen the case that the Class I forms other than *-li* are clitics. Somewhat less helpfully for my analysis, they also show that Class II markers that cross-reference objects are omissible, while those that cross-reference subjects are not. However, as with the data concerning Class I markers, the speakers I asked did not share the judgments.

5.1 Clitic climbing vs. multiple agreement

In many Romance languages, when two verbs are in a restructuring configuration, an object clitic pronoun can show up in one of two places. It may be enclitic on the embedded infinitival verb, as in 16a, or it may be proclitic on the matrix verb, as in 16b.

(16) a. Volevo chiamar=**la** ieri.
I.wanted to.call=**her** yesterday

b. **La=** volevo chiamare ieri.
Her= I.wanted to.call yesterday
'I wanted to call her yesterday.' (Italian, Rooryck 1994:417)

One characteristic of clitic climbing configurations is that although the clitic may show up in either position, it cannot show up in both positions simultaneously. This contrasts with *multiple agreement* patterns, in which two verbs both obligatorily exhibit agreement with an argument of the clause. This is exemplified by the Swahili example in 17.

(17) Juma **a**-li-kuwa **a**-me-pika chakula.
Juma **SUBJ.AGR**-PST-be **SUBJ.AGR**-PERF-cook food
'Juma had cooked food.' (Swahili, reglossed from Carstens 2011:3)

The differing behavior of clitic pronouns and agreement morphemes is explained by the analysis of clitic pronouns in section 2.2. Since clitics undergo syntactic movement, and therefore form a movement chain, we would only expect to see one copy pronounced. Multiple agreement morphemes, by contrast, do not form a movement chain, and therefore we would not expect to see only the highest agreement morpheme pronounced.

In the following subsections, we see that the Class I-III markers all participate in alternations that resemble the clitic climbing pattern, and not the multiple agreement pattern.

5.2 Class I-III markers clitic-climb

There is a construction in Choctaw which I will refer to as the *auxiliary-participle* (AP) construction, discussed in more detail in Broadwell & Martin (1993) and Broadwell (2006), which lends itself well to exploring clitic-climbing alternations. In it, a participial verb is

embedded under an auxiliary. Here, I follow Broadwell & Martin and use the auxiliary *tahli/taha* 'finish'. An instance of this construction with no clitic pronouns is shown in 18 (using only 3rd-person arguments ensures that there are no clitic pronouns).

(18) Bill-at aanowa-t tahli-h.
Bill-SUBJ walk-PART finish-TNS
'Bill finished walking.'

When a non-3rd-person subject is used, as in 19 from Broadwell & Martin (1993:6), the clitic pronoun may show up on either the participle or the auxiliary, but not on both.

(19) a. Bashli-t **ish**-tahli-tok.
cut-PART **2SG.I**-finish-PST
'**You** finished cutting it.'

b. **Ish**-bashli-t tahli-tok.
2SG.I-cut-PART finish-PST
'**You** finished cutting it.'

This looks like a straightforward clitic climbing alternation, providing evidence for the clitic pronoun analysis of Class I markers (except 1SG *-li*, on which see section 5.3).

Turning now to Class II markers, they also participate in clitic-climbing alternations in AP constructions, with a caveat. Recall that Class II markers cross-reference both objects and non-agentive subjects—it turns out that only object-referencing Class II markers can clitic-climb. This is shown in 20, from Broadwell & Martin (1993:6).

(20) a. Fammi-t **sa**-tahli-tok.
whip-PART **1SG.II**-finish-PST
'He/she finished whipping **me**.'

b. **Sa**-fammi-t tahli-tok.
1SG.II-whip-PART finish-PST
'He/she finished whipping **me**.'

As they show in 21, from Broadwell & Martin (1993:7), clitic climbing with subject-referencing Class II markers is marginal or dialectal/idiolectal.

(21) a. % Niya-t **sa**-taha-h.
fat-PART **1SG.II**-finish-TNS
'**I** am completely fat.'

b. **Sa**-niya-t taha-h.
1SG.II-fat-PART finish-TNS
'**I** am completely fat.'

Broadwell & Martin argue that this difference between the subject- and object-referencing Class II markers shows that while the object-referencing Class II markers are indeed clitics, the subject-referencing Class II markers comprise a homophonous series of agreement morphemes. Although the split is curious and requires an explanation that I am unable to give, I reject Broadwell & Martin's account. This is partly because it does not seem very perspicuous to say that a language has a fully homophonous series of clitics and agreement morphemes, but partly because there is in fact another configuration in which subject-referencing Class II markers may undergo a clitic-climbing-like alternation.

I will term the configuration in question a *raising-to-object* (RtO) construction. In it, a verb in the jussive mood is embedded under the verb *ahni* (usually translated as 'think' but here meaning something closer to 'want').[9] When the embedded verb is one that cross-references its subject with a Class II marker (e.g. *chonna* 'be skinny'), that Class II marker may optionally 'climb' onto *ahni*. This alternation is shown in 22.

(22) a. John-at [ik-**sa**-chonna-'] ahni-h.
John-SUBJ [IRR-**1SG.II**-skinny-JUSS] think-TNS.

b. John-at [ik-chonna-'] **si**-ahni-h.
John-SUBJ [IRR-skinny-JUSS] **1SG.II**-think-TNS.
'John wants **me** to be skinny.'

As with the clitic climbing alternations we've seen so far, the marker may only show up in one position, implying that it is indeed a clitic, rather than an agreement morpheme. Note that only subject-referencing clitics can raise and adjoin to *ahni*. 23 shows that attempting to raise an object clitic results in ungrammaticality.

(23) a. [noshkobooka-mat chishn-ako ik-**chi**-atookoli-'] ahni-li-h.
captain-DET.SUBJ you-FOC.OBJ IRR-**2SG.II**-pick-JUSS think-1SG.I-TNS

b. * [noshkobooka-mat chishn-ako ik-atookoli-'] **chi**-ahni-li-h.
captain-DET.SUBJ you-FOC.OBJ IRR-pick-JUSS **2SG.II**-think-1SG.I-TNS
'I want the captain to pick *you*.'

[9] Jussive mood is realized in Choctaw with the irrealis prefix *ik-*, a final glottal stop, and a pitch accent on the final syllable (not marked in my examples). Broadwell (2006:148) and Byington (1870:351) record the jussive verb with a final *h*, rather than a glottal stop. However, the speakers I consulted for the most part used a glottal stop. All examples here are shown with final glottal stops.

There is more to be said about RtO in Choctaw—see the appendix for evidence that it does not involve quotation or PROLEPSIS, (where the argument is generated as an object).

Turning finally to the Class III markers, they also fail to undergo clitic-climbing in AP constructions, as shown in 24.[10]

(24) a. [**A**-nokshoopa-t] taha-h.
[**1SG.III**-scared-PART] finish-TNS
'He/she is totally scared **of me**.'

b. * [Nokshoopa-t] **a**-taha-h.
[scared-PART] **1SG.III**-finish-TNS
intended: 'He/she is totally scared **of me**.'

But in RtO configurations, we see that Class III markers do participate in that alternation. In 25, the Class III marker can remain on embedded jussive verb, or it can 'climb' onto the matrix verb *ahni*. As before, it cannot appear in both positions simultaneously.

(25) a. Mary-at [holisso alhiiha ik-**hapi**-kaniiya-'] ahni-h.
Mary-SUBJ [letter PL IRR-**1PL.III**-lose-JUSS] think-TNS

b. Mary-at [holisso alhiiha ik-kaniiya-'] **hapim**-ahni-h.
Mary-SUBJ [letter PL IRR-lose-JUSS] **1PL.III**-think-TNS
'Mary wants **us** to lose those letters.'

5.3 Summary of clitic climbing

Class I, II and III markers therefore all participate in some kind of clitic-climbing-like alternation. The two configurations in which clitic climbing is attested are the AP and RtO constructions. The AP construction permits raising of subject-referencing clitics and object-referencing clitics, with some restrictions, while the RtO construction only permits raising of subject-referencing clitics. These findings are summarized in the table in 26.

[10]The sentences in 24 show an object-referencing Class III marker attempting to clitic-climb. I do not currently have data on whether subject-referencing Class III forms may participate in clitic climbing in AP constructions. Given that in the Class II paradigm, speakers find object-clitic climbing much more natural than subject-clitic climbing, it would be surprising if their preferences reversed in the Class III paradigm, and so I feel reasonably safe in predicting that speakers would also reject clitic-climbing of a subject-referencing Class III form in an AP construction. However, this topic requires further research.

(26)

	Class I	Class II	Class III
AP; subj.	OK	%	no data
AP; obj.	N/A	OK	*
RtO (subj. only)	N/A	OK	OK

I do not attempt to explain the gaps in the paradigm here. The crucial point is that each of the Class I, II and III markers undergoes some form of clitic climbing, supporting the claim that they are all clitics. Before moving onto the next argument for the clitichood of the Class I-III markers, I provide a brief note on the rogue 1SG agreement morpheme *-li*.

Broadwell & Martin (1993:6) note that the 1st-person singular Class I marker *-li* is unlike the other Class I markers in several ways. Not only is it the only Class I marker (and indeed the only piece of argument-referencing morphology in the language) to follow the stem rather than precede it, it also fails to participate in clitic climbing in AP constructions:

(27) a. Bashli-t tahli-**li**-tok.
cut-PART finish-**1SG.I**-PST
'I finished cutting it.'

b. * Bashli-**li**-t tahli-tok.
cut-**1SG.I**-PART finish-PST
'I finished cutting it.'

Consequently, they propose that unlike the other Class I markers, it is an agreement morpheme rather than a clitic. I follow their analysis, in a more radical way: *-li* is the only ϕ-agreement form in the language (see Tyler 2017 for further elaboration).

In the next section, I introduce a second argument for the clitichood of (most of) the Class I-III markers, which involves their ability to license the floating quantifier *oklah* where an equivalent full DP argument would be unable to.

6 Licensing *oklah*

Broadwell (2006:239) describes *oklah* as a preverb which is licensed by animate plural subjects. In 28a, *oklah* associates with a null 3rd-person subject, and in 28b it associates with a null 1st-person subject that is doubled by a Class I clitic.

(28) a. Tamaaha' **oklah** iya-tok.
town **PL** go-PST
'They went to town.'

b. Oklhiili-kma **okl**-ii-taloow-aachi-h.
dark-COMP.DS **PL**-1PL.I-sing-FUT-TNS
'When it gets dark, we'll sing.' (Broadwell 2006:239)

In section 6.1 I refine distributional facts about *oklah* and I lay out an analysis of *oklah* as a floating quantifier (FQ). Following the analysis of clitic-FQ interactions in Rezac (2010), the interaction between Class II markers and *oklah* is taken to be further evidence for the clitic status of Class II markers. Then in sections 6.2 and 6.3 we see that clitic climbing in the AP and RtO constructions also has the effect of altering the positions in which *oklah* is licensed—an effect which is predicted under Rezac's account.

6.1 *Oklah* as a floating quantifier

Oklah seems to have a wider distribution than that described by Broadwell (2006). In addition to associating with all plural subjects, *oklah* can also associate with 1PL and 2PL objects, as in 29—that is, it can associate with plural objects which are clitic-doubled. As shown in 30, it cannot associate with 3PL objects, which are not clitic-doubled.

(29) a. **Oklah**$_i$ ak-**hachi**$_i$-piso-tok.
PL 1SG.NEG-**2PL.II**-see.NEG-PST
'I didn't see **y'all**.'

b. Bill-at **oklah**$_i$ **hapi**$_i$-nokshoopa-h.
Bill-SUBJ **PL** **1PL.III**-scared-TNS
'Bill is scared **of us**.'

(30) **Ofi**$_i$ **(*oklah**$_i$**)** ak-piso-tok.
dog (*PL) 1SG.NEG-see.NEG-PST
'I didn't see the dogs.'

The distribution of *oklah* is very similar to that of the French FQ *tous* 'all'. As shown in 31, *tous* may associate with object clitic pronouns, but not with full object DPs.

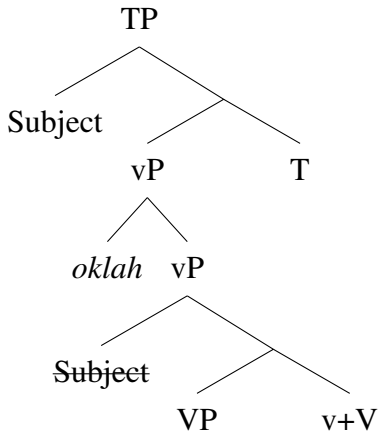
(31) a. Je leur$_i$ ai **toutes**$_i$ piquées.
I them have all asked.
'I asked them all.' (De Cat 2000:2)

b. * Elles ont **tous**$_i$ voulu manger les escargots$_i$.
they.F have **all** wanted wanted the snails.
intended: 'They wanted to eat all the snails.' (De Cat 2000:6)

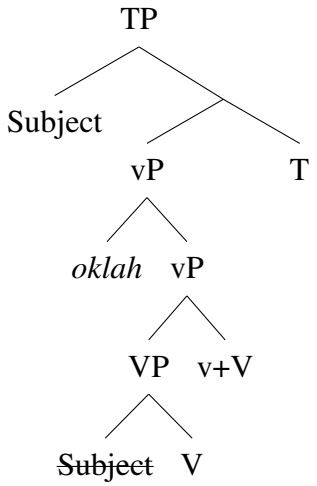
Starting out from this similarity, I argue that *oklah* is a FQ.[11] I make use of a simple licensing condition on FQs: they must be c-commanded from an A-position by the argument with which they are associated. It has been known since Kayne (1981) and Belletti (1982) that FQs must be c-commanded by their associates, and at least since Déprez (1989) it has been known that (clause-bounded) FQs can only be licensed by DPs in A-positions. As we will see, the Choctaw data support the argument in Rezac (2010) that clitic pronouns function as arguments in A-positions for the purposes of licensing FQs.

We can now see why subjects, clitic-doubled or not, can license *oklah*. Let's assume that Choctaw subjects start out either in Spec-vP (for agentive subjects) or the complement of V (for non-agentive subjects), and that they raise to an A-position for overt subjects—for convenience, Spec-TP. Let's also take Broadwell's (2006) analysis that *oklah* adjoins at some level of the verb phrase to mean that *oklah* can adjoin at vP or VP. Whether *oklah* adjoins at vP or VP, it will find itself in the appropriate configuration—c-commanded by its associate from an A-position (Spec-TP). 32a shows vP-adjoined *oklah* associating with an agentive subject and 32b shows it associating with a non-agentive subject.

(32) a.



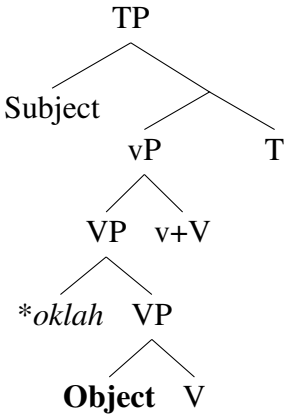
b.



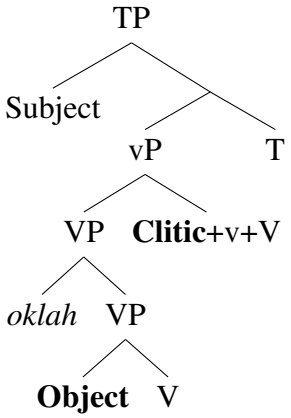
[11] There is considerable debate as to whether floating quantifiers are derived by stranding (e.g. Sportiche 1988, Shlonsky 1991) or whether they are merged as adverbs (e.g. Doetjes 1997, Bobaljik 2003). The Choctaw data does not help decide between the analyses, and I remain agnostic.

We can also see why clitic-doubled objects license *oklah* (as in 29), while non-doubled DPs do not (as in 30): clitic pronouns (here, Class II and III markers) attach above *oklah*, while full DP objects do not. In 33a, the object is not clitic-doubled—even if *oklah* adjoins as low as VP, as is shown, it will still not be c-commanded by a copy of the object, so cannot associate with it. By contrast, the clitic-doubled object in 33b can associate with *oklah*—the clitic adjoins to the verb, from where it c-commands *oklah*.

(33) a.



b.



Note that this analysis rests on the assumption that clitics function as arguments for the purposes of licensing floating quantifiers. See Rezac (2010) for exactly this argument, using data from French. We have therefore seen that the distribution of *oklah* can be accounted for under the assumptions (a) that *oklah* is a floating quantifier, and (b) that the Class II and III markers (when they double object arguments) are clitics.

In sections 6.2-6.3, I show that clitic climbing in the AP and RtO constructions (see section 5) allows *oklah* to be licensed in places where it would not otherwise be licensed.

6.2 Licensing *oklah* in the auxiliary-participle construction

Oklah is typically happy to associate with subjects, clitic-doubled or not. However, in AP constructions, which allow clitic climbing, the position of the Class I or II marker affects the positions in which *oklah* can appear. The generalization is this: when the Class I/II marker adjoins to the matrix verb, *oklah* may immediately precede either the matrix or embedded verb. However, when the Class I/II marker adjoins to the embedded verb, *oklah* may only appear before the embedded verb, and not immediately before the matrix verb.

Let's look first at Class I markers. When a plural Class I marker attaches to the matrix auxiliary, as in 34a, *oklah* may immediately precede either the matrix auxiliary, or the embedded participle. But when the Class I marker adjoins to the embedded participle, as in 34b, *oklah* is licensed only in the lower position, in the participial phrase.

(34) a. [Alla-ma (**oklah**) im-anopoli-t] (**oklah**) **ii**-tahli-kmat...
[child-that.OBJ (**PL**) 3.III-talk-PART] (**PL**) **1PL.I**-finish-when.SS
'When **we**'ve finished talking to that kid...'

b. [Alla-ma (**oklah**) **il**-im-anopoli-t] (***oklah**) tahli-kmat...
[child-that.OBJ (**pl**) **1PL.I**-3.III-talk-PART] (***PL**) finish-when.SS
'When **we**'ve finished talking to that kid...'

The same holds for Class II markers. 35a shows that when a Class II marker attaches to the matrix verb, *oklah* is permitted in either position. But when a Class II marker attaches to the embedded verb, as in 35b, *oklah* is permitted only in the lower position.[12]

(35) a. [(**Oklah**) Noklhakacha-t] (**oklah**) **hapi**-taha-h.
[(**PL**) shocked-PART] (**PL**) **1PL.II**-finish-TNS
'**We** are completely shocked.'

b. [(**Oklah**) **hapi**-noklhakacha-t] (***oklah**) taha-h.
[(**PL**) **1PL.II**-shocked-PART] (***PL**) finish-TNS
'**We** are completely shocked.'

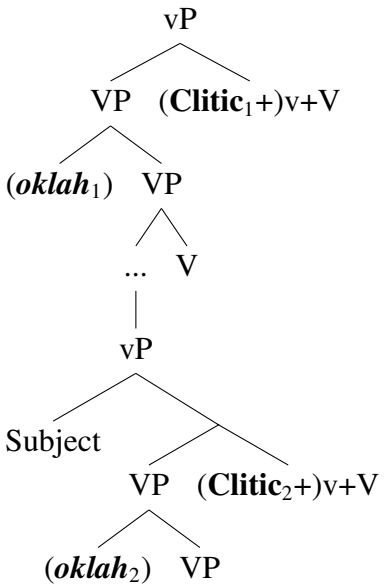
The sentences in 35 involve subject-referencing Class II markers. I currently lack the relevant data for object-referencing Class II markers, but the pattern from Class III markers suggests that the generalization would extend to object-referencing Class II markers too. Although a Class III marker may attach only to the embedded verb, it too will license *oklah* only in the lower position, in line with the patterns shown in 34b and 35b:

(36) [Bill-at (**oklah**) **hapi**-nokshoopa-t] (***oklah**) taha-h.
[Bill-SUBJ (**PL**) **1PL.III**-scared-PART] (***PL**) finish-TNS
'Bill is completely afraid **of us**.'

[12] 2 out of 6 speaker consulted consistently permitted subject-referencing Class II forms to show up on the matrix auxiliary, in line with Broadwell & Martin's (1993) observation that it is a marked or dialectal option.

Given the licensing condition on *oklah* established in the previous section—it must be c-commanded by its associate DP from an A-position—we can derive these patterns. First, I assume that AP constructions have the basic structure shown in 37, up to the level of the matrix vP. The tree shows both potential clitic positions ('Clitic$_1$' and 'Clitic$_2$') and some of the potential *oklah* positions ('*oklah*$_1$' and '*oklah*$_2$').[13] Note that despite its structural position, *oklah*$_1$ is pronounced immediately before the matrix verb, rather than before the embedded clause—I propose that *oklah* in this context is subject to an obligatory m-merger with [v+V] (Matushansky 2006), although more research is required on this point.

(37)



First we can derive the pattern in 34a and 35a, where the subject is doubled by a clitic pronoun on the matrix verb, i.e. in position 'Clitic$_1$'. In these cases, *oklah* is licensed in both positions, because Clitic$_1$ c-commands both positions. Second, we can derive the patterns in 34b, 35b and 36, where the subject is doubled by a clitic pronoun on the embedded verb (position 'Clitic$_2$'). From here, only *oklah*$_2$ is c-commanded by the clitic pronoun or the by the subject DP itself. There is no clitic or full pronoun c-commanding *oklah*$_1$, and therefore *oklah* is not licensed in that position.

A note is required on what happens to the null subject DP in these clauses when the

[13] Some positions for *oklah*—adjoined at matrix vP and embedded vP—are left out for reasons of space.

matrix TP layer is built. If it raises to Spec-TP (as in 32), then we might expect *oklah*$_1$ to be licensed, as it will now be c-commanded by a plural DP in an A-position. Indeed, we can see that when there is an overt plural subject, *oklah* is licensed in either position:

(38) Alla-t (**oklah**) washooha-t (**oklah**) tahli-hmat...
child-SUBJ (**PL**) play-PART (**PL**) finish-when.SS
'When the children finished playing...'

However, the fact that *oklah*$_1$ is not licensed in 34b, 35b and 36 suggests that the matrix Spec-TP position goes unfilled in these cases.[14]

In summary, we have seen in this section that the Class I, II and III markers all affect the licensing possibilities of *oklah*, which I argue to be a FQ. This could only be the case of the Class I-III markers were clitics, rather than agreement morphemes.

6.3 Licensing *oklah* in the raising-to-object construction

We saw that changing the position of the Class II/III marker in AP constructions affects where *oklah* is licensed. Here we see that the same holds for RtO constructions. First, note that if the subject of the embedded clause is 3rd-person, and so is not clitic-doubled, *oklah* can only appear in the embedded clause, as in (39).

(39) [Alla alhiiha-yat (**oklah**) ik-baliili-'] (***oklah**) ahni-li-h.
[child PL-SUBJ (**PL**) IRR-run-JUSS] (***PL**) think-1SG.I-TNS
'I want the kids to run.'

Now consider what happens if the subject of the embedded clause is doubled by a clitic (in these cases, a Class II marker) on the matrix verb—*oklah* is now licensed in both the embedded clause 40a and the matrix clause 40b. In this way, we see the pattern from section 6.2 repeated with RtO constructions, further supporting the clitic analysis.

(40) a. Mary-at [**oklah** ik-nayoppa-'] **hapi**-ahni-h.
Mary-SUBJ [**PL** IRR-happy-JUSS] **1PL.II**-think-TNS
'Mary wants us to be happy'

[14]This suggests in turn that Choctaw patterns with those languages that do not require Spec-TP to be filled (Alexiadou & Anagnostopoulou 1998). The validity of this claim in Choctaw requires more research.

b. [Ik-baliili-'] **oklah hachi**-ahni-li-h.
[IRR-run-JUSS] **PL** **2PL.II**-think-1SG.I-TNS
'I want **y'all** to run

7 Conclusion

There is evidence from several domains that the Class I-III markers are clitic pronouns rather than agreement morphemes (with the exception of the 1SG Class I marker *-li*). We first examined two suggestive pieces of evidence: (a) that Class II and III markers lead double lives as possessive determiners, and (b) that Class I and III markers are phonological clitics (except *-li*). However, the crucial pieces of evidence come from (c) the fact that the Class I-III markers all take part in clitic-climbing-like alternations, which are distinct from the multiple-agree patterns we would expect to see were they agreement morphemes, and (d) the fact that the floating quantifier *oklah* can be licensed in the c-command domain of the Class I-III markers, even when *oklah* is structurally higher than the DP being clitic-doubled. These properties can be explained under a theory where clitics are pronouns represented in the syntax, while ϕ-agreement features are syntactically inert.

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Appendix: more on raising-to-object

This appendix makes two points about RtO constructions in Choctaw: (a) they do not involve quotation; (b) they do not involve prolepsis. Addressing point (a), if RtO involved quotation we would expect *wh*-movement out of the embedded clause to be impossible, quotes being islands for movement. Yet *wh*-words can move out of the embedded clause:

(41) Nata-ho$_i$ John-at [t_i ik-ikbi-'] hapi-ahni-h.
what-OBJ John-SUBJ [IRR-make-JUSS] 1PL.II-think-TNS
'What does John want us to build?'

Similarly, if RtO involved quotation we would expect indexical expressions in the embedded clause to be interpreted with respect to the reported context. However, embedded indexicals (e.g. 'I' in 42) are interpreted with respect to the utterance context:

(42) John-at [ik-**sam**-aala-'] chi-ahni-h.
John-SUBJ [IRR-**1SG.III**-come-JUSS] 2SG.II-think-TNS
'John wants you to come to **me**.' (not: 'John wants you to come to John.')

Turning to point (b), section 5.2 argues that when a subject-referencing Class II/III marker ends up on the matrix verb, it has undergone syntactic movement, just as in an AP construction with clitic climbing. However, a alternative analysis would hold that the 'raised' clitic is in fact an argument of the matrix verb *ahni* and did not originate in the lower clause. The matrix object argument would then bind a null subject in the lower clause, in an instance of prolepsis (see e.g. Davies 2005). One counterargument is that *ahni* is typically restricted to taking clausal complements, and cannot take a DP object:

(43) * Chi-ahni-li-h.
2SG.II-think-1SG.I-TNS
intended: 'I think of/about you.'