Deriving verb-initial word order in Mayan*
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Comments Welcome

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Abstract

While languages in the Mayan family are predominantly verb-initial (V1), individual languages display either rigid VSO or alternating VOS/VSO word orders (England 1991). Existing proposals derive V1 order in Mayan by base-generating the subject in a *v*P-internal right-side specifier (Aissen 1992) or by XP-fronting a predicate to a high left-side specifier position (Coon 2010). We review problems with previous accounts and argue that V1 is consistently derived by head movement of the verb to a position above the subject and below Infl^0. This proposal accounts for uniformity in verb-stem formation across the family and provides a natural account of VSO orders. Next, we turn to VOS/VSO alternating languages, where a variety of factors have been reported to determine postverbal argument order, including specificity, definiteness, phonological weight, discourse prominence, and argument animacy (see e.g. England 1991). After an in-depth examination of these factors, we suggest that there are three distinct and independently motivated paths to VOS order in the Mayan family. First, based on prosodic evidence from Ch'ol, we argue that VOS may be derived by postsyntactic reordering of NP objects (Clemens 2014). In addition, VOS may arise through right-side subject topicalization (Can Pixabaj 2004; Curiel 2007) or the shifting of heavy subjects towards the periphery of the clause (Larsen 1988). This account both provides better empirical coverage internal to Ch'ol, and makes testable predictions in the domains of word order and prosodic constituency for other Mayan languages.

Keywords: Verb-initial languages; head-raising; prosody; Ch'ol; Mayan languages

1   Introduction

Languages of the Mayan family are predominantly verb-initial (V1) in discourse-neutral contexts and fall into two main groups with respect to postverbal argument order: (i) languages with rigid VSO order, and (ii) languages with alternating VOS/VSO orders (England 1991). For VOS/VSO-alternating languages, a variety of factors have been reported to determine postverbal argument order, including specificity, definiteness, animacy, phonological weight, and discourse status.

The degree of variation in the factors that govern postverbal argument order presents a challenge for any account of V1. Despite this variation, however, a number of common patterns emerge. Drawing on these patterns and other similarities across the family (e.g. Grinevald & Peake 2012; England & Zavala 2013; Bennett et al. to appear; Aissen et al. to appear, discussed in §2), we begin this paper by providing a unified account of V1 order in Mayan. Though a full study of word

order variation in the roughly thirty currently-spoken Mayan languages is beyond the scope of this paper, we will draw from a diverse set of publications on a range of Mayan languages to demonstrate a broad base of support for our unifying analysis. We further outline the consequences and predictions of our account—especially with respect to prosodic constituency—that will bear testing in future work.

Our specific proposal for the derivation of V1 order in Mayan is based on head-movement of the verb root to a projection above the subject and below Infl^0; The "SS" projection hosts the status suffix and Infl^0 hosts the Tense-Aspect-Mood morpheme, both discussed below. The basic structure we propose is shown in (1b) for a VSO sentence like the Q'anjob'al example in (1a).

(1)   HEAD-MOVEMENT VSO

  a.   [I Max] [V slaq'] [S ix   unin] [O naq Pilin   ].
          TAM   hug   CLF.FEM child   CLF Felipe
        'The girl hugged Felipe.'   (Q'anjob'al; Baquiax Barreno et al. 2005:168)

  b.
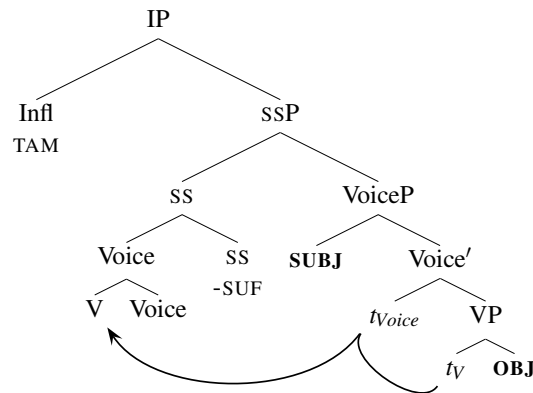
From a cross-linguistic perspective, there is nothing new about a head-movement approach to V1; assuming that subjects remain low, head movement is a well-supported way to achieve VSO order in a variety of languages (see Clemens & Polinsky to appear for a recent overview). For Mayan languages with rigid VSO order, like Q'anjob'al, relatively little needs to be said: the bracketed elements in (1a) correspond to terminal elements in (1b), discussed in more detail in section 2. Nonetheless, to our knowledge this is the first explicit proposal for a head-movement approach to V1 order in Mayan.

More controversial is the claim that a head-movement account for V1 order should be maintained even for languages which have been described as basically VOS, or alternating VOS/VSO. We examine one such language in detail in this paper: Ch'ol, a language of the Ch'olan–Tseltalan branch. For the family more

generally, we argue that there are three types of VOS clauses, each independently motivated, which may co-exist in a single language. We further posit that, each of these paths to VOS is compatible with a single head-movement analysis of Mayan V1 syntax like the one in (1b).

(2)   PATHS TO VOS
          a.   subject in high right-side topic position
          b.   heavy-NP shift of phonologically heavy subjects
          c.   prosodic re-ordering of bare NP objects

We provide a syntactic account for (2a) based on Aissen (1992), supported by evidence from the Mayan literature for the existence of high topics ordered to the right of the verb (e.g. Can Pixabaj 2004; Curiel 2007), in addition to the well-established topic position to the left of the verb. Similarly, heavy-NP shift (2b) is attested in a wide range of languages, including those of the Mayan family (see Larsen 1988); here, we remain agnostic as to whether heavy-NP should receive a syntactic, prosodic, or processing account. Finally, with an empirical focus on Ch'ol, we provide novel evidence for the existence of (2c) in Mayan: VOS order is derived post-syntactically through reordering of the object due to prosodic requirements. Specifically, drawing on Clemens's (2014) proposal for VOS in Niuean, we argue that bare NP objects are subject to a high-ranked prosodic constraint which requires them to be linearly adjacent to the verb so that they can be pronounced in the same prosodic phrase as their selecting head.

The account sketched above makes strong testable predictions: all else being equal, word order in Mayan should be VSO, with VOS arising due to the factors listed in (2). In principle, any language should allow subjects to appear to the far right if they are topics (2a) or phonologically heavy (2b). However, languages that generally allow bare NP arguments (i.e. "NP languages" in Chierchia 1998; Bošković 2008) may frequently show VOS due to the prosodic constraint we motivate below, which protects full DP arguments from reordering by virtue of their phasehood. Though much of the empirical discussion and subsequent proposal below focuses on Ch'ol, we point to converging evidence in other languages and suggest avenues for testing the predictions of our account.

The remainder of this paper is organized as follows. In section 2, we provide basic information about the Mayan family and present our proposal for a head-movement account of stem derivation and VSO order. Next, in section 3, we look in more detail at variation in word order across the family in order to understand the environments for VOS and VSO, including a specific look at VOS and VSO orders in Ch'ol. Section 4 reviews the existing accounts of Mayan word order: XP-fronting of a predicate (Coon 2010) and base-generation of right-side specifiers

(Aissen 1992). We discuss insights to be taken from each approach as well as the benefits of adopting a head-movement account. In section 5, we present our account of VOS and VSO sentences in Ch'ol, in which bare NP objects shift towards the verb in order to satisfy a high-ranked constraint on prosodic constituency. Finally, in section 6, we briefly discuss VOS in other Mayan languages and the potential for extending the analysis to include languages with a general preference for peripheral topics. We discuss prosodic predictions of each avenue to VOS, as well as directions for future work before concluding in section 7.

2 A unified Mayan syntax

In this section, we offer the first head-movement account of verb-initial order in Mayan. The Mayan language family consists of about thirty languages divided into six major sub-groups as shown in (3) (Campbell & Kaufman 1985); these languages are spoken today in Mexico, Guatemala, and Belize by roughly five million people (England 2003). Below, we examine data from the major sub-families; for more information on subgroupings, see Campbell & Kaufman 1985; England & Zavala 2013; Bennett et al. to appear and references cited there.

(3)   MAYAN LANGUAGE FAMILY (CAMPBELL & KAUFMAN 1985)

    a.   <u>Yucatecan:</u> Yucatec, Itzaj, Lacandon, Mopan
    b.   <u>Huastecan:</u> Huastec
    c.   <u>Ch'olan–Tseltalan:</u> Ch'ol, Chontal, Ch'orti', Tseltal, Tsotsil
    d.   <u>Q'anjob'alan:</u> Tojolab'al, Chuj, Q'anjob'al, Akatek, Popti', Mocho'
    e.   <u>Mamean:</u> Mam, Tektitek, Awakatek, Chalchitek, Ixil
    f.   <u>K'ichean:</u> Kaqchikel, Tz'utujil, K'iche', Achi, Sipakapense, Saka-pultek, Poqomam, Poqomchi', Q'eqchi', Uspantek

Despite considerable variation across the family, Mayan languages share a number of commonalities relevant to our proposal, which we review briefly here; for general grammatical overviews, see Grinevald & Peake 2012; England & Zavala 2013; Bennett, Coon & Henderson to appear; Aissen, England & Zavala to appear.

    Most Mayan languages are *pro*-drop, allowing core arguments to be omitted. Overt nominal arguments are unmarked for case. Instead, grammatical relations are head-marked on the predicate with two sets of person/number markers: "Set A" (ergative, possessive) and "Set B" (absolutive). The majority of the data in this paper will be drawn from transitive sentences, in which subjects bear Set A markers and objects bear Set B markers. Third-person singular Set B morphology is unmarked across the family, and in many languages free-standing pronouns are

used only for emphasis. Transitive examples from Ch'ol and Chuj are shown in (4).[1]

(4)   a.   Tyi k-chuk-u-yety.
               PFV A1-carry-SS-B2
               'I carried you.'   (Ch'ol)
      b.   Ix-ach-ko-chel-a'.
               PFV-B2-A1P-hug-SS
               'We hugged you.'   (Chuj)

These examples also illustrate that in verbal predicates, a tense-aspect-mood (TAM) marker normally appears initially; there is variation across the family as to whether and where a word boundary is transcribed internal to the TAM–stem complex.[2] Verb stems are often suffixed with a "status suffix," the nature of which may vary depending on transitivity, aspect, and other factors. Status suffixes are glossed "SS" throughout the paper.

For many Mayan languages, Set A markers are understood to be prefixes, while Set B markers are clitics (see discussion in Grinevald & Peake 2012). While order of morphemes on the stem is relatively consistent across the Mayan family, languages vary as to the location of the Set B clitic, as schematized in (5). For example, in the sentences in (4) above, Ch'ol shows the low option (4a), while Chuj illustrates the high option (4b).

(5)   TAM – {**ABS**} – **ERG** – VERB.STEM – {**ABS**}

Mayan languages exhibit two basic word order types: (i) rigid VSO order, and (ii) alternating VOS/VSO order (England 1991).[3] Head-movement offers the most

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[1]Abbreviations used in glosses are as follows: A – "Set A" (ergative, possessive); ABS – absolutive; AFF – affirmative; AP – antipassive; APPL – applicative; B – "Set B" (absolutive); CAUS – causative; CLF – classifier; DEIC – deictic; DEM – demonstrative; DES – desiderative; DET – determiner; DIR – directional; ENC – enclitic; EMPH – emphatic; FOC – focus; HS – hearsay; IRR – irrealis; MOD – modal; PART – particle; PASS – passive; PERF – perfect; PFV – perfective; PL – plural; PLUR – pluractional; PRON – pronoun; PST – past tense; REP – reportative; SS – "status suffix"; TOP – topic. In some cases, glosses, transcriptions, or the spelling of language names have been modified from the original source for consistency and in accordance with revised conventions (see discussion in Mateo Toledo 2003 and Bennett et al. to appear). Examples without citations are from our own elicitation work and translations from Spanish sources are our own.

[2]We assume that the presence of an orthographic word boundary does not necessarily reflect a syntactic difference with respect to the head movement proposal here, but rather reflects differences in the constraints governing the formation of prosodic words in the language (following Bennett, Harizanov & Henderson 2015) and/or in language-specific orthographic conventions.

[3]Even "rigidly VSO" languages may display VOS in special circumstances, discussed further in sections 5 and 6 below. For example, VSO Q'anjob'al displays non-canonical VOS order in

straightforward account of V1 order in rigidly VSO languages like Q'anjob'al (6a) and the VSO structures of alternating-VOS/VSO languages like Ch'ol (6b).

(6)   a.   Max y-il   [$_S$ no   tx'i] [$_O$ naq Lwin].
              PFV A3-see   CLF dog   CLF Pedro
              'The dog saw Pedro.'   (Q'anjob'al; Baquiax Barreno et al. 2005:169)
       b.   Tyi i-k'uch-u   [$_S$ aj-Maria   ] [$_O$ jiñi si'   ].
              PFV A3-carry-SS   CLF-Maria   DET wood
              'Maria carried the wood.'   (Ch'ol)

Looking ahead, head-movement of the verb into a position above the external argument will form the foundation of our account of VOS in VOS/VSO languages. Before turning to the derivation of VOS, we outline our proposal for VSO here.

    As previewed above, to derive V1 in both VSO and VOS/VSO-alternating languages, we propose that the root undergoes cyclic head movement to a functional head above the subject and below Infl^0. This complex stem lands in the head that hosts the status suffix, labelled SS^0 in this paper.[4] The order of morphemes in the verb stem—ROOT-(VOICE)-STATUS.SUFFIX—is consistent with the Mirror Principle (Baker 1985). As shown in (7), repeated from (1) above, this movement lands the stem in a position *below* the TAM marker in Infl^0, and above the subject. The position of clitics, which regularly intervene between the TAM marker and the verb stem (discussed in section 4.2 below), provides further evidence for this structure.

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reflexives, the incorporation antipassive (§5.1), and topicalized first- and second-person pronominal subjects (§6.3) (Mateo Toledo 2008).

    [4]The projection "SSP" corresponds to the projection labelled "*v*P" by Coon et al. (2014) (see also Armstrong 2015). While these authors stress that the *v*P label should not be taken to imply that this head has all the properties associated with *v*^{0} heads elsewhere (e.g. categorization and case-assignment; see Harley 2016 for an overview), here we have chosen a more neutral label for clarity. A closer parallel to SSP may be Halpert's (2015) "L(icensing)P," although we leave the exact nature of this projection to future work. Crucially for us, ss^0 is a head at the edge of the extended verbal projection that sits above the subject and hosts the status suffix.

(7)   HEAD-MOVEMENT VSO
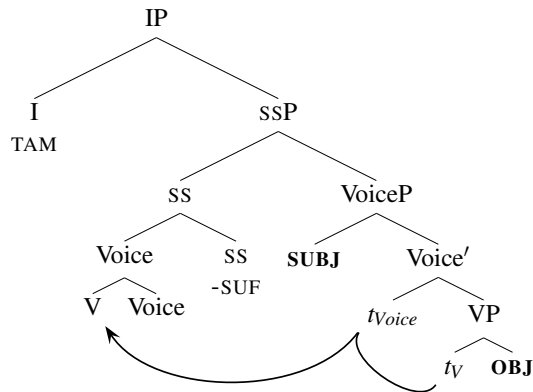
This proposal both provides a natural account of VSO order and a way to connect Mayan to other unrelated verb-initial languages that have received head-movement accounts of VSO (see Clemens & Polinsky to appear for a recent overview of V1 languages). Perhaps more importantly, the head-movement account captures both the pan-Mayan attributes of morpheme order within the verbal complex (found in both VSO and VOS/VSO languages) and the fact that all Mayan languages make VSO order available in at least some contexts.

The question now becomes how to derive *VOS order* in such a way that it is compatible with a general head-movement account of V1. In section 5, we argue for a prosodic account of VOS order in Ch'ol, in which bare NP objects are post-syntactically reordered to satisfy prosodic requirements. In section 6, we turn to the other paths to VOS listed in (2): right-side topics and heavy-NP shift. Before formalizing our account of VOS order, we consider the complex set of factors that condition word-order variation in the postverbal realm.

3   Mayan word order

Though Mayan languages are generally described as "verb initial," in many languages, all six orders of S, V, and O are possible (see e.g. Brody 1984 on Tojolab'al; Hofling 1984 on Yucatecan languages; Can Pixabaj 2006 on Uspantek). This section examines the factors governing word-order alternations in Mayan. Section 3.1 briefly reviews the ordering of *preverbal* arguments, and then sections 3.2 and 3.3 discuss postverbal variation, the main focus of this paper. While a range of complex factors have been claimed to govern postverbal order in languages that show variation, we suggest—following Minkoff 2000—that some of these factors may be attributed to processing effects (see also some discussion in Brody 1984; Skopeteas & Verhoeven 2009). Once these clearly extra-grammatical factors are eliminated, we

focus on the first of a series of generalizations which we argue cannot be attributed to processing alone: a ban on D^0-level material (i.e. determiners, demonstratives, pronouns, proper names) in VOS object position, corroborated for Ch'ol in 3.4.

3.1 Preverbal orders

Though Mayan languages are generally considered V1, a range of work across the family has shown that one or both arguments may appear preverbally for topic, focus, *wh*-questions, and relativization (e.g. Norman 1977, discussed in Larsen 1988, and Aissen 1992). Topic position precedes focus position, as shown in the SOV examples in Tsotsil and Ch'ol in (8) and (9).

(8)   [_TOP A   ti   prove tzeb-e   ] [_FOC sovra   ] ch'ak'bat.
                 TOP DET poor girl-ENC   leftovers was.given
         'It was leftovers that the poor girl was given.'   (Tsotsil; Aissen 1992:51)

(9)   [_TOP A   li   aj-Oskar-i   ] [_FOC ixim-äch] tyi i-kuch-u   tyälel.
                 TOP DET CLF-Oskar-ENC   corn-AFF PFV A3-carry-SS DIR
         'As for Oscar, it is corn that he brought.' (Ch'ol; Vázquez Álvarez 2011:340)

OSV order—with a topical object and a focused subject—appears to be less frequent, but is also attested. Examples from Tojolab'al and Itzaj are shown in (10) and (11).

(10)   [_TOP Ja-xa   pan-i   ] [_FOC ja' Roberto] s-lo'-o.
                 DET-now bread-ENC   FOC Roberto A3-eat-SS
         'As for the bread, it was Roberto who ate it.' (Tojolab'al; Brody 1984:721)

(11)   [_TOP U-meyaj-ej   ] [_FOC in-ten   ] k-inw-il-ik   ti'ij.
                 A3-work-TOP   EMPH-1PRON   IPFV-A1-see-SS 3PRON
         'His work, *I* look after it for him.'   (Itzaj; Hofling 2000:196)

For many languages, including the ones cited above, preverbal topichood is morphologically marked. In other cases, word order alone can indicate that a preverbal constituent is the topic of the utterance (Broadwell 2000; Gutiérrez Bravo & Monforte y Madera 2008). Generally speaking, if a clause has an unmarked, preverbal topic, that topic is also the grammatical subject. We return to topics in section 6 below.

While the ordering of preverbal elements is clearly linked to discourse status (in addition to A'-movement for *wh*-questions and relativization), the relative ordering of *postverbal* arguments is less well understood, and also appears to show more variation across the family. Accounting for variation in postverbal word order is the focus of the remainder of this paper.

3.2   Postverbal orders

Determining "basic word order" in any given language is not always a straightforward matter, and in Mayan this is particularly true (see discussion in Brody 1984; Larsen 1988; England 1991; Quizar 1979; Robinson 2002). As noted in section 2, Mayan languages generally allow both subjects and objects to be *pro*-dropped. Furthermore, arguments appear in preverbal position for topic and focus. As a result, it is actually very uncommon in naturally occurring speech to find a transitive sentence with two overt arguments (DuBois 1987; England & Martin 2003), and even less common for both overt arguments to appear postverbally. 3% or fewer of corpus sentences in England & Martin's (2003) survey have two overt arguments; see Robinson 2002; Curiel 2007; Skopeteas & Verhoeven 2005; Vázquez Álvarez & Zavala 2013 for more detailed numerical corpus counts). Yet, however uncommon V-NP$_1$-NP$_2$ clauses may be in natural speech, they provide key evidence on the derivation of word order in the Mayan family.

In her detailed study of word order across the family, England (1991) begins by grouping Mayan languages into three main types based on the behavior of postverbal arguments: **(i)** VSO (e.g. Mam, Tektiteko, Awakateko, Ixil, Q'anjob'al); **(ii)** VOS (e.g. Mopan, Lakandon, Tsotsil); and **(iii)** alternating VOS/VSO (e.g. Ch'ol, Tseltal, Kaqchikel, K'iche', Akateko). However, while languages in the VSO category have a rigid ordering of postverbal arguments (i.e., VOS is generally prohibited), the distinction between the latter two categories—VOS and alternating VOS/VSO—is less clear. England (1991) ultimately concludes that these two alternatives should be collapsed into a single category of VOS languages that allow VSO to varying extents (see also Quizar 1979):

> "Having examined the data in more detail, I conclude that the original distinction I drew between VOS languages and VOS/VSO languages is not useful. These languages fall on a continuum from accepting VSO rather readily under some conditions, to accepting it only under very restricted circumstances, to not accepting it at all" (England 1991:477)

Factors that have been proposed to influence the ordering of postverbal arguments include phonological weight, discourse prominence, definiteness, specificity, animacy—and, in some cases, the *relative* values of these features. In section 6, we review the evidence that phonologically heavy arguments may undergo heavy-NP shift to the right. In addition, section 6 reviews evidence from the Mayanist literature for a *peripheral* topic position, ordered either to the left or to the right of the main clausal structure. In the rest of section 3, we concentrate on the remaining factors influencing postverbal argument order: definitenes, specificity, and animacy.

We suggest below that the relevant grammatical factor at play is not semantic definiteness or specificity, per se, but rather the presence of D^0-level material. We further propose that the apparent animacy effects are due to processing and should not factor into grammatical accounts of word order.

3.3 Definiteness, specificity, and animacy

Much of the literature discussing the apparent effect of animacy on postverbal word order in Mayan languages cites the seminal work of Norman & Campbell (1978:146), who state that for Proto-Mayan: "Unmarked order was VSO when S and O were equal on the [animacy] feature hierarchy, VOS when S was higher than O". Norman & Campbell base this claim primarily on comparative data from two genetically distant, extant Mayan languages: Huastec and Tseltal. Tseltal examples are illustrated in (12): the VSO sentence in (12a) involves two equal-animacy animals, while in the VOS sentence in (12b), the human subject outranks the non-human object.

(12)   a.   La   s-t'om ta ti'el [ₛ ts'i'] [ₒ te   baka].
              ASP A3-bite   dog   DET cow
              'The dog bit the cow.'
        b.   La   s-mil   [ₒ baka] [ₛ te   jpetule].
              ASP A3-kill   cow   DET Pedro
              'Pedro killed the cow.'   (Tseltal; Norman & Campbell 1978:145)

Quizar (1979) and England (1991) add, based on data from a range of languages, that the relative definiteness of the two postverbal nominals should be included in the features governing order. A further, related distinction is also illustrated in the examples in (12): the object in the VSO sentence bears a determiner, while the object in the VOS sentence does not. This distinction will be important to our discussion below.

Though the claim in Norman & Campbell 1978 is widely cited, conflicting statements also exist, and a range of seemingly more complex interactions arise. Larsen (1988:341) writes of K'iche' that, "if the NP in O function is animate, it must be 'non-definite'" (Larsen 1988:341). Brody (1984:720) states that for Tojolab'al, VSO is only acceptable when the subject is high-ranked in animacy and the object is low-ranked, in apparent conflict with Norman & Campbell's generalization. Hofling (2000:191) writes for Itzaj that, while "animacy of arguments has some effect on interpretations, with subjects typically human, specificity appears to be more important. If the first argument following the verb is equal to, or greater, in specificity than the second argument, the sentence is ambiguous out of context, with a VSO interpretation preferred."

A careful look at the data on which descriptions like these are based lends credibility to a proposal by Minkoff (2000), who suggests a processing explanation for the apparent relevance of animacy and prominence in the emergence of hierarchy effects in Mayan languages (this type of explanation is also alluded to in other work on Mayan word order, including Bohnemeyer 2009 and Skopeteas & Verhoeven 2005). Recall from section 2 that Mayan languages (i) are verb-initial, (ii) show no case-marking on nominals, and (iii) permit pro-drop of both subject and object. A transitive V1 configuration is schematized in (13).

(13)   V [NP$_1$] [NP$_2$]

Taken together, the factors we discuss above mean that, at the point at which a speaker has uttered a string [V]–[NP$_1$], out of context, the listener will not know whether the first nominal is the subject or the object. For one thing, neither argument will be marked for case. This generalization holds true for all Mayan languages, and is shown in (14) for VOS/VSO-alternating Itzaj. The verb does show Set A agreement with a third-person subject (recall that third-person Set B is unmarked), but when both arguments are third person, the third-person Set A marker does not disambiguate the clause. According to Hofling (2000), provided that both interpretations are equally plausible, this type of sentence may be interpreted as either VOS or VSO. This is shown in (14).

(14)   T-u-kin-s-aj   [$_{ARG1}$ winik] [$_{ARG2}$ b'alum].
         PFV-A3-die-CAUS-SS   man   jaguar
         'A man killed a jaguar.' / 'A jaguar killed a man.' (Itzaj; Hofling 2000:191)

The confluence of grammatical features that leads to this ambiguity (V1 order, head-marking, and null 3rd person Set B markers) is likely to affect the processing of Mayan languages—*even those with rigid VSO order*. In Minkoff's terms, "the processor cannot determine which argument is the subject until it has identified both arguments" (Minkoff 2000:205). In a VSO language, three interpretations are available for the string [V]–[NP$_1$], it could be that NP$_1$ is the subject and the object is still to come; that NP$_1$ is the subject and the object has been *pro*-dropped; or that NP$_1$ is the *object* and the subject has been *pro*-dropped.

Minkoff proposes that, in caseless, V1, *pro*-drop languages like those of the Mayan family, the processor "is innately configured so that it values any interpretation that assigns the agent role to any argument that might bear it, and that this value is proportional to the animacy of the argument in question" (see also discussions of "harmonic alignment" in Skopeteas & Verhoeven 2005; Bohnemeyer 2009). Following Minkoff, we take the apparent role of animacy in determining postverbal word order to be a *processing* effect: when presented with a constructed

example in a language with variable VOS/VSO order, we suggest that consultants are most likely to assign the role of subject to the most animate/salient argument—regardless of whether the grammar of the language in question would generate such a sentence.

Grammatical descriptions that report animacy hierarchy effects in Mayan base their discussion on elicited examples (again, this is often *necessary*, since it is very rare to find two postverbal arguments in natural speech); see e.g. Mondloch 1978; Hofling 2000; Minkoff 2000; Can Pixabaj 2006; Vázquez Álvarez 2011. Given the factors described above, there is an inherent risk associated with eliciting judgments for non-naturally occurring examples. For Akatek, for example, Peñalosa (1987:283) writes that consultants presented with V-NP$_1$-NP$_2$ sequences with two third-person nominal arguments "may give contradictory interpretations on different occasions, be confused, or say it depends on the context which is subject and which is object." Likewise, in a controlled study of postverbal word order in Yucatec, Skopeteas & Verhoeven (2005) report a wide range of variation in interpretations assigned by participants to V-NP$_1$-NP$_2$ sentences, including ones in which the second argument is interpreted as a subconstituent of the first. The problem described here has been replicated in our own work with Ch'ol, and is articulated clearly by Larsen (1988), who writes of K'iche':

> "It is often dangerous to attempt to investigate word order phenomena by means of eliciting sentences. And in fact, it turns out that even though my informants might, when presented with [certain constructed examples], accept these as good [VOS] sentences, they never seemed to produce such sentences spontaneously…similarly, even though my informants might accept sentences like [certain constructed examples] as well-formed [VSO] sentences, I have never encountered such sentences in texts." (Larsen 1988:345).

Indeed, in Robinson's (2002:76) corpus study of Tenejapa Tseltal, he states that he has "found little evidence in favor of the claim, first made by Smith (1975) and later cited by Norman & Campbell (1978) and Dayley (1981), that Tenejapa Tzeltal constituent order is determined by a hierarchy of animacy."

When it comes to VOS/VSO-alternating languages, then, what *do* speakers produce? In her larger survey, England (1991:464) concludes that once animacy is set aside; "The general rule is that VOS is used when the S is definite and the O indefinite, while VSO is used when both S and O are definite." Note that the crucial factor is the status of the *object*; the general preference for definite subjects in V-NP$_1$-NP$_2$ configurations may be connected to discourse constraints (DuBois 1987) and topicality, to which we return in section 6 below.

In his spoken corpus of 4,631 clauses, 909 of which are transitive, Robinson (2002) finds two naturally-occurring VSO sentences in Tseltal. In one, the constituent analyzed as the object is phonologically heavy (discussed in §6); in the other, shown in (15), the object appears with a determiner.

(15) Ma' ba s-tak'   xlok' j-k'atin   [$_S$ jo'tik   ] [$_O$ te
      NEG   A3-be.possible AUX A1-take.warmth.from   1PL.PRON   DET
      j-ch'ul-tat-tik-e   ].
      A1-holy-father-1PL-ENC
      'It is not possible for us to get out and warm ourselves in the sun.'
      (Tseltal; Robinson 2002:76)

The rest of the naturally-occurring examples with two postverbal arguments are VOS sentences. In all of the examples Robinson provides, the object is a determinerless NP. An example is given in (16):

(16) Ja'   nax laj jich, la   laj s-ta   [$_O$ alchaxiltik   ] [$_S$ te   winik-e].
      EMPH only HS thus PFV HS A3-find   orange.orchard   DET man-ENC
      'Thus it was, the man found an orange orchard.'   (Tseltal; Robinson
      2002:61)

Below, we propose that it is the absence of D^0-level material on the object—including determiners, demonstratives, pronouns, and proper names—which triggers VOS order in Ch'ol, and we develop a prosodic account for this pattern. We suggest, following Larsen (1988) and England (1991), that while elicitation is a valuable tool for ruling out ungrammatical examples, care must be taken when evaluating judgments on constructed examples. In particular, based on our survey of reported word order variation across Mayan, we suggest that the absence of D^0-level material on VOS objects (not *definiteness* or *specificity* per se) is a grammatical fact to be accounted for in languages for which word order has been reported to be sensitive to definiteness/specificity.

We claim, however, that the reported effects of animacy result from processing considerations. This is in keeping with the fact that the effects of animacy are best supported by speakers' judgments of constructed examples (i.e. a processing task), rather than by naturally-occurring sentences. We discuss specific examples of this for Ch'ol in the section that follows, and propose that animacy effects should not be considered in developing an account of the grammar of V1 order.

3.4   VOS and VSO in Ch'ol

Basic word order in Ch'ol is described as VOS (Vázquez Álvarez 2002, 2011; Coon to appear-a), illustrated in the examples in (17).

(17) a. Tyi i-kuch-u   [$_O$ si'   ] [$_S$ aj-Maria   ].
          PFV A3-carry-SS   wood   CLF-Maria
          'Maria carried wood.   (Coon 2010:355)
      b. Tyi y-il-ä   [$_O$ x'ixik   ] [$_S$ wiñik].
          PFV A3-see-SS   woman   man
          'The man saw the woman.'   (Vázquez Álvarez 2011:21)

As the above examples show, VOS in Ch'ol is possible regardless of the animacy of the object; conversely, inanimate *subjects* are generally dispreferred, regardless of word order (see e.g. England 1991:449). However, as discussed in detail in Coon 2010, VOS objects cannot be full DPs. This is shown by the ungrammaticality of the sentences in (18).

(18) a. *Tyi i-kuch-u   [$_O$ ili   si'   ] [$_S$ aj-Maria   ].
          PFV A3-carry-SS   DEM wood   CLF-Maria
          intended: 'Maria carried this wood.'   (Coon 2010:355)
      b. *Tyi y-il-ä   [$_O$ jiñi x'ixik   ] [$_S$ wiñik].
          PFV A3-see-SS   DET woman   man
          intended: 'The man saw the woman.'

One exception to this rule occurs when the subject undergoes heavy-NP shift, as shown in (19) below (see also section 6.2).

(19) a. *Tyi i-boñ-o   [$_O$ ili   otyoty] [$_S$ jiñi wiñik].
          PFV A3-paint-SS   DEM hous   DET man
          intended: 'The man painted this house.'
      b. Tyi i-boñ-o   [$_O$ ili   otyoty] [$_S$ jiñi wiñik ta'-bä   k'oty-i   ].
          PFV A3-paint-SS   DEM house   DET man PFV-REL arrive-SS
          'The man who arrived painted this house.'

In general, however, determiners, demonstratives, and proper names are all rejected in VOS object position in Ch'ol (and free-standing pronouns, too, generally only appear in preverbal positions). It is worth emphasizing that this restriction appears to pertain to the presence of D^0-level material, not semantic interpretation. As discussed in Coon 2010 and in section 6.1 below, *bare nouns* in VOS object position may receive definite interpretations in Ch'ol, given an appropriate context. Possessed nouns and numerals—including the numeral *one*, which may appear with

indefinites—also behave as bare NPs, and we assume following Coon (2010) that possessive phrases and numerals sit below the level of D^0.

If both arguments in a Ch'ol sentence are postverbal and the object is a full DP, VSO order is preferred. This is shown in (20).

(20)   a.   Tyi i-kuch-u   [s aj-Maria   ] [o ili   si'   ].
            PFV A3-carry-SS   CLF-Maria   DEM wood
            'Maria carried this wood.'
       b.   Tyi y-il-ä   [s aj-Pedro   ] [o jiñi wiñik].
            PFV A3-see-SS   CLF-Pedro   DET man
            'Pedro saw the man.'

Note that in (20b), the subject is a proper name. If the immediately postverbal argument were instead a bare NP, a VOS interpretation would be most natural. By making the first postverbal argument a full DP, we rule out the possibility of a VOS reading (due to the restriction against DP objects in VOS). In (20a), the VOS reading is also ruled out for pragmatic reasons (wood does not carry women) and a general dispreference for inanimate subjects.

Vázquez Álvarez (2002) writes that animacy may influence the order of postverbal arguments, and provides the example in (21).

(21)   Tyi y-il-ä   [s x'ixik] [o tyuñ].
       PFV A3-see-SS   woman   rock
       'The woman saw the rock.'
       not: 'The rock saw the woman.'   (Vázquez Álvarez 2002:28)

We suggest that this interpretation arises due to the processing considerations outlined in section 3.2 above. This proposal is in keeping with Vázquez Álvarez's own account: he notes that, while speakers will offer a VSO interpretation, they insist that this interpretation sounds incorrect, and would only be said by someone who is learning Ch'ol or forgetting how to speak it (Vázquez Álvarez 2002:fn. 2).

As with animacy, the ban on full DPs in VOS object position may also have an effect on how constructed sentences are evaluated by consultants. As Vázquez Álvarez (2011:22) notes in his description of the sentence in (22), "a definite noun in the [immediately postverbal] position can also have an effect on the VOS reading…The noun with *li* is more readily interpreted as the subject, even if it is in the position usually reserved for the object" (Vázquez Álvarez 2011:22).

(22)   Tyi y-il-ä   [li   wiñik] [x'ixik   ].
       PFV A3-see-SS   DET man   woman
       'The man saw the woman.'
       ?'The woman saw the man.'   (Ch'ol; Vázquez Álvarez 2011:22)

In other words, when presented with a sentence like (22), the hearer will reason that the immediately postverbal argument must be the subject, since DP objects are banned from VOS object position.

To summarize: in Ch'ol, we aim to provide an account for the generalization, reported in Coon 2010 and supported by naturally produced data, that NP objects appear in VOS and DP objects appear in VSO (setting aside for now phonologically heavy subjects, which we tackle in §6). However, the discussion above has served to highlight that other factors may also play a role in how consultants evaluate constructed examples in Ch'ol. In particular, problems arise when consultants are asked to provide interpretations for V-NP$_1$-NP$_2$ sentences with two third-person arguments, as we also saw for other languages above. In what follows, we set processing considerations aside and present a prosodic account of the contrast between NP and DP objects, restricting ourselves to sentences generated by the grammar.

4   Previous accounts

In this section we examine previous analyses of the derivation of V1 orders in Mayan. We begin in section 4.1 by considering approaches that take V1 to be base-generated, as articulated in Aissen 1992 and assumed in much subsequent work on Mayan. In section 4.2, we discuss the proposal in Coon 2010 that V1 is derived by fronting of a maximal projection (containing the predicate and object) over the subject. We discuss challenges faced by these analyses before presenting in detail our head-movement account of V1 order.

4.1   Right-side specifiers

The standard approach to Mayan V1 base-generates VOS by placing the subject in a right-side specifier (Aissen 1992), as in (23).

(23)   RIGHT-SIDE SPECIFIER VOS

```
              IP
           ╱     ╲
          I       VoiceP
                 ╱      ╲
              Voice′     SUBJ
             ╱    ╲
          Voice    VP
                  ╱  ╲
                 V    OBJ
```
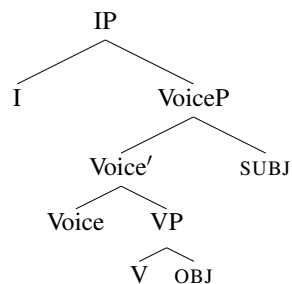
Aissen proposes that the linearization of specifiers is parameterized, such that specifiers of functional categories appear to the left (i.e. topic and focus), and specifiers of lexical categories to the right (i.e. postverbal subjects). Specifier 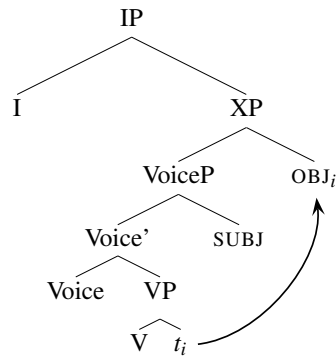paramaterization also captures word order in the nominal domain, where *wh*-possessors precede the noun and all other possessors follow it.[5]

Aissen (1992:44) explicitly states that her account is not meant to capture variation in postverbal order. In fact, she notes this limitation as "a point in [her account's] favor, since the conditions governing pre- and postverbal orders are different" (as we saw in sections 3.1–§3.3 above). Nonetheless, an Aissen-style base-generation approach does allow for the derivation of VSO via object post-posing to a right-side specifier, as in (24). Such an approach is also in line with suggestions in Norman 1977, discussed in Larsen 1988 and England 1991.

(24)   RIGHT-SIDE-SPECIFIER VSO

```
                IP
              /    \
             I      XP
                  /    \
             VoiceP    OBJ_i
            /    \       ↑
       Voice'   SUBJ     |
       /   \            |
   Voice    VP          |
           /  \         |
          V    t_i ─────┘
```

This type of derivation for VSO order is discussed in Chung 2006, Clemens & Polinsky to appear, and Coon 2010, and we do not review it in detail here. From a pan-Mayan perspective, base-generating subjects in a right-side specifier is a natural approach to languages that are predominately VOS, but presents complications for rigid-VSO languages like Q'anjob'al and Mam.

4.2   VP-fronting

Coon (2010) argues for a predicate-fronting account of the VOS/VSO patterns described for Ch'ol in section 3.4 above. Drawing on Massam's (2001) account of similar alternations in the Polynesian language Niuean—in which VOS also occurs

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[5]Aissen posits right-side specifiers for lexical categories V, N, Adj, and does not assume VP-external subjects; we, on the other hand, show subjects as occupying Spec,VoiceP (e.g. Kratzer 1996). Aissen's parameterization could be maintained by dividing thematic positions (ordered to the right), from specifier positions which are the landing site for movement (ordered to the left).

with NP objects, and VSO with DP objects—Coon proposes that bare NP objects remain internal to the *v*P, which fronts to Spec,IP, as in (25).

(25)   PREDICATE-FRONTING VOS
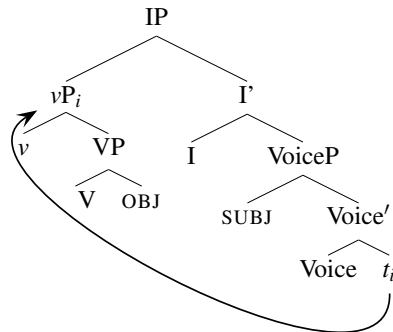
When the object is a full DP, it must evacuate the VP to a position below the subject—here labelled "AbsP", since for Massam it is the locus of absolutive case—in a process akin to Object Shift in Germanic languages (Holmberg 1986). The remnant VP fronts, resulting in the VSO order shown in (26).

(26)   PREDICATE FRONTING VSO
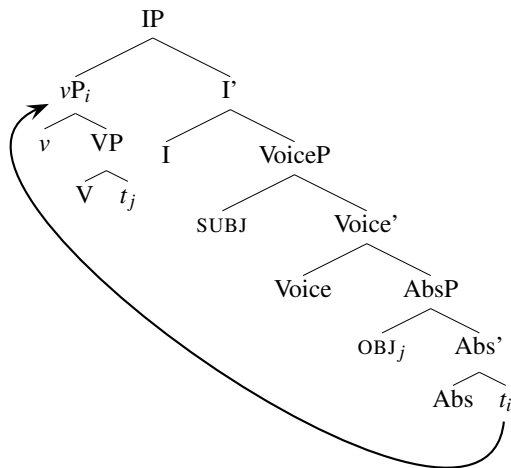
Coon (2010) uses the placement of adjuncts to demonstrate that NP objects and DP objects occupy different structural positions in Ch'ol. As shown in (28a), an adjunct like *abi* 'yesterday' can intervene between the verb and a full DP object, but it cannot intervene between the verb and an NP object (28b). Instead, the adverb

must follow the NP object, as in (28c). The placement of these adverbs is consistent with the fact that the verb and the object form a surface constituent in VOS clauses.[6]

(28) a. Tyi k-wuts'-u **abi**   [_{DP} ili   pisil   ].
          PFV A1-carry-SS yesterday   DEM clothes
          'I washed these clothes yesterday.'

      b. *Tyi k-wuts'-u **abi**   [_{NP} pisil   ].
          PFV A1-carry-SS yesterday   clothes
          Intended: 'I washed clothes yesterday.'

      c. Tyi k-wuts'-u   [_{NP} pisil   ] **abi**.
          PFV A1-carry-SS   clothes yesterday
          'I washed clothes yesterday.'   (Coon 2010:367)

While this account provides a clear connection between the NP/DP status of the object and VOS/VSO word order, it—like the right-side-specifier account above—would be difficult to extend to a rigid-VSO language like Q'anjob'al or Mam. Specifically, it is unclear how children would acquire predicate-fronting if it were consistently *remnant* predicate fronting. This account also faces several additional problems, summarized here, which our head-movement account addresses.

First, as seen already in some of the examples above, verb stems across Mayan contain a series of suffixes, including voice and status suffixes, as shown by the complex Ch'ol verb forms in (29).

(29) a. Tyi wäy-**is-äñ**-**ty**-**i**   jiñi ñeñe'.
          PFV sleep-CAUS-SUF-PASS-SS DET baby
          'The baby was put to sleep.'

      b. Tyi ch'äx-**beñ**-**ty**-**i**   ja' aläl.
          PFV boil-APPL-PASS-SS water child
          'Water was boiled for the child.'   (Vázquez Álvarez 2011:30)

Recall from (25) above that, in order to derive VOS order in Ch'ol, Coon (2010) omits the external argument from the fronted material that the predicate which fronts does not include the external argument. To achieve this, she specifically locates the status suffix in v^0 (or ssP), *below* the subject in Spec,VoiceP. However, taking the order of suffixes on the stem to reflect the order of syntactic derivation,

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[6] While the verb and a bare NP object must be adjacent, we know that VOS clauses in Ch'ol are not instances of head incorporation, because the object in a VOS clause can be modified, as in (27):

(27)   Tyi i-mäñ-ä [_{NP} pejtyelel tyumuty] jiñi alob.
       PFV A3-buy-SS   all   egg   DET boy
       'The boy bought all the eggs.'   (Coon 2010:360)

in accordance with the Mirror Principle (Baker 1985), there is reason to believe that external arguments are introduced below the head which hosts the status suffix, (Coon et al. 2014; Armstrong 2015).[7] Consider the unaccusative/transitive alternation in (30).

(30)   a.   Tyi wäy-**i**   ñeñe'.
              PFV sleep-SS baby
              'The baby slept.'
        b.   Tyi i-wäy-**is-ä**   ñeñe' x-k'aläl.
              PFV A3-sleep-CAUS-SS baby CLF-girl
              'The girl put the baby to sleep.'

A reasonable approach to deriving the causative in (30b) would be to posit that the external argument is introduced in the specifier of the causative Voice head (per Pylkkänen 2002). Head movement of the verb root through Voice^0 to SS^0, as outlined in section 2 above, results in the correct order of morphemes on the stem, as shown in (31).[8] Following Coon to appear-b, we assume that ergative agreement prefixes arise via local agreement relationship between the in-situ subject and a low functional head, e.g. Voice^0.

(31)   HEAD-MOVEMENT TO vP
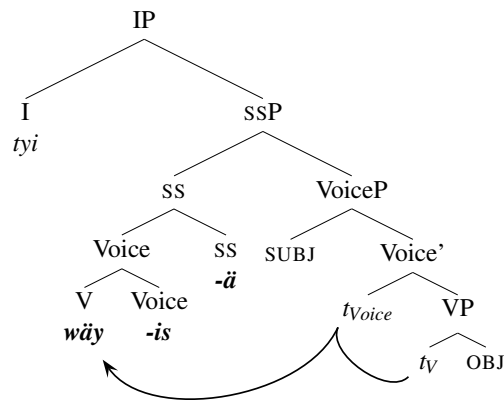
Now, however, we encounter a problem for a predicate-fronting account of word order. Note that in (31), there is no maximal projection XP containing the verb

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[7]There is Ch'ol-internal support for believing that the linear order of morphemes reflects the order of syntactic derivation; for example, passive morphology appears *after* transitivizing causative morphemes, as in (29a).

[8]Note that our trees do not include a verbalizing v^0 under Voice^0. We assume following Coon & Preminger 2013 and Harley 2016 that v^0 and Voice^0 are bundled together into a single head in Ch'ol (and perhaps Mayan more generally); see Pylkkänen 2002 and Harley 2016 for extensive discussion. An alternative possibility, also compatible with the proposal here, is that there is a null v^0 below Voice^0.

and the object but *not the subject*, which could front to derive VOS. Futhermore, if head-movement is independently necessary in Mayan (i.e. to form the stem), it is not obvious what might then trigger XP-fronting of the verbal projection (to derive VOS order).

Second, in addition to the question of *what* raises, it is also unclear *where* the XP predicate raises to. Coon (2010) proposes that the predicate fronts to Spec,IP, but Infl^0 is typically taken to be occupied by a TAM marker which appears *to the left of* the verb stem (Aissen 1992; see §2). Some TAM markers are clitics, and their ordering could perhaps be parameterized. Others, however, are free-standing words that may themselves host clitics; in the Ch'ol example in (32), the free-standing perfective morpheme *tsa'* hosts second-position affirmative and reportative clitics.

(32)   **Tsa'**=äch=bi i-mel-e   waj   aj-Maria.
         PFV=AFF=REP A3-make-SS tortilla CLF-Maria.
         'Apparently Maria did indeed make tortillas.'

Clitic placement in "High-ABS" languages like Chuj in (4b) above provides a similar kind of evidence. Recall that, in Ch'ol, the Set B clitic appears stem-finally, while in Chuj, it appears between the TAM marker and the verb stem.

The fact that clitics consistently intervene between TAM markers and the stem suggests that the verb stem is fronting to a position *below* Infl^0 (but above the subject). Under an XP-fronting account, the fronted predicate would have to raise to the specifier of some other position, below the TAM marker and above the subject. While this is in principle plausible, one of the original goals of Massam's (2001) and Coon's (2010) work was to connect predicate fronting to Spec,IP to an EPP feature on Infl (which requires DPs in a language like English, but predicate XPs in Niuean and Ch'ol); this connection can no longer be maintained under a putative XP-fronting account. Our own proposal, on the other hand—represented in (31) above, posits head-movement of the verb stem to the position of the status suffix: the final suffix on the complex head that forms the verb stem. This proposal derives exactly the right configuration as predicted by morpheme order.

Finally, as discussed in Clemens 2014, it is difficult to reconcile a predicate-fronting approach to V1 order with the proposal in Coon, Mateo Pedro & Preminger 2014 for ergative extraction restrictions in the Mayan family. Specifically, Coon et al. propose that, in languages in which the A'-extraction of ergative subjects is restricted, objects raise to a position above the subject, trapping the subject inside the *v*P-phase (our SSP). If this is so, XP-fronting of a predicate should *also* trap subjects. Ch'ol, however, is a language which freely permits the extraction of ergative arguments. Again, the head-movement account outlined in section 2 and illustrated in (31) does not face this problem: the verb undergoes head movement up to the SSP phase edge and, in Ch'ol, the subject XP can still freely extract.

5 Head-raising and VOS

Having reviewed problems with existing accounts, we now turn to a new approach to VOS/VSO alternations in Ch'ol that (i) accounts for the position of the verb via a series of head movements in the syntax (see section 2) and (ii) motivates the VOS order of clauses with NP objects with a constraint on prosodic well-formedness requiring the verb and its complement to be phrased together. Because full DP complements are spelled out as phases, they are not subject to prosodic reordering.

Acoustic data from Ch'ol support our prosodically driven analysis. In Clemens & Coon to appear, three acoustic cues to prosodic phrase boundaries (pitch, duration, and the distribution of pauses) are argued to indicate the prosodic constituency schematized in (33):

(33)   PROSODIC PHRASING OF VSO AND VOS CLAUSES IN CH'OL
         a. $(V)_\varphi\ (S)_\varphi\ (O)_\varphi$
         b. $(V\ O)_\varphi\ (S)_\varphi$

As (33) shows, the verb and the object form a prosodic unit in VOS clauses (true for both modified and unmodified objects), whereas each of the major sentential constituents is parsed into a unique prosodic phrase in VSO clauses.

In the remainder of this section, we argue that this prosodic phrasing provides important information about the derivation of V1 orders in Ch'ol. Then, in section 6, we discuss testable predictions made by our account and amass some support for our claims from existing data. First, however, we begin in section 5.1 by framing our account with background on "pseudo noun incorporation" (PNI), the original impetus for Clemens' (2014) prosodic analysis, on which our account draws. We discuss similarities and differences between traditional PNI constructions and Ch'ol VOS before establishing the prosodic background for our proposal in section 5.2. Sections 5.3 and 5.4 present our account of VOS and VSO orders in Mayan, while section 5.5 walks through a derivation of each word order in detail.

5.1 PNI background

The proposal developed here is based on Clemens' (2014) account of Niuean (a Polynesian language). As noted in section 4.2 above, Niuean, like Ch'ol exhibits VOS with bare NP objects and VSO with full DP objects. Furthermore, though the acoustic cues differ, Niuean shows the same basic difference in prosodic phrasing between VSO and VOS orders illustrated for Ch'ol in (33) above. However, while Ch'ol is basically VOS (§3.4), Niuean is basically VSO (Massam 2001). VOS

sentences in Niuean arise in so-caled "pseudo-noun incorporation" (PNI) structures (Massam 2001), as illustrated in (34).

(34)   Ne inu   [kofe   kono] [$_S$ e   Mele].
        PST drink   coffee bitter   ABS Mele
        'Mary drank bitter coffee.'   (Niuean; Massam 2001:158)

PNI constructions like (34) are formally *intransitive*: the subject is marked as absolutive instead of ergative, while the incorporated element in PNI constructions—*kofe kono* in (34)—is interpreted as nonspecific and non-referential (Massam 2001).

   The Niuean PNI construction is reminiscent of the "incorporation antipassive" found in some "rigidly VSO" Mayan languages, including the Q'anjob'alan languages Popti', Akatek, Q'anjob'al, and the San Sebastián Coatán variant of Chuj (Maxwell 1976; Craig 1979; Zavala 1992; Mateo Toledo 2008). Compare the Q'anjob'al transitive in (35a) with the incorporation antipassive in (35b).

(35)   a.   Max s-tzok'   [$_S$ naq winaq] [$_O$ te'   si'   ].
              PFV A3-chop   CLF man   CLF wood
              'The man cut the wood.'
        b.   Max tzok'-w-i [si'   ] [$_S$ naq winaq].
              PFV cut-AP-SS wood   CLF man
              'The man cut wood.'   (Q'anjob'al)

As in Niuean PNI, the Q'anjob'alan "incorporation antipassive" in (35b) occurs only with nonreferential, nonspecific objects (Maxwell 1976). The notional object must be adjacent to the verb, which is grammatically intransitive. In (35b), the verb appears with the intransitive status suffix *-i* and, as in Niuean, the subject is absolutive (recall that third-person absolutive in Mayan is unmarked; an ergative subject would trigger overt Set A marking on the predicate). Also as in Niuean, the incorporated element need not be a bare root, but may include certain modifiers, as discussed in detail by Maxwell (1976) for Chuj.

   Both Niuean in (34) and Q'anjob'al in (35) are thus languages with basic VSO order in which VOS can be derived by pseudo-incorporating a non-referential phrasal NP object. The resulting constructions can be described schematically as VOS, but with respect to case/agreement, the subject in each language is*intransitive*. This configuration is *unlike* the situation in Ch'ol, described in section 3.4 above, in which VOS is not pragmatically marked, the object may be interpreted as definite, and the subject patterns with other transitive subjects in triggering Set A (ergative) agreement on the verb. A Ch'ol VOS example is repeated in (36).

(36)   Tyi y-il-ä   [$_O$ x'ixik] [$_S$ wiñik].
       PFV A3-see-TV   woman   man
       'The man saw the woman.'   (Ch'ol; Vázquez Álvarez 2011:21)

Despite the differences between the Niuean PNI/Q'anjob'alan incorporation antipassive, on the one hand, and Ch'ol VOS, on the other hand, we argue that the crucial factor underlying VOS order in all three languages is *the absence of D^0-level material on the object*. In Ch'ol—as in many alternating VOS/VSO Mayan languages, including Tseltal in (16), discussed further in section 6—bare NP objects occur frequently and behave as true arguments of the verb (i.e. we assume they combine with the predicate via FUNCTIONAL APPLICATION; see Chierchia 1998, Bošković 2008, and references cited therein on languages that allow true bare NPs as arguments). Unlike in Q'anjob'al and Niuean, bare NPs in Ch'ol may be referential, individuated, and definite (although Ch'ol also has demonstratives and elements that are typically glossed as determiners and force a definite interpretation). Compare the Ch'ol example in (36) with the Q'anjob'al example in (37b), in which a bare object is judged ungrammatical in VSO object position (nominal classifiers 'CLF' have an article-like function in Q'anjob'alan languages, cf. Craig 1986 and Zavala 2000.

(37)   a.   Max s-b'e   [$_S$ ix   ix   ] [$_O$ ixim b'utx   ].
            PFV A3-make   CLF woman   CLF tortilla
            'The woman made the tortillas.'
       b.   *Max s-b'e   [$_S$ ix   ix   ] [$_O$ b'utx   ].
            PFV A3-make   CLF woman   tortilla
            intended: 'The woman made tortillas.'   (Q'anjob'al)

In contrast, Niuean and Q'anjob'al do not generally allow bare NPs as arguments. Though a full account of PNI/incorporation-antipassive constructions is beyond the scope of this paper, we assume that the bare-NP complements in Niuean (34) and Q'anjob'al (35) combine with their predicates via the mode of semantic composition known as RESTRICT (Chung & Ladusaw 2003); the "objects" in these constructions are not true arguments of the verb (hence the intransitive verb morphology), but serve to *restrict* the denotation of the predicate, rather than saturate an argument slot. They are nonetheless *complements*, which are selected by the verb, and thus may be subject to the ARGUMENT-φ constraint introduced below.

The overall picture is summarized in (38). For the languages discussed in this section, we find a pattern in which bare NP objects appear in VOS order, while full DP objects trigger VSO. For languages that allow NP arguments, this alternation does not have an effect on transitivity: both NP and DP complements to the verb may serve as full arguments. In DP languages like Niuean and Q'anjob'al, however,

bare NPs appear only in pragmatically marked structures. NP complements do not behave as arguments and the resulting construction is intransitive.

(38)

	VOS (complement to V=NP)	**VSO** (complement to V=DP)
"NP languages"		
Ch'ol	transitive	transitive
Tseltal	transitive	transitive
"DP languages"		
Niuean	PNI	transitive
Q'anjob'al	incorporation antipassive	transitive

We return to the predictions of this proposal in section 6, after describing the derivations of VOS and VSO structures, below.

5.2 Match Constraints and Argument-φ

Our account of Ch'ol VOS finds its basis in Match Theory (Selkirk 2011), an indirect-reference theory of the syntax-phonology interface. Indirect-reference theories, which include Beckman & Pierrehumbert 1986; Hayes 1989; Inkelas & Zec 1990; Ladd 2008; Nespor & Vogel 1986; Selkirk 1995; and Truckenbrodt 1999, maintain that phonological rules apply to prosodic domains built on syntactic structures, as opposed to applying to syntactic domains directly.

Match Theory addresses positive evidence for the existence of recursion in prosodic structure-building (Elfner 2015; Féry 2011; Féry & Truckenbrodt 2015; Itô & Mester 2010; Wagner 2005, 2010) using syntax-prosody isomorphism (enforced via MATCH Constraints) as a springboard. MATCH Constraints are input-output correspondence constraints (McCarthy & Prince 1995) that call for isomorphism between syntactic and prosodic constituents (39):

(39)   a.   MATCH (XP, φ):
            The left and right edges of XP-constituents correspond to the left and right edges of φ-constituents.
    b.   MATCH (φ, XP):
            The left and right edges of φ-constituents correspond to the left and right edges of XP-constituents.

MATCH Constraints require that syntactic constituents (the input) and prosodic constituents (the output) correspond at three levels, specified in (40).

(40) a. MATCH-ι:
          Clauses with illocutionary force (CP/IP) correspond to intonational
          phrases and vice versa.
      b. MATCH-φ:
          Syntactic XPs correspond to phonological phrases and vice versa.
      c. MATCH-ω:
          Syntactic X^0s correspond to prosodic words and vice versa.

Selkirk's MATCH Constraints are construed as violable in the context of Optimality
Theory (Prince & Smolensky 1993), which allows Match Theory to capture in-
stances of nonisomorphism between syntactic and prosodic structure. For example,
if a constraint pertaining to prosodic wellformedness outranks a MATCH Constraint,
syntax-prosody nonisomorphism may result.

   Following our hypothesis, outlined in section 2 above, that all V1 structures are
derived via head-raising, we predict that VSO word order should be more isomor-
phic than VOS. Under our account, Ch'ol VOS is the result of compliance with
a prosodic well-formedness constraint, ARGUMENT-φ (Clemens 2014), which re-
quires that the verb and its complement be phrased together.[9] A first version of
ARGUMENT-φ is given in (41).

(41)   ARGUMENT CONDITION ON PHONOLOGICAL PHRASING (to be revised):
        A head and its internal argument(s) must be adjacent sub-constituents of a
        phonological phrase (φ-phrase).

In order for VOS to surface, ARGUMENT-φ must outrank at least one of the series
of MATCH Constraints, requiring isomorphism between syntactic structure (input)
and prosodic structure (output).

   A question arises at this point: how does the prosodic component of the gram-
mar recognize that a verb and an object are members of a head-argument pair, es-
pecially since they do not form a syntactic constituent in the input (since the verb
has undergone head movement)? This issue is discussed at length in Clemens 2014,
where it is resolved by (i) treating categorial selection (c-selection) as an instance of
AGREE (Emonds 2000; Adger & Svenonius 2011, a.o.) and (ii) adopting a feature-
sharing approach to AGREE (Pesetsky & Torrego 2007). Adopting this AGREE
framework allows the prosodic grammar to reference head-argument pairs via lex-
ical class features (which many scholars argue the prosody must be able to "see"

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[9]We assume that the syntactic relationship of selection under sisterhood is the crucial factor
here, not "objecthood" or "argumenthood", per se. That is, though we proposed in §5.1 above that
bare NP complements in Niuean PNI and Q'anjob'alan incorporation antipassives do not combine
semantically as true arguments, they are nonetheless subject to ARGUMENT-φ by virtue of being
selected by the head.

in any case; cf. Kaisse 1985; Nespor & Vogel 1986; Smith 1997, 2011; and see Clemens 2014 for a more detailed discussion of this solution).[10]

  With these technologies in place, we can revise the definition of ARGUMENT-φ as in (43) to allow the prosodic component of the grammar to make reference to head-argument pairs, even when the selecting head has moved out of the position in which it selected its internal arguments.[11]

(43)   ARGUMENT CONDITION ON PHONOLOGICAL PHRASING (final version): A head H^0 with a categorial feature [C] and head C^0 with the same [C] feature must constitute a φ-phrase.

The next section demonstrates how ARGUMENT-φ interacts with the series of MATCH Constraints, in such a way that the object ultimately shifts to a position where it can be pronounced in the same φ-phrase as the verb. As we discuss in more detail in the following sections, ARGUMENT-φ only applies to bare NP objects; DPs are assumed to be phases and are sent to Spell-Out before ARGUMENT-φ would apply (see §5.4).

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[10]Recall from section 2 that external arguments are merged oustide of the VP proper, and thus not subject to ARGUMENT-φ.

[11]Levin 2015 proposes an alternative account of the linearization of objects in PNI constructions of the type discussed in section 5.1 above. Like Clemens 2014, Levin 2015 proposes that the adjacency requirement between the verb and its complement is post-syntactic. However, for Levin, the position of the PNI object is a matter of morphological *Local Dislocation* (Embick & Noyer 2001) in a Distributed Morphology framework.

  There are three reasons to prefer an ARGUMENT-φ analysis. First, ARGUMENT-φ makes testable prosodic predictions, which are borne out in Ch'ol. Second, Levin's analysis focuses specifically on "intransitive" cases of PNI, as found in Niuean and Q'anjob'al. As discussed above, Ch'ol does not exhibit PNI in this strict sense (contra Coon 2010): unlike Niuean and Q'anjob'al, VOS clauses in Ch'ol are transitive, because the language generally allows bare NP arguments. The prosodic proposal in Clemens 2014 connects word order directly to the NP vs. DP status of arguments, thus making it possible to capture the ordering commonalities found in PNI constructions (Q'anjob'al, Niuean) and VOS in bare-NP argument languages (Ch'ol).

  Finally, a stated virtue of Levin's proposal is that it requires *head-head adjacency* between the verb head and the head of the pseudo-incorporated object, which is consistent with data from several of the languages discussed by Levin. However, it is unclear how this account could be extended to any of the Mayan languages he discusses, because modifiers in these languages consistently *precede* the "incorporated" noun, thus violating head-head adjacency. A Ch'ol example was shown in footnote 6; a Chuj example is given in (42) (see also Maxwell 1976).

(42)   **Ix-in-man-w-i**   [niwak **kaxlan**].
        PFV-B1S-buy-AP-SS   fat   chicken
        'I bought fat chickens.'   (Chuj; Coon 2016:13)

5.3   Deriving VOS

Recall that under the current proposal, VSO order is the result of head-movement of the verb to a position above the subject (§2); in the tableaux below, this derived VSO order is shown as the input to prosodic structure assignment. Thus it is VOS order—even though it has been described as the "basic" order in Ch'ol—that we must account for: any time the verb selects a bare NP in the syntax, the output is VOS. We account for this fact via ARGUMENT-φ, given in (43) above.

The tableau in (44) illustrates two versions of the output of a Ch'ol sentence with a bare NP object: (a) a strictly isomorphic representation of the input (VSO), and (b) an alternative that satisfies ARGUMENT-φ by shifting the object to the input location of the verb (VOS). ARGUMENT-φ is ranked higher than the MATCH Constraints, so the strictly isomorphic VSO output is correctly ruled out.

(44)

Input: $[_{vP}$ Verb $[_{VoiceP}$ $[_{DP}$ Subject] $[_{VP}$ $[_{NP}$ Object]]]]]	ARG φ	MATCH (φ, XP)	MATCH (XP, φ)
a. (Verb (Subject)φ(Object)φ)ι	*!		
b. ☞ ((Verb Object)φ(Subject)φ)ι		*	*

Note that SVO clauses have the same potential as VOS clauses for realizing the verb and the object as a single φ-phrase. While SVO sentences are quite common in Mayan languages, including Ch'ol, SVO does not arise here for prosodic reasons (see §3.1). The tableau in (45) includes an additional SVO candidate, (c), in which the verb shifts to the input location of the object. Again, while ARGUMENT-φ correctly rules out the VSO candidate in (a), it is satisfied by both the VOS (b) and SVO (c) candidates.

(45)

Input: $[_{vP}$ Verb $[_{VoiceP}$ $[_{DP}$ Subject] $[_{VP}$ $[_{NP}$ Object]]]]]	ARG φ	MATCH (φ, XP)	MATCH (XP, φ)
a. (Verb (Subject)φ(Object)φ)ι	*!		
b. ☞ ((Verb Object)φ(Subject)φ)ι		*	*
c. ☞ ((Subject)φ(Verb Object)φ)ι		*	*

We use MATCH Constraints to explain why a structure that needs to satisfy ARGUMENT-φ surfaces as VOS instead of SVO. Whenever prosodic restructuring occurs above the level of the word, a MATCH Constraint is necessarily violated.

For both candidates (b) and (c), the object XP of the input does not correspond to a unique φ-phrase in the output. At the same time, a φ-phrase in the output (comprising the verb and the object) does not correspond to a unique syntactic XP in the input.

Initial positions are known to be privileged at different levels of the prosodic hierarchy (Becker 2009; Becker et al. 2012; Beckman 1997, 2013). We treat the Ch'ol preference for candidate (b) over candidate (c) as an instance of positional faithfulness to the initial edge of the ι-phrase, as articulated in (46):

(46)   MATCH-ι_{INT}:
        The initial edge of an ι-phrase and the initial edge of a syntactic phrase
        with illocutionary force (CP/IP) must correspond.

In an isomorphic output, the ι-phrase boundary would be realized on the verb. In (47), candidate (c) incurs a violation of MATCH-ι_{INT}, because the verb shifts to a position adjacent to the object in order to satisfy ARGUMENT-φ. From a phrase-medial position, the verb cannot anchor the initial edge of the ι-phrase without incurring additional violations of MATCH-ι. In contrast, the object in candidate (b) shifts to the verb; this prosodic shift simultaneously satisfies ARGUMENT-φ and MATCH-ι_{INT} by allowing the initial ι-phrase boundary to be realized on the verb.

(47)

Input: [$_{vP}$ Verb [$_{VoiceP}$ [$_{DP}$ Subject] [$_{VP}$ [$_{NP}$ Object]]]]]	ARG φ	MATCH ι_{INT}	MATCH (φ, XP)	MATCH (XP, φ)
a. (Verb (Subject)φ(Object)φ)ι	*!			
b. ☞ ((Verb Object)φ(Subject)φ)ι			*	*
c. ((Subject)φ(Verb Object)φ)ι		*!	*	*

In addition to the prosodic phrasing illustrated by the attested candidate (b), it is possible to satisfy both ARGUMENT-φ and MATCH-ι_{INT} with nested prosodic constituents, as shown in (48):

(48)

Input: [$_{vP}$ Verb [$_{VoiceP}$ [$_{DP}$ Subject] [$_{VP}$ [$_{NP}$ Object]]]]]	ARG φ	MATCH ι_{INT}	MATCH (φ, XP)	MATCH (XP, φ)
a. ☞ ((Verb (Object)φ)φ(Subject)φ)ι			*	
b. ☹ ((Verb Object)φ(Subject)φ)ι			*	*!
c. (((Verb)φ (Object)φ)φ(Subject)φ)ι			**!	

For candidate (a), the object corresponds to a φ-phrase nested inside another φ-phrase containing the verb and the object. Here, nesting the object does not incur a violation of MATCH (XP, φ): bare objects are phrasal in Ch'ol and XPs are predicted by Match Theory to correspond to φ-phrases. The same is true for candidate (c). However, candidate (c) incurs an additional violation of MATCH (φ, XP), because the verb does not correspond to an XP-constituent in the syntax.

In contrast, the attested phrasing of candidate (b) violates MATCH (XP, φ) because the object is not realized in its own φ-phrase. However, unlike the winning candidate (a), the attested candidate (b) satisfies an additional eurythmic constraint that is known to be high-ranked in many languages. STRONG START (Bennett et al. 2016; Elfner 2012, 2015; Selkirk 2011; Werle 2009).

(49)   STRONG START (Selkirk 2011): A prosodic constituent optimally begins with a leftmost daughter constituent which is not lower in the prosodic hierarchy than the constituent that immediately follows.

In (50), candidate (a) violates STRONG START: because the φ-phrase comprising the verb and the object contains two prosodic sub-constituents, the first of which is lower on the prosodic hierarchy than the second ($\omega < \varphi$). Candidate (b) does *not* incur a violation of STRONG START: the two prosodic constituents corresponding to the verb and the object in this candidate are equal on the prosodic hierarchy ($\omega = \omega$). The same is true for candidate (c), where the verb and the object are realized as equal prosodic constituents ($\varphi = \varphi$); however, as observed earlier, candidate (c) incurs an additional violation of MATCH (φ, XP).

(50)

Input: $[_{vP}$Verb $[_{VoiceP}[_{DP}$Subject] $[_{VP}[_{NP}$Object]]]]]	STR START	ARG φ	MATCH ι_{INT}	MATCH (φ, XP)	MATCH (XP, φ)
a. ((Verb (Object)φ)φ (Subject)φ)ι	*!			*	
b. ☞ ((Verb Object)φ (Subject)φ)ι				*	*
c. (((Verb)φ (Object)φ)φ (Subject)φ)ι				**!	

STRONG START is also satisfied in VSO constructions, as shown in (33), where the prosodic constituents corresponding to the verb and the subject are equal on the prosodic hierarchy ($\varphi = \varphi$). This observation brings us to the question of why VSO *ever* surfaces in a language where ARGUMENT-φ is highly ranked, this question forms is the topic of the next section.

5.4   VSO revisited

Recall that a successful account of the Mayan data must allow VSO order to surface when an object contains D^0-level material. In other words, ARGUMENT-φ fails to affect the output of a transitive clause with a DP object.

In accounting for the fact that underlying VSO order is allowed to surface with DP objects, we appeal to Multiple Spell-Out (Uriagereka 1999); specifically, we adopt the proposal that syntactic derivation is transferred to the interfaces in stages. We articulate this proposal according to Phase Theory (Chomsky 2000, 2001), which maintains that "phase heads" determine the process of syntactic transfer to the interfaces. We adopt the position that minimally D^0, v^0 and C^0 are phase heads (Chomsky 2001; Dobashi 2003; Svenonius 2004; Hiraiwa 2005).[12]   When a particular phase head enters the derivation, a portion of the derivation—the "spell-out domain"—is sent to the interfaces. The spell-out domain consists of a phase head and its complement (Svenonius 2004) and is transferred to the interfaces when the next phase head enters the derivation (Chomsky 2001).

One of the the things that happens at spell-out is that syntactic constituents are assigned prosodic structure (Ishihara 2007; Kahnemuyipour 2004; Kratzer & Selkirk 2007). This process involves evaluating prosodic constraints; for the purposes of this paper, we assume that constraints on prosodic well-formedness are evaluated at each spell-out cycle. For example, a syntactic phrase might map onto a φ-phrase in one spell-out cycle, but then be reassigned prosodic-ω status in a subsequent cycle, in order to repair a new violation of a eurythmic constraint like STRONG START.

Prosodic well-formedness may be reevaluated every time new material spells out, but the fact that syntactic features become invisible after prosodic structure is first assigned affects the way certain prosodic constraints influence the surface form of an utterance. Take ARGUMENT-φ as an example: in the previous section, we argued that the prosodic component of the grammar references lexical category features when evaluating compliance with ARGUMENT-φ. Prosodic constraints that reference syntactic features, like ARGUMENT-φ, will not be able to see the potentially relevant syntactic features on previously spelled-out material. More specifically, if a head and its internal argument are spelled-out in different spell-out cycles, ARGUMENT-φ will only be able to see one instantiation of the relevant lexical feature at a time.

NP objects, unlike DP objects, do not include a phase head, and thus their spell-out is not triggered until C^0 enters the derivation. As a result, both instantiations

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[12]Recall from above (fn. 8) that v^0 is either null or bundled together with Voice^0. For our purposes, we assume that the head we have labelled Voice^0 in the Mayan derivations above is a phase head.

of the categorial feature relevant to ARGUMENT-φ (one associated with the object and one with the verb root) are visible to PF during the same spell-out cycle. This is illustrated in (51); note that output material that was assigned prosodic structure in an earlier spell-out cycle (in this case, the subject DP) is crossed out. Lexical features relevant to the evaluation of ARGUMENT-φ are shown in subscript.

(51)

Input: [$_{vP}$Verb [$_{VoiceP}$[$_{DP}$Subject] [$_{VP}$[$_{NP}$Object]]]]]	STR START	ARG φ	MATCH ι_{INT}	MATCH (φ, XP)	MATCH (XP, φ)
a. (Verb$_N$ (~~Subject~~)φ(Object$_N$)φ)ι	*!	*			
b. ((Verb$_N$)φ(~~Subject~~)φ(Object$_N$)φ)ι		*!		*	
c. ((Verb$_N$ (Object$_N$)φ)φ (~~Subject~~)φ)ι	*!			*	
d. (((Verb$_N$)φ (Object$_N$)φ)φ (~~Subject~~)φ)ι				**!	
e. ☞ ((Verb$_N$ Object$_N$)φ (~~Subject~~)φ)ι				*	*
f. ((~~Subject~~)φ(Verb$_N$ Object$_N$)φ)ι			*!	*	*

In contrast, the spell-out of a DP object includes a phase head and is therefore triggered earlier, by the introduction of the next phase head v^0. This means that in clauses with a DP object, the two instantiations of the relevant categorial feature are never visible to PF at the same time. In (52), as before, material that has already been assigned prosodic structure is crossed out. Lexical features that would have been relevant to the evaluation of ARGUMENT-φ had they been visible to PF are not shown.

(52)

Input: [$_{vP}$Verb [$_{VoiceP}$[$_{DP}$Subject] [$_{VP}$[$_{NP}$Object]]]]]	STR START	ARG φ	MATCH ι_{INT}	MATCH (φ, XP)	MATCH (XP, φ)
a. (Verb$_D$(~~Subject~~)φ(~~Object~~)φ)ι	*!				
b. ☞ ((Verb$_D$)φ(~~Subject~~)φ(~~Object~~)φ)ι				*	
c. ((Verb$_D$ (~~Object~~)φ)φ (~~Subject~~)φ)ι	*!			*	
d. (((Verb$_D$)φ (~~Object~~)φ)φ (~~Subject~~)φ)ι				**!	
e. ((Verb$_D$ ~~Object~~)φ (~~Subject~~)φ)ι				*	*!
f. ((~~Subject~~)φ(Verb$_D$ ~~Object~~)φ)ι			*!	*	*

The constraints STRONG START, ARGUMENT-φ, and the relevant MATCH constraintsm as ranked in (51) and (52) above—in coordination with a feature-sharing approach to categorial selection and Phase Theory—result in the attested prosodic phrasing of both VOS and VSO orders.

5.5   Sample derivations

In this section, we review our account of Ch'ol VOS and VSO from start to finish,
We begin with the VOS example in (53).

(53)   Tyi i-kuch-u   [$_O$ si'   ] [$_S$ aj-Maria   ].
       PFV A3-carry-SS   wood   CLF-Maria
   'Maria carried the wood.

In (53), the root *kuch* 'carry' selects a bare NP complement with an [N] feature;
once *si'* 'wood' enters the derivation, the same [N] feature is associated with the
selecting head and its complement. The tree in (54) illustrates the *in situ* location
of verb and NP object.

(54)   FEATURE SHARING *in situ*
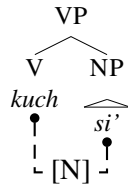
Next, the verb undergoes a series of X^0-movements, forming the stem and eventu-
ally landing above the subject in the head SS^0 that hosts the status suffix:

(55)   FEATURE SHARING AND V^0-RAISING
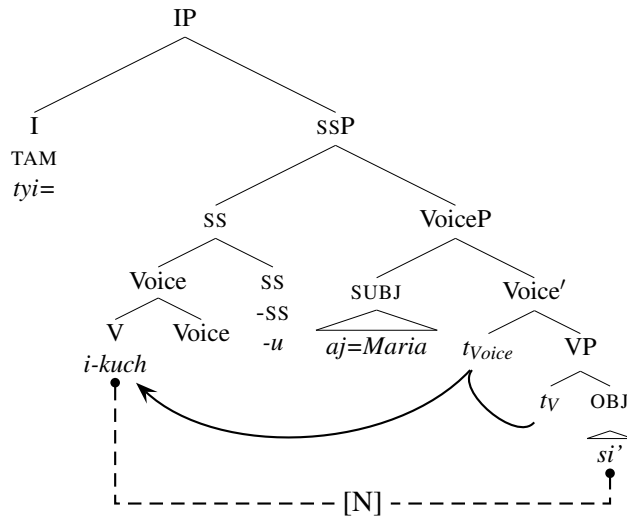
Finally, the tableau in (56) illustrates the role of ARGUMENT-φ in determining the sentence's prosodic structure. The subject (a DP) is crossed out to indicate that it was assigned prosodic structure in an earlier phase.

(56)

Input: [$_{TP}$Tyi [$_{vP}$ikuchu [$_{VoiceP}$[$_{DP}$aj=Maria] [$_{VP}$[$_{NP}$si']]]]]	STR START	ARG φ	MATCH ι_{INT}	MATCH (φ, XP)	MATCH (XP, φ)
a. (tyi'=kuchu$_N$ (aj=Maria)φ (si'$_N$)φ)ι	*!	*			
b. ((tyi'=kuchu$_N$)φ (aj=Maria)φ (si'$_N$)φ)ι		*!		*	
c. ((tyi'=kuchu$_N$ (si'$_N$)φ)φ (aj=Maria)φ)ι	*!			*	
d. (((tyi='kuchu$_N$)φ (si'$_N$)φ)φ (aj=Maria)φ)ι				* *!	
e. ☞ ((tyi='kuchu$_N$ si'$_N$)φ (aj=Maria)φ)ι				*	*
f. ((aj=Maria)φ (tyi='kuchu$_N$ si'$_N$)φ)ι			*!	*	*

Next, we turn to a derivation of an instance where VOS does not arise.

(57)   Tyi i-kuch-u   [$_S$ aj-Maria   ] [$_O$ jiñi si'   ].
       PFV A3-carry-SS   CLF-Maria   DET wood
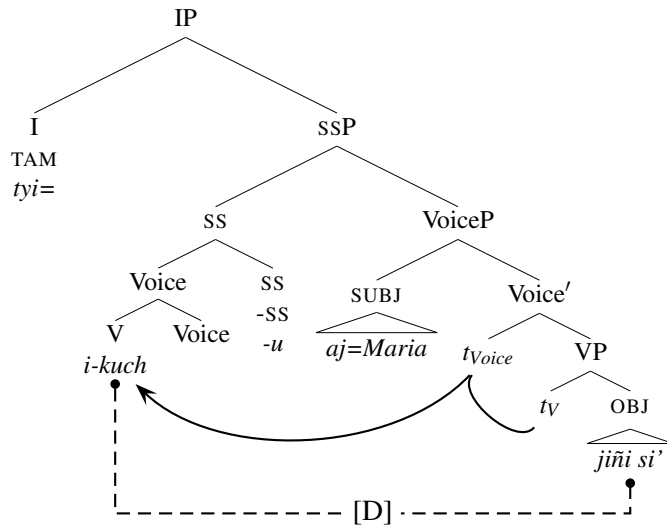   'Maria carried the wood.

In this case, the root *kuch* 'carry' selects a complement with a [D] feature, which is is shared between the root and the object DP *jiñi si'* 'the wood.'

(58)   FEATURE SHARING IN SITU
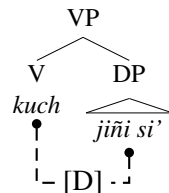
As in the derivation of VOS, the verb in the incipient VSO structure undergoes a series of X^0-movements, eventually landing in SS^0, as shown in (59).

(59) FEATURE SHARING AND V^0-RAISING

IP
 I
  TAM
  tyi=
 ssP
  SS
   Voice
    V
    i-kuch
    Voice
   SS
   -SS
   -u
  VoiceP
   SUBJ
   aj=Maria
   Voice′
    t_{Voice}
    VP
     t_V
     OBJ
     jiñi si'
[D]

ARGUMENT-φ does not influence the way prosodic structure is built in this example, because only one instance of the relevant feature ([D] in this example) is ever visible at a given time. Below, the subject and object (both DPs) are crossed out, indicating that their syntactic features are no longer visible because they were assigned prosodic structure in an earlier phase.

(60)

Input: [$_{TP}$Tyi [$_{vP}$ikuchu [$_{VoiceP}$[$_{DP}$aj-Maria] [$_{VP}$[$_{DP}$jiñi si']]]]]]	STR START	ARG φ	MATCH ι_{INT}	MATCH (φ, XP)	MATCH (XP, φ)
a. (tyi'=kuchu$_D$ (aj=Maria)φ (jiñi si')φ)ι	*!				
b. ☞ ((tyi'=kuchu$_D$)φ (aj=Maria)φ (jiñi si')φ)ι				*	
c. ((tyi'=kuchu$_D$ (jiñi si')φ)φ (aj=Maria)φ)ι	*!				
d. (((tyi='kuchu$_D$)φ (jiñi si')φ)φ (aj=Maria)φ)ι				* *!	
e. ((tyi='kuchu$_D$ jiñi si')φ (aj=Maria)φ)ι				*	*!
f. ((aj=Maria)φ (tyi='kuchu$_D$ jiñi si')φ)ι			*!	*	*

We propose that an equivalent derivation to the one articulated here is at play in languages that have been described as rigidly VSO. Evidence for this is found in languages of the Q'anjob'alan branch, in which apparent "VOS" order occurs in intransitive, pseudo-incorporation environments—the exact environments that allow bare NP objects. In these languages, objects are typically DPs and thus inaccessible to ARGUMENT-φ.

6   VOS across Mayan

In the preceding sections, we argued for a consistent *syntactic* derivation of V1 order in Mayan, with a particular focus on Ch'ol: we proposed that the verb undergoes head movement up through Voice^0 and any other stem-forming heads (e.g. valence-related heads), landing in the specifier of the projection that hosts the status suffix, SS^0. This places the verb stem above the transitive subject and below the TAM marker, deriving TAM–V–S–O order. This syntax, we propose, underlies both VSO and VOS clauses.

We argued that, at least for Ch'ol VOS order, the bare NP object is reordered post-syntactically to satisfy a high-ranked prosodic constraint—ARGUMENT-φ— which requires that the verb and its selected object be pronounced in the same phonological phrase. DP objects have been spelled out as phases, and are thus not subject to ARGUMENT-φ. This analysis provides a natural account of the fact that objects in Ch'ol VOS constructions must be bare NPs, while objects in VSO are full DPs.

Though the sections above have touched on other languages in the family, our primary prosodic data have come from our own fieldwork on Ch'ol. In this section, we examine in greater detail the possibility of extending our account to other Mayan languages, especially those with VSO/VOS alternations. We examine data from the major sub-families in (3) above: Yucatecan, Ch'olan–Tseltalan, Q'anjob'alan, Mamean, and K'ichean.[13] Though time and space prevent a full examination of all of these languages, we will provide enough evidence to suggest that it is possible to maintain an underlying VSO syntax while allowing multiple paths to VOS order. The possible routes to VOS order were foreshadowed in (2) above and are repeated here in (61).

(61)   PATHS TO VOS
            a.   subject in high right-side topic position   (§6.3)
            b.   heavy-NP shift of phonologically heavy subjects   (§6.2)
            c.   prosodic re-ordering of bare NP objects   (§6.1)

The prosodic reordering of bare NP objects was outlined in section 5. We predict that prosodically derived VOS order should be possible only with D^0-less NP objects. This prediction is examined in section 6.1. If prosody were the only factor governing postverbal order in Mayan languages, we might expect all VOS sentences to have bare NP objects. However, other independently motivated factors come into play as well. In particular, we discuss heavy-NP shift in section 6.2 and

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[13]We omit discussion of the most divergent language, Huastec—classified in its own sub-family, and geographically distant from the others—due to a lack of available information.

right-side subject topicalization in section 6.3; both of these configurations result in the possibility of VOS order with full DP objects. In section 6.4, we outline the various testable prosodic predictions that these different paths to VOS make. These predictions should prove especially useful for future work, since our account allows for the fact that a single language may have multiple paths to VOS, each of which should have distinct consequences for prosodic constituency.

6.1   NP objects and prosodic reordering

The majority of the Mayan languages that are described as basically VOS, or VOS/ VSO alternating, are languages which permit bare NP arguments and for which D^0-level material associated with the object appears to play a role in conditioning VOS/VSO alternations. These include languages from the Yucatecan and Ch'olan–Tseltalan families, as well as some K'ichean languages. Given the dearth of information on prosodic constituency in Mayan languages more generally, our aim here is merely to address the potential we see for extending the account presented in section 5 to other VOS/VSO-alternating languages.

Hofling (1984) compares word order across the Yucatecan branch, providing a useful jumping-off point for the discussion here:

> "In Lacandon and Classical Yucatec, the first NP of VOS sentences is typically unspecified [i.e. bare] or is specified by possessive pronouns, while the second is specific. In the other dialects, the relationship of specificity to word order may be stated more precisely: the first NP is of lower specificity than the second and is not topicalized, while the second is specified, often by a topic marker" (Hofling 1984:44)

Compare the Lacandon examples in (62): in the VOS sentence in (62a), the object is a bare NP argument. In the VSO example in (62b), it is a proper name (i.e. a DP).[14]

(62)   a.   T-u-kin-s-a   [$_O$ balum] [$_S$ K'ak'].
              PFV-A3-die-CAUS-SS   jaguar   K'ak'
              'K'ak' killed the jaguar.'

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[14]The examples in Hofling 1984 generally conform to this pattern, with the exception of some examples which are clearly elicited (e.g. reporting on possible interpretations of *kill–[man]–[jaguar]* in different languages). As per the discussion in section 3.3, we set such examples aside here.

b. Paytan t-u-yil-a   [$_S$ nukuch winik] [$_O$ Kanank'ax].
    first   PFV-A3-see-SS   old   man   Kanank'ax
    'First the ancestors saw Kanank'ax.'   (Lacandon; Hofling
    1984:41–43)

In more recent work, focusing on the Yucatecan language Itzaj, Hofling (2000:190) writes that VOS is the basic order and "VOS order commonly has an unmodified, indefinite object NP." A naturally-occurring example from Itzaj is shown in (63); as in Ch'ol in section 3.4, we assume that possessors sit below DP.[15]

(63)   Ii   t-u-p'ät-aj   b'in [$_O$ u-tzimin] [$_S$ a'   winik-ej].
        and PFV-A3-leave-SS REP   A3-horse   DET man-TOP
        'And the man left his horse, they say.'   (Itzaj; Hofling 2000:191)

In a similar vein, Bohnemeyer (2009) discusses Yucatec word order in detail, noting that in VOS, it is ungrammatical for the object to be definite if the subject is indefinite; Tonhauser (2004) describes a similar restriction. Though naturally-produced examples are not provided by these authors, we assume that the relevance of subject definiteness is connected to topicality, addressed in section 6.3.[16] If our assumption is correct, then another way to conceive of Tonhauser's generalization is that DP objects surface in VOS contexts only when the subject is a right-side topic.

Within the Ch'olan–Tseltalan branch, the fact that bare NPs may serve as arguments has already been demonstrated for Ch'ol (§3.4) and Tseltal (example (16)). Robinson's (2002) corpus study of Tseltal gives eight naturally-occurring VOS sentences, seven of which have D[0]-less objects. An example is shown in (64). The one exception discussed in section 6.2 below, features a phonologically heavy subject.

(64)   . . . la   laj s-ta-ik   [$_O$ ti'   uk'um] [$_S$ te   j'uch-etik-e   ].
            PFV HS A3-find-PL   edge river   DET possum-PL-ENCL
        '. . . the possums reached the riverbank.'   (Tseltal; Robinson 2002:67)

As noted in section 3.3, many studies conflate the semantic notions of *definiteness* and *specificity* with the presence of D[0]-level material. However, in many cases it is clear that the word order alternations in Mayan are influenced not by definiteness

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[15]Note the position of reportative *b'in* in (63), which indicates that at least a subset of discourse particles in Itzaj can surface between a verb and a bare NP object. The same is true for closely related Yucatec (Scott AnderBois *p.c.*). Given our limited understanding of the syntax and prosody of this type of discourse particle, we simply flag this example as illustration of an empirical fact that would need to be addressed in the context of an ARGUMENT-φ account of VOS for these languages.

[16]DuBois (1987), discussed in England 1991, describes a universal discourse constraint against introducing new information in the subject of a transitive clause. It is thus unsurprising, from a discourse point of view, that the transitive subjects here and below are frequently definite.

or specificity per se, but rather the presence vs. absence of D^0-level material (and thus under our account, syntactic *phasehood* of the object). Take Tsotsil, another Ch'ol–Tseltalan language, for instance. Aissen (1987) describes Tsotsil as VOS. The example provided in (65) suggests that bare NPs in this language may receive a definite interpretation, while sill appearing as VOS objects.

(65)   I-s-pet   lok'el [$_O$ antz   ] [$_S$ ti   t'ul-e   ].
        PFV-A3-carry away   woman   DET rabbit-ENCL
        'The rabbit carried away the woman.'   (Tsotsil; Aissen 1987:1)

A clear discussion of the distinction between D^0-level material and definiteness is found in Dayley 1985 for the K'ichean language Tz'utujil. Dayley notes that VOS is the basic or unmarked order in Tz'utujil, but that the object may not appear with the definite article, as shown by the pair of sentences in (66). He continues: "However, the patient may be 'understood' as definite when no article occurs with it" (Dayley 1985:304).

(66)   a.   X-kee-tij   [$_O$ tzyaq   ] [$_S$ ch'ooyaa'].
             PFV-A3P-ate   clothes   rats
             'Rats ate (the) clothes.'
        b.   *X-kee-tij [$_O$ ja tzyaq] [$_S$ ch'ooyaa'].   (Tz'utujil; Dayley 1985:305)

Larsen (1988:342) provides a detailed discussion of word-order alternations in K'iche', demonstrating that VOS is acceptable when the subject is definite and the object is "unmarked" (i.e. a bare NP), as in (67).

(67)   X-u-q'aj   [$_O$ chee'] [$_S$ lee   kaqiiq'].
        PFV-A3-break   tree   DET wind
        'The wind broke trees.'   (K'iche; Larsen 1988:342

   Echoing the discussion of Yucatec above, Larsen states that full DP objects are only possible in K'iche' VOS if the subject is both definite and animate; DP objects in VOS are otherwise judged ungrammatical. Below, we will argue that this behavior is suggestive of topicality effects.

   Finally, DuBois (1981) lists VOS as the basic order in Sakapultek, and provides a single example with a bare object:

(68)   R-tix   [$_O$ kinaq'] [$_S$ l   achen].
        A3-eat   bean   DET man
        'The man ate beans.'   (Sakapultek; DuBois 1981:239)

   In sum, all of the languages discussed in this section allow bare NPs to serve as arguments and all are described as basically VOS or alternating VOS/VSO in the

works cited above and in England's (1991) survey article. A clear pattern emerges in naturally occurring examples of VOS order and in the description of word order alternations by individual authors: these languages prefer objects to be NPs in VOS clauses (VO$_{NP}$S). Under our proposal, bare NP objects do not include a phase head and are thus sent to spell-out in the same cycle as their selecting head. When ARGUMENT-φ is ranked above the constraints that prevent prosodic restructuring, this results in the reordering of the object to a position where it can be pronounced in the same φ-phrase as the verb. Of course, this type of account makes very specific predictions for prosodic constituency, which we address in section 6.4.

Mayan VOS examples that depart from the VO$_{NP}$S pattern have either (i) heavy subjects or (ii) full DP subjects; we turn to the latter cases next.[17]

6.2   Heavy-NP shift

As noted above, all else being equal, we might expect that naturally-occurring instances of VOS order should always have bare NP objects. Indeed, this holds true for many examples of VOS, but counterexamples with DP objects are not difficult to find. One type of counterexample occurs in cases of heavy-NP shift. Although we will briefly review evidence that word order in Mayan languages is subject to heavy-NP shift, a full account of this phenomenon is outside the scope of this paper (see however Ross 1967; Rizzi 1990; Staub et al. 2006); we remain agnostic as to whether heavy-NP shift should receive a syntactic/prosodic account or a processing-based account.

Heavy-NP shift results in non-canonical word order in a wide variety of languages. FIn Mayan languages, as in English, heavy NPs tend to shift towards clause-final position, although this tendency is not universal (see, e.g., Chang 2009 for Japanese).

Although the existence of heavy-NP shift is clearly documented in the Mayanist literature, the exact nature of the phenomenon is not well understood. Indeed, at this time, it is not even possible to give a precise definition of "heavy"; phonological weight, syntactic complexity, or both of these factors may determine whether a given Mayan NP is "heavy" enough to shift.[18] Maxwell (1975), discussed in Nor-

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[17]Note that we have not discussed languages described as "rigidly VSO" here. Under the head-raising syntax developed above (§2), VSO is straightforwardly derived in the syntax. Ultimately, we may wish to distinguish between (i) VSO languages in which arguments are always full DPs (and so ARGUMENT-φ does not affect word order), and (ii) those in which arguments may be bare NPs, but ARGUMENT-φ is ranked below the relevant MATCH constraints, allowing VSO$_{NP}$ to surface.

[18]As the purpose of section 6 is to discuss postverbal word-order variation in the Mayan family more generally, it is also worth noting that we know of no evidence that heavy-NP shift affects one branch of Mayan languages more than any other, nor can we think of any principled reason why it should.

man & Campbell 1978, proposes a "complex object constraint" for San Mateo Chuk that would ban complex objects from VOS configurations; see also Quizar 1979. In a similar vein, Norman (1977) proposed that VOS is the underived or "basic" order in K'iche', but that heavy objects must undergo an operation of heavy-shift, resulting in VSO, as in (69). The K'iche' facts are discussed in detail in Larsen 1988.

(69)   K'a tee   ka-r-il   [$_S$ lee achi] [$_O$ rii jun keej xaa maa
       until suddenly IPFV-A3-see DET man   DET one horse just EXCL
       pwaq k-uu-kisiij   ].
       money IPFV-3A-shit
       'Suddenly the man sees a horse that is just shitting money.'   (K'iche;
       Mondloch 1978:18)

Additional examples of VSO sentences with heavy object are given for Tseltal in (70) and for Chuj in (71); both of these languages are described as basically VOS:

(70)   K-ich'-oj   niwan bel [$_S$ jo'tik   ] [$_O$ jo'-winik rosina a   te
       A1-receive-STAT perhaps DIR   1PL.PRON   five-score dozen DEM DET
       karchucha nichim-e   ].
       cartucha flower-ENCL
       'We had brought perhaps one-hundred dozen cartucha flowers.'   (Tseltal;
       Robinson 2002:76)

(71)   Ix-s-milcham [$_S$ eb' winak] [$_O$ cha'-wan eb' winh k-et'   b'ey-um   ].
       PFV-A3-kill   PL man   two-CLF PL CLF A1P-RN walk-NML
       'The men killed two of our companions.'   (Chuj; Buenrostro 2013:109)

Relatedly, Aissen (1992) notes that CP complements to transitive verbs in basic-VOS Tsotsil must appear extraposed to the right of the subject.

On the head-movement account of V1 developed in section 2, VSO is straight-forwardly derived in the syntax whether or not the object is heavy. More relevant to us is the observation that heavy *subjects* also appear in clause-final positions. In his corpus study of Tseltal word order, Robinson (2002) provides eight naturally occuring VOS sentences; as noted in section 6.1, all but one of these sentences has a bare NP object. The one VOS example with a DP object has a coordinate phrase as its subject. Examples like the one in (72) demonstrate that heavy-NP shift is one avenue to VOS order.

(72) Ja'-uk   me to jajch me s-ti'-ik   [$_O$ te   k'ulub-etik-e] [$_S$ te
      EMPH-IRR DES still AUX DES A3-eat-PL   DET locus-PL-ENC   DET
      mut-etik-e,   te   tz'i'-etik-e, te   mis-etik-e].
      chicken-PL-ENC DET dog-PL-ENC, DET cat-PL-ENC
      'Chickens, dogs, and cats ate locusts.'   (Tseltal; Robinson 2002:55)

By hypothesis, if the subject of a clause is heavy and the object is bare, then heavy-NP shift and ARG-φ conspire to produce a VOS clause. However, as (72) shows, VOS may arise even when the object is associated with D^0-level material—provided that the subject is heavy. In such cases, it is the shifting of the subject, not the object, that results in VOS. Thus, a DP object may surface in the position determined by the syntax, and the result may still be VOS.

The next section brings us to the final way in which Mayan languages arrive at VOS order: postverbal topics.

6.3   Peripheral topics

Recall from the discussion in section 3 that generalizations about word order in Mayan languages can be problematic when based on elicited examples. If an elicitation setting does not provide a context that allows for information structural considerations to be taken into account, such factors may be overlooked. This section focuses on positive evidence that some VOS subjects occupy a high right-side topic position. We suspect that right-side topics are more prevalent in Mayan languages than the literature suggests, in part because a right-side subject topics do not result in a 'marked' word order in VOS languages and may thus be less apparent than preverbal topics. Because topics are generally subjects, we suspect that the type of analysis presented here is particularly applicable to languages with a strong tendency to realize subjects on the periphery of the clause (i.e. SVO/VOS).

The discussion of Tojolab'al in Curiel 2007 provides important support for the idea that Mayan languages have a postverbal topic position, in addition to the well-documented preverbal topic position (see §3.1). Curiel demonstrates that topics in Tojolab'al appear not only clause-initially, but also *clause-finally*: that is topics may occupy either extreme of the clause. This is especially apparent in Tojolab'al, which possesses overt topic morphology.

Compare the two naturally produced Tojolab'al examples in (73). In both, we find a transitive verb followed by two full DP arguments. The sentence in (73a) shows the VSO order expected under our analysis, while (73b) is VOS despite having a full DP object. Note, however, that in the VOS example, the subject is explicitly marked with topic morphology, while the VSO clause lacks topic marking.

(73) a. S-mak'-a-ta   [$_S$ ja 'epra] [$_O$ ja   men marya].
          A3-hit-SS-EMPH   DET Efraín   DET FEM María
          'Efraín hit María.'

      b. S-mak'-unej [$_O$ ja   jorje] [$_S$ ja   jwano='i]
          A3-hit-PERF   DET Jorge   DET Juan=TOP
          'Juan hit Jorge.'   (Tojolab'al; Curiel 2007:26)

Five other naturally-produced VOS sentences occur in Curiel's thesis; of these, the NP is a bare object in four. In the fifth, the object is a full DP but the subject again appears with topic-marking (Curiel 2007:67), on par with (73b).

Polian (2013) provides a similar discussion in support of a general peripheral topic effect in Oxchuc Tseltal, where it is also possible to find examples of VOS with an unmarked topical subject. Polian (2013:65) provides two naturally occuring VOS sentences, reproduced in (74) and (75c) below.

(74) La y-ich'   [$_O$ nujk'ul] [$_S$ te   kerem=e].
      PFV A3-receive   rope   DET boy=DET
      'The boy received rope.'   (Tseltal; Polian 2013:65)

(75) a. [Q:] The teacher in primary school didn't teach you anything?
      b. [A:] He never taught well, never, it was a mess...
      c. ... ma s-bijtes lek [$_O$ te   indigena-etik] [$_S$ te   kaxlan-etik]
              NEG A3-teach well   DET indigenous-PL   DET *ladino*-PL
          namey.
          long.ago
          '...the *ladinos* (teachers) didn't teach the indigeous people well.' (Tseltal;
          Polian 2013:66)

In (74), the object is a bare NP and thus compatible with either our prosodic account of VOS or our right-side-topic account. The object in the VOS sentence in (75c) is a full DP. Here, however, Polian provides a context which clarifies that the subject—*ladino*—is the topic. The sentence is taken from an interview in which the interviewer asks about teachers (75a). The speaker responds with the sequence in (75b)–(75c).

Polian (2013:66) discusses pragmatic prominence as a contributing factor to postverbal order in Tseltal, writing that "VSO order is used particularly when the patient is pragmatically more prominent than the agent." This generalization suggests that while topics tend to be subjects, objects may also occupy a high right-side topic position.

(76) a. Ma x-y-ich'   bel [$_S$ winik-etik] [$_O$ me   pantalon-to].
          NEG MOD-A3-take DIR   man-PL   DEM pants-DEIC
          'The men don't wear those pants.'
      b. Ja' ya   x-kuch [$_S$ k-inam-tik] away ts'in [$_O$ te   j-mats'-tik-e].
          FOC IPFV A3-carry A1-wife-PL   PART well   DET A1-*pozol*-PL-DET
          'Our wives carry our *pozol*.'   (Tseltal; Polian 2013:66)

Further evidence that clause-final objects can be inconspicuous postverbal top-
ics comes from Can Pixabaj's 2004 study of topicalization patterns in K'iche'.
Can Pixabaj finds that topics surface most commonly in preverbal position, but that
they occur frequently in postverbal position as well, as illustrated by (77). Based
on examples from the texts analyzed in Can Pixabaj 2004, postverbal topics appear
to be particularly common in constructions that introduce new topics and those in
which topics are updated.

(77) Tonse k'a te   ka-r-il   [$_O$ jo-sin   tz'unun   ].
      etonces PART PART INC-A3-see   DET-AFF hummingbird
      'Suddenly he saw a *hummingbird*.'   (K'iche'; Can Pixabaj 2004:115)

Turning to Yucatecan, as discussed above, Hofling (1984) notes a strong pref-
erence for bare NPs in VOS object position. He provides one textual example from
Classical (16th century) Yucatec which appears to counter-exemplify this claim, but
again, the subject appears with explicit topic marking:[19]

(78) Ka   u-ch'a-ah   [$_O$ ix   yaxun] [$_S$ Chakan-e   ].
      CONJ A3-receive-SS   FEM quetzal   Chakan-TOP
      'And the Chakans received the quetzal.'   (Classical Yucatec; Hofling
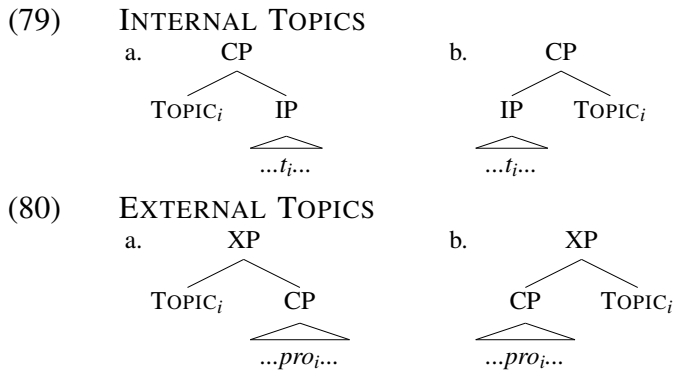   1984:40)

One final observation in support of our proposal comes from England 1991, who
writes that, for most languages with a high occurrence of VOS clauses, SVO is
also a strong candidate for "basic" word order. This observation leads us to suggest
that a subset of Mayan languages makes frequent use of a structural topic posi-
tion, whether that position is clause-initial or clause-final. Such languages might be
described as "peripheral-topic" languages.

   Topics tend to be grammatical subjects, so if a language is a peripheral-topic
language, it seems natural that this fact would emerge through tracking the location
of the subject in the clause. Languages with a tendency to locate designated top-
ics on the periphery of the clause include Ch'orti', Kaqchikel, and Yucatec. Word

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[19]We are assuming that the feminine *ix* preceding the object has a D^0-like function, as it does in
other languages of the family (Craig 1986).

order in these languages is somewhat contentious: they are often described as predominantly VOS, although some researchers contend that SVO is somehow more basic (Clemens 2013; Gutiérrez Bravo & Monforte y Madera 2008, 2010; Gutiérrez Bravo 2011; Quizar 1979). This disagreement suggests to us that word order in these languages might be best explained by a strong tendency to have peripheral topics.

In order to account for clause-final topics, we combine Aissen's (1992) account of internal and external topics with her right-side specifier account of Mayan VOS. Recall that Aissen places the subjects of VOS clauses in a right-side specifier of the verbal complex, while specifiers for higher topic and focus positions are ordered to the left (§4.1). Our analysis maintains that subjects are uniformly base-generated in left-side specifier positions (i.e. Spec,VoiceP), but that higher topic positions may be alternately ordered either to the left or to the right, as shown in (79) and (80).

(79)   INTERNAL TOPICS
         a.   CP   b.   CP

            TOPIC$_i$ IP   IP   TOPIC$_i$

                      ...t_i...   ...t_i...

(80)   EXTERNAL TOPICS
         a.   XP   b.   XP

            TOPIC$_i$ CP   CP   TOPIC$_i$

                      ...pro_i...   ...pro_i...

Focusing on Tsotsil, Popti', and Tz'utujil, Aissen (1992) provides a number of diagnostics that allow her to distinguish between (i) "internal topics" like those in (79), which arrive in their high CP-internal position via movement, and (ii) "external topics" like those in (80), which are adjoined to a CP-external position and co-indexed with a null pronominal. We leave for future work the question of whether right-side topics may be of one or both types, as well as whether the full range of diagnostics for clause-initial topics—including intonational phrases and the distribution of intonational phrase clitics—will be useful in identifying clause-final topics as well. The next section discusses our account's predictions for prosodic boundary marking and prosodic constituency more generally.

6.4   Predictions

Thus far, we have provided an in-depth discussion of postverbal word order alternations in Ch'ol and a basic discussion of word order variation in a handful of languages primarily from the Yucatecan, Ch'olan–Tseltalan, and K'ichean branches

of the Mayan family. Our preliminary investigation demonstrates that a unified derivation of V1 in the Mayan family is possible. On our account, VSO order is derived in the syntax via head-movement, while VOS order—described as "basic" in many languages—is the result of orienting subject-topics to the right side of the clause, shifting heavy subjects towards clause-final position, and the post-syntactic reordering of NP objects into a position where they can be pronounced with the verb.

We have also argued, following discussion in Minkoff 2000, Robinson 2002, and Skopeteas & Verhoeven 2005, that apparent animacy effects on Mayan word order should not receive a syntactic treatment; rather, we believe this is fundamentally a *processing* effect that arises in cases where speakers are asked to interpret potentially ambiguous clauses. At this point, we also set aside cases of heavy-NP shift, a phenomenon which we suspect to be so prevalent in Mayan languages that it does not contribute to understanding patterns in word order variation across the family.

The remainder of this section focuses on the intersection of two factors (i) the ranking of ARG-φ (high or low) and (ii) the availability of a high right-side topic position. Again, setting aside the effects of heavy-NP shift, we predict four basic types of Mayan languages.[20]

(81)   MAYAN WORD ORDER TYPOLOGY

a.	ARGUMENT-φ: low; right-side topic: ✗	VSO
b.	ARGUMENT-φ: low; right-side topic: ✓	VSO/VOS
c.	ARGUMENT-φ: high; right-side topic: ✗	VSO/VOS
d.	ARGUMENT-φ: high; right-side topic: ✓	VSO/VOS

Below, we explore the implicit predictions of (81) in the areas of word order and prosodic constituency.

6.4.1   Languages with low-ranking ARG-φ

For languages with low-ranking ARG-φ, which do not make use of a right-side topic position (81a), VSO is the predicted word order, whether or not the object is associated with D^0-level material, as shown in (82).

(82)   LOW ARGUMENT-φ WITHOUT RIGHT-SIDE TOPIC

a.   VSO$_{DP}$

b.   VSO$_{NP}$

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[20]Recall that we are focusing exclusively on order of postverbal arguments here; of course, we expect that *preverbal* topicalized and focused arguments will be derivable, either by A'-movement or high base-generation (Aissen 1992), irrespective of the ranking in (81).

Languages of this type are most likely to be found in the Q'anjob'alan and Mamean branches of the Mayan family, where rigid adherence to VSO order is most widely reported (see England 1991 and sources cited therein).

A language with low-ranking ARGUMENT-φ may also make use of the right-side topic position (81b). In this case, we predict that VSO order will be able to surface with NP, DP, and topical objects (83a)-(83c). In contrast, we predict VOS order *only* in cases where the subject is the topic of the clause (83d).

(83)   LOW ARGUMENT-φ WITH RIGHT-SIDE TOPIC

      a.   VSO$_{DP}$

      b.   VSO$_{NP}$

      c.   VSO$_{TOP}$

      d.   VOS$_{TOP}$

Both context and the presence of topic morphology should give clear indication that a VOS subject is also the topic. Additionally, distinct prosodic structure is a likely corollary of the expression of a right-side topic.

Work on the prosodic properties of preverbal topic constructions has consistently found that topicalized constituents are associated with specific intonational patterns. Boundary tones and the distribution of pauses may indicate that an intonational phrase boundary (or some other higher-order prosodic boundary) delimits the topic from the rest of the clause (see Aissen 1992 for Tsotsil and Popti'; Berinstein 1991 for Q'eqchi'; and Nielsen 2005 for K'iche'); designated pitch accents may also be associated with topicalized constituents (see Avelino 2011, Kügler & Skopeteas 2007, and Kügler et al. 2007 for Yucatec). Although perfect symmetry between the prosodic realization of preverbal and postverbal topics is unlikely— languages often mark the right and left edges of prosodic constituents differently— the prosodic cues to preverbal topics are a good place to start looking for prosodic evidence for the topical status of peripheral arguments.

One additional prediction for languages with low-ranking ARGUMENT-φ and a designated postverbal topic position pertains to the prosodic expression of the object. For this type of VSO/VOS language, the object in a VOS$_{TOP}$ clause may be either a bare NP or a full DP; in either case, we predict that the object will be realized in the position determined by the underlying syntax. As such, we do not predict the prosodic structure associated with the object to be affected by the presence or absence of D^0-level material.

6.4.2   Languages with high-ranking ARGUMENT-φ

Turning to languages with high-ranking ARGUMENT-φ and no right-side topic position (81c), we expect to find a strict correlation between word order and the pres-

ence of D^0-level material on the object in these languages. Specifically, in VOS clauses, the object should be a bare NP; while in VSO clauses, the object should be a full DP, as shown in (84).

(84)   HIGH ARGUMENT-φ WITHOUT RIGHT-SIDE TOPIC
    a.   VSO$_{DP}$
    b.   VO$_{NP}$S

In the VOS clauses of these languages, we expect the object and the verb to be realized as subconstituents of a unique phonological phrase. For some languages, conditions on prosodic well-formedness may require that a given prosodic constituent (e.g., a prosodic phrase), may have a limited number of immediate subconstituents, (e.g., prosodic words) (de Lacy 2004; Ketner 2006; Itô & Mester 2007). We do not necessarily expect this type of constraint to directly influence the prosodic phrasing of objects in the VOS clauses of high-ranking ARGUMENT-φ languages, given the availability of heavy-NP shift. If a bare NP object is large enough to influence prosodic structure assignment, it may instead shift towards the periphery of the clause (see §6.2).

The final language type to consider is one with high-ranking ARGUMENT-φ *and* a designated topic position (81d). In this case, we predict VSO with DP and topical objects, VOS with NP objects and either non-topical or topical subjects (85c)–(85d), and VOS with DP objects and topical subjects (85e).

(85)   HIGH ARGUMENT-φ WITH RIGHT-SIDE TOPIC
    a.   VSO$_{DP}$
    b.   VSO$_{TOP}$
    c.   VO$_{NP}$S
    d.   VO$_{NP}$S$_{TOP}$
    e.   VO$_{DP}$S$_{TOP}$

From the perspective of prosodic predictions, this is the most interesting type of language under consideration. As discussed in the context of low-ranking ARGUMENT-φ with right-side topics, we expect topicalized constituents to have distinct prosodic properties and/or consequences for clause-level prosody.

However, with high-ranking ARGUMENT-φ, we *do* expect to see a difference between the prosodic constituency of VOS clauses with NP objects, as in (85c) and (85d), and VOS clauses with DP objects and topicalized subjects, as in (85e). For examples like (85c) and (85d), we predict that the verb and the NP object will be parsed into a common φ-phrase, whereas for examples like (85e), we do not.

In the section on peripheral topics above (§6.3), we suggested that Yucatec is a possible exemplar of a "subject-periphery" language, i.e., a language in which

clauses generally have a designated topic, found either to the left or right of the clause. We also hypothesized that Yucatec is a high-ranking ARGUMENT-φ language, according to our system (§6.1). These two factors make Yucatec an exemplar of type ((81d)): a high-ranking ARGUMENT-φ language with a designated topic position. Anecdotal evidence from the prosodic domain is consistent with this hypothesis.

The Yucatecan literature is unique among Mayan languages in containing studies of sentential phonology, including those by Avelino (2011), Kügler & Skopeteas (2007), and Kügler et al. (2007). These studies were designed to investigate the prosodic correlates of preverbal topic and focus, but the discussion and examples found in these papers are relevant to postverbal word-order variation as well.

Avelino (2011) finds that a LH* pitch accent is aligned with the right edge of three kinds of clause-initial constituents: (i) nominals in preverbal topic position, (ii) nominals in preverbal focus position, and (iii) the verb in VOS constructions (cf. Kügler et al. 2007; Kügler & Skopeteas 2007). Avelino (2011) also identifies an alternative phrasing, in which the LH* pitch accent is aligned to the right edge of the second constituent rather than the first. He illustrates these two patterns with examples of VOS word order, in which the LH* pitch accent is either realized on the right edge of the verb (e.g., see Figure 2 in Avelino 2011), or on the object (e.g., see Figure 6 in Avelino 2011).

Although Avelino (2011) does not address whether postverbal objects plays a role in determining the prosodic phrasing of the clause, in the examples he provides, a familiar pattern emerges: the relevant LH* pitch accent is realized on the verb when the object is a full DP and on the object when the object is a bare NP. In other words, anecdotal evidence suggests that the verb and the object are phrased together when the object is an NP, but phrased separately when the object is a DP. This pattern is exactly what our account predicts for the prosody of these clauses. We leave it to future work to determine whether (i) the subjects in the VOS examples with DP objects are postverbal topics and (ii) our observation about the correlation between object type and prosodic constituency in Yucatec extends beyond the examples provided in Avelino 2011.

Finally, although we have not been able to locate any prosodic data of the relevant kind, we suspect that a systematic study of transitive clauses with one *pro*-dropped nominal—VO$_{NP}$ examples with a *pro*-dropped subject (86a), VO$_{DP}$ examples with a *pro*-dropped subject (86a), or VS examples with a *pro*-dropped object (86c)—would be extremely useful for testing the prosodic predictions of high-ranking ARGUMENT-φ (with and without a high right-side topic position). This type of study would be particularly informative because clauses with a single postverbal argument are far more common than those with two overt postverbal arguments. If our predictions hold, we should expect VO$_{NP}$ examples to display

different prosodic constituency than VO$_{DP}$ examples, which should look more like VS examples, as schematized in (86):

(86)   HIGH ARGUMENT-φ: PROSODIC PREDICTIONS

      a.   V O$_{NP}$ *pro* $\Rightarrow$ (V O)φ

      b.   V *pro* O$_{DP}$ $\Rightarrow$ (V)φ (O)φ

      c.   V S *pro* $\Rightarrow$ (V)φ (S)φ

Care must be taken when interpreting prosodic data, because multiple constraints on prosodic well-formedness may be simultaneously active. By means of illustration, consider the potential effects of BINARITY (Bennett et al. 2016; Elfner 2015; Itô & Mester 2007; Inkelas & Zec 1990), a constraint that privileges prosodic constituents consisting of exactly two sub-constituents. If, contrary to our prediction, each clause type in (86) were parsed into a single φ-phrase, it would be important to consider whether BINARITY were affecting the prosodic constituency of the clause. If it were, then the verb and the subsequent constituent would be parsed into a φ-phrase, without consideration for whether the immediately postverbal constituent were an NP object, DP object, or non-c-selected subject.[21]

6.4.3   Summary of predictions

In this section we have explored the predictions of our account with respect to possible word order permutations and their implications for prosodic structure. Specifically, we have considered the intersection of two factors—(i) the ranking of ARGUMENT-φ (high or low) and (ii) the availability of a high right-side topic position—resulting in the recognition of four language types, each of which we considered in turn. In addition to the prosodic predictions discussed here, our account also predicts that it should not be possible to find naturally occurring examples of VOS in cases where the object is a DP and the subject can not be characterized as

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[21]Investigating the prosody of clauses with modified nominals should help us control for this type of confound. For example, Elfner (2012) demonstrates for Irish that the verb and the subject in a VSO clause are phrased together unless the subject is modified, in which case the verb and the subject are phrased separately. For us, ranking ARGUMENT-φ above BINARITY predicts that both modified and unmodified objects should be phrased with the verb in VOS constructions with NP objects, whereas only unmodified subjects in VSO constructions and unmodified DP objects in VOS constructions should be phrased with the verb. At least for Ch'ol, we see no evidence that BINARITY is even a factor in how prosodic constituency is assigned; both modified and unmodified NP objects are pronounced with the verb in VOS constructions, while neither modified nor unmodified subjects are pronounced with the verb in VSO constructions (Clemens & Coon to appear). However, due to the potential effects of eurhythmic constraints like BINARITY, it is important to stress that the prosodic predictions we have outlined in this section should be tested in the context of a general understanding of a given language's prosodic system as much as possible.

a topic (or a heavy NP). Furthermore, it should not be possible to find a language that has naturally occurring examples of both (i) VOS clauses with NP objects, for which the subject is neither heavy nor a topic, *and* (ii) VSO clauses with NP objects. On our account, this sort of situation would cause an ARGUMENT-φ ranking paradox.

7 Summary and conclusions

This paper has examined a complex set of factors governing constituent order in the Mayan language family, with a particular focus on variation between VSO and VOS orders. We highlighted certain challenges for existing accounts of Mayan V1 and presented evidence in favor of a uniform syntax underlying Mayan V1, in which the verb stem is formed by successive head-raising to a position just above the transitive subject, but below the TAM marker in Infl^0. To our knowledge, this is the first explicit head-raising account proposed for VSO order in Mayan.

Head movement of the verb provides a natural explanation for VSO order; having developed this proposal, our next challenge lay in accounting for VOS in languages described as either basically VOS, or VOS/VSO-alternating. As the discussion in section 3 demonstrated, the literature suggests a variety of influences on postverbal order, including specificity, definiteness, phonological weight, discourse prominence, and animacy. One important contribution of this paper has been to whittle down this long list of factors. Following discussion in previous work, we provided evidence that the effects of animacy arise exclusively in elicitation contexts, and should be considered a processing phenomenon. We further demonstrated that it is not the semantic properties of definiteness or specificity that affect postverbal word order alternations, but rather the presence of a DP layer (including determiners, demonstratives, proper names, and pronouns).

Having reduced the factors governing postverbal order to three, we argued in sections 5 and 6 for three avenues to VOS order from an underlying VSO syntax: (i) prosodic restructuring of bare NP objects; (ii) heavy-NP shift; (iii) right-side topics. While the second two have been independently proposed within Mayan, the first claim—drawing on Clemens's (2014) account of Niuean—is new and is supported not only by prosodic evidence found in Clemens & Coon to appear for Ch'ol and Avelino 2011 for Yucatec, but also by the fact that languages which are described as VOS or VOS/VSO-alternating languages are overwhelmingly languages that allow bare NPs to serve as arguments in a transitive frame.

We concluded our discussion of the Mayan family as a whole by proposing a typology of word-order variation reflecting two of our three proposed paths to VOS: (i) prosodic restructuring of bare NP objects and (ii) right-side topics. We

determined that the heavy-NP shift phenomenon should be considered together with preverbal topic and focus as factors too wide-spread to be helpful in explaining differences among individual Mayan languages.

Our analysis of V1 order in Mayan and the typology we propose produce clear, falsifiable predictions. In the final section of this paper, we worked through predictions in two lines of research that we hope will serve as a basis for future work: (i) prosodic constituency in different types of VSO/VOS-alternating languages and (ii) the syntax and information structure of naturally occurring examples of VSO and VOS. For example, naturally occurring examples of VOS in cases where the object is a DP and the subject is neither a topic nor a heavy NP would constitute counter-evidence to our claims, as would naturally occurring examples in a single language of (i) VOS with NP objects and non-topicalized, light subjects and (ii) VSO clauses with NP objects.

References

Adger, David & Peter Svenonius. 2011. Features in minimalist syntax. In Cedric Boeckx (ed.), *The oxford handbook of linguistic minimalism*, 27–51. New York: Oxford University Press.

Aissen, Judith. 1987. *Tzotzil clause structure*. Reidel: Dordrecht.

Aissen, Judith, Nora England & Roberto Zavala (eds.). to appear. *The Mayan languages*. Routledge.

Aissen, Judith L. 1992. Topic and focus in Mayan. *Language* 68. 43–80.

Armstrong, Grant. 2015. Non-verbal predicate constructions in Yucatec Maya. Ms. University of Wisconsin, Madison.

Avelino, Heriberto. 2011. Intonational patterns of topic and focus constructions in Yucatec Maya. In Heriberto Avelino (ed.), *New perspectives in Mayan linguistics*, 56–79. Cambridge, MA: MIT Working Papers in Linguistics.

Baker, Mark. 1985. The Mirror Principle and morphosyntactic explanation. *Linguistic Inquiry* 16. 373–415.

Baquiax Barreno, Modesto, Rigoberto Juárez Mateo, Fernando Rodríguez Mejía & María Magdalena Pérez. 2005. *Yaq'b'anil stxolilal ti' Q'anjob'al: Gramática descriptiva Q'anjob'al*. Academia de Lenguas Mayas de Guaatemala.

Becker, Michael. 2009. *Phonological trends in the lexicon: The role of constraints*: University of Massachusetts Amherst dissertation.

Becker, Michael, Jonathan Levine & Andrew Nevins. 2012. Asymmetries in generalizing alternations to and from initial syllables. *Language* 88. 231–268.

Beckman, Jill N. 1997. Positional faithfulness, positional neutralisation and shona vowel harmony. *Phonology* 14(1–46).

Beckman, Jill N. 2013. *Positional faithfulness: an Optimality Theoretic treatment of phonological asymmetries*. Routledge.

Beckman, Mary & Janet Pierrehumbert. 1986. Intonational structure in Japanese and English. *Phonology Yearbook* 3. 255–309.

Bennett, Ryan, Jessica Coon & Robert Henderson. to appear. Introduction to Mayan linguistics. *Language and Linguistics Compass* .

Bennett, Ryan, Emily Elfner & James McCloskey. 2016. Lightest to the right: an anomolous displacement in Irish. *Linguistic Inquiry* 47. 169–234.

Bennett, Ryan, Boris Harizanov & Robert Henderson. 2015. Prosodic smothering in macedonian and kaqchikel. Ms. Yale University, Stanford University, and University of Arizona.

Berinstein, Ava. 1991. The role of intonation in K'ekchi Mayan discourse. In *Texas linguistic forum 32: Discourse*, Austin, TX: Department of Linguistics and the Center for Cognitive Science, The University of Texas, Austin.

Bohnemeyer, Jürgen. 2009. Linking without grammatical relations in Yucatec: Alignment, extraction, and control. In Y. Nishina, Y. M. Shin, S. Skopeteas, E. Verhoeven & J Helmbrecht (eds.), *Issues in functional-typological linguistics and language theory: A festschrift for christian lehmann on the occasion of his 60th birthday*, 185–214. Berlin: Mouton de Gruyter.

Bošković, Željko. 2008. What will you have, DP or NP? In *Proceedings of 37th Northeast Linguistics Society (NELS 37)*, GLSA.

Broadwell, George Aaron. 2000. Word order and markedness in Kaqchikel. In *Proceedings of the LFG00 conference*, .

Brody, Jill. 1984. Some problems with the concept of basic word order. *Linguistics* 22. 711–736.

Buenrostro, Cristina. 2013. *La voz en Chuj de San Mateo Ixtatán*. Mexico City: El Colegio de México dissertation.

Campbell, Lyle & Terrence Kaufman. 1985. Mayan linguistics: Where are we now? *Annual Review of Anthropology* 14. 187–198.

Can Pixabaj, Telma. 2004. La topicalización en K'ichee': una perspectiva discursiva. BA Thesis.

Can Pixabaj, Telma. 2006. *Gramática descriptiva Uspanteka*. Oxlajuuj Keej Maya' Ajtz'iib' (OKMA).

Chang, Franklin. 2009. Learning to order words: A connectionist model of heavy NP shift and accessibility effects in japanese and english. *Journal of Memory and Language* 61(3). 374–397.

Chierchia, Gennaro. 1998. Reference to kinds across languages. *Natural Language Semantics* 6. 339–405.

Chomsky, Noam. 2000. Minimalist inquiries: the framework. In Roger Martin, David Michaels & Juan Uriagereka (eds.), *Step by step: Essays on minimalist*

syntax in honor of Howard Lasnik, 89–155. Cambridge, MA: MIT Press.

Chomsky, Noam. 2001. Derivation by phase. In Michael Kenstowicz (ed.), *Ken hale: A life in language*, 1–52. Cambridge, MA: MIT Press.

Chung, Sandra. 2006. Properties of VOS languages. In Martin Everaert & Henk van Riemsdijk (eds.), *The blackwell companion to syntax*, 685–720. Malden: Blackwell.

Chung, Sandra & William A. Ladusaw. 2003. *Restriction and saturation*. Cambridge, Mass.: MIT Press.

Clemens, Lauren Eby. 2013. V2 in a v1 language: Kaqchikel svo. In Michael Kenstowicz (ed.), *Mit working papers in linguistics volume on kaqchikel*, MIT Working Papers in Linguistics.

Clemens, Lauren Eby. 2014. *Prosodic noun incorporation and verb-initial syntax*. Cambidge, MA: Harvard University dissertation.

Clemens, Lauren Eby & Jessica Coon. to appear. Prosodic constituency of verb-initial clauses in Ch'ol. In Megan Keough (ed.), *Proceedings of the The 21st Workshop on Structure and Constituency in Languages of the Americas (WSCLA 2016)*, .

Clemens, Lauren Eby & Maria Polinsky. to appear. Verb-initial word orders (primarily in Austronesian and Mayan languages). In Martin Everaert & Henk van Riemsdijk (eds.), *The Blackwell Companion to Syntax*, Wiley-Blackwell 2nd edn.

Coon, Jessica. 2010. VOS as predicate fronting in Chol Mayan. *Lingua* 120. 345–378.

Coon, Jessica. 2016. Unergatives, antipassives, and roots in Chuj. In *Proceedings of CILLA: The Conference on Indigenous Languages of Latin America-VII*, AILLA, University of Texas at Austin.

Coon, Jessica. to appear-a. Ch'ol. In Judith Aissen, Nora England & Roberto Zavala (eds.), *The Mayan languages*, Routledge.

Coon, Jessica. to appear-b. Little-v agreement and templatic morphology in Ch'ol. *Syntax* (http://ling.auf.net/lingbuzz/002331).

Coon, Jessica, Pedro Mateo Pedro & Omer Preminger. 2014. The role of case in A-bar extraction asymmetries: Evidence from Mayan. *Linguistic Variation* 14(2). 179–242.

Coon, Jessica & Omer Preminger. 2013. Transitivity in Chol: A new argument for the Split-VP Hypothesis. In Lena Fainleib, Nicholas LaCara & Yangsook Park (eds.), *Proceedings of NELS 41*, 127–142.

Craig, Colette Grinevald. 1979. The antipassive and Jacaltec. In Laura Martin (ed.), *Papers in Mayan linguistics*, vol. 1, 139–164. Lucas Brothers.

Craig, Colette Grinevald. 1986. Jacaltec noun classifiers. *Lingua* 70. 241–284.

Curiel, Alejandro. 2007. *Estructura de la información, enclíticos y configuración sintáctica en tojol 'ab'al*. México: CIESAS MA thesis.

Dayley, Jon. 1981. Voice and ergativity in Mayan languages. *Journal of Mayan Linguistics* 2. 3–82.

Dayley, Jon Philip. 1985. *Tzutujil grammar*. Berkeley: University of California Press.

Dobashi, Y. 2003. *Phonological phrasing and syntactic derivation*. Ithaca, NY: Cornell University dissertation.

DuBois, John W. 1987. The discourse basis of ergativity. *Language* 63. 815–855.

DuBois, John William. 1981. *The Sacapultec language*. Berkeley, CA: University of California, Berkeley dissertation.

Elfner, Emily. 2012. *Syntax-prosody interactions in Irish*: University of Massachusetts Amherst dissertation.

Elfner, Emily. 2015. Recursion in prosodic phrasing: Evidence from Connemara Irish. *Natural Language and Linguistic Theory* 33. 1169–1208.

Embick, David & Rolf Noyer. 2001. Movement operations after syntax. *Linguistic Inquiry* 32(4). 555–595.

Emonds, Joseph. 2000. *Lexicon and grammar: The English syntacticon*. Berlin: Mouton de Gruyter.

England, Nora. 1991. Changes in basic word order in Mayan languages. *International Journal of American Linguistics* 57. 446–486.

England, Nora C. 2003. Mayan language revival and revitalization: Linguists and linguistic ideologies. *American Anthropologist* 105(4). 733–743.

England, Nora C. & Laura Martin. 2003. Issues in the comparative argument structure analysis in Mayan narratives. In John W. DuBois, Lorraine E. Kumpf & William J. Ashby (eds.), *Preferred argument structure: Grammar as architecture for function*, 131–157. John Benjamins.

England, Nora C. & Roberto Zavala. 2013. Mayan languages. In Mark Aronoff (ed.), *Oxford bibliographies in linguistics*, Oxford: Oxford University Press.

Féry, Caroline. 2011. German sentence accents and embedded prosodic phrases. *Lingua* 121. 1906–1922.

Féry, Caroline & Hubert Truckenbrodt. 2015. Hierarchical organization and tonal scaling. *Phonology* 32. 19–47.

Grinevald, Colette & Marc Peake. 2012. Ergativity and voice in Mayan: A functional-typological approach. In Gilles Authier & Katharina Haude (eds.), *Ergativity, valency and voice*, 15–49. Berlin: Mouton de Gruyter.

Gutiérrez Bravo, Rodrigo. 2011. External and internal topics in Yucatec Maya. In R. Gutiérrez Bravo, L. Mikkelsen & E. Potsdam (eds.), *Representing language: Linguistic essays in honor of judith aissen*, 105–119. Santa Cruz, CA: Linguistics Research Center, University of California Santa Cruz.

Gutiérrez Bravo, Rodrigo & Jorge Monforte y Madera. 2008. La alternancia sujeto inicial/verbo inicial y la teoría de la optimidad. In R. Gutiérrez Bravo & Y E. Herrera Zendejas (eds.), *Teoría de optimidad: Estudios de sintaxis y fonología*, 61–90. México: El Colegio de México.

Gutiérrez Bravo, Rodrigo & Jorge Monforte y Madera. 2010. On the nature of word order in Yucatec Maya. In José Camacho, Rodrigo Gutiérrez Bravo & Liliana Sánchez (eds.), *Information structure in indigenous languages of the americas*, 139–170. Berlin: Mouton de Gruyter.

Halpert, Claire. 2015. *Argument licensing and agreement* Studies in Comparative Syntax. Oxford: Oxford University Press.

Harley, Heidi. 2016. The 'bundling' hypothesis and the disparate functions of little v. Ms. University of Arizona.

Hayes, Bruce. 1989. The prosodic hierarchy in meter. In Paul Kiparsky & Gilbert Youmans (eds.), *Rhythm and meter*, 201–260. Academic Press.

Hiraiwa, Ken. 2005. *Dimensions of symmetry in syntax: Agreement and clausal architecture*: Massachusetts Institute of Technology dissertation.

Hofling, Charles A. 1984. On Proto-Yucatecan word order. *Journal of Mayan Linguistics* 4(2). 35–64.

Hofling, Charles A. 2000. *Itzaj Maya grammar*. Salt Lake City: University of Utah Press.

Holmberg, Anders. 1986. *Word Order and Syntactic Features in the Scandinavian Langauges and English*. Stockholm: University of Stockholm Doctoral dissertation.

Inkelas, Sharon & Draga Zec. 1990. Prosodically constrained syntax. In Sharon Inkelas & Draga Zec (eds.), *The phonology-syntax connection*, 365–378. Stanford, CA, and Chicago, IL: CSLI Publications and Chicago University Press.

Ishihara, Shinichiro. 2007. Major phrase, focus intonation, Multiple Spell-Out. *The Linguistic Review* 24(2/3). 137–167.

Itô, Junko & Armin Mester. 2007. Prosodic adjunction in Japanese compounds. In *Formal approaches to japanese linguistics*, vol. 4, 97–111. Cambridge, MA: MIT Working Papers in Linguistics.

Itô, Junko & Armin Mester. 2010. Recursive prosodic phrasing in Japanese. In *The proceedings of the 18th Japanese/Korean conference*, 147–164. CSLI.

Kahnemuyipour, Arsalan. 2004. *The syntax of sentential stress*. Toronto: University of Toronto dissertation.

Kaisse, Ellen. 1985. *Connected speech: The interaction of syntax and phonology*. Orlando: Academic Press.

Ketner, K. H. 2006. *Size restrictions in prosodic morphology*: University of Cambridge, Cambridge, UK dissertation.

Kratzer, Angelika. 1996. Severing the external argument from its verb. In Johan Rooryck & Laurie Zaring (eds.), *Phrase Structure and the Lexicon*, 109–137. Dordrecht: Kluwer Academic Publishers.

Kratzer, Angelika & Elisabeth Selkirk. 2007. Phase theory and prosodic spellout: The case of verbs. *The Linguistic Review* 24. 93–135.

Kügler, Frank & Stavros Skopeteas. 2007. On the universality of prosodic reflexes of contrast: The case of Yucatec Maya. In *Proceedings of the 16th international congress of phonetic sciences*, Saarbrücken.

Kügler, Frank, Stavros Skopeteas & Elisabeth Verhoeven. 2007. Encoding information structure in Yucatec Maya: On the interplay of prosody and syntax. In S. Ishihara, S. Jannedy & A. Schwarz (eds.), *Interdisciplinary studies on information structure 08*, 187–208.

de Lacy, Paul. 2004. Maximal words and the Maori passive. In John J. McCarthy (ed.), *Optimality theory in phonology: A reader*, 495–512. Blackwell.

Ladd, D. Robert. 2008. *Intonational phonology*. Cambridge, UK: Cambridge University Press 2nd edn.

Larsen, Thomas. 1988. *Manifestations of ergativity in Quiché grammar*: University of California, Berkeley. dissertation.

Levin, Theodore. 2015. *Licensing without case*. Cambidge, MA: Massachusetts Institute of Technology dissertation.

Massam, Diane. 2001. Pseudo noun incorporation in Niuean. *Natural Language and Linguistic Theory* 19. 153–197.

Mateo Toledo, Eladio. 2003. The use of languages' names: The Mayan case. *International Journal of American Linguistics* 69(2). 151–153.

Mateo Toledo, Eladio. 2008. *The family of complex predicates in Q'anjob'al (Maya): Their syntax and meaning*: University of Texas, Austin dissertation.

Maxwell, Judith. 1975. San mateo chuj: A vos language that paid the price. Paper presented at the LSA Annual Meeting.

Maxwell, Judith M. 1976. Chuj intransitives: Or when can an intransitive verb take an object? *Journal of Mayan Linguistics* 1. 128–140.

McCarthy, John J. & Alan Prince. 1995. Faithfulness and reduplicative identity. In Jill N. Beckman, Suzanne Urbancyzk & Laura Walsh Dickey (eds.), *University of massachusetts occasional papers in linguistics 18: Papers in optimality theory*, 249–384. Amherst, MA: Graduate Linguistic Student Association, University of Massachusetts, Amherst.

Minkoff, Seth. 2000. Animacy hierarchies and sentence processing. In Andrew Carnie & Eithne Guilfoyle (eds.), *The syntax of verb initial languages*, 201–212. Oxford University Press.

Mondloch, James. 1978. Disambiguating subjects and objects in Quiché. *Journal of Mayan Linguistics* 1(1). 3–19.

Nespor, Marina & Irene Vogel. 1986. *Prosodic phonology*. Dordrecht: Foris.

Nielsen, Kuniko Y. 2005. Kiche intonation. *UCLA Working Papers in Phonetics* 104. 45–60.

Norman, William. 1977. Topic and focus in Mayan. Paper presented at the Mayan Workshop II, San Cristóbal de las Casas, Chiapas, Mexico.

Norman, William M. & Lyle Campbell. 1978. Toward a Proto-Mayan syntax: a comparative perspective on grammar. In Nora C. England (ed.), *Papers in Mayan linguistics*, vol. University of Missouri Miscellaneous Publications in Anthropology, no. 6; Studies in Mayan Linguistics, no. 2, Columbia: University of Missouri.

Peñalosa, Fernando. 1987. Major syntactic structures of Acatec (dialect of San Miguel Acatán). *International Journal of American Linguistics* 53(3). 281–310.

Pesetsky, David & Esther Torrego. 2007. The syntax of valuation and the interpretability of features. In Simin Karimi, Vida Samiian & Wendy K. Wilkins (eds.), *Phrasal and clausal architecture: Syntactic derivation and interpretation*, 262–294. Amsterdam: John Benjamins.

Polian, Gilles. 2013. *Gramática del tseltal de Oxchuc* Publicaciones de la Casa Chata. México: Centro de Investigaciones y Estudios Superiores en Antropología Social.

Prince, Alan & Paul Smolensky. 1993. Optimality Theory: Constraint interaction in generative grammar. In *RUCCS Technical Report No. 2*, Piscataway, NJ: Rutgers University Center for Cognitive Science.

Pylkkänen, Liina. 2002. *Introducing arguments*. Cambridge, MA: Massachusetts Institute of Technology dissertation.

Quizar, Robin. 1979. *Comparative word order in Mayan*: University of Colorado Boulder dissertation.

Rizzi, Luigi. 1990. *Relativized minimality*. Cambridge, MA: MIT Press.

Robinson, Stuart. 2002. Constituent order in Tenejapa Tzeltal. *International Journal of American Linguistics* 68(1). 51–80.

Ross, John R. 1967. *Constraints on variables in syntax*. Cambridge, MA: MIT Doctoral dissertation.

Selkirk, Elisabeth. 1995. The prosodic structure of function words. In Jill N. Beckman, Laura Walsh Dickey & Suzanne Urbancyzk (eds.), *University of massachusetts occasional papers in linguistics 18: Papers in optimality theory*, Amherst, MA: Graduate Linguistic Student Association, University of Massachusetts, Amherst.

Selkirk, Elisabeth. 2011. The syntax-phonology interface. In John Goldsmith, Jason Riggle & Alan C. L. Yu (eds.), *The handbook of phonological theory*, 435–484. Wiley-Blackwell 2nd edn.

Skopeteas, Stavros & Elisabeth Verhoeven. 2005. Postverbal argument order in Yucatec Maya. *Sprachtypologie und Universalienforschung* 58. 347–373.

Skopeteas, Stavros & Elisabeth Verhoeven. 2009. Distinctness effects on vos order: Evidence from Yucatec Maya. In Heriberto Avelino, Jessica Coon & Elisabeth Norcliffe (eds.), *New perspectives in mayan linguistics*, 157–174. Cambridge, MA: MIT Working Papers in Linguistics.

Smith, Jennifer. 1997. *Noun faithfulness: On the privileged behavior of nouns in phonology*. Amherst: University of Massachusetts MA thesis.

Smith, Jennifer. 2011. Category-specific effects. In Marc van Oostendorp, Colin J. Ewen, Elizabeth Hume & Keren Rice (eds.), *Phonological interfaces*, vol. 4 The Blackwell Companion to Phonology, New York: Blackwell.

Smith, Joshua Hinmán. 1975. La familia tzeltalana. Paper presented at the Mayan Workshop, Antigua, Guatemala.

Staub, Adrian, Charles Clifton & Lyn Frazier. 2006. Heavy NP shift is the parser's last resort: Evidence from eye movements. *Journal of memory and language* 54(3). 389–406.

Svenonius, Peter. 2004. On the edge. In David Adger, Cécile De Cat & George Tsoulas (eds.), *In peripheries: Syntactic edges and their effects*, 226–287. Dordrecht: Kluwer Academic Publishers.

Tonhauser, Judith. 2004. Grammar meets discourse: The case of Yucatec Maya. Paper presented at the LSA Annual Meeting.

Truckenbrodt, Hubert. 1999. On the relation between syntactic phrases and phonological phrases. *Linguistic Inquiry* 30. 219–256.

Uriagereka, Juan. 1999. Multiple Spell-Out. In S. Epstein & Norbert Hornstein (eds.), *Working minimalism*, 251–282. Cambridge, MA: MIT Press.

Vázquez Álvarez, Juan J. 2002. *Morfología del verbo de la lengua chol de Tila Chiapas*. México: CIESAS M.A. thesis.

Vázquez Álvarez, Juan J. 2011. *A grammar of Chol, a Mayan language*: The University of Texas at Austin dissertation.

Vázquez Álvarez, Juan J. & Roberto Zavala. 2013. La estructura argumental preferida en el chol, una lengua agentiva. *Memorias del VI Congreso de Idiomas Indígenas de Latinoamérica* .

Wagner, Michael. 2005. *Prosody and recursion*: MIT dissertation.

Wagner, Michael. 2010. Prosody and recursion in coordinate structures and beyond. *Natural Language and Linguistic Theory* 28. 183–237.

Werle, Adam. 2009. *Word, phrase, and clitic prosody in Bosnian, Serbian, and Croatian*. Amherst: University of Massachusetts dissertation.

Zavala, Roberto. 1992. *El Kanjobal de San Miguel Acatán*. México: UNAM.

Zavala, Roberto. 2000. Multiple classifier sytems in Akatek (Mayan). In Gunter Senft (ed.), *Systems of nominal classification*, 114–146. Cambridge, UK: Cam-

bridge University Press.