

# Prosodic smothering in Macedonian and Kaqchikel \*

Ryan Bennett, Boris Harizanov, and Robert Henderson

*This manuscript has been accepted for publication in Linguistic Inquiry*

## Abstract

This paper deals with a so-far unnoticed phenomenon in prosodic phonology, which we dub PROSODIC SMOTHERING. Prosodic smothering arises when the prosodic status of a clitic or affix varies with the presence or absence of some outer morpheme. We first illustrate prosodic smothering with novel data from two genetically unrelated languages, Macedonian (Slavic) and Kaqchikel (Mayan). We then provide a unified account of prosodic smothering based on a principled extension of the theory of prosodic subcategorization (Inkelas 1990, Peperkamp 1997, Chung 2003, Yu 2003, Paster 2006, Bye 2007, among others). Prosodic subcategorization typically involves requirements placed on items to the left or the right of the selecting morpheme. We show that prosodic smothering naturally emerges in a theory which also allows for subcategorization in the vertical dimension, such that morphemes may select for the prosodic category which immediately dominates them in surface prosodic structure. This extension successfully reduces two apparent cases of non-local prosodic conditioning to the effects of strictly local prosodic selection.

## 1 Introduction

This paper is concerned with the description and analysis of a so-far unnoticed phenomenon in prosodic phonology, which we dub PROSODIC SMOTHERING. This phenomenon, illustrated schematically in (1), concerns a specific type of contextual variability in the prosody of dependent morphemes (affixes and clitics). Assume that two co-occurring morphemes, A and B, are normally realized with the prosodic structure in (1a). In this structure morpheme A is parsed into a higher prosodic domain than morpheme B (e.g. morpheme B might be dominated by a prosodic word  $\omega$ , while morpheme A is dominated by a phonological phrase  $\phi$ ). Now assume that A and B can also co-occur with a third, outer functional morpheme  $\mathbb{F}$ . In many cases the presence of  $\mathbb{F}$  will have no effect on the prosody of A and B (1b): compare, for example, English phrases like *the window* [  $\delta\partial$  ( $\omega$  'win.d $\partial$ u) ] vs. *in the window* [ m  $\delta\partial$  ( $\omega$  'win.d $\partial$ u) ] (Selkirk 1995).

---

\*We thank the Kaqchikel speakers who participated in the production experiment described in section 3.2.2, and the Comunidad Lingüística Kaqchikel for logistical assistance with the study. *Matyöx chiwe iwonojel*. Thanks as well to Victor Friedman and Marjan Markovikj for helping us understand the Macedonian data in section 2.5. We are further grateful to Marjorie Pak, and to audiences at the Workshop on the Sound Systems of Mexico and Central America, Form and Analysis in Mayan Linguistics III, CLS 51, AMP 2015, USC, and UC Santa Cruz for providing feedback on this work.

- (1) a. /A B/ → [<sub>δ</sub> A [<sub>π</sub> B]] (δ ≥ π on the prosodic hierarchy)  
 b. /F A B/ → [<sub>δ</sub> F A [<sub>π</sub> B]] (no effect of F)  
 c. /F A B/ → [<sub>π</sub> F A B] (prosodic smothering of A by F)

But this is not the only possible outcome: as we will show, in some cases F can trigger restructuring of the prosodic boundary between A and B. This is prosodic smothering: in the presence of some morpheme F, the prosody of A and B flattens out such that all three morphemes are contained within the same domain (1c). In our terminology, morpheme F ‘smothers’ A because the presence of F (an outer morpheme) has the effect of compressing A (an inner morpheme) into a lower prosodic domain than it would otherwise belong to.

The effect of smothering is to generate prosodic alternations akin to faux-English *the window* [ ðə (ω 'wm.dōv) ] vs. *in the window* [ (ω m 'ði wm.dōv) ], in which the stressability of *the* depends on the presence or absence of an outer functional morpheme. In this paper we demonstrate that prosodic smothering (1c) occurs in both Macedonian (section 2) and Kaqchikel (section 3), two genetically and geographically disparate languages.

The theoretical import of prosodic smothering resides, in part, with the notion of phonological locality. Phonological processes are typically local, in the sense that phonological interactions occur between string-adjacent elements (where ‘adjacency’ may be defined over different levels of representation, such as autosegmental tiers; see Goldsmith 1990, Archangeli and Pulleyblank 1994, Gafos 1999, Hansson 2010, and references there). Indeed, one of the great insights of prosodic phonology has been the reduction of apparently non-local phonological interactions (such as rhythmic stress assignment) to simpler, local processes computed over abstract prosodic structure (e.g. Liberman and Prince 1977, Prince 1983, 1991, Nespor and Vogel 1986, Halle and Vergnaud 1987, Hayes 1995, and many others). In this light, prosodic smothering presents a puzzle: how is it that an outer morpheme (F) can condition the prosodic boundary between two other morphemes (A and B) when that outer morpheme is not itself adjacent to the boundary in question? The analytical question, then, is whether and how such apparently non-local interactions can be reduced to strictly local conditions on the morphemes involved.

This brings us to a second facet of prosodic smothering: in the case studies presented here, smothering is lexically idiosyncratic, being triggered by some but not all morphemes in the relevant configuration (1b,c). As we argue below, it is not in general possible to predict which morphemes will trigger smothering: the ability to induce non-local prosodic reparsing appears to be an arbitrary fact about individual lexical items. For reasons laid out in sections 2 and 3, we believe that the lexical specificity of smothering effects implicates PROSODIC SUBCATEGORIZATION as a driving force behind patterns of variability like (1a)~(1c).

Prosodic subcategorization refers to a family of theories in which dependent morphemes may select for prosodic properties of their hosts (e.g. Inkelas 1990, Peperkamp 1997, Chung 2003, Yu 2003, Paster 2006, Bye 2007, among others). These requirements are formalized as lexical subcategorization frames which specify prosodic structure to the left or right of the selecting morpheme. By way of illustration, consider the subcategorization frames in (2b,e) (inspired by Inkelas 1990, Raffelsiefen 1999). In English, the default pattern of stress assignment for underived adjectives places primary stress on the antepenultimate syllable (2a) (we oversimplify here for expositional reasons; see Chomsky and Halle 1968, Hammond 1999

for more details). The English prefix *un-* selects for a completed prosodic word to its right (3b), and so blocks the normal pattern of antepenultimate stress found for English adjectives (3d). In contrast, the trivial subcategorization frame for *in-* (2e) places no requirements at all on its host, and so allows the otherwise expected integration of this prefix into the same prosodic word as the following stem, with concomitant antepenultimate stressing (3f).

- (2) English *un-* and *in-* (after Inkelas 1990, Raffelsiefen 1999)
- a. Default adjective stress: antepenultimate  
*íntimate, prímitive, dérelict, ásinine,...*
  - b. SUBCATEGORIZATION: [<sub>ω</sub> un- [<sub>ω</sub> ...]]
  - c. [<sub>ω</sub> ùn- [<sub>ω</sub> fínished]]
  - d. \*<sub>ω</sub>[<sub>ω</sub> ún-finished]
  - e. SUBCATEGORIZATION: [<sub>ω</sub> in- [...]]
  - f. [<sub>ω</sub> ín-finite]
  - g. \*<sub>ω</sub>[<sub>ω</sub> ìn- [<sub>ω</sub> fínite]

The idiosyncratic stressing of *un-* and *in-* cannot be reduced to independent facts about the phonology, syntax, or semantics of these prefixes: it must somehow be stipulated as part of their lexical entries.<sup>1</sup> We follow Zec (2005) and many others in taking lexical subcategorization to be a simple, natural, and conceptually appropriate tool for formalizing morpheme-specific prosodic requirements of this sort.

Prosodic subcategorization is typically understood to be LATERAL and LOCAL. By ‘lateral’, we mean that prosodically dependent morphemes may subcategorize for prosodic properties of their hosts—that is, for prosodic structure occurring on either side of the morpheme itself. In (1) we have an example of subcategorization for a following element, but enclitics and suffixes can also subcategorize for preceding elements (and there might exist elements that subcategorize for material in both directions).

By ‘local’ we mean that prosodic subcategorization frames may refer only to strictly adjacent elements, as discussed above. This principle is enshrined as the GENERALIZED FOCUS DETERMINANT ADJACENCY CONDITION of Inkelas (1990) (see also Paster 2006, Embick 2010). The selectional restrictions encoded by local subcategorization frames are therefore limited to referring to a single, string-adjacent prosodic constituent. (See McCarthy and Prince 1986/1996:1, McCarthy 2003:80, Buckley 2009 for related definitions of prosodic locality.)

Less attention has been paid to the vertical dimension of prosodic subcategorization—the prosodic constituent *produced* by the attachment of a dependent morpheme to its host.<sup>2</sup> In

---

<sup>1</sup>In the framework of Lexical Phonology and Morphology (LPM), *in-* and *un-* would be assigned to different lexical strata; this conclusion is motivated by a constellation of different morphological, phonological, and semantic properties that appear to correlate with the Level 1 vs. Level 2 distinction in English (Chomsky and Halle 1968, Siegel 1974, Allen 1979, Lieber 1980, Kiparsky 1982, 1985, etc.). However, it has long been known that these diagnostics do not correlate quite as neatly as predicted by strong versions of LPM (see Raffelsiefen 1999 for a recent critique). In any case, the discussion in this section is merely intended to illustrate the formal device of prosodic subcategorization: we are not committed to any particular analysis of the English prefixes *in-* and *un-*.

<sup>2</sup>The schema that Inkelas (1990) develops for prosodic subcategorization explicitly includes the prosodic output of affixation/cliticization. However, in all the cases that Inkelas discusses this specification is essentially redundant, being predictable from other facts about the morphemes being concatenated (see p.112ff.).

non-procedural terms, we can think of vertical subcategorization as encoding a restriction on the prosodic category that immediately dominates the selecting morpheme. For example, the subcategorization frames in (1) can be restated in terms of domination by different levels of a recursive prosodic word structure  $\omega$  (3).

$$(3) \quad \text{a. } [\omega\text{-NONMIN } \text{un-} [ \dots ] ] \quad \text{b. } [\omega\text{-MIN } \text{in-} [ \dots ] ]$$

In (3) the prefix *un-* subcategorizes for domination by a non-minimal prosodic word  $\omega\text{-NONMIN}$  (a  $\omega$ -level constituent that dominates one or more constituents belonging to the same  $\omega$ -level).<sup>3</sup> This subcategorization frame effectively forces *un-* to be parsed into a recursive  $\omega$  structure with its host, accounting for the exclusion of this prefix from the stress domain of the stem,  $[\omega\text{-NONMIN } \text{un-} [\omega\text{-MIN } \textit{finished} ] ]$ . In contrast, the prefix *in-* selects for domination by a *minimal* prosodic word (i.e. a prosodic word that dominates no other prosodic word); this insures its integration into the same stress domain as the stem,  $[\omega\text{-MIN } \textit{in-finite} ]$ . By restricting vertical subcategorization to selection for an immediately dominating prosodic category, we ensure that the subcategorization frames in (3) retain the local character of classic lateral subcategorization.

We will argue that prosodic smothering (1) is in fact a response to the vertical subcategorization requirements imposed by certain functional morphemes. Schematically, a vertical subcategorization frame like (4) can trigger non-local prosodic reparsing (5c) in exactly those cases where the default prosodic structure would lead to a violation of the lexical requirements of the selecting morpheme (5b).

$$(4) \quad \text{Vertical subcategorization for } \mathbb{F}: [\pi \mathbb{F} [ \dots ]]$$

$$(5) \quad \begin{array}{ll} \text{a. } /A B/ \rightarrow [\delta A [\pi B]] & (\delta \geq \pi \text{ on the prosodic hierarchy}) \\ \text{b. } /F A B/ \rightarrow *[\delta F A [\pi B]] & (\text{lexical requirements of } \mathbb{F} \text{ are not met}) \\ \text{c. } /F A B/ \rightarrow [\pi F A B] & (\text{prosodic smothering by } \mathbb{F}) \end{array}$$

In this way, apparently non-local patterns of prosodic reparsing can be reduced to strictly local conditioning by vertical subcategorization. While the effect of prosodic smothering is indeed non-local, in that some morpheme  $\mathbb{F}$  triggers a distal prosodic change, the formal mechanisms which drive reparsing are themselves strictly local in character.

We place no *a priori* constraints on the identity of  $\pi$  and  $\delta$  in the schema (4)-(5) beyond the requirement that these be categories of the prosodic hierarchy. Within this framework, both vertical and lateral subcategorization is possible: whether or not smothering occurs will depend on the subcategorization requirements of a given morpheme and the context in which it appears. Prosodic subcategorization is of course needed for completely independent reasons, and as we show in 4.1 smothering is predicted by at least two different formalizations of such morpheme-specific requirements. The question of whether and how the schema in (4)-(5) might need to be further restricted is an empirical issue, and one we take up briefly in sections 4 and 4.1.

---

<sup>3</sup>The predicates ‘(non-)minimal’ and ‘(non-)maximal’ are also locally-defined structural relations. For more discussion of these notions in the context of recursive prosodic structure, see (Itô and Mester 2007, 2013, Elfner 2012) and references there.

Though we frame our analysis in terms of vertical subcategorization, the larger point to be made here is that purely lexical factors can dramatically impinge on prosodic parsing, even at the phrase level. This observation has both practical and theoretical consequences for research on the interface between morpho-syntax and prosodic phonology. We return to these issues after establishing the empirical facts which motivate our proposal.

Section 2 analyzes the context-dependent prosody of object clitics in Western Macedonian as a prosodic smothering effect, triggered by the vertical subcategorization requirements of morphemes high in the clausal spine. Section 3 provides convergent evidence that absolutive agreement markers in Kaqchikel have a different prosodic status depending on their larger morphophonological context; this prosodic variability is then analyzed as another instance of prosodic smothering conditioned by vertical subcategorization. Section 4 discusses the theoretical implications of our proposal and concludes.

## 2 Macedonian

Macedonian is a South Slavic language, spoken by over 1.3 million people in the Republic of Macedonia and by minority communities in neighboring Balkan countries. In this paper, we are concerned with the Western dialects of Macedonian (Rudin et al. 1999, Vidoeski 2005, Tomić 2012). The clitic system of these dialects provides a straightforward case of prosodic smothering: the prosody of preverbal object clitics varies with the presence or absence of certain preceding function words. These function words are themselves prosodically dependent on a following host, and are always parsed inside a relatively low prosodic domain. When object clitics co-occur with these prosodically deficient functional items, the prosodic requirements of the latter take precedence, forcing the object clitics into a lower prosodic domain than they would normally occupy. This is the essence of prosodic smothering.

### 2.1 The Macedonian clitic system

Macedonian has a system of object clitics marking person, number, and gender features of both direct and indirect objects (Table 1). These clitics are left-adjacent to tensed verbs (i.e., those that bear tense morphology but also *-l* participles; Joseph 1983) (6).<sup>4</sup>

	Direct object	Indirect object
1SG	me	mi
2SG	te	ti
3SG	go (non-fem) / ja (fem)	mu (non-fem) / ì (fem)
1PL	nè	ni
2PL	ve	vi
3PL	gi	im
Reflexive	se	si

Table 1: Object clitics in Macedonian

---

<sup>4</sup>Examples are given in a romanized Macedonian orthography. Capital letters indicate stress placement, as in other work on the prosody of South Slavic clitics (e.g. Rudin et al. 1999, Tomić 2012).

- (6) a. go            VIdē  
           3SG.M.ACC see.3SG.PST  
           ‘(S)he saw him’
- b. go            ZEde  
           3SG.M.ACC take.3SG.PST  
           ‘(S)he took it’
- c. toj mu            go            DAL  
           he 3SG.M.DAT 3SG.M.ACC given.3SG.M  
           ‘he gave it to him’
- d. sum mu            go            ZEL  
           am 3SG.M.DAT 3SG.M.ACC taken.1SG  
           ‘I took it from him’

These object clitics are strictly monosyllabic and do not carry an independent (lexically assigned) stress. In other words, they are prosodically deficient elements, parsed as something less than a full prosodic word  $\omega$  (e.g. as bare syllables).<sup>5</sup>

Pronominal object clitics appear in post-predicate position with all tenseless predicates (7): non-tensed verbs (e.g., imperatives and most participles) and non-verbal predicates (though see Tomić 2012:65 on variation in clitic placement with tenseless predicates):

- (7) a. DAJ mi            go  
           give.IMP 1SG.DAT 3SG.M.DAT  
           ‘give it to me’
- b. MIL mi            e Petko  
           dear 1SG.DAT is Petko  
           ‘Petko is dear to me.’

These constructions are largely outside the scope of the paper, partly because they seem to involve different patterns of morphosyntactic constituency; see Tomić (1997), Bošković (2004), Franks (2009), Tomić (2012:313-6), Harizanov (2014) for discussion.<sup>6</sup>

In the remainder of the paper we use the term ‘clitic’ purely in its phonological sense: clitics are prosodically weak elements which cannot be parsed as independent prosodic words on their own, and which are typically integrated into a prosodic word with some lexical host (Selkirk 1995, Anderson 2005). Phonological clitics may or may not be ‘clitics’ in a morphosyntactic sense, depending on the specifics of their morphosyntactic behavior (Zwicky 1977, Zwicky and Pullum 1983, Klavans 1995, Anderson 2005, etc.).

## 2.2 Stress assignment in Macedonian

Our interest in the object clitic system of Macedonian lies in the non-uniform behavior of these clitics with respect to stress placement. Stress in the Western dialects of Macedonian is regularly antepenultimate (8a,b,c), or initial in monosyllabic and disyllabic words (8d,e) (examples from Tomić 2012:53-59; see also Lunt 1952, Franks 1989, Idsardi 1992, Hyde 2012).

- (8) a. proizVEduva ‘produce (3SG.IMPV.PRS)’  
       b. proIZvede ‘produce (3SG.PST)’  
       c. PROizvod ‘product’  
       d. VOdi ‘lead (3SG.IMPV.PRS)’  
       e. LIK ‘figure, image’

<sup>5</sup>We assume that the minimal prosodic word  $\omega$ -MIN is the domain of stress assignment in Macedonian, although little hinges on the specific category label of the stress domain (see Lunt 1952, Franks 1989, Rudin et al. 1999 for some examples of stress assignment in multi-word domains).

<sup>6</sup>Preverbal auxiliary clitics like like *sum* ‘am’ (6d) have the same prosodic behavior as preverbal object clitics, with which they form a single clitic cluster (Franks and King 2000, Tomić 2012). We focus on the object clitics here simply for the sake of convenience.

Post-predicate clitics, just like inflectional suffixes, affect stress placement: stress is antepenultimate within the predicate-clitic complex, and so the addition of an object enclitic can trigger rightward stress shift (9) (even shifting stress entirely off the verb; see (14)).

- (9) a. DOnesi ‘Bring!’  
 b. doNEsi go ‘Bring it!’  
 c. doneSI mi go ‘Bring it to me!’ (Rudin et al. 1999:551)

Assuming that stress is assigned within the minimal prosodic word, postverbal object clitics must be parsed relatively low, inside  $\omega$ -MIN: [ $\omega$ -MIN doneSI mi go ] (see Harizanov 2014 for additional arguments for this parse).

Preverbal clitics do not generally affect stress placement. With tensed verbs, stress remains on the predicate rather than shifting to antepenultimate position within the clitic-host complex (10).

- (10) a. mi go DAle ‘They gave it to me.’  
 b. \*mi GO dale (Rudin et al. 1999:553)

Preverbal object clitics are therefore outside the stress domain containing the verb. Nor do they receive a stress of their own, as already observed in (6). The pre-verbal object clitics are thus extraprosodic with respect to the domain of stress, the minimal prosodic word (see again Harizanov 2014):

- (11) a. [ mi go [ $\omega$ -MIN DAle ] ]  
 b. [ CLITIC(S) [ $\omega$ -MIN V ] ]

A comparison with other preverbal clitics demonstrates that the stress pattern in (10) and (11) owes to the interaction between the default stress placement rule in Macedonian and prosodic structure, rather than a blanket ban on stressed clitics (e.g. Klavans 1995). Recall that clitics do not introduce an independent lexical stress. However, nothing in principle prevents clitics from coming to bear stress as the result of regular stress assignment rules (e.g. Klavans 1995, Anderson 2011, who discuss a number of cases of stressed clitics). Stressed clitics are, in fact, encountered in Macedonian. For example, the negative clitic *ne* belongs to the same stress domain as the following verb and happens to bear stress (12), even though it does not contribute a lexical stress itself. (Examples like (12) play an important part in our analysis, and we treat them in more detail in the following section.) Prepositions can also bear stress despite being prosodically deficient, (13) (see also Lunt 1952:Ch.4, p.53). Most importantly, examples like (14) demonstrate that pronominal object clitics can in fact bear stress in certain contexts.<sup>7</sup> Accounting for clitic stress in these contexts is the main goal of the following sections.

- (12) [ NE znam ]  
 NEG know.1SG  
 ‘I don’t know’ (Lunt 1952:23, Friedman 2010:254)

---

<sup>7</sup>This example involves *kamo* ‘where-to’, which is found in the Southwestern dialects of Macedonian and occurs in clauses without a lexical verb (see Rudin et al. 1999:554 and Tomić 2012:194, fn.38).

- (13) a. [ so neVESata ] ‘with the bride’  
 b. [ SO mene ] ‘with me’ (Franks 1989, Tomić 2012:62-3)
- (14) [ Kamo MI ti e ] knigata?  
 where.to 1SG.DAT 2SG.DAT be.3SG the.book  
 ‘Where is your book, my dear little one?’ (Tomić 2012:194)

### 2.3 Exceptional clitic stress

There are several environments in which pre-verbal clitics systematically receive stress, deviating from the unmarked pattern (6), (10) in which such clitics are invisible for purposes of stress assignment. Clauses containing sentential negation are one such environment: when the negative marker *ne* is present, pre-verbal object clitics form a prosodic constituent with the verb and may receive regular antepenultimate stress:

- (15) a. [ ne GO vide ]  
 NEG 3SG.M.ACC see.3SG.PST  
 ‘(S)he didn’t see him’ (Lunt 1952)
- b. go [ VIdē ]
- c. [ ne mu GI dava ] [ jaBOLkata ]  
 NEG 3SG.M.DAT 3PL.ACC give.3SG.PRS the.apples  
 ‘(S)he is not giving him the apples.’ (Tomić 2012:66)
- d. mu gi [ DAva ] [ jaBOLkata ]

Franks (1989) and Rudin et al. (1999) use the term ENLARGED STRESS DOMAIN (ESD) for constructions in which the domain of stress assignment is larger than a single lexical word; we mark such domains with square brackets. Example (12) (*NE znam* ‘I don’t know’) shows that the negative marker *ne* may itself bear stress in such constructions, and so must belong to the same stress domain as the verb and object clitics in (15), a point we return to below.<sup>8</sup>

---

<sup>8</sup>There is an exception to this pattern provided by the ‘Monosyllabic Head Effect’ (Franks 1989): when the verb is monosyllabic, stress placement in an enlarged stress domain is penultimate (on the syllable immediately preceding the verb) rather than antepenultimate:

- (i) a. ne mu GO dal ~ \*ne MU go dal  
 NEG 3SG.DAT 3SG.ACC given.3SG.M  
 ‘(He) did not give it to him.’
- b. što bi MU zel ~ \*što BI mu zel  
 what would 3SG.DAT taken.3SG.M  
 ‘What should he take from him?’

We assume that the Monosyllabic Head Effect reflects a constraint demanding that root syllables be parsed into feet (Buckley 1997, Itô and Mester 2015). Since this constraint can only be violated when antepenultimate stress occurs with a monosyllabic verb, e.g. \*[što (BI mu) zel] vs. [što bi (MU zel)], the desired effect is achieved. See also Beasley and Crosswhite (2003), Tomić (2012:66, fn.44) for discussion, and Franks (1989:559) for the observation that trisyllabic stress domains do not necessarily exhibit the Monosyllabic Head Effect, so that stress is either antepenultimate or penultimate.

The same pattern of stress assignment occurs in both root and embedded *wh*-questions. These questions may be formed with *wh* pronouns (e.g. *koj* ‘who’) or *wh* adverbial words (e.g. *kako* ‘how’); we subsume these single-word *wh* elements under the name *wh* CLITIC:

- (16) a. [ kako SE vikaš ]  
 how REFL call.2SG  
 ‘What’s your name?’ (Lunt 1952:23)
- b. [ koj mu GI dava ] [ jaBOLkata ]  
 who 3SG.M.DAT 3PL.ACC give.3SG.PRS the.apples  
 ‘Who is giving him the apples?’ (Tomić 2012:66)
- c. [ zošto mu GO dade ]  
 why 3SG.M.DAT 3SG.M.ACC give.3SG.PST  
 ‘Why did you give it to him?’ (Vidoeski 2006:21)
- d. [ NE znaeš ] [ TI ] [ kako SE žali ] [ za mominSKO  
 NEG know.2SG.PRS you how REFL sorrow.3SG.PRS for maiden  
 vreme ]  
 time  
 ‘You don’t know how one sorrows for her maiden life.’ (Lunt 1952:24)
- e. [ NEmam ] [ što da TI piša ]  
 not.have.1SG.PRS what to 2SG.DAT write.1SG.PRS  
 ‘I have nothing to write to you about’ (Hendriks 1976:95)

In these Western Macedonian dialects, *wh* clitics behave like the negative clitic *ne* in being parsed into a constituent with the verb for stress assignment (Tomić 2012:419ff):

- (17) a. [ KOJ reče ]?  
 who.NOM say.3SG.PST  
 ‘Who said it?’ (Rudin et al. 1999:557)
- b. [ koMU dade ] [ poDAroci ]?  
 who.DAT gave.2/3SG.PST presents  
 ‘To whom did you/(s)he give presents?’ (Tomić 2012:419)
- c. [ JAS ] [ ne VNImavav ] [ KAJ gazam ]  
 I not pay.attention.1SG.PST where step.1SG.PST  
 ‘I wasn’t paying attention to where I was stepping’ (Lunt 1952:23)

To recap, both single-word *wh* phrases and the sentential negation marker *ne* are included in the same stress domain as the verb and any other preverbal clitics. When these elements are in antepenultimate position in the minimal prosodic word containing the verb, they carry the stress associated with that verb, (12), (17).<sup>9</sup>

<sup>9</sup>Rudin et al. (1999:556-61) report that examples like (17) can also be realized with a distinct lexical stress on negation or the *wh*-word: e.g., [ KOJ ] [ REče ] ‘Who said it?’. This stress pattern implies some sort of semantic or pragmatic focus on negation or the *wh*-word itself. When the verb is emphasized, it may bear stress instead of the *wh*-word or negation: e.g., [ što da PRAvam ] ‘What shall I *do*?’ (Lunt 1952:24). See section 2.5 for more discussion.

The prosodically dependent behavior of *wh*-words is quite general in Western Macedonian. Beyond the single-word *wh* phrases shown above, certain *wh* modifiers internal to the nominal phrase also form a stress domain with the NP that follows them:

- (18) a. [ kaKOV fustan ] [ SAkaš ]  
 what.kind.SG.M dress want.2.SG.PRS  
 ‘What kind of dress do you want?’ (Tomić 2012:420)
- b. [ kolKU pari ] [ SAkaš ]  
 how.much money want.2SG.PRS  
 ‘How much money do you want?’ (Lunt 1952:23)

Additionally, *wh* clitics trigger the extension of stress domains in one non-question context, exclamatory sentences (Hendriks 1976, p. 95):

- (19) a. [ kaKO griziš ] [ JABloka]!  
 which.way chew.2SG.PRS apples  
 ‘the way you chew apples!’
- b. [ kolku ME bolit ]  
 how.much 1SG.ACC hurt.3SG.PRS  
 ‘how (much) it hurts me!’

Summarizing our conclusions so far, *ne* (the marker of sentential negation) and *wh* clitics are always in the same stress domain as the following verb (20a) (or the following NP in constructions like (18)), while preverbal object clitics are typically outside the stress domain of the following verb (20b) (see section 2.4 for an analysis of this default parse for preverbal object clitics). The crucial exception is when one or more object clitics co-occur with *ne* or a *wh* clitic, in which case all preverbal clitic elements are integrated into a single stress domain ( $\omega$ -MIN) which includes the verb (20c).

- (20) a. [ $\omega$ -MIN *ne/WH* V] (cf. (12) and (17))  
 b. [ CLITIC(S) [ $\omega$ -MIN V] ] (cf. (10))  
 c. [ $\omega$ -MIN *ne/WH* CLITIC(S) V] (cf. (15) and (16))

Drawing on terminology from Selkirk (1995), *ne* and *wh* clitics are INTERNAL CLITICS, being parsed into a minimal prosodic word  $\omega$ -MIN with the verb (20a). In contrast, object clitics are EXTERNAL CLITICS by default, standing outside the  $\omega$ -MIN of the verb (20b), and are internal clitics when prosodically smothered (20c).<sup>10</sup>

Macedonian clitic stress thus instantiates the phenomenon of prosodic smothering, precisely as defined in section 1: the prosody of the clitic-verb complex depends on the presence or absence of some outer morpheme (*ne* or a *wh* clitic). This appears to be a non-local interaction, in that the triggering morpheme is not adjacent to the prosodic boundary that

<sup>10</sup>Our term ‘external clitic’ encompasses both the AFFIXAL CLITICS and FREE CLITICS of Selkirk (1995). In the two cases analyzed here (Macedonian and Kaqchikel), we lack evidence which would allow us to distinguish free and affixal parses for external clitics. For that reason, we have chosen to unify these two classes under a single term. See also footnote 16.

undergoes restructuring. In the schema (1),  $\pi$  (the lower category) corresponds to  $\omega$ -MIN, while  $\delta$  corresponds to a higher category such as  $\omega$ -NONMIN or  $\phi$ P (see footnote 16 for more discussion of this potential ambiguity).

We emphasize that these patterns are lexically idiosyncratic, being conditioned by sentential negation and clitic *wh*-words but not by other functional elements high in the clausal spine, including other clitics. Auxiliary proclitics like *k'e* and modal particles like *da* do not trigger an enlarged stress domain (21a-d). Nor does the interrogative enclitic *li* (21e,f) (on which, see Rudin et al. 1999:552). Proclitic complementizers (21g,h) are similarly inert for the assignment of stress.

- (21) a. k'e se [ VENča ]  
           will REFL marry.3SG  
           ‘He will get married’ (Lunt 1952:23)
- b. \*[ k'e SE venča ]
- c. [ SAka ] da se [ VENča ]  
           want.3SG.PRS to REFL marry.3SG  
           ‘(S)he wants to get married’ (Lunt 1952:23)
- d. \*[ SAka ] [ da SE venča ]
- e. [ doNEsuvaš ] li?  
           bring.2SG.PRS Q  
           ‘Are you bringing (it)?’ (Rudin et al. 1999:552)
- f. \*[ doneSUvaš li ]
- g. deka [ DOšol ]  
           that come.3SG.PST  
           ‘that he came’ (Franks 1987:129)
- h. \*[ deKA došol ]

Likewise, *wh*-words that introduce adjunct clauses (including restrictive and non-restrictive relative clauses) do not trigger extended stress domains, even though their homophonous counterparts in questions and exclamatory sentences do. This is illustrated, for example, by the contrast between questions (22), in which stress shifts leftward onto the *wh*-word, and adjunct clauses (23), in which stress remains on the verb while the *wh*-word procliticizes to it (Koneski 1987, p. 168-169):

- (22) a. [ koGA dojde ] [ TOJ ]?  
           when come.3SG.PST he  
           ‘When did he come?’
- b. [ KAJ saka ] da [ Odi ] [ TOJ ]?  
           where want.3SG.PRS to go.3SG.PRS he  
           ‘Where does he want to go?’

- (23) a. koga [ DOJde ] [ TOJ ], [ TEbe ] te [ NEmāše ]  
 when come.3SG.PST he you.ACC 2SG.ACC not.have.3SG.PST  
 ‘when he came, you weren’t there’
- b. kaj [ SAka ] [ NEka ] [ Odi ]  
 where want.3SG.PRS let go.3SG.PRS  
 ‘let him go where he wants (to go)’

Similarly, when the *wh*-word *što* introduces a relative clause, it procliticizes to the verb but does not trigger stress domain extension, as the following examples show:

- (24) a. [ prviOT čovek ], što se [ KAžuva ] [ Adam ]  
 the.first man who REFL call.3SG.PRS Adam  
 ‘the first man, who is called Adam’ (Lunt 1952:105)
- b. [ poLIcata ], što [ Bila ] nad [ KAtot ]  
 the.rack that be.3SG.F.PST over the.floor  
 ‘the rack that was over the floor’ (Lunt 1952:109)

The following example further illustrates the distinct behavior of *wh*-words in questions and non-questions with respect to the position of stress. Here, the adverbial adjunct clause introduced by *koga* and the relative clause introduced by *što* do not trigger the extension of the stress domain, while the *wh* question word *kakvo* ‘what (kind)’ does.

- (25) koga ke ni se [ ROdi ] [ DEtevo ] što go  
 when will 2.PL.DAT REFL be.born.3SG.PRS baby that 3SG.ACC  
 [ NOsam ] [ VO mene ], [ kakVO ime ] ke mu [ KLAdeme ]?  
 carry.1SG.PRS in me what.3SG.N name will 3SG.DAT put.1PL.PRS  
 ‘When the baby I’m carrying is born, what name are we going to give him?’  
 (Lunt 1952:109)

These distinct behaviors can be understood in terms of the featural specification of each class of *wh*-words. We assume that *wh*-words in questions and exclamatives are specified as [+Q,+WH], while other *wh*-words are specified as [−Q,+WH] (e.g. Chomsky and Lasnik 1977, Grimshaw 1979; see Manetta 2011 for a recent defense of such a feature system).<sup>11</sup> The [+Q] *wh*-words idiosyncratically extend stress domains, while the [−Q] *wh*-words—despite being homophonous with their [+Q] counterparts—do not. In Selkirk’s (1995) terminology, [+Q] *wh*-words are internal clitics (inside the same stress domain as the verb), while [−Q] *wh*-words are external clitics (like object clitics and other non-*wh* clausal clitics), and as a result are systematically unstressed.

The failure of [−Q] *wh*-words to trigger expansion of a following stress domain is unlikely

---

<sup>11</sup>The feature [±Q] simply reifies the distinction between interrogative *wh*-clauses, which are usually taken to be alternative-denoting (Hamblin 1973, Groenendijk and Stokhof 1984), and *wh*-relatives (including adjunct relatives), which are usually taken to be property-denoting (Montague 1973, Caponigro 2004). There is independent semantic evidence to include *wh*-complements like (16d) and *wh*-exclamatives like (19) in the [+Q] category. While these constructions do not involve a questioning speech act, their semantic properties require that they be alternative-denoting like *bona fide* questions (unlike *wh*-relatives; e.g. Lahiri 2002, Zanuttini and Portner 2003).

to be due to a systematic difference in their structural position: while relative *što* can be considered a complementizer (occupying a distinct position from the [+Q] *wh*-phrase *što* in, e.g. (16e)), all other *wh*-words introducing adjunct and relative clauses have been argued to occupy [SPEC,CP], the same position their [+Q] counterparts occupy in root and embedded questions (Rudin 2015).

Our overall conclusion is that the distinctive prosodic behavior of sentential negation and clitic *wh*-words in Macedonian cannot be reduced to the syntactic position or the semantic function of these items.<sup>12</sup> The expanded stress domains associated with these function words must be determined arbitrarily, through some type of lexical specification. We propose that prosodic subcategorization provides exactly the right notion of lexical idiosyncrasy needed for an analysis of exceptional clitic stress in Macedonian.

## 2.4 Analysis: vertical subcategorization

Vertical subcategorization (section 1) offers a fairly simple analysis of exceptional clitic stress in Macedonian. We argued above that the prosodic idiosyncrasies of sentential negation and *wh* clitics in Macedonian must be lexically specified. We implement such lexical specification in (26) using the vertical subcategorization format from section 1. Specifically, both sentential negation *ne* and *wh* clitics select for an immediately dominating minimal prosodic word (i.e. they are internal clitics). When this subcategorization is satisfied, *ne* and [+Q] *wh* clitics will be in the same stress domain as a following verb (12), (17), etc.

$$(26) \quad \text{a. } [\omega\text{-MIN } ne [ \dots ] ] \quad \text{b. } [\omega\text{-MIN } WH_{[+Q]} [ \dots ] ]$$

As these clitics make no specific demands on the prosodic category of their hosts, apart from the requirement that both be contained in the same  $\omega\text{-MIN}$ , we leave the category of the inner bracket unspecified (that is, there is no lateral subcategorization for prosodic category in this case).

The subcategorization frames (26) also account for why the presence of *ne* or a *wh* clitic causes preverbal object clitics to be parsed into a stress domain with the verb. Negative *ne* and *wh* clitics must belong to the same minimal prosodic word as their hosts, lest the subcategorization frames (26) be violated. The host is identified as the prosodic constituent that immediately follows the function word in question. When the host is a verb and no other clitics are present (as in (12) and (17)), no significant problem arises: *ne* or the *wh* clitic is simply parsed into the same stress domain ( $\omega\text{-MIN}$ ) as the verb.

However, what if the morpheme that follows *ne* or a *wh* clitic is *itself* a clitic rather than a verb?<sup>13</sup> By default, preverbal object clitics are parsed outside of the minimal prosodic word (i.e. they are external clitics; section 2.2):

$$(27) \quad [ \text{CLITIC(S)} [\omega\text{-MIN } \text{VERB} ] ]$$

---

<sup>12</sup>Note that [+Q] and [-Q] *wh* items differ phonologically *only* in how they are integrated into the larger prosodic structure, and not in their internal, segmental, phonology. This is yet another reason for formalizing the prosodic behavior of [+Q] and [-Q] *wh* items in terms of subcategorization (26), as their differential patterning cannot be reduced to independent facts about their phonological content.

<sup>13</sup>Due to ordering constraints on clitics in Macedonian, the only possible interveners are object and/or auxiliary clitics (see Franks and King 2000).

But in configurations of this type, the subcategorization requirements of *ne/wh* clitics cannot be satisfied: there is no possible way for *ne/wh* clitics to be added to this structure while also being parsed into the same minimal prosodic word as its host (the following clitic) when the host itself is completely external to the  $\omega$ -MIN level:

(28) \* $[ ne/WH \text{ CLITIC}(S) [\omega\text{-MIN} \text{ VERB} ] ]$

In such cases, the selectional requirements of *ne* and *wh* clitics take precedence over default prosodic parsing in (27): to satisfy the subcategorization frames (26), the stress domain of the verb is expanded to include preverbal object clitics along with *ne* and/or any *wh* clitics:

(29)  $[\omega\text{-MIN} \text{ } ne/WH \text{ CLITIC}(S) \text{ VERB} ]$

This extension of the  $\omega$  boundary allows *ne* and *wh* clitics to be parsed into the same minimal  $\omega$  as their hosts:

- (30) a. go  $[\omega\text{-MIN} \text{ VId}e ]$   
           3SG.M.ACC           see.3SG.PST  
           ‘(S)he saw him’
- b.  $[\omega\text{-MIN} \text{ } ne \text{ GO} \text{ vide} ]$   
           NEG 3SG.M.ACC see.3SG.PST  
           ‘(S)he didn’t see him’
- c. \*ne go  $[\omega\text{-MIN} \text{ VId}e ]$
- d. \* $[\omega\text{-NONMIN} \text{ } ne \text{ go} [\omega\text{-MIN} \text{ VId}e ] ]$

Stress on the object clitics is incidental here, and arises only because the preverbal object clitics intervene between the selecting morpheme (*ne* or the *wh* clitic) and the nearest host that can satisfy the selectional requirements of that morpheme. This is PROSODIC SMOTHERING: the prosodic demands of *ne* or *wh* clitics force any following clitics into a lower prosodic domain than they would otherwise belong to. In this case prosodic subcategorization trumps the default syntax-prosody mapping otherwise responsible for determining stress domains.<sup>14</sup>

Lastly, we note that the dominance requirement of *ne/wh* clitics (26) would also be satisfied by a parse like \*[NE] [ZNAeš], in which the prosodically deficient clitic *ne* has been strengthened to an independent prosodic word and bears its own stress. But such a parse would not satisfy the *adjacency* requirement of (26), which states that these clitics must lean onto something to their right. The upshot is that the selectional requirements in (26) require that *ne/wh* clitics be parsed into (and immediately dominated by) the very same minimal

---

<sup>14</sup>Without further elaboration, our account of exceptional clitic stress (30) does not extend to multiword stress domains in Macedonian that involve only lexical words, such as numeral expressions like [ PET dena ] ‘five days’ (Lunt 1952). By their very nature, subcategorization frames are item-specific and do not flexibly generalize to other morphemes or constructions. However, while there are clear parallels across different types of multiword stress domains in Macedonian (such as the monosyllabic head effect, footnote 8), it is unlikely that prosodic subcategorization drives stress domain extension in these cases, as the participating items are lexical words which are not generally prosodically dependent. In any event, previous work on this topic has been largely observational: to our knowledge no one has even attempted to unify the behavior of negation and *wh* clitics with other enlarged stress domains in Macedonian.

prosodic word  $\omega_{\text{MIN}}$  as their host. Given that *ne* and *wh* clitics are stressed as a unit with the following verb (15)-(16), this is the correct result.

In (31)-(32) we provide a more formally explicit analysis, couched in Optimality Theory (Prince and Smolensky 1993/2004) and illustrated with example (15c). We adopt two constraints from Selkirk (1995):  $\text{ALIGN-L}(\text{LEX}, \omega)$ , which requires the left edge of every lexical word to coincide with the left edge of some minimal prosodic word; and  $\text{ALIGN-R}(\omega, \text{LEX})$ , which requires the right edge of every minimal prosodic word to coincide with the right edge of a lexical word (see also Anderson 2005, Werle 2009). Constraints of the  $\text{SUBCAT}(\mathbb{F})$  family are violated whenever the prosodic subcategorization of item  $\mathbb{F}$  is not met in the output (here, the subcategorization frame for *ne*, (26); see also Bonet et al. 2007).<sup>15</sup> Tableau (31) shows how these alignment constraints derive the ‘default’ prosody of preverbal object clitics, which are unstressable (and so  $\omega_{\text{MIN}}$ -external) in the absence of *ne* or *wh* clitics. Tableau (32) demonstrates how alignment constraints interact with the subcategorization requirements of *ne* to yield prosodic smothering.<sup>16</sup>

(31)

mu gi [V dava] [DP jabolkata]	SC(ne)	AL-R( $\omega$ , LEX)	AL-L(LEX, $\omega$ )
a. $\{ \phi \text{ mu gi } [\omega_{\text{MIN}} \text{ DAva}] \} [\omega_{\text{MIN}} \text{ jaBOLkata}]$			
b. $[\omega_{\text{NONMIN}} \text{ mu gi } [\omega_{\text{MIN}} \text{ DAva}]] [\omega_{\text{MIN}} \text{ jaBOLkata}]$			
c. $[\omega_{\text{MIN}} \text{ mu GI dava}] [\omega_{\text{MIN}} \text{ jaBOLkata}]$			*! W
d. $[\omega_{\text{MIN}} \text{ MU gi}] [\omega_{\text{MIN}} \text{ DAva}] [\omega_{\text{MIN}} \text{ jaBOLkata}]$		*! W	

(32)

ne mu gi [V dava] [DP jabolkata]	SC(ne)	AL-R( $\omega$ , LEX)	AL-L(LEX, $\omega$ )
a. $[\omega_{\text{MIN}} \text{ ne mu GI dava}] [\omega_{\text{MIN}} \text{ jaBOLkata}]$			*
b. $\{ \phi \text{ ne mu gi } [\omega_{\text{MIN}} \text{ DAva}] \} [\omega_{\text{MIN}} \text{ jaBOLkata}]$	*! W		L
c. $[\omega_{\text{NONMIN}} \text{ ne mu gi } [\omega_{\text{MIN}} \text{ DAva}]] [\omega_{\text{MIN}} \text{ jaBOLkata}]$	*! W		L
d. $[\omega_{\text{MIN}} \text{ NE mu gi}] [\omega_{\text{MIN}} \text{ DAva}] [\omega_{\text{MIN}} \text{ jaBOLkata}]$		*! W	L

The effect of  $\text{SUBCAT}(\text{ne})$  is to eliminate candidates which parse this clitic outside the minimal prosodic word containing the verb, either by excluding *ne* from the  $\omega$  level entirely (32b) or by integrating it into a recursive  $\omega$  structure (32c). This morpheme-specific prosodic effect arises precisely because a morpheme-specific constraint ( $\text{SUBCAT}(\text{ne})$ ) dominates the general constraints responsible for default prosodic parsing (in other words, this

<sup>15</sup>In section 4 we comment on morpheme-specific alignment constraints, another common device for capturing item-specific prosodic requirements (e.g. Kim 2010 and references there).

<sup>16</sup>The constraints in tableau (31) result in a tie between parse (a) and parse (b). Since we do not have empirical evidence that distinguishes between these two options—the language does not provide diagnostics to distinguish the left edge of a phonological phrase and the left edge of a non-minimal prosodic word—we opt for an analysis that gives both parses equal standing. If it turns out that only one of these parses is actually attested, there must be other constraints (in addition to the ones included in (31)) which disfavor its competitor.

is an instance of a Pāṇinian special-general relation, Anderson 1969, 1974, Kiparsky 1973, Prince and Smolensky 1993/2004, Baković 2013, and many others).

The optimal candidate (32a) satisfies the subcategorization requirements of *ne* through prosodic smothering: the prosodic word corresponding to the verb is extended leftward to encompass both *ne* and the intervening object clitics. But there are other conceivable responses to the prosodic dilemma presented by *ne*. For instance, that *ne* (or a *wh* clitic) could appear in a minimal prosodic word containing the object clitics but not the verb: this is candidate (32d), in which the clitic string constitutes an independent  $\omega$  and the verb retains its own stress. However, this hypothetical outcome includes a prosodic word which contains only functional material. It is typically assumed that prosodic words are licensed by virtue of their association with a lexical word. We express this requirement through the alignment constraint ALIGN-R( $\omega$ , LEX), which penalizes prosodic words which do not have a lexical word at their right edge. This constraint is responsible for eliminating candidate (32d).<sup>17</sup>

## 2.5 Alternative approaches to item-specific prosody

We have so far assumed that vertical subcategorization is needed to express the item-specific prosodic requirements which drive prosodic smothering in Macedonian. In this section we defend that assumption against two alternative formalizations of item-specific prosody, lateral subcategorization and prosodic prespecification.

Lateral subcategorization refers only to the prosody of those elements adjacent to the selecting morpheme, i.e. to the prosody of the dependent morpheme’s host. To capture the fact that *ne* and *wh* clitics attach low, inside the same minimal prosodic word as the following host, one could assume the subcategorization frames in (33).

- (33) Lateral subcategorization frames for *ne* and *wh* clitics (to be rejected):
- |                         |                             |
|-------------------------|-----------------------------|
| [ ne [ $\sigma$ ... ] ] | [ WH[+Q] [ $\sigma$ ... ] ] |
|-------------------------|-----------------------------|

These frames should be interpreted as selecting for a syllable to the right, with no other prosodic boundary intervening between *ne* or a *wh* clitic and its host. Such frames could conceivably generate examples like *NE znam* (12), in which the selecting clitic is parsed into a stress domain with the verb. But these frames are utterly unable to generate prosodic

---

<sup>17</sup>Another strategy for satisfying the prosodic subcategorization requirements (26) would be to re-order *ne* or the *wh* clitic with respect to any preverbal clitics (ib,d). Such configurations would meet the selectional requirements of *ne* and the *wh* clitic while leaving the pronominal object clitics outside the domain of stress, as dictated by the default prosodic mapping.

- |     |                                  |             |                                      |             |
|-----|----------------------------------|-------------|--------------------------------------|-------------|
| (i) | a. [ $\omega$ -MIN ne GO vide ]  | (cf. (30b)) | c. [ $\omega$ -MIN Kako SE vikaš ]?  | (cf. (16a)) |
|     | b. *go [ $\omega$ -MIN NE vide ] |             | d. *se [ $\omega$ -MIN kaKO vikaš ]? |             |

While our account does predict that patterns like (ib,d) should be possible in *some* language, they can very easily be ruled out in the specific case of Macedonian. It is clear that the unmarked word order in Macedonian (as elsewhere) would be one which transparently reflects syntactic dominance relations, with words/morphemes preceding the words/morphemes that they asymmetrically c-command (e.g., Kayne’s 1994 Linear Correspondence Axiom). To dispense with the ungrammatical reorderings in (ib,d), we might implement this preference with a constraint requiring a transparent mapping between dominance/c-command relations and linear order (see López 2009, Elfner 2012 for this idea in an Optimality-Theoretic context).

smothering. The essential problem is that frames like (33) will be satisfied by having *ne* or a *wh* clitic lean directly on a following object clitic, without any reparsing of the prosodic word which dominates the verb. These frames are effectively indifferent as to the prosodic category which dominates the selecting morpheme: they do not distinguish between clitic strings contained in a  $\omega$ -MIN (34a,d),  $\omega$ -NONMIN (34c),  $\phi$ P (34b), or any other category. Without some explicit sensitivity to the prosodic constituent produced by attaching *ne* or a *wh* clitic to its host, subcategorization simply cannot derive prosodic smothering. (L-SUBCAT(*ne*) in (34) is shorthand for the lateral subcategorization frame (33).)

(34)

ne mu gi [V dava] [DP jabolkata ]	L-SC( <i>ne</i> )	AL-R( $\omega$ , LEX)	AL-L(LEX, $\omega$ )
a. $\ominus$ [ $\omega$ -MIN ne mu GI dava] [ $\omega$ -MIN jaBOLkata]			*!
b. $\text{☞}$ { $\phi$ ne mu gi [ $\omega$ -MIN DAva] } [ $\omega$ -MIN jaBOLkata]			
c. $\text{☞}$ [ $\omega$ -NONMIN ne mu gi [ $\omega$ -MIN DAva] ] [ $\omega$ -MIN jaBOLkata]			
d. [ $\omega$ -MIN NE mu gi] [ $\omega$ -MIN DAva] [ $\omega$ -MIN jaBOLkata]		*!	

The second alternative we consider exploits the notion of prosodic prespecification (Idsardi 1992, Halle and Idsardi 1995, Özçelik 2014 and references there). Assume that *ne* and *wh* clitics are lexically specified with a left  $\omega$ -MIN boundary, e.g. / $[\omega$ -MIN ne/. If this open constituent must be closed by a corresponding right-edge  $\omega$  boundary in the surface phonology (Halle and Vergnaud 1987), we might expect prosodic smothering as in (35).

(35) / $[\omega$ -MIN ne go vide/  $\rightarrow$   $[\omega$ -MIN ne GO vide]

The principal difficulty for this approach comes from constructions with multiple triggers, in which a *wh* clitic is followed by *ne*. Stress assignment in multiple-trigger constructions is exactly parallel to single-trigger constructions (36b,c), and therefore implicates the exact same flat  $\omega$ -MIN structure (penult stress is also possible in these forms; see footnote 8).<sup>18</sup>

- (36) a. [ $\omega$ -MIN ŠTO ne zel ] ‘What didn’t he take?’ (Victor Friedman, p.c.)  
 b. [ $\omega$ -MIN NE bi dal ] ‘He should not have given.’  
 c. [ $\omega$ -MIN KOJ go zel ] ‘Who took it?’ (Franks 1989:559)

The prosody of these constructions is as predicted by vertical subcategorization (37a): the entire clitic string is parsed into a single stress domain ( $\omega$ -MIN), thereby satisfying the selectional requirements of both triggering clitics simultaneously (all selecting morphemes are

<sup>18</sup>Descriptive sources on Macedonian often claim that [WH ne (object clitic) verb] constructions have two distinct stresses, as in *ZOšto ne ME skorna?* ‘Why didn’t you wake me?’ (Garde 1968:36 and many citing it, such as Groen 1977, Elson 1993; see also Hendriks 1976:88-95). However, the examples given by these authors are all reason questions, and the Macedonian equivalent of ‘why’ is plausibly bimorphemic, e.g. *zo + što* ‘what’. Since internally-complex *wh*-expressions in Western Macedonian carry a separate stress for independent reasons (18), we doubt that reason questions are probative as to the prosody of two-trigger constructions. In any case, these examples may be contaminated by the factors illustrated in examples (37)/(38), as single-stressed examples like *zaš ne GO zede* ‘Why didn’t (s)he take it?’ can also be found in texts (Hendriks 1976:248).

parsed into the same  $\omega$ -MIN as their hosts).<sup>19</sup> (For formal verification of this claim, see tableau (88) in section 4.1.)

One might worry that the stress pattern in (36a) reflects some kind of pragmatic or discourse emphasis on the *wh* clitic *što* ‘what’ (as Victor Friedman has, in fact, suggested to us). Even so, evidence from the interaction between stress and emphasis in other contexts confirms that we are dealing with a single  $\omega$ -MIN in (36a). Certain kinds of emphasis—variously called “semantic emphasis” (Rudin et al. 1999:560-2), “formal or semantic” prominence (Elson 1993), emphasis of the “meaning” of the relevant word (Lunt 1952:24), “contrastive” marking (Tomić 2001:§3), or “special logical emphasis” (Koneski 1987)—can indeed trigger stress shift within the stress domain containing the verb. This is illustrated in (37) (examples from Koneski 1987:167-8; see too footnote 9, Garde 1968, Hendriks 1976:89). In this case stress shifts rightward onto the verb, falling on the penultimate syllable in the stress domain.

- (37) a. Toj [ ne MU reče ]  
 he NEG 3SG.DAT tell.3SG.PST  
 ‘he didn’t tell him’
- b. Toj [ ne mu REče ]  
 ‘he didn’t *tell* him’ (“presupposes a certain consequence”, Koneski 1987:167)

*Wh* clitics and *ne* can also carry stress-attracting emphasis. But the prosody of such constructions is importantly different from those that involve verbal emphasis: here we observe two distinct stresses (38), one falling on the verb and one falling on the emphasized clitic. (Elson 1993 offers a different characterization of this pattern which is nonetheless consistent with our general argument.)

- (38) a. [ KOJ ] [ mu REče ], samo da znam  
 who 3SG.M.DAT tell.3SG.PST only to know.1SG.PRS  
 ‘If I only knew who told him!’ (Koneski 1987:§102)
- b. #[ KOJ mu rece ] / #[ KOJ ] mu rece
- c. Toj [ NE ] [ mu REče ]  
 he NEG 3SG.M.DAT tell.3SG.PST  
 ‘he *didn’t* tell him (I insist)’ (Koneski 1987:167-8)
- d. #[ NE mu rece ] / #[ NE ] mu rece

These examples demonstrate that the *wh* clitic *što* in (36a) does not carry stress-attracting emphasis. If it did, we should find two distinct stresses: #<sub>[ $\omega$ -MIN ŠTO]</sub> [<sub>[ $\omega$ -MIN NE zel]</sub>]. We thus conclude that examples like [<sub>[ $\omega$ -MIN ŠTO ne zel]</sub>] (36a) reflect the prosodic structure of two-trigger constructions in which neither trigger carries a stress-attracting emphasis. (While

<sup>19</sup>While Macedonian allows multiple *wh*-questions like *Koj što dobi?* ‘Who got what?’ (Tomić 2012:425), we do not know where stress falls in questions with more than one preverbal *wh* clitic. The issue is complicated by the observation that “question words are always focused” in a general semantic sense (Rudin et al. 1999:561), making it difficult to control for the non-phonological factors which affect stress assignment in Macedonian. A further difficulty is that the preverbal position is often a position of focus for DPs and other constituents (e.g. Tomić 2012:218-20). Our account predicts the same pattern of default stress assignment for multiple *wh* questions as for [WH ne verb] constructions like (36a).

*wh*-words may be inherently discourse-prominent, this type of pragmatic prominence does not appear to interact with stress placement, (36a), Rudin et al. 1999:fn.20.)<sup>20</sup>

This result is difficult to guarantee through prosodic prespecification. To account for prosodic smothering with single-trigger cases, it must be assumed that *ne* and all *wh* clitics come with a prespecified left  $\omega$ -MIN boundary in their lexical representations. Given that the two-trigger forms in (38) consist of just a single prosodic word, it follows that underlyingly specified prosodic boundaries need not persist into the surface (perhaps they are deleted under domination from constraints like ALIGN-R( $\omega$ , LEX), which would penalize parses like [ $\omega$ -MIN ŠTO] [ $\omega$ -MIN NE zel]). But this raises a puzzle: if underlying  $\omega$ -MIN boundaries may be deleted, why would an exhaustive  $\omega$ -MIN-parse like [ $\omega$ -MIN ŠTO ne zel] be favored over a non-exhaustive  $\omega$ -MIN-parse like [što [ $\omega$ -MIN NE zel]]?<sup>21</sup> Both parses delete a prespecified  $\omega$ -MIN boundary, but the non-exhaustive parse has the further virtue of excluding the initial *wh* clitic from the domain of stress (recall that, in the general case, preverbal clitics are excluded from stress domains in Macedonian). Without further stipulation, prosodic prespecification cannot account for the stress profile of two-trigger constructions like (38).<sup>22</sup> In contrast, this result is easy to guarantee under vertical subcategorization, as prosodic structures like (38) fully satisfy the subcategorization requirements of both smothering triggers.

There is another theoretical device that merits consideration here: morpheme-specific alignment constraints could, in principle, be used to model the prosodic selectional requirements of *ne* and *wh* clitics in Macedonian (McCarthy and Prince 1993, Kim 2010, Pater 2010). The comparison between vertical subcategorization and morpheme-specific alignment is subtle, and so we defer the comparison of these formalisms to section 4.1.

### 2.5.1 Against a syntactic analysis of clitic stress

To close, we consider the viability of a more syntactically-oriented analysis of exceptional clitic stress in Western Macedonian. Is it possible that the different prosodic parses found

---

<sup>20</sup>Interesting questions of course remain about the interaction between discourse pragmatics and stress in two-trigger constructions. For example, emphasis on the second trigger seems to result in just a single stress within the verbal complex: *koj ŠTO zel?* ‘Who bought *what?*’ and *što NE zel?* ‘What *didn’t* he take?’ (Victor Friedman, p.c.). Since the existence of such patterns does not affect our basic claim that the stress pattern of (36a) is neutral or default (in lacking ‘emphasis’ of the relevant sort), we do not attempt to account for them here.

<sup>21</sup>Depending on one’s assumptions about how underlying  $\omega$ -MIN boundaries should be closed on the surface, a recursive parse like [ $\omega$ -NONMIN što [ $\omega$ -MIN NE zel]] might be favored for a second reason, namely that the initial  $\omega$ -MIN boundary persists despite not being strictly minimal on the surface.

<sup>22</sup>Beasley and Crosswhite (2003) propose a derivational account of Macedonian stress that could successfully generate antepenultimate stress in two-trigger forms like (36a). Since our focus is on parallel OT models of Macedonian prosody, we defer a full comparison with Beasley and Crosswhite (2003) till another occasion. However, we note that the analysis developed in Beasley and Crosswhite (2003) presupposes that *wh* clitics are morphologically affixed to their verbal hosts (see e.g. Kiparsky 1982, Booij and Rubach 1987, Halle and Vergnaud 1987, Halle and Idsardi 1995). This cannot be correct, given that *wh* clitics can be separated from the verb by adverbs and parentheticals (i):

- (i) Koj kogo, spored tebe, pretepa?  
 who whom.ACC according you.ACC beat.3SG.AOR  
 ‘Who, according to you, beat whom?’ (Tomić 2012:427)

in the presence and absence of *ne/wh* clitics result directly from a difference in the underlying syntax (see also Tomić 2001)? For instance, the observed prosodic differences might correspond to a difference in whether the object clitics form a complex head with the verb. On the assumption that complex syntactic heads ( $\approx$  morphological words) map to minimal prosodic words, adopting a complex head structure in constructions with *ne/wh* clitics would generate the desired prosodic output. Concretely, we might suppose that the verb raises to the polarity head  $\Sigma^0$  (Laka 1990) when *ne* is present, picking up the pronominal object clitics on the way (39b). When *ne* is absent, verb raising must not occur (39a).

- (39) a.  $[\Sigma P [VP \text{ go vide} ] ] \rightarrow [ \text{ go } [\omega\text{-MIN VIdE} ] ]$   
 b.  $[\Sigma P \text{ ne } \underbrace{[VP \text{ go vide} ]} ] \rightarrow [ \omega\text{-MIN ne GO vide} ]$

For *wh* clitics, one might assume roll-up verb raising to  $C^0$  (or [SPEC, CP], Matushansky 2006, Bayer and Brandner 2008) in *wh*-questions and exclamatives, but not other clause types.

While this approach might be technically workable (though less obviously so in the case of *wh* clitics), it is unclear why verb movement through the positions hosting object clitics would occur only in the presence of *ne* or a *wh* clitic but not otherwise. Furthermore, there is no independent morphosyntactic evidence that head movement is triggered by *ne* and *wh* clitics but not by other higher clausal elements like auxiliaries and complementizers (many of which are themselves proclitics). In other words, there is no evidence at all (as far as e.g. word order is concerned) that the syntax of preverbal object and auxiliary clitics is different in the context of higher negation and *wh* clitics.

Note, in addition, that clitic *wh* elements exhibit the same prosodic behavior in a different syntactic context: as (18) demonstrates, prosodically dependent *wh*-words lean on the element to their right even in complex *wh*-expressions where the host for the *wh* clitic is an NP complement rather than the verb (e.g.  $[\omega\text{-MIN kolKU pari}]$  ‘how much money’). Not only would these patterns of stress assignment require a separate explanation—perhaps  $N^0$  to  $D^0$  raising occurs in complex *wh*-expressions?—one must also assume that verb raising does *not* occur in these contexts, lest the verb be incorrectly integrated into the same prosodic word as the complex *wh*-expression (e.g.  $*[\omega\text{-MIN kolku paRI sakaš}]$ , cf. (18)). On balance, this syntactic counter-analysis offers at best a fragmentary and stipulative account of the facts. As such we believe that syntax-oriented approaches should be viewed unfavorably in comparison to the more holistic explanation offered by prosodic subcategorization.

Having completed our discussion of Macedonian, we now extend our proposals to a similar pattern of prosodic variability in Kaqchikel.

### 3 Kaqchikel

Kaqchikel is a K’ichean-branch Mayan language spoken by over half a million people in the central highlands of Guatemala (Richards 2003). As in Macedonian, the prosody of verbal agreement morphology in Kaqchikel is conditioned by the presence or absence of higher functional elements. Specifically, absolutive agreement markers behave as internal clitics on tensed verbs (where aspect is overtly marked), but as external clitics on non-verbal predicates (which lack overt aspect marking). In this section we argue for a parallel treatment

of Kaqchikel, which like Macedonian, instantiates prosodic smothering: the phonological subcategorization requirements of verbal aspect markers trump the default prosodification of absolutive agreement.

### 3.1 Person agreement in Kaqchikel

Kaqchikel, like all Mayan languages, has a system of verbal agreement in which core arguments (subjects and direct objects) are cross-referenced by agreement morphology on the verb. Verbal agreement follows an ergative-absolutive pattern of alignment: the absolutive markers (ABS) index transitive objects, as well as subjects of intransitives and aspectless non-verbal predicates (40); the ergative markers (ERG) index transitive subjects, as well as nominal possessors (41).<sup>23</sup>

(40) Absolutive marking in Kaqchikel

- |   |  |
|---|--|
| <p>a. y-<u>ix</u>-ki-tz'ët<br/>INCPL-2PL.ABS-3PL.ERG-see<br/>'They see <u>y'all</u>.'</p> | <p>c. <u>ix</u>           tijonel-a'<br/>2PL.ABS teacher-PL<br/>'<u>Y'all</u> are teachers.'</p> |
| <p>b. x-<u>ix</u>-anin<br/>CPL-2PL.ABS-run<br/>'<u>Y'all</u> ran.'</p>                    |  |

(41) Ergative marking in Kaqchikel

- |   |   |
|---|---|
| <p>a. y-a-<u>qa</u>-q'etej<br/>INCPL-2SG.ABS-1PL.ERG-hug<br/>'<u>We</u> hug you.'</p> | <p>b. <u>qa</u>-jolom<br/>1PL.ERG-head<br/>'<u>Our</u> head.'</p> |
|---|---|

Ergative and absolutive markers always precede their hosts in Kaqchikel. In this respect Kaqchikel differs from those Mayan languages in which ABS follows its host in at least some contexts (e.g. Tsotsil, Aissen 1987, Woolford 2011).

---

<sup>23</sup>All Kaqchikel examples are given in standard Mayan orthography. The orthography is fairly shallow, hewing closely to phonemic form. Most symbols have their IPA values, with the following exceptions: ⟨ $\ddot{V}$ ⟩ = lax (centralized) vowel, ⟨C'⟩ = glottalized consonant, ⟨tz⟩ = [t͡s], ⟨x⟩ = [χ], ⟨ch⟩ = [t͡ʃ], ⟨j⟩ = [χ], ⟨y⟩ = [j], ⟨'⟩ = [ʔ] (except in ⟨C'⟩).

	<b>Ergative (Pre-C/Pre-V)</b>	<b>Absolutive (Pre-C/Pre-V)</b>
1SG	in-/inw-	i-/in-
2SG	a-/aw-	a-/at-
3SG	ru-/r-/u-	∅
1PL	qa-/q-	öj-
2PL	i-/iw-	ix-
3PL	ki-/k-	e-/e'-

Table 2: Predicate agreement markers in Kaqchikel

As a matter of orthographic convention, absolutive markers in Kaqchikel are written as sub-parts of a complex word in verbal contexts (40a,b), but as independent words in non-verbal predicate constructions (40c). While this convention does reflect the grammatical organization of Kaqchikel—in particular the prosodic variability of ABS markers (section 3.2), which we return to shortly—it masks the fact that ABS behaves as a dependent morpheme even when occurring with non-verbal predicates (NVPs).<sup>24</sup> The ABS markers fail a number of standard tests for independent wordhood in NVP contexts. First, ABS is always predicate-adjacent (García Matzar et al. 1999:p. 289): it cannot be separated from the NVP by other content words (42)-(45), or by functional items like particles, as in (46).

- (42) a. wakamin e tijonel-a'  
now 3PL.ABS teacher-PL  
'Now they are teachers.'
- b. \*e wakamin tijonel-a'  
3PL.ABS now teacher-PL  
'Now they are teachers.'
- (43) a. jantape öj ch'ayonel  
always 1PL.ABS fighter  
'We're always quarrelsome.'
- b. \*öj jantape ch'ayonel  
1PL.ABS always fighter  
'We're always quarrelsome.'
- (44) a. jun b'e chik ix nüm  
one time more 2PL.ABS hungry  
'They're hungry again.'
- b. \*ix jun b'e chik nüm  
2PL.ABS one time more hungry  
'They're hungry again.'
- (45) a. yalan in jwi'  
very 1SG.ABS smart  
'I'm very smart'
- b. \*in yalan jwi'  
1SG.ABS very smart  
'I'm very smart'
- (46) a. e aq'omanel-a' k'a  
3PL.ABS doctor-PL then  
'They're doctors, then.'
- b. \*e k'a aq'omanel-a'  
3PL.ABS then doctor-PL  
'They're doctors, then.'

The inseparability of ABS from its NVP host holds even in the case of clitic interveners which can normally interrupt syntactic constituents. The negative/irrealis clitic *ta* freely intervenes

<sup>24</sup>As noted in section 1, the term 'dependent morpheme' subsumes both morphosyntactic affixes and morphosyntactic clitics (as opposed to roots and other free elements). We address the clitic vs. affix status of Kaqchikel ABS markers below.

between function words and their complements. This is illustrated for the focus marker *ja* in (47) (see Majzul et al. 2000:145-9 for Kaqchikel, Henderson 2012, Yasavul 2014 for K'iche'). But the same clitic *ta* cannot separate ABS from its host in NVP constructions (48).

- (47) a. Ja ixim nintij  
FOC corn I.eat.it  
'It's CORN that I'm eating.'
- b. Man ja ta ixim nintij  
NEG FOC NEG.IRR corn I.eat.it  
'It's not CORN that I'm eating.'
- (48) a. man at tz'uyül ta  
NEG 2SG.ABS seated NEG.IRR  
'You're not sitting.'
- b. \*man at ta tz'uyül  
NEG 2SG.ABS NEG.IRR seated  
'You're not sitting. / It's not you  
who's sitting.'

Second, ABS markers cannot appear in isolation—they are not free forms. One could not respond to the question *Achike aq'omanel?* 'Who is a doctor?' with the 1SG.ABS marker *in* 'me' (the free-standing pronoun *rïn~yïn* would be used instead). Third, ABS markers cannot be coordinated:

- (49) in (\*chuqa' at) aq'omanel-a'  
ABS.1S ( and 2SG.ABS) doctor-PL  
INTENDED: 'You and I are doctors.'

These properties distinguish ABS markers from true pronouns, which can co-occur with ABS marking (50) and which have a more flexible distribution than ABS agreement (51), as they may be separated from their associated predicates by intervening adverbials and particles. True pronouns may also appear as the object of a preposition, while ABS markers may not (52).

- (50) a. rat at aj=kematz'ib'  
you 2SG.ABS AGT=computer  
'You are a computer programmer.'
- b. röj öj q'ojomanel-a'  
we 1PL.ABS musician-PL  
'We are musicians.'
- (51) a. rïx (ojer) ïx tijoxel-a  
they (before) 2PL.ABS student-PL  
'They are (used to be) students.'
- b. röj k'a öj q'ojomanel-a'  
we then 1PL.ABS musician-PL  
'We are musicians, then.'
- c. man röj ta öj  
NEG we NEG.IRR 1PL.ABS  
na'ojinel-a'  
politician-PL  
'We're not politicians /  
It's not us who are politicians.'
- (52) a. matyöx chiwe' rïx  
thanks to y'all  
'Thanks y'all.'
- b. \*matyöx chiwe' ïx  
thanks to 2PL.ABS  
'Thanks y'all.'

The same diagnostics identify both ABS and ERG as dependent morphemes in inflected verbs (53). Here we show only that particles like *k'a* 'then' cannot separate ABS and ERG from their hosts in verbal contexts.

- (53) a. x-at-in-tz'ët  
 CPL-2SG.ABS-1SG.ERG-see  
 'I saw you.'
- b. \*x-a(t)-k'a-in-tz'ët  
 CPL-2SG.ABS-then-1SG.ERG-see  
 INTENDED: 'I saw you, then.'
- c. \*x-at-in-k'a-tz'ët  
 CPL-2SG.ABS-1SG.ERG-then-see  
 INTENDED: 'I saw you, then.'

We conclude that the ABS and ERG markers in Kaqchikel are dependent morphemes in all contexts in which they appear. Indeed, we can draw the stronger conclusion that these agreement markers are morphosyntactically affixes rather than clitics. By 'morphosyntactic clitic' we mean a morpheme which (1) is phonologically weak; (2) cannot appear in isolation; and (3) has some syntactic independence from its phonological host (e.g. it does not form a complex morphosyntactic head with it, as diagnosed by variable positioning, separability from its host, and other standard criteria for distinguishing affixes from clitics, e.g. Zwicky and Pullum 1983). The fact that ABS and ERG markers are inseparable from their hosts strongly suggests that they are affixal in nature.<sup>25</sup>

Since the ABS markers are also formally identical in all of their contexts of use (apart from phonologically-conditioned allomorphy, Table 2 and section 3.2.1), we draw the further conclusion that ABS markers constitute a single set of morphemes which happen to be used in both verbal and non-verbal contexts. There is no reason to assume a lexical difference between the ABS markers used with verbs and those used with non-verbal predicates.<sup>26</sup>

---

<sup>25</sup>It has sometimes been suggested that ABS is a morphosyntactic clitic—that is, a kind of reduced or incorporated pronoun—in verbal contexts in K'ichean languages (e.g., Preminger 2014). We stress two things here: first, there is no direct relation between morphosyntactic cliticness and prosodic cliticness, apart from the observation that morphosyntactic clitics are normally less than full prosodic words (Anderson 2005 and section 3.3). Second, this characterization of the ABS markers appears to be more appropriate for non-K'ichean languages like Q'anjob'al than for languages of the K'ichean branch.

Diachronically, the evidence is strong that ABS was a morphosyntactic clitic in proto-Mayan (see Robertson 1992:53, Law 2014:179). The synchronic evidence for this claim is much weaker in K'ichean languages, and hinges primarily on the observation that movement-indicating morphemes like *b'e* 'go' can intervene between ABS and ERG in verbs (Majzul et al. 2000:130, see also Larsen 1988:153-161,180-4; the [ʔ]in (i) occurs to resolve hiatus).

- (i) y-e-b'e'-in-tz'ët-a'  
 INCPL-3PL.ABS-go-[ʔ]-1SG.ERG-see-TRANS  
 'I go to see them.'

Were these movement morphemes themselves morphosyntactic clitics, one might plausibly conclude that ABS markers are morphosyntactic clitics too, following the standard diagnostic that only clitics can attach outside other clitics (e.g. Zwicky and Pullum 1983, van Riemsdijk 1999). But the evidence for a clitic treatment of movement morphemes is itself quite weak: the same data seems amenable to an analysis in terms of templatic affix ordering (e.g. Aronoff and Xu 2010, Ryan 2010 and references there). See Heaton 2015 for detailed discussion of the synchronic patterning of movement affixes in Kaqchikel.

<sup>26</sup>The same conclusions hold for the ergative markers in Kaqchikel, with one caveat: the ERG.1S marker

## 3.2 The prosodic variability of ABS

Having concluded that the ABS markers are a unified morphological class across verbal and non-verbal contexts, in this section we argue that the prosody of ABS marking is in fact heterogeneous in Kaqchikel. Absolutive agreement markers behave as external clitics in NVP structures (where there is no aspect marking), and as internal clitics in verbs (when aspect marking is present).<sup>27</sup> Section 3.2.1 provides phonological and morphophonological evidence for this conclusion, and section 3.2.2 provides supporting data from sub-segmental phonetic patterning. In section 3.3 we argue that the prosodic variability of ABS reflects prosodic smothering by higher aspect prefixes, and argue against alternative syntactic accounts of this prosodic difference.

### 3.2.1 Phonological evidence for variable ABS prosody

There are two pieces of phonological evidence that the ABS agreement markers have a context-dependent prosodic realization in Kaqchikel. The first comes from the differential behavior of [ʔ]-insertion. Words that begin with an underlying vowel typically bear an epenthetic glottal stop on the surface (54) (García Matzar et al. 1999:12, Barrett 2007, Bennett to appear; for the sake of readability we omit the initial [ʔ] from our examples except when relevant for the argumentation).

- (54) a. jun [ʔ]oj  
one avocado  
'an avocado'
- b. lajuj [ʔ]äk'  
ten chicken  
'ten chickens' (Majzul 2007:93,295)

Prefixation bleeds [ʔ]-insertion, provided that the prefixes are internal clitics. We illustrate this with ERG possessive prefixes (55)-(56), as well as with the completive aspect marker *x-* (56)-(57).

- (55) a. [ʔ]ik' 'month'  
b. aw-ik' / \*a(w)-[ʔ]ik'  
2SG.ERG-month  
'Your month/period.'
- (56) a. /-el/ 'to leave'  
b. [ʔ]el-e-b'äl  
leave-V-LOC  
'exit'
- c. w-el-e-b'al  
1SG.ERG-leave-V-LOC  
'my exit'
- d. \*w-[ʔ]el-e-b'al, \*nu-[ʔ]el-e-b'al

---

is *in(w)-* with verbs, but *nu-/w-* with nouns. See Kenstowicz (2013) for an attempt to reduce this difference to separate morphophonological factors.

<sup>27</sup>The terms 'internal clitic' and 'external clitic' are somewhat misleading here, inasmuch as absolutive marking in Kaqchikel is a morphosyntactic affix rather than a morphosyntactic clitic or independent word (section 3.1; see Selkirk 1995:188). We nonetheless retain this terminology to emphasize that the prosodic structures we propose for Kaqchikel are exactly parallel to the prosodic structures proposed earlier for Macedonian (section 2.4).

- (57) x-el / \*x-[ʔ]el  
 CPL-3SG.ABS-leave  
 ‘(S)he left.’ (Majzul 2007:166-7)

In contrast, morphological prefixes that are external clitics do not bleed [ʔ]-insertion (58), being parsed outside of the minimal  $\omega$  containing the stem.

- (58) a. aj=[ʔ]ik’ / \*aj=ik’  
 AGT=month  
 ‘domestic worker  
 (lit. monthly worker)’  
 b. ach=[ʔ]al-i’ / \*ach=ali’  
 COM=child.of.a.woman-PL  
 ‘co-parents-in-law  
 (Spanish *consuegros*)’  
 (Majzul 2007:59,67,82)

For similar observations in K’iche’ and Tz’utujil, two closely related Mayan languages, see Dayley (1981:22-3,245-6) and Larsen (1988:54,130-2).

Turning to the absolutive markers, we see that [ʔ]-epenthesis is blocked by the affixation of ABS when functioning as verbal agreement (59)-(60). This data is consistent with treating ABS as an internal clitic in this context.

- (59) a. y-at-el  
 INCPL-2SG.ABS-leave  
 ‘You leave.’  
 b. \*y-a(t)-[ʔ]el  
 c. y-in-apon  
 INCPL-1SG.ABS-arrive  
 ‘I arrive.’  
 d. \*y-i(n)-[ʔ]apon

But in NVP constructions, the absolutive markers co-occur with an epenthetic glottal stop (60)-(61). This is to be expected if ABS is an external clitic in this context.

- (60) a. at [ʔ]oj  
 2SG.ABS aguacate  
 ‘You are an avocado.’  
 b. \*at oj  
 c. in [ʔ]umül  
 1SG.ABS rabbit  
 ‘I am a rabbit.’  
 d. \*in umül

Patterns of [ʔ]-insertion thus indicate that ABS has a dual prosodic status in Kaqchikel: it is an internal clitic in verbal contexts, and an external clitic when occurring with non-verbal predicates (see Dayley 1981:84,195 for a similar, albeit less concrete suggestion for Tz’utujil).

Additional support for this conclusion comes from patterns of phonologically-conditioned allomorphy. Ergative markers in Mayan languages typically come in two sets: a pre-vocalic form and a pre-consonantal form (Kaufman 1990). Kaqchikel has extended these alternations to the ABS markers (Table 2).<sup>28</sup> The pre-vocalic forms are C-final (61), the pre-consonantal forms V-final (62). This is a morphophonological innovation that has not been reported

<sup>28</sup>García Matzar et al. 1999:178 reports that this innovation is found in the dialects of Tecpan (Iximche’) and Semetab’äj, though two of the authors (Bennett and Henderson) have encountered these patterns more widely across dialects of eastern Kaqchikel.

for other languages in the K'ichean branch. Selection of the pre-vocalic allomorph bleeds [ʔ]-insertion (59).

- |      |   |      |  |
|------|---|------|--|
| (61) | Pre-V absolutive markers  | (62) | Pre-C absolutive markers   |
|      | a. x- <u>in</u> -oq<br>CPL-1SG.ABS-cry<br>'I cried.'                |      | a. x- <u>i</u> -b'e<br>CPL-1SG.ABS-go<br>'I went.'                       |
|      | b. x- <u>at</u> -in-tzu'<br>CPL-2SG.ABS-1SG.ERG-see<br>'I saw you.' |      | b. x- <u>a</u> -ru-tzu'<br>INCPL-2SG.ABS-3SG.ERG-see<br>'(S)he saw you.' |

(García Matzar et al. 1999:178; Majzul 2007:32,40)

That these alternations represent suppletive allomorphy rather than a purely phonological alternation is clear from the following facts: (i) not all ABS markers show the alternations in question (e.g. 1PL.ABS *öj* is invariant); (ii) allomorphy avoids clusters that are otherwise attested in Kaqchikel, e.g. *y-i-b'e*/\**y-in-b'e* 'I go' vs. *n-in-b'ij* 'I say it'; and (iii) the alternating consonants are not phonologically predictable, and so cannot represent consonant insertion motivated by hiatus avoidance (the normal strategy for avoiding hiatus in Kaqchikel is [ʔ]-insertion, García Matzar et al. 1999:32).

Importantly, these alternations only occur for ABS in its function as a marker of verbal agreement. In non-verbal predicates, the pre-vocalic (C-final) ABS allomorphs are used, regardless of the initial segment of the NVP host (63)-(64).

- |      |   |      |   |
|------|---|------|---|
| (63) | a. at      aj=yoq'<br>2SG.ABS AGT=to.shepard<br>'You are a pastor.'           | (64) | a. in      aj=k'ay<br>1SG.ABS AGT=sell<br>'I am a merchant.'          |
|      | b. at/*a    r-achib'il<br>2SG.ABS 3SG.ERG-friend<br>'You are his/her friend.' |      | b. in/*i    b'ix-an-el<br>1SG.ABS sing-ANTIP-NMLZ<br>'I am a singer.' |

We suggest that the ABS markers are too prosodically 'distant' from their hosts in NVP constructions for the segmental phonology of those hosts to condition allomorphy of ABS (see also Zwicky and Pullum 1983, Nespore and Vogel 1986, Hayes 1990, Mascaró 1996, 2007, van Riemsdijk 1999, Nevins 2011a,b, Varis 2012, Wagner 2011, 2012; see Henderson 2012 for related facts in K'iche'). Absolutive allomorphy in Kaqchikel can therefore be meaningfully unified with the [ʔ]-insertion patterns in (54)-(60) if we assume that the prosodic boundary between ABS and its host is stronger in NVP constructions than in fully inflected verbs.

### 3.2.2 Phonetic evidence for variable ABS

Confirmatory evidence for the prosodic variability of ABS marking in Kaqchikel comes from sub-segmental phonetic patterning. Derived (or 'false') geminates are significantly longer across the boundary between ABS and an NVP than across the boundary between ABS and

a verbal stem. This contrast is consistent with the presence of a stronger post-ABS prosodic boundary in NVP constructions than in verbal forms.

Like all Mayan languages, Kaqchikel has no phonemic geminates: underlying geminates only occur as the result of morphological or syntactic concatenation (65)-(66). (See e.g. Herrera Zendejas 2014:Chs.9,10 for similar patterns in other Mayan languages.)

- |      |   |      |   |
|------|---|------|---|
| (65) | a. <u>öj</u> jot-öl<br>1PL.ABS elevate-POSIT<br>‘We are elevated.’<br><br>b. X- <u>oj</u> -jot-e’<br>CPL-1PL.ABS-elevate-INTRANS<br>‘We climbed.’ | (66) | x-in-tij <u>jun</u> <u>pix</u> xär<br>CPL-1SG.ERG-eat one tomato blue<br>‘I ate a blue tomato.’ |
|------|---|------|---|

These geminates are ‘false’ in the sense that they represent a sequence of identical consonants rather than a unitary long consonant (e.g. McCarthy 1986, Blevins 2004).

It is well-known that derived geminates may differ in duration from singleton consonants, and that this durational difference may be sensitive to the strength of the boundary between the two identical consonants. In English, for example, the word *innumerable* has a shorter doubled *nn* [n] than a phrase like *in Nevada* [nn] or a compound like *tin nickels* [nn] (e.g. Inkelas 1990:97, Hammond 1999, Martin 2007, Oh and Redford 2012). Here duration correlates with boundary strength: derived geminates are longer across stronger boundaries.

We investigated whether these results would extend to the ABS markers in a production study with Kaqchikel speakers. Our expectation was that derived geminates should be phonetically longer across ABS-NVP boundaries (65a) than across ABS-VERB boundaries (65b), given the phonological evidence for a stronger boundary in ABS-NVP constructions (section 3.2.1). Two of the authors (Bennett and Henderson) recorded six Kaqchikel speakers in Chimaltenango, Guatemala, to test this claim. The speakers were presented with a written list of phrases in Spanish, composed of copular constructions corresponding to NVP constructions in Kaqchikel (65a) (e.g. Spanish *Soy grande* → Kaqchikel *In nīm* ‘I am large’) as well as non-copular verb phrases corresponding to inflected verbs in Kaqchikel (65b) (e.g. Spanish *Ustedes se sentaron* → Kaqchikel *Xixtz’uye* ‘Y’all were sitting down.’). Participants were asked to translate the Spanish phrase to Kaqchikel, then produce it twice in the carrier phrase (67):

- |      |  |                                       |
|------|--|---------------------------------------|
| (67) | María x-Ø-u-b’ij<br>María CPL-3SG.ABS-3SG.ERG-say<br>‘María said _____ in the street.’ | _____ pa b’ey.<br>_____ in the.street |
|------|--|---------------------------------------|

The materials were presented in Spanish rather than in Kaqchikel to avoid an orthographic confound: the absolute markers are written as separate words in NVP constructions, which might prime participants to produce NVPs with a stronger prosodic boundary. Most Kaqchikel speakers are also more comfortable reading Spanish than Kaqchikel.

The target items were NVP constructions or intransitive verbs like (65a)-(65b). In both cases the ABS marker is in immediately pre-predicate position. We focused on the ABS markers *öj* 1PL.ABS and *ix* 2PL.ABS, as these are the only two phonologically-invariant ABS markers (other ABS markers have patterns of allomorphy that make it impossible to create

derived geminates, section 3.2.1). Our dependent measure was the duration of the ABS-final consonants, these being  $j$  [χ] and  $x$  [ʃ]. The two ABS markers  $öj$  and  $ix$  were paired with hosts beginning in  $j$  [χ] and  $x$  [ʃ] to test the durations of derived geminates (68a,b). These items were compared with singleton  $j$  [χ] and  $x$  [ʃ] in non-geminate clusters (68c,d).

- (68) a. Geminate [C-C] in a verb: *x-ix-xik'an* ‘Y’all flew.’  
 b. Geminate [C=C] in an NVP: *ix xar* ‘Y’all are blue.’  
 c. Singleton [C] in a verb: *x-ix-katäj* ‘Y’all got up’  
 d. Singleton [C] in an NVP: *ix nüm* ‘Y’all are large.’

These items were combined with filler forms containing other absolute markers (e.g. *in kow* [in kow] ‘I am tough’) or ergative markers (e.g. *xinjäl* [ʃ-in-χəl] ‘I changed it’), as well as some bare roots (e.g. *b’aq* [βaq<sup>h</sup>] ‘bone’). This gave a total of 40 experimental items.

All recordings were made using a head-mounted microphone, at a sampling rate of 44.1 kHz. We measured the duration of the fricatives  $j$  [χ] and  $x$  [ʃ] in each target item by marking the beginning and end of aperiodic noise in the waveform corresponding to the ABS-final consonant (e.g. Turk et al. 2006). Productions with obvious disfluencies in the target item were excluded from analysis. All measurements were done in Praat (Boersma and Weenink 2010), and the statistical analysis was completed in R (R Development Core Team 2013) using the `lmer` and `ggplot2` packages (Bates et al. 2011, Wickham 2009).

The results are presented graphically in Figure 1. Our measurements display exactly the predicted pattern of fricative duration. The duration of the singleton fricatives  $j$   $x$  [χ] [ʃ] is about the same in both verbal and NVP contexts, but the duration of derived geminates varies with morphosyntactic context.

Partial degemination of the ABS-final consonant occurs with intransitive verbs: derived geminates are somewhat longer than singletons, but not as long truly doubled consonants ( $\Delta$ :  $x$  [ʃ] = 69ms,  $j$  [χ] = 52ms; Ratio:  $x$  [ʃ] = 1.57,  $j$  [χ] = 1.46). With NVP constructions, the durational difference between false geminates and singletons is much larger ( $\Delta$ :  $x$  [ʃ] = 97ms,  $j$  [χ] = 143ms; Ratio:  $x$  [ʃ] = 1.67,  $j$  [χ] = 2.28), indicating a lesser degree of degemination in this environment. This is as expected if the prosodic boundary between ABS and an NVP host is stronger than between ABS and a following verbal stem. This contextual difference emerges as strongly significant in a linear mixed-effects model (the PREDICATE TYPE X C LENGTH interaction in Table 3; Pinheiro and Bates 2000, Gelman and Hill 2006): derived geminates are roughly 73ms shorter when the host predicate is a verb rather than a non-verbal predicate.<sup>29</sup>

As already suggested, these patterns of sub-phonemic variation can be easily explained if there is a relatively strong prosodic boundary between the absolute marker and its predicate host in non-verbal predicate constructions. This boundary must be absent, or

<sup>29</sup>The linear mixed-effects model in Table 3 was determined by a step-down model selection procedure using the log-likelihood and AIC tests to compare nested models. The initial full model had fixed effects for CONSONANT LENGTH (/C<sub>k</sub>/ vs. /C<sub>k</sub>C<sub>k</sub>/), PREDICATE TYPE, PLACE OF ARTICULATION, the stress profile of the initial syllable of the host (STRESS), and syllable count of the host (HOST LENGTH). A fixed effect for the CONSONANT LENGTH x PREDICATE TYPE interaction was also included. The model also includes by-speaker random slopes for CONSONANT LENGTH, PREDICATE TYPE, PLACE OF ARTICULATION, STRESS, and CONSONANT LENGTH x PREDICATE TYPE, as well as simple random effects for speaker and item (see Baayen et al. 2008, Barr et al. 2013).

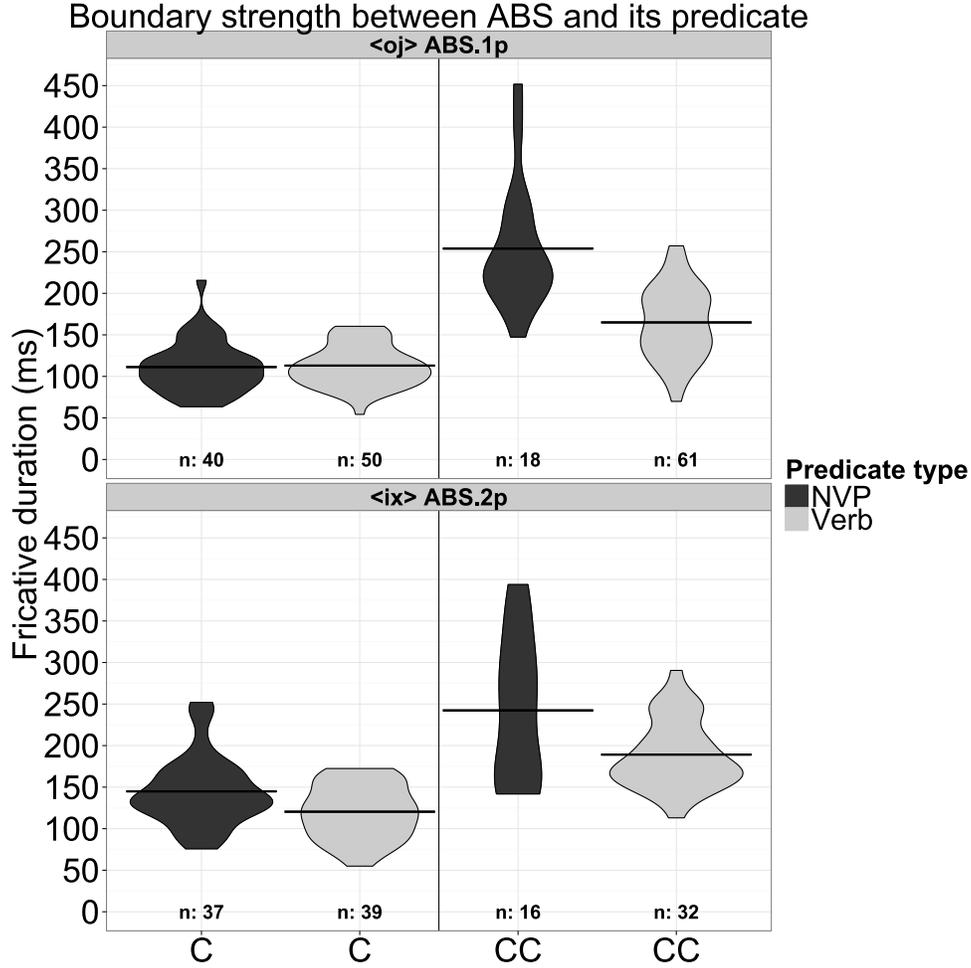


Figure 1: Duration of the fricatives in *öj* /ɔχ-/ 1PL.ABS and *ix* /ɪf-/ 2PL.ABS by context.

	Estimated $\beta$ (ms)	SE( $\beta$ )	$t$	$p$ -value
(Intercept)	-59	11.2	-5.30	< .001
CONSONANT LENGTH (/C <sub>k</sub> / vs. /C <sub>k</sub> C <sub>k</sub> /)	127	17.4	7.29	< .001
PREDICATE TYPE X C LENGTH (verb x /C <sub>k</sub> C <sub>k</sub> /)	<b>-73</b>	<b>14</b>	<b>-5.22</b>	<b>&lt; .001</b>
PLACE OF ARTICULATION ( $x$ [f])	23	8.4	2.80	< .006
STRESS (ABS + $\acute{\sigma}$ )	25	9.2	2.70	< .008
PREDICATE TYPE (verb)	13	10.3	1.30	< .20

Table 3: Final fricative duration model. Coefficients express predicted increase in duration.

at least weaker between absolute markers and intransitive verbal stems. These findings dovetail with the phonological and morphophonological evidence for a distinction in the

strength of the post-ABS boundary across NVP and verbal contexts (section 3.2.1).

We conclude that the prosody of ABS is indeed variable and context-dependent in Kqchikel. The puzzle then is why such variation exists, given that the ABS markers represent a single set of lexical items realized as dependent morphemes in both NVP and verbal constructions. In the following section we argue that this variation can be reduced to prosodic smothering: the presence or absence of an outer aspect marker conditions the prosody of inner absolutive agreement, for reasons related to the prosodic subcategorization requirements of aspect.

### 3.3 Analysis: vertical subcategorization

Section 2 demonstrated that variation in the prosodic parsing of Macedonian object clitics can receive a straightforward account in terms of prosodic smothering, formalized with prosodic subcategorization frames which make direct reference to dominating categories. The goal of this section is to show that prosodic smothering in Kqchikel absolutive marking is amenable to the same type of analysis. This suffices to establish prosodic smothering as a typologically recurrent pattern. Moreover, the fact that a unified analysis is available for these two phenomena, which come from unrelated languages and which recruit completely different phonological processes, provides further support for the use of vertical subcategorization frames in the analysis of prosodic smothering.

Like the functional elements of the Macedonian clausal spine, verbal inflection in Kqchikel can be split into those dependent morphemes that must be dominated by a minimal prosodic word and those which are by default parsed outside of the minimal  $\omega$  containing the verb. We propose that aspect marking in Kqchikel, like *ne* and *wh* clitics in Macedonian, has a prosodic subcategorization frame (69) which requires immediate domination by a minimal prosodic word—aspect prefixes are internal clitics. Example (70) shows the behavior of aspect under such a parse in a clause with no overt person marking. That aspect belongs to the same minimal prosodic word as the verb stem can be diagnosed by the failure of [ʔ]-insertion in examples like *x-el* ‘(S)he left’ (57).<sup>30</sup>

(69)  $[\omega\text{-MIN ASP} [\dots]]$

(70)  $[\omega\text{-MIN } \underline{x}\text{- } w\ddot{a}r]$   
           CPL sleep  
           ‘He/she/it slept.’

While Kqchikel aspect markers subcategorize for domination by a minimal prosodic word, we assume that absolutive markers are external clitics by default, parsed outside of the  $\omega\text{-MIN}$  containing their host. This is illustrated for a non-verbal predicate construction in (71).

(71) in=  $[\omega\text{-MIN } n\ddot{i}m]$   
       1SG.ABS       big  
       ‘I’m big.’

When aspect and ABS co-occur in verbal contexts, a conflict results: it is not possible

---

<sup>30</sup>While we have not directly investigated degemination with verbal aspect prefixes, impressionistically, forms like *xxajo* /f-ʃaχoʔ/ ‘(s)he danced’ and *nniman* ‘(s)he believes’ /n-niman/ are pronounced with singleton consonants, [ʃa.ʔχoʔ] and [ni.man], as predicted by our account (Majzul 2007:290,534).

to assign ABS its default parse as an external clitic while also incorporating aspect into a minimal prosodic word containing its host. This is illustrated in (72). Here we see that ASP appears to the left of ABS, with the consequence that satisfying the default prosody of ABS would strand ASP outside the  $\omega$ -MIN of the verb, in violation of the vertical subcategorization frame (69).

- (72) a. \*x- in=  $[\omega$ -MIN wär]  
 CPL 1SG.ABS sleep  
 ‘I slept.’  
 b. \*ASP-ABS= $[\omega$ -MIN V]

If this conflict is resolved in favor of the prosodic subcategorization of the outer morpheme ASP, the result is prosodic smothering, exactly as in Macedonian. Example (73) illustrates that when aspect is parsed inside the minimal prosodic word, so is the absolutive marker, contra its default behavior as an external clitic (cf. (71)).

- (73) a.  $[\omega$ -MIN x- i- wär]  
 CPL 1SG.ABS sleep  
 ‘I slept.’  
 b.  $[\omega$ -MIN ASP-ABS-V]

The prosodic variability of Kaqchikel absolutive markers, then, is completely akin to the patterning of Macedonian object clitics. In both cases, vertical subcategorization frames take precedence over default parsing (74), and thereby force prosodic smothering (75). And just as in Macedonian, standard syntax-prosody mapping constraints are responsible for ruling out alternative repairs to the prosodic dilemma in (72)-(73).

(74)

$[\text{VP in- wär}]$	SUBCAT(ASP)	ALIGN-R( $\omega$ , LEX)	ALIGN-L(LEX, $\omega$ )
a. $\{ \phi \text{ in- } [\omega$ -MIN wär] $\}$			
b. $\{ \phi \text{ } [\omega$ -NONMIN in= $[\omega$ -MIN wär] $\}$			
c. $[\omega$ -MIN in- wär]			*! W
d. $[\omega$ -MIN in] $[\omega$ -MIN wär]		*! W	

(75)

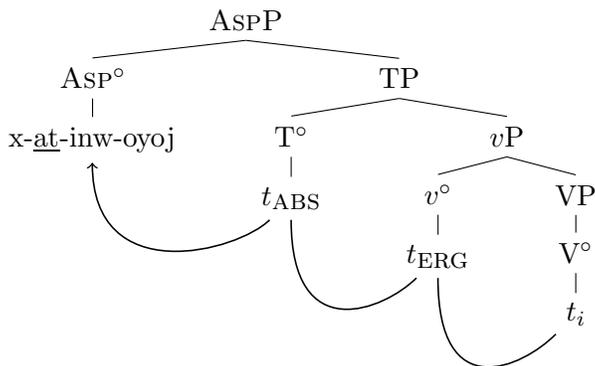
$[\text{ASPP x- } [\text{VP in- wär}]]$	SUBCAT(ASP)	ALIGN-R( $\omega$ , LEX)	ALIGN-L(LEX, $\omega$ )
a. $[\omega$ -MIN x- in- wär]			*
b. $\{ \phi \text{ x- in= } [\omega$ -MIN wär] $\}$	*! W		L
c. $[\omega$ -NONMIN x- in= $[\omega$ -MIN wär] $\}$	*! W		L
d. $[\omega$ -MIN x- in] $[\omega$ -MIN wär]		*! W	L

### 3.3.1 Against a syntactic analysis of the prosodic variability of ABS

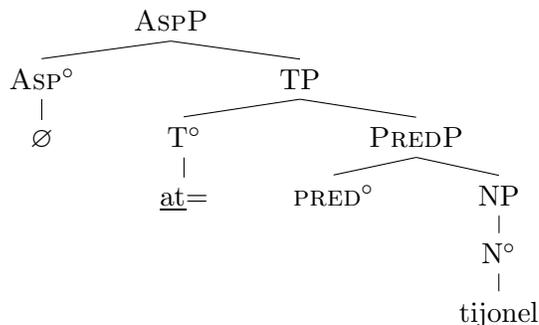
As with Macedonian (section 2.5.1), we now address a competing syntactic analysis of ABS marking in Kaqchikel in which the variable prosody of the ABS markers owes to an underlying syntactic difference between verbal and NVP constructions. One might reasonably assume

that ABS is part of a complex syntactic head in verbal contexts (76), but part of a head-complement structure in non-verbal predicates (77). As with our proposal, the presence or absence of higher aspect marking might be the determining factor behind this difference: predicates raise to ASP when ASP is present in the structure (or at least phonologically overt) (76), but otherwise remain *in situ*.

(76) ABS as a complex head in verbal *xatinwoyoj* ‘I called you’.



(77) ABS in a head-complement structure in non-verbal *at tijonel* ‘You are a teacher’.



For proposals along these lines see Baker (2003), Mateo Toledo (2008), Coon et al. (2014), among others. Now assume with Selkirk (2011) and others that the default mapping from syntax to prosody parses complex heads (76) into single prosodic words  $\omega$ , while parsing head-complement structures (77) into multiple prosodic words. Such a mapping algorithm would derive the observed prosodic variation in ABS marking from the hypothesized syntactic structures (76)-(77) without any special stipulations about the morphology or prosody of ABS or ASP. We stress that very few of the syntactic particulars matter here: the argument hinges only the structural distinction between complex heads and head-complement structures, along with a syntax-prosody mapping algorithm that treats such structures differently. The central premise of this analysis is that syntactic integration necessarily entails prosodic integration.

We suspect that something like the syntax sketched in (76)-(77) is correct for predicative structures in Kaqchikel. But whatever the syntax of predication may be in Kaqchikel, we believe that the analysis just sketched is deficient in several important respects. Perhaps most problematic is the assumption of a transparent mapping between syntactic and prosodic structure. While the correlation between syntactic headedness and prosodic wordhood is no

doubt a robust tendency, there is strong evidence for a double-dissociation of this apparent correspondence (a conclusion reached independently by Harley 2013, Green and Morrison 2015, and Barrie and Mathieu 2016, among others).

First, both within and outside of Kaqchikel we find complex syntactic heads that do not map to unitary prosodic words (see also Inkelas 1990, Poser 1990, Peperkamp 1997). We have already encountered one such example: agentive nominals formed with the prefix *aj-* in Kaqchikel behave phonologically like clitic=host structures rather than simple prosodic words (58). Morphosyntactic diagnostics clearly indicate that agentive nouns like *ajq'ij* ‘shaman’ are prefixed stems, i.e. internally complex morphosyntactic words (e.g. Zwicky 1977, Zwicky and Pullum 1983, van Riemsdijk 1999, Anderson 2005, Nevins 2011a). For instance, affixal inflectional morphology may appear outside of *aj-*, suggesting that this morpheme is also a morphosyntactic affix rather than a morphosyntactic clitic (under the widespread assumption that affixes cannot attach to hosts already containing clitics, Zwicky and Pullum 1983). In (78) we see that *aj-* forms stems that can be further inflected with ergative possessor agreement.<sup>31</sup>

- |      |    |  |    |   |
|------|----|--|----|---|
| (78) | a. | r-aj=to'-öl<br>3SG.ERG-AGT=help-NMLZ<br>'his/her helper' | b. | r-aj=t'is<br>3SG.ERG-AGT=sew<br>'his/her tailor' (Majzul 2007:75) |
|------|----|--|----|---|

A second test concerns the behavior of *aj-* with bound stems. As example (79) shows, *aj-* patterns with unambiguous morphosyntactic affixes in satisfying the morphological requirements of these stems, which may not occur unaffixed.

- |      |    |                           |    |                           |
|------|----|---------------------------|----|---------------------------|
| (79) | a. | -xikin ‘ear’              | f. | -chi’ ‘mouth’             |
|      | b. | aj=xikin ‘listener’       | g. | aj=chi’ ‘chatty person’   |
|      | c. | nu-xikin ‘my ear’         | h. | nu-chi ‘my mouth’         |
|      | d. | *-xikin ‘(an) ear’        | i. | *-chi ‘(a) mouth’         |
|      | e. | (cf. xikin-aj ‘(an) ear’) | j. | (cf. chi-'aj ‘(a) mouth’) |

(Macario et al. 1998; Majzul 2007)

Finally, while *aj-* usually has transparent agentive semantics, it is only semi-compositional in some forms, indicating the higher degree of lexicalization which is characteristic of affixes (e.g. Inkelas 1990, Zwicky and Pullum 1983). For instance, the nominal derived by combining *aj-* with *potz'* ‘police’ is not agentive, but a derisive form of the noun. This again points towards the conclusion that *aj-* is a word-level prefix rather than a morphosyntactic clitic or independent function word.

---

<sup>31</sup>One might expect to find prosodic smothering in forms like (78) when *aj-* is attached to a vowel-initial stem and then possessed, e.g. *aj'ik'* [ʔaχ=ʔikʔ] ‘domestic worker’ ~ *rajik* [r-aχ-ikʔ] (*aj-* smothered). We do not know what the facts are here, but either outcome would be consistent with our proposals. Either possessive inflection smothers *aj-*, in which case we must assume that the ergative prefixes in Kaqchikel have a subcategorization frame like that of ASP (69), or smothering fails to occur, in which case we can assume that the ergative prefixes have no particular prosodic requirements of their own. We thank Heidi Harley for bringing examples like these to our attention.

- (80) a. potz’ ‘police’  
 b. ajpotz’ ‘police (derisive)’  
 c. chij ‘wool; sheep; candle’  
 d. ajchij ‘annoying person’  
 e. iq’ ‘ceramic container’  
 f. aj’iq’ ‘person with a sweet-tooth’  
 g. ch’ak ‘meat, flesh’  
 h. ajch’ak ‘hawk; carnivore’  
 (Macario et al. 1998; Majzul 2007)

All such tests confirm that *aj-* is a morphosyntactic prefix in Kaqchikel, forming a complex head with its host. But as demonstrated earlier, *aj-* has the phonological behavior of an external clitic. First, it fails to bleed word-initial [ʔ]-insertion on its stem (81) (see too Bennett to appear).<sup>32</sup>

- (81) aj=[ʔ]eyaj / \*aj=eyaj’  
 AGT=tooth  
 ‘dentist’ (Majzul 2007:67)

Furthermore, *aj-* does not trigger degemination when attaching to a stem that also begins with *j* [χ]:

- (82) a. aj=juku’ [ʔaχ=χukuʔ]  
 AGT=boat  
 ‘boatman’  
 b. aj=jach’öl [ʔaχ=χatʔ<sup>h</sup>ɔ̃]  
 AGT=shuck  
 ‘corn-shucker’ (Majzul 2007:69)

The primary conclusion from this data is that morphosyntactic wordhood does not itself guarantee phonological wordhood. The tendency for correspondence between these notions of ‘word’ can be disrupted by arbitrary and idiosyncratic properties of individual morphemes. Crucially, this conclusion interferes with the core assumption necessary for a syntactic explanation of the prosodic alternations of Kaqchikel ABS markers, namely that internal clitics, and only internal clitics, belong to complex syntactic heads.

It is even more straightforward to show that distinct syntactic heads may (and frequently do) form a single prosodic word with their complements, despite being syntactically independent objects. This is especially true of functional elements. One such example comes from prepositional phrases in Western Macedonian: prepositions are proclitic to their complements, and together form a single stress domain ( $\omega$ -MIN), e.g. [ $\omega$ -MIN PRED vas] ‘before you’ (Tomić 2012:63). See Selkirk (1995), Zec (2005) and references there for related discussion. This completes the double-dissociation between syntactic unity and prosodic unity that the syntactic alternative relies on.

The goal of this section has been to defuse a potential syntactic analysis of the variable prosody of ABS marking in Kaqchikel. Crucially, such an analysis presupposes a tight mapping between syntax and prosody. We have shown that this critical assumption is flawed. The data instead supports a fundamental assumption of our own proposals: idiosyncratic, lexically-specific constraints on prosodic phrasing can disrupt more general patterns of

<sup>32</sup>Kaufman (2015) analyzes *aj-* as a root rather than a prefix. We believe that the synchronic evidence for treating *aj-* as a root is limited, at least for Kaqchikel. Regardless, treating *aj-* as a root would not explain its behavior with respect to [ʔ]-insertion, as [ʔ]-insertion does not normally occur in root-root compounds with a vowel-initial second member (e.g. *kajulew* [kaχ-ulew] ‘universe’ (lit. ‘sky-earth’), not \*[kaχ-ʔulew]; Brown et al. 2010:152-4).

syntax-prosody correspondence. We contend that in Kaqchikel, as in Macedonian, these lexically-specific constraints should be understood as subcategorization requirements operating over the vertical dimension.

## 4 Discussion

Drawing on data from Macedonian and Kaqchikel, we have argued that prosodic smothering is a general phenomenon which may occur whenever item-specific prosodic requirements take precedence over default patterns of prosodic parsing. The typical configuration for prosodic smothering is  $[X [Y Z]]$ , where  $X$  triggers a non-default prosodic parse for  $Y$ :  $[\delta Y (\pi Z)]$  but  $[\delta X (\pi Y Z)]$ . This characterization of prosodic smothering leaves completely unspecified the lexical identities of the participating elements and their morphosyntactic relationships, as well as the prosodic categories involved. It may be that this characterization of the phenomenon is too broad: we currently lack a full typology of item-specific prosodic effects, especially in the domain of prosodic smothering. With this caveat in mind, there are several similarities between the Macedonian and Kaqchikel cases which deserve further consideration.

First, in both languages the subcategorization requirements of a functional head  $X$  (ASP in Kaqchikel; NEG and *wh* clitics in Macedonian) in the extended projection of  $Z$  (a verb) are satisfied by disrupting the default prosodic behavior of some element  $Y$  (ABS in Kaqchikel; object clitics in Macedonian) that is both structurally and linearly closer to  $Z$ . Second, in both languages, the relevant heads and extended projections are verbal. Finally, in both languages, the prosodic constituent at issue is the minimal prosodic word.

One might reasonably wonder if these similarities are accidental. We suspect that two shared features—smothering in verbal constituents, and at the  $\omega$ -MIN level—are simply coincidental. That is, we do not expect prosodic smothering to be restricted solely to verbal projections or to prosodic words. On the one hand, prosodic phenomena are not usually sensitive to syntactic category distinctions (Nespor and Vogel 1986). And on the other hand, prosodically-conditioned processes (e.g. domain-final devoicing; Wetzels and Mascaró 2001) are not typically restricted to a single level of the prosodic hierarchy (see Poser 1990, Inkelas and Zec 1990, Inkelas 1990, Chung 2003, Kisseberth and Abasheikh 2011:§7.1, Henderson 2012 for possible examples of prosodic subcategorization at the  $\phi$ P- and  $\iota$ P-levels). And of course, nothing about our analysis of prosodic smothering predicts that the phenomenon should be limited to particular syntactic or prosodic categories.

What may not be accidental is the observation that prosodic smothering takes place within a single extended projection in both Macedonian and Kaqchikel. More formally, it may be that the vertical subcategorization frames which trigger prosodic smothering cross-linguistically all conform to the following schema:

- (83) Element  $\alpha$  in the extended projection of head  $H$  is required to occur in the same prosodic constituent  $\pi \in \{\omega, \phi P, \iota P\}$  as  $H$ .

This is of course speculative, but we offer the prospective generalization in (83) to set the stage for future research. If it turns out that all cases of prosodic smothering involve co-members of the same extended projection, the subcategorization template in (83) will need to be formally incorporated into the theory in some way (see Clemens 2014, Merchant 2015, Richards 2016 for similar ideas in a very different context).

## 4.1 Further comments on vertical subcategorization

In this paper we have couched vertical subcategorization in terms of violable constraints (e.g. SUBCAT(*ne*), (31)). However, in the cases under consideration these constraints are never actually violated: they are surface-true statements about prosodic parsing. We are thus agnostic as to whether prosodic subcategorization requirements should be formalized as violable constraints or as inviolable dictums, obeyed absolutely in output forms. In either case, we are committed to the view that prosodic subcategorization requirements can trigger phonological repairs: they must do more than simply mark certain combinations of morphemes as ill-formed. For related discussion, see Kiparsky (1994), Inkelas (1990), Chung (2003), Raffelsiefen (2004), Zec (2005), Paster (2006), Yu (2007), Bye (2007), Kim (2010).

Supposing that prosodic subcategorization requirements are indeed best understood as violable constraints, we are still left with a question of formalization. Item-specific prosodic requirements, of the sort we have modeled with vertical subcategorization, can also be stated in terms of morpheme-specific alignment constraints (McCarthy and Prince 1993, Kim 2010, among others; see section 2.5 on other approaches to item-specific prosody). For example, the basic pattern of prosodic smothering triggered by *ne* and *wh* clitics in Macedonian can be captured with constraints requiring that the left edge of these clitics correspond to the left edge of a minimal prosodic word (84b,c). As with vertical subcategorization, basic syntax-prosody alignment constraints will eliminate candidates in which the clitic string constitutes a prosodic word to the exclusion of the verb (84d).

(84)

ne mu gi [V dava] [DP jabolkata]	AL-L( <i>ne</i> , $\omega$ -MIN)	AL-R( $\omega$ , LEX)	AL-L(LEX, $\omega$ )
a. $\text{[}_{\omega\text{-MIN}} \text{ne mu GI dava] [}_{\omega\text{-MIN}} \text{jaBOLkata]}$			*
b. $\{ \phi \text{ne mu gi [}_{\omega\text{-MIN}} \text{DAva}] \} [}_{\omega\text{-MIN}} \text{jaBOLkata]}$	*! W		L
c. $[}_{\omega\text{-NONMIN}} \text{ne mu gi [}_{\omega\text{-MIN}} \text{DAva}] [}_{\omega\text{-MIN}} \text{jaBOLkata]}$	*! W		L
d. $[}_{\omega\text{-MIN}} \text{NE mu gi] [}_{\omega\text{-MIN}} \text{DAva}] [}_{\omega\text{-MIN}} \text{jaBOLkata]}$		*! W	L

Morpheme-specific alignment differs from vertical subcategorization in its predictions about constructions which contain multiple triggers for prosodic smothering. Consider for instance the following example, repeated from section 2.5, which contains a *wh* clitic and *ne*.

(85)  $[_{\omega\text{-MIN}} \text{ŠTO ne zel}]$  ‘What didn’t he take?’

Example (85) demonstrates that in the configuration [*wh ne VERB*], the *wh* clitic is parsed into the same prosodic constituent as *ne* and the verb. As discussed in section 2.5, this structure falls out immediately from vertical subcategorization: it is the only configuration that satisfies the selectional requirements of both triggering morphemes while also satisfying mapping constraints like ALIGN-R( $\omega$ , LEX).

Given the prosodic structure (85), analyses which rely on morpheme-specific alignment must assume that ALIGN-L(WH,  $\omega$ -MIN) outranks ALIGN-L(*ne*,  $\omega$ -MIN) (86): this is the only ranking which will produce a single, flat stress domain in constructions with both *ne* and an outer *wh* clitic.

(86)

što ne [V zel]	AL-L(WH, $\omega$ -MIN)	AL-L(ne, $\omega$ -MIN)	AL-R( $\omega$ , LEX)	AL-L(LEX, $\omega$ )
a. $\text{[}\omega\text{-MIN ŠTO ne zel]}$		*		*
b. što $\text{[}\omega\text{-MIN NE zel]}$	*! W	L		*

But under this ranking, alignment constraints predict there should be no smothering if the linear order of clitics were inverted, as in the hypothetical example (87), which features an order that is not actually attested in Macedonian. In that case, only the innermost clitic, the *wh* clitic, should be aligned with a  $\omega$ -MIN boundary.

(87)

ne što [V zel]	AL-L(WH, $\omega$ -MIN)	AL-L(ne, $\omega$ -MIN)	AL-R( $\omega$ , LEX)	AL-L(LEX, $\omega$ )
a. $\text{[}\omega\text{-MIN ne ŠTO zel]}$	*! W	L		*
b. $\text{[}\omega\text{-MIN ne ŠTO zel]}$		*		*

In contrast, vertical subcategorization predicts that the prosody of two-trigger constructions should remain the same even when the order of the triggers is permuted (88), (89). This is no surprise: by design, vertical subcategorization is largely insensitive to linear order).

(88)

što ne [V zel]	SUBCAT(WH)	SUBCAT(ne)	AL-R( $\omega$ , LEX)	AL-L(LEX, $\omega$ )
a. $\text{[}\omega\text{-MIN ŠTO ne zel]}$				*
b. što $\text{[}\omega\text{-MIN NE zel]}$	*! W			*

(89)

ne što [V zel]	AL-L(WH, $\omega$ -MIN)	AL-L(ne, $\omega$ -MIN)	AL-R( $\omega$ , LEX)	AL-L(LEX, $\omega$ )
a. $\text{[}\omega\text{-MIN NE što zel]}$				*
b. ne $\text{[}\omega\text{-MIN ŠTO zel]}$	*! W			*

In sum, vertical subcategorization and morpheme-specific alignment make different predictions about the prosody of constructions in which the negative clitic *ne* precedes a *wh* clitic in Western Macedonian: [*ne* WH V]. Unfortunately, this order of clitics is not attested in Macedonian and we are not aware of any other evidence which would allow us to tease apart the predictions of vertical subcategorization and morpheme-specific alignment in the cases under consideration. We must therefore leave a proper comparison of vertical subcategorization and morpheme-specific alignment to another day. The crucial point is that vertical subcategorization is not a recasting of alignment, but in fact makes different empirical predictions.

## 4.2 Practical implications

Along with the theoretical conclusions of this paper, we draw several practical lessons from our investigation of prosodic smothering. Most saliently, we have demonstrated two important facts about the mapping between syntactic and prosodic structure. First, there is a double-dissociation between syntactic and phonological bracketing: not all syntactic constituents map to shared prosodic constituents, and not all prosodic constituents correspond to syntactic constituents. This is particularly true at the level of the word: while there is a clear tendency for complex syntactic heads to correspond to prosodic words (and vice-versa), this isomorphism is at best partial.

Second, we have shown that item-specific prosodic requirements are an important conditioning factor for such non-isomorphisms. Surface prosodic structure is determined not only by general syntax-prosody mapping constraints, but also by idiosyncratic prosodic properties of individual morphemes. The upshot is that we need to be very cautious about using prosodic differences as a diagnostic for underlying morphosyntactic structure, especially at the level of the word and below. This lesson is not completely new (see Harley 2013, Green and Morrison 2015, and Barrie and Mathieu 2016, among others), but it is sharply underscored by the observation that individual morphemes can exert their own peculiar influence on the prosodic structure of output forms.

## References

- Aissen, Judith. 1987. *Tzotzil clause structure*. Dordrecht: Kluwer Academic Publishers.
- Allen, Margaret. 1979. Morphological investigations. Doctoral Dissertation, University of Connecticut.
- Anderson, Stephen. 2011. Clitics. In *The Blackwell Companion to Phonology*, ed. Elizabeth Hume Marc van Oostendorp, Colin J. Ewen and Keren Rice, 2002–2018. Blackwell Publishing.
- Anderson, Stephen R. 1969. West Scandinavian vowel systems and the ordering of phonological rules. Doctoral Dissertation, Massachusetts Institute of Technology.
- Anderson, Stephen R. 1974. *The organization of phonology*. New York: Academic Press.
- Anderson, Stephen R. 2005. *Aspects of the theory of clitics*. Oxford, UK: Oxford University Press.
- Archangeli, Diana, and Douglas Pulleyblank. 1994. *Grounded phonology*. Cambridge, MA: MIT Press.
- Aronoff, Mark, and Zheng Xu. 2010. A Realization Optimality-Theoretic approach to affix order. *Morphology* 20:381–411.
- Baayen, R. Harald, Douglas Davidson, and Douglas Bates. 2008. Mixed-effects modeling with crossed random effects for subjects and items. *Journal of memory and language* 59:390–412.
- Baker, Mark. 2003. *Lexical categories: verbs, nouns and adjectives*. Cambridge, UK: Cambridge University Press.
- Baković, Eric. 2013. *Blocking and complementarity in phonological theory*. London: Equinox.
- Barr, Dale, Roger Levy, Christoph Scheepers, and Harry Tily. 2013. Random effects structure for confirmatory hypothesis testing: Keep it maximal. *Journal of Memory and Language* 68:255–278.

- Barrett, Rusty. 2007. The evolutionary phonology of glottal stops in K'ichean. In *Proceedings of the 33rd Berkeley Linguistics Society (BLS)*. Berkeley, CA: University of California Press.
- Barrie, Michael, and Eric Mathieu. 2016. Noun incorporation and head movement. *Natural Language and Linguistic Theory* 34:1–51.
- Bates, Douglas, Martin Maechler, and Ben Bolker. 2011. *lme4: Linear mixed-effects models using S4 classes*. Version 0.999375-41, retrieved from <http://CRAN.R-project.org/package=lme4>.
- Bayer, Josef, and Ellen Brandner. 2008. On wh-head-movement and the doubly-filled-comp filter. In *West Coast Conference on Formal Linguistics (WCCFL) 26*, ed. Charles Chang and Hannah Haynie, 87–95. Somerville, MA: Cascadilla Press. Available online at <http://www.lingref.com/>, document #1659.
- Beasley, Tim, and Katherine Crosswhite. 2003. Avoiding boundaries: antepenultimate stress in a rule-based framework. *Linguistic Inquiry* 34:361–392.
- Bennett, Ryan. to appear. Mayan phonology. *Language and Linguistics Compass*.
- Blevins, Juliette. 2004. *Evolutionary phonology: the emergence of sound patterns*. Cambridge, UK: Cambridge University Press.
- Boersma, Paul, and David Weenink. 2010. Praat: doing phonetics by computer (version 5.1.32). Computer program. Retrieved from <http://www.praat.org/>.
- Bonet, Eulàlia, Maria-Rosa Lloret, and Joan Mascaró. 2007. Allomorph selection and lexical preferences: Two case studies. *Lingua* 117:903–927.
- Booij, Geert, and Jerzy Rubach. 1987. Postcyclic versus postlexical rules in lexical phonology. *Linguistic Inquiry* 18:1–44.
- Bošković, Željko. 2004. Clitic placement in South Slavic. *Journal of Slavic Linguistics* 12:37–90.
- Brown, R. McKenna, Judith Maxwell, and Walter Little. 2010. *La üt̃ awäch?: Introduction to Kaqchikel Maya language*. Austin, TX: University of Texas Press.
- Buckley, Eugene. 1997. Optimal iambs in Kashaya. *Rivista di linguistica* 9:9–52.
- Buckley, Eugene. 2009. Locality in metrical typology. *Phonology* 26:389–435.
- Bye, Patrik. 2007. Allomorphy — selection, not optimization. In *Freedom of analysis?*, ed. Sylvia Blaho, Patrik Bye, and Martin Krämer, 63–91. Berlin: Walter de Gruyter.
- Caponigro, Ivano. 2004. The semantic contributions of wh-words and type shifts: Evidence from free relatives crosslinguistically. In *Semantics and Linguistic Theory*, volume 14, 38–55.
- Chomsky, Noam, and Morris Halle. 1968. *The sound pattern of English*. New York: Harper & Row.
- Chomsky, Noam, and Howard Lasnik. 1977. Filters and control. *Linguistic Inquiry* 8:425–504.
- Chung, Sandra. 2003. The syntax and prosody of weak pronouns in Chamorro. *Linguistic Inquiry* 34:547–599.
- Clemens, Lauren Eby. 2014. Prosodic noun incorporation and verb-initial syntax. Doctoral Dissertation, Harvard University.
- Coon, Jessica, Pedro Mateo Pedro, and Omer Preminger. 2014. The role of case in A-bar extraction asymmetries: Evidence from Mayan. *Linguistic Variation* 14:179–242.
- Dayley, Jon P. 1981. Tz'utujil grammar. Doctoral Dissertation, University of California,

- Berkeley.
- Elfner, Emily. 2012. Syntax-prosody interactions in Irish. Doctoral Dissertation, University of Massachusetts, Amherst.
- Elson, Mark. 1993. Collocational stress in contemporary standard Macedonian. *The Slavic and East European Journal* 37:149–161.
- Embick, David. 2010. *Localism versus globalism in morphology and phonology*. Cambridge, MA: MIT Press.
- Franks, Steven. 1987. Regular and irregular stress in Macedonian. *International journal of Slavic linguistics and poetics* 35-36:93–142.
- Franks, Steven. 1989. The monosyllabic head effect. *Natural Language and Linguistic Theory* 7:551–563.
- Franks, Steven. 2009. Macedonian pronominal clitics as object agreement markers. In *A linguist's linguist: Studies in South Slavic linguistics in honor of E. Wayles Browne*, ed. Steven Franks, Vrinda Chidambaram, and Brian Joseph, 189–222. Bloomington: Slavica.
- Franks, Steven, and Tracy Holloway King. 2000. *A handbook of Slavic clitics*. Oxford: Oxford University Press.
- Friedman, Victor A. 2010. Macedonian. In *The slavonic languages*, ed. Bernard Comrie and Greville G. Corbett, 249–305. New York, NY: Routledge.
- Gafos, Adamantios. 1999. *The articulatory basis of locality in phonology*. New York: Garland.
- García Matzar, Pedro Oscar, Valerio Toj Cotzajay, and Domingo Coc Tuiz. 1999. *Gramática del idioma Kaqchikel*. Antigua, Guatemala: Proyecto Lingüístico Francisco Marroquín.
- Garde, Paul. 1968. Note sur l'enclise et la proclise en macédonien 11:31–37.
- Gelman, Andrew, and Jennifer Hill. 2006. *Data analysis using regression and multi-level/hierarchical models*. Cambridge, UK: Cambridge University Press.
- Goldsmith, John. 1990. *Autosegmental and metrical phonology*. Blackwell.
- Green, Christopher, and Michelle Morrison. 2015. Somali wordhood and its relationship to prosodic structure. *Morphology* 1–30.
- Grimshaw, Jane. 1979. Complement selection and the lexicon. *Linguistic Inquiry* 10:279–326.
- Groen, B.M. 1977. *A structural description of the Macedonian dialect of Dihovo: Phonology, morphology, texts, lexicon*. Lisse: The Peter de Ridder Press.
- Groenendijk, Jeroen, and Martin Stokhof. 1984. Studies on the semantics of questions and the pragmatics of answers, unpublished ph. d. *D: University of Amsterdam dissertation*.
- Halle, Morris, and William Idsardi. 1995. General properties of stress and metrical structure. In *The handbook of phonological theory*, ed. John Goldsmith, 403–443. Oxford.
- Halle, Morris, and Jean-Roger Vergnaud. 1987. *An essay on stress*. Cambridge, MA: MIT Press.
- Hamblin, Charles L. 1973. Questions in Montague English. *Foundations of language* 10:41–53.
- Hammond, Michael. 1999. *The phonology of English: a prosodic optimality-theoretic approach*. Oxford, UK: Oxford University Press.
- Hansson, Gunnar Ólafur. 2010. *Consonant harmony: long-distance interactions in phonology*. Berkeley, CA: University of California Press.
- Harizanov, Boris. 2014. The role of prosody in the linearization of clitics: evidence from Bulgarian and Macedonian. In *Formal approaches to Slavic linguistics 22*, ed. Cassandra Chapman, Olena Kit, and Ivona Kučerová, 109–130. Ann Arbor, MI: Michigan Slavic

Publications.

- Harley, Heidi. 2013. Getting morphemes in order: merger, affixation, and head movement. In *Diagnosing syntax*, ed. Lisa Cheng and Norbert Corver, 44–74. Oxford, UK: Oxford University Press.
- Hayes, Bruce. 1990. Precompiled phrasal phonology. In *The phonology-syntax connection*, ed. Sharon Inkelas and Draga Zec, 85–108. Chicago: University of Chicago Press.
- Hayes, Bruce. 1995. *Metrical stress theory*. Chicago: The University of Chicago Press.
- Heaton, Raina. 2015. Variation and change: the case of movement verbs in Kaqchikel. Unpublished Manuscript, University of Hawaii Manoa.
- Henderson, Robert. 2012. Morphological alternations at the intonational phrase edge. *Natural Language and Linguistic Theory* 30:741–787.
- Hendriks, P. 1976. *The Radožda-Vevčani dialect of Macedonian*. Lisse: The Peter de Ridder Press.
- Herrera Zendejas, Esther. 2014. *Mapa fónico de las lenguas mexicanas: formas sonoras 1 y 2*. Mexico, D.F.: El Colegio de México, 2nd edition.
- Hyde, Brett. 2012. Alignment constraints. *Natural Language and Linguistic Theory* 30:789–836.
- Idsardi, William. 1992. The computation of stress. Doctoral Dissertation, Massachusetts Institute of Technology.
- Inkelas, Sharon. 1990. *Prosodic constituency in the lexicon*. New York: Garland.
- Inkelas, Sharon, and Draga Zec. 1990. Prosodically constrained syntax. In *The phonology-syntax connection*, ed. Sharon Inkelas and Draga Zec, 365–378. Chicago: University of Chicago Press.
- Itô, Junko, and Armin Mester. 2007. Prosodic adjunction in Japanese compounds. In *Formal approaches to Japanese linguistics (FAJL) 4*, ed. Yoichi Miyamoto and Masao Ochi, 97–111. Cambridge, MA: MITWPL.
- Itô, Junko, and Armin Mester. 2013. Prosodic subcategories in Japanese. *Lingua* 124:20–40.
- Itô, Junko, and Armin Mester. 2015. The Perfect Prosodic Word in Danish. *Nordic Journal of Linguistics* 38:5–36.
- Joseph, Brian D. 1983. *The synchrony and diachrony of the balkan infinitive: A study in areal, general, and historical linguistics*. Cambridge: Cambridge University Press.
- Kaufman, Terrence. 1990. Algunos rasgos estructurales de los idiomas mayances con referencia especial al K'iche'. In *Lecturas sobre la lingüística maya*, ed. Nora England and Stephen Elliott, 59–114. Antigua, Guatemala: Centro de Investigaciones Regionales de Mesoamérica.
- Kaufman, Terrence. 2015. Initial glottal stop in mayan languages. Unpublished ms.
- Kayne, Richard. 1994. *The antisymmetry of syntax*. Cambridge, MA: MIT Press.
- Kenstowicz, Michael. 2013. Realize morpheme in Kaqchikel. In *Studies in Kaqchikel grammar*, ed. Michael Kenstowicz, 67–80. Cambridge, MA: MITWPL.
- Kim, Yuni. 2010. Phonological and morphological conditions on affix order in Huave. *Morphology* 20:133–163.
- Kiparsky, Paul. 1973. 'Elsewhere' in phonology. In *A festschrift for Morris Halle*, ed. Stephen R. Anderson and Paul Kiparsky, 93–106. New York: Holt, Reinhart, and Winston.
- Kiparsky, Paul. 1982. Lexical phonology and morphology. In *Linguistics in the Morning Calm*, 3–91. Seoul: Hanshin Publishing.

- Kiparsky, Paul. 1985. Some consequences of Lexical Phonology. *Phonology Yearbook* 2:85–138.
- Kiparsky, Paul. 1994. Allomorphy or morphophonology? In *Trubetzkoy's orphan: Proceedings of the montréal roundtable on "morphology: contemporary responses" (montréal, october 1994)*, ed. Rejandra Singh, 12–31. Amsterdam: John Benjamins.
- Kisseberth, Charles, and Mohammad Imam Abasheikh. 2011. Chimwiini phonological phrasing revisited. *Lingua* 121:1987–2013.
- Klavans, Judith. 1995. *On clitics and cliticization: The interaction of morphology, phonology, and syntax*. New York: Garland.
- Koneski, Blaže. 1987. *Gramatika na makedonskiot literaturnen jazik*. Skopje: Kultura.
- Lahiri, Utpal. 2002. *Questions and answers in embedded contexts*. Oxford University Press.
- Laka, Itziar. 1990. Negation in syntax: On the nature of functional categories and projections. Doctoral Dissertation, Massachusetts Institute of Technology.
- Larsen, Thomas. 1988. Manifestations of ergativity in Quiché grammar. Doctoral Dissertation, University of California, Berkeley.
- Law, Danny. 2014. *Language contact, inherited similarity and social difference: The story of linguistic interaction in the maya lowlands*, volume 328. John Benjamins Publishing Company.
- Lieberman, Mark, and Alan Prince. 1977. On stress and linguistic rhythm. *Linguistic Inquiry* 8:249–336.
- Lieber, Rochelle. 1980. On the organization of the lexicon. Doctoral Dissertation, Massachusetts Institute of Technology.
- López, Luis. 2009. Ranking the linear correspondence axiom. *Linguistic Inquiry* 40:239–276.
- Lunt, Horace. 1952. *A grammar of the Macedonian literary language*. Skopje: Macedonian State Press.
- Macario, Narciso Cojtí, Martín Chacach Cutzal, and Marcos Armando Calí Semeyá. 1998. *Diccionario Kaqchikel*. Antigua, Guatemala: Proyecto Lingüístico Francisco Marroquín.
- Majzul, Filiberto Patal, Pedro Oscar García Matzar, and Carmelina Espantzay Serech. 2000. *Rujunamaxik ri Kaqchikel chi': variación dialectal en Kaqchikel*. Ciudad de Guatemala, Guatemala: Cholsamaj.
- Majzul, Lolmay Filiberto Patal. 2007. *Rusoltzij ri Kaqchikel: diccionario estándar bilingüe Kaqchikel-Español*. Ciudad de Guatemala, Guatemala: Cholsamaj.
- Manetta, Emily. 2011. *Peripheries in Kashmiri and Hindi-Urdu: The syntax of discourse-driven movement*. Amsterdam: John Benjamins.
- Martin, Andrew. 2007. The evolving lexicon. Doctoral Dissertation, University of California, Los Angeles.
- Mascaró, Joan. 1996. External allomorphy as emergence of the unmarked. In *Current trends in phonology: Models and methods*, ed. Jacques Durand and Bernard Laks, 473–483. Salford, Manchester: University of Salford, European Studies Research Institute. Reprinted 2004 in *Optimality Theory in Phonology: A reader*, ed. John J. McCarthy, 513–522. Oxford: Blackwell.
- Mascaró, Joan. 2007. External allomorphy and lexical representation. *Linguistic Inquiry* 38:715–735.
- Mateo Toledo, B'alam Eladio. 2008. The family of complex predicates in Q'anjob'al (Maya); their syntax and meaning. Doctoral Dissertation, The University of Texas at Austin.

- Matushansky, Ora. 2006. Head movement in linguistic theory. *Linguistic Inquiry* 37:69–109.
- McCarthy, John. 1986. OCP effects: gemination and antigemination. *Linguistic Inquiry* 17:207–263.
- McCarthy, John J. 2003. OT constraints are categorical. *Phonology* 20:75–138.
- McCarthy, John J., and Alan Prince. 1986/1996. Prosodic morphology. Technical Report 32, Rutgers University Center for Cognitive Science. Available online at [http://works.bepress.com/john\\_j\\_mccarthy/54/](http://works.bepress.com/john_j_mccarthy/54/).
- McCarthy, John J., and Alan Prince. 1993. Generalized alignment. *Yearbook of Morphology* 79–154. Available online as ROA-7, Rutgers Optimality Archive, <http://roa.rutgers.edu/>.
- Merchant, Jason. 2015. How much context is enough? Two cases of span-conditioned stem allomorphy. *Linguistic Inquiry* 46.
- Montague, Richard. 1973. The proper treatment of quantification in ordinary english. In *Approaches to natural language*, 221–242. Springer.
- Nespor, Marina, and Irene Vogel. 1986. *Prosodic phonology*. Dordrecht: Foris Publications. Reprinted 2008 by Mouton de Gruyter.
- Nevins, Andrew. 2011a. Multiple agree with clitics: Person complementarity vs. omnivorous number. *Natural Language and Linguistic Theory* 29:939–971.
- Nevins, Andrew. 2011b. Phonologically conditioned allomorph selection. In *The Blackwell companion to phonology*, ed. Marc van Oostendorp, Colin Ewen, Beth Hume, and Keren Rice, 2357–2382. Malden MA: Wiley-Blackwell.
- Oh, Grace, and Melissa Redford. 2012. The production and phonetic representation of fake geminates in English. *Journal of phonetics* 40:82–91.
- Özçelik, Öner. 2014. Prosodic faithfulness to foot edges: the case of Turkish stress. *Phonology* 31:229–269.
- Paster, Mary. 2006. Phonological conditions on affixation. Doctoral Dissertation, University of California, Berkeley.
- Pater, Joe. 2010. Morpheme-specific phonology: constraint indexation and inconsistency resolution. In *Phonological argumentation: essays on evidence and motivation*, ed. Steve Parker, 123–154. London: Equinox.
- Peperkamp, Sharon. 1997. *Prosodic words*. Holland Academic Graphics.
- Pinheiro, José, and Douglas Bates. 2000. *Mixed-effects models in S and S-PLUS*. New York: Springer.
- Poser, William J. 1990. Word-internal phrase boundary in Japanese. In *The phonology-syntax connection*, ed. Sharon Inkelas and Draga Zec, 279–287. Chicago: University of Chicago Press.
- Preminger, Omer. 2014. *Agreement and its failures*. Linguistic Inquiry Monograph 68.
- Prince, Alan. 1983. Relating to the grid. *Linguistic Inquiry* 14:19–100.
- Prince, Alan. 1991. Quantitative consequences of rhythmic organization. In *CLS 26(2): Papers from the Parasession on the Syllable in Phonetics and Phonology*, ed. Karen Deaton, Manuela Noske, and Michael Ziolkowski, 355–398. Chicago: Chicago Linguistics Society.
- Prince, Alan, and Paul Smolensky. 1993/2004. *Optimality Theory: constraint interaction in generative grammar*. Malden, MA: Blackwell. Revision of 1993 technical report, Rutgers University Center for Cognitive Science. Available online as ROA-537, Rutgers Optimality Archive, <http://roa.rutgers.edu/>.
- R Development Core Team. 2013. *R: A language and environment for statistical computing*.

- R Foundation for Statistical Computing, Vienna, Austria. Version 3.0.1, retrieved from <http://www.R-project.org/>.
- Raffelsiefen, Renate. 1999. Diagnostics for prosodic words revisited: the case of historically prefixed words in English. 133–201. John Benjamins.
- Raffelsiefen, Renate. 2004. Absolute ill-formedness and other morphophonological effects. *Phonology* 21:91–142.
- Richards, Michael. 2003. *Atlas lingüístico de Guatemala*. Instituto de Lingüístico y Educación de la Universidad Rafael Landívar.
- Richards, Norvin. 2016. *Contiguity theory*. Cambridge, MA: MIT Press.
- Robertson, John S. 1992. *The history of tense/aspect/mood/voice in the Mayan verbal complex*. Austin, TX: University of Texas Press.
- Rudin, Catherine. 2015. Sorting out *-to* and *što*: Bulgarian and Macedonian relative markers.
- Rudin, Catherine, Christina Kramer, Loren Billings, and Matthew Baerman. 1999. Macedonian and Bulgarian *li* questions: Beyond syntax. *Natural Language and Linguistic Theory* 17:541–586.
- Ryan, Kevin. 2010. Variable affix order: grammar and learning. *Language* 86:758–791.
- Selkirk, Elisabeth. 1995. The prosodic structure of function words. In *Papers in Optimality Theory*, ed. Jill Beckman, Laura Walsh Dickey, and Suzanne Urbanczyk, 439–470. Amherst, MA: GLSA Publications. Also in *Signal to Syntax: Bootstrapping from Speech to Grammar in Early Acquisition*, eds. James L. Morgan and Katherine Demuth, 187–214.
- Selkirk, Elisabeth. 2011. The syntax-phonology interface. In *Handbook of phonological theory*, ed. John Goldsmith, Alan C.L. Yu, and Jason Riggle, Blackwell Handbooks in Linguistics Series, 435–484. Malden MA: Wiley-Blackwell.
- Siegel, Dorothy. 1974. Topics in English morphology. Doctoral Dissertation, Massachusetts Institute of Technology.
- Tomić, Olga Mišeska. 1997. Non-first as a default clitic position. *Journal of Slavic linguistics* 5:301–323.
- Tomić, Olga Mišeska. 2001. The Macedonian negation operator and cliticization. *Natural Language and Linguistic Theory* 19:647–682.
- Tomić, Olga Mišeska. 2012. *A grammar of Macedonian*. Bloomington: Slavica.
- Turk, Alice, Satsuki Nakai, and Mariko Sugahara. 2006. Acoustic segment durations in prosodic research: A practical guide. In *Methods in empirical prosody research*, ed. Stefan Sudhoff, Denisa Lenertova, Roland Meyerand Sandra Pappert, Petra Augurzky, Ina Mleinek, Nicole Nicole Richter, and Johannes Schließer, 1–28. Berlin: De Gruyter.
- van Riemsdijk, Henk. 1999. Clitics: A state-of-the-art report. 1–30. Berlin: Walter de Gruyter.
- Varis, Erika Elizabeth. 2012. The Spanish feminine *el* at the syntax-phonology interface. Doctoral Dissertation, University of Southern California.
- Vidoeski, Božidar. 2005. *Dialects of Macedonian*. Bloomington, IN: Slavica Publishers.
- Vidoeski, Božo. 2006. *Dialects of Macedonian*. Bloomington: Slavica.
- Wagner, Michael. 2011. Production planning constraints on allomorphy. *Canadian Acoustics* 39:160–161.
- Wagner, Michael. 2012. Locality in phonology and production planning. *McGill Working Papers in Linguistics* 22:1–18. Proceedings from Phonology in the 21st Century: In Honour of Glyne Piggott.

- Werle, Adam. 2009. Word, phrase, and clitic prosody in bosnian, serbian, and croatian. Doctoral Dissertation, University of Massachusetts, Amherst.
- Wetzels, W. Leo, and Joan Mascaró. 2001. The typology of voicing and devoicing. *Language* 207–244.
- Wickham, Hadley. 2009. *ggplot2: elegant graphics for data analysis*. New York: Springer. URL <http://had.co.nz/ggplot2/book>.
- Woolford, Ellen. 2011. PF factors in pronominal clitic selection in Tzotzil. 305–320. Santa Cruz, CA: Linguistics Research Center. Available online at <https://escholarship.org/uc/item/0vf4s9tk#page-313>.
- Yasavul, Murat. 2014. Negation in K'iche'. In *Proceedings of Formal Approaches to Mayan Linguistics (FAMLi) 2*, ed. Lauren Eby Clemens, Robert Henderson, and Pedro Mateo Pedro, 119–139. Cambridge, MA: MIT Working Papers in Linguistics.
- Yu, Alan C.L. 2003. The morphology and phonology of infixation. Doctoral Dissertation, University of California, Berkeley.
- Yu, Alan C.L. 2007. *A natural history of infixation*. Oxford, UK: Oxford University Press.
- Zanuttini, Raffaella, and Paul Portner. 2003. Exclamative clauses: At the syntax-semantics interface. *Language* 39–81.
- Zec, Draga. 2005. Prosodic differences among function words. *Phonology* 22:77–112.
- Zwicky, Arnold. 1977. *On clitics*. Bloomington, Indiana: Indiana University Linguistics Club.
- Zwicky, Arnold, and Geoffrey Pullum. 1983. Cliticization vs. inflection: English *n't*. *Language* 59:502–513.

Ryan Bennett  
 Yale University  
 Dept. of Linguistics  
 P.O. Box 208366  
 New Haven, CT 06520-8366  
[ryan.bennett@yale.edu](mailto:ryan.bennett@yale.edu)  
<http://pantheon.yale.edu/~rtb27/>

Boris Harizanov  
 Stanford University  
 Dept. of Linguistics  
 103 Margaret Jacks Hall  
 Stanford, CA 94305  
[bharizan@stanford.edu](mailto:bharizan@stanford.edu)  
<http://stanford.edu/~bharizan/>

Robert Henderson  
 University of Arizona  
 Dept. of Linguistics  
 1103 E University Blvd.  
 Tucson, AZ 85719  
[rhenderson@email.arizona.edu](mailto:rhenderson@email.arizona.edu)  
<http://www.rhenderson.net/>