Prosodic noun incorporation: The relationship between prosody and argument structure in Niuean

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Abstract. This paper explains the VOS order of Niuean pseudo noun incorporation (PNI) by appealing to a condition on prosodic well-formedness, ARGUMENT-φ, that requires a head and its internal argument(s) to form a unique phonological phrase. In order to satisfy this requirement, the incorporated argument undergoes prosodic restructuring into a position adjacent to the verb at PF. Since the verb arrives at its clause-initial position via X^0-raising, the syntactic input to the prosodic grammar is VSO, while the prosodic output is VOS. This analysis eliminates the need to posit different locations for the generation of internal arguments based on eventual surface structure (VSO or VOS), which results in a simpler syntax of PNI. This account of Niuean PNI is also compatible with a uniform X^0-raising analysis of verb-initial structures, allowing for a more parsimonious account of Niuean argument structure and the formation of the verbal complex.

1. Introduction

The linear order of sentential constituents is not exclusively determined by the hierarchical structure of syntax. Numerous phonological factors, including length, weight, and stress, have been shown to influence the outcome of linearization (Anttila et al. 2010; Janssen and Caramazza 2009; McDonald et al. 1993; Shih 2014; Inkelas and Zec 1990; Zubizarreta 1998; among others). Recent work on linearization also addresses the relationship between the well-formedness of prosodic constituents and the linear order of syntactic constituents, with new results indicating that the op-

timization of prosodic phrasing plays a role in determining the linear order of the sentence (e.g., Bennett et al., 2015, to appear, and Sabbagh 2014).

Cross-linguistically, different factors influence optimal prosodic phrasing. This paper focuses on developing the prosodic well-formedness constraint, ARGUMENT-φ, which mandates that heads and their internal arguments be phrased in the same phonological phrase (φ-phrase). Prosodic constituents can be restructured post-syntactically in order to satisfy ARGUMENT-φ; as such, ARGUMENT-φ plays a role in determining the linear order of the sentence.

1.1 Related proposals

ARGUMENT-φ represents a new instantiation and application of an idea that has existed in the literature since Selkirk (1984). Selkirk argued that phonological phrasing is subject to a semantic constraint known as the *Sense Unit Condition*: the immediate constituents of a prosodic phrase (C1 and C2) must comprise a *Sense Unit*, in which C1 modifies or functions as an argument of C2. In this way, the *Sense Unit Condition*, like ARGUMENT-φ, addresses prosodic well-formedness and argument structure, although Selkirk does not consider the proposal to be involved in linearization.

Although the *Sense Unit Condition* has fallen out of favor for reasons discussed in Section 4, the fact that different facets of the *Sense Unit Condition* continue to surface in the literature suggests that Selkirk's basic insight remains valid and that the problematic aspects of the condition's original formulation are worth solving. Recent proposals that continue to reflect Selkirk's (1984) original intuition include Truckenbrodt's (1999, 2007) well-known WRAP-XP constraint – "for each XP, there must be a single φ-phrase that contains it." WRAP-XP is used to account for the fact that verbs are sometimes unexpectedly phrased with all of their internal arguments. Viewed in this light, WRAP-XP is essentially a constraint on the prosody of argument structure.

Truckenbrodt argues that WRAP-XP should be restricted to *lexical* XPs, while Henderson (2012) proposes that a related constraint COMPLEMENT-φ applies only to the phonological phrasing of *functional* heads and their complements. Given these disparate analyses, a unified theory that makes the correct predictions for both lexical and functional heads and their complements

would represent a significant advancement. ARGUMENT-φ aims to accomplish this task.

A final member of this class of contraints is *Selectional Contiguity* (Richards to appear), which states that pairs of heads in a selection relation must be contiguous. Richards' (to appear) understanding of *Selectional Contiguity* (Richards to appear) and my application of ARGUMENT-φ share a similar objective: to ensure that two elements are pronounced together when they are related to one another via a selectional relationship – established when a head selects a complement – even when those two elements are nonadjacent at some point in the derivation. However, unlike *Selectional Contiguity*, ARGUMENT-φ maintains the traditional view that the syntactic component of the grammar does not access phonological information.

1.2 Structure of the paper

The first objective of this paper is to formulate a prosodic well-formedness constraint, ARGUMENT-φ, that captures the intuitioin that head-argument pairs should be phrased together, while remaining consistent with our current understanding of the architecture of the grammar, in which the modules responsible for the phonological form of the utterance (PF) and the semantic interpretation of the utterance (LF) do not interact. The second objective of this paper is to argue that ARGUMENT-φ can, in certain cases, influence the linear order of sentential constituents. The context for these large goals is the problem of Niuean pseudo noun incorporation.

Niuean is a VSO language (1-a) with a basic clause structure that can be straightforwardly captured with successive cyclic head movement (X^0-raising). However, an XP-raising analysis has become the standard for Niuean syntax following Massam's (2001) seminal paper on a construction she dubbed pseudo-noun incorporation. PNI sentences have VOS word order, which X^0-raising cannot directly account for.[1]

(1) a. Kua fakahū he ekekafo **e** **tohi.**
PFV send ERG doctor ABS letter
'The doctor sent the letter.' Niuean VSO

[1]Unless otherwise noted, Niuean examples are from the author's notes, some of which were based on examples found in the literature, e.g. Seiter (1980), Sperlich (1997), and Massam (2001)

b. Kua fakahū **tohi** e ekekafo.
PFV send letter ABS doctor
'The doctor sent the letter.' Niuean VOS/PNI

The prosodic account of Niuean PNI developed here maintains that the movement of the verb into initial position always occurs in the syntax via X^0-raising. The position of the object in VOS clauses is the result of a prosodic restructuring. Thus, the present analysis breaks from the assumption that VSO/VOS alternations are syntactically motivated.

Massam (2001, et seq.) advances an account of Niuean word order, in which the major constituents of the hierarchical structure achieve their final linearization in narrow syntax. She argues that Niuean VOS is the result of VP-movement, while VSO is the result of VP-remnant movement, where the object evacuates the VP before the VP moves into its final position. While VP-raising affords an elegant account of VSO/VOS alternations in Niuean, X^0-raising provides a more straightforward account of Niuean clause structure more generally.

The remainder of the paper is organized as follows: Section 2 reviews the Niuean PNI construction, Massam's (2001) syntactic analysis of Niuean PNI, and some relevant observations about sentential prosody in Niuean; Section 3 introduces ARGUMENT-φ, a prosodic well-formedness constraint mandating that heads and their internal arguments are phrased together; Section 4 illustrates how the proposal works in a grammatical model where LF and PF do not interact and places the proposal in the context of Multiple Spell-out (Uriagereka 1999). Before concluding, I discuss the X^0-raising analysis of Niuean clause structure in Section 5.

2. Niuen PNI and the syntactic account of VSO/VOS alternations

Niuean is a dependent-marking ergative language that employs different case-marking paradigms for common nouns and proper nouns/pronouns (2).

(2) Ergative and absolutive markers

	Ergative	Absolutive
Common nouns	*he*	*e*
Proper nouns/pronouns	*e*	*a*

The data in (3)-(4) illustrate these characteristics, as well as the fact that the Niuean verb precedes the subject, the object (shown in bold), and any oblique arguments or adverbial phrases (italicized). In other words, Niuean's most basic word order is VSOX.

(3) Transitive clause (VSOX)

a. Kua kitia he tama **e** **maukoloa** *he fale koloa haana*.
PFV see ERG child ABS shopkeeper LOC shop POSS
'The child saw the shopkeeper at his shop.' Common nouns

b. Kua kitia e Sione **a** **Peleni** *he fale koloa haana*.
PFV see ERG sione ABS Peleni LOC shop POSS
'Sione saw Peleni at his shop.' Proper nouns

(4) Intransitive clause (VSX)

a. To fano e kāmuta *ke he taone*.
FUT go ABS carpenter to LOC town.
'The carpenter will go to town.' Common nouns

b. To fano a Sione *ke he taone*.
FUT go ABS sione to LOC town
'Sione will go to town.' Proper nouns

2.1 Internal arguments

In broad focus contexts, all of Niuean's arguments surface after the verb; however, only some of these arguments are VP-internal. VP-internal arguments in Niuean include direct objects (DP and NP), middle objects (PP and NP), instrumental objects (PP and NP), unaccusative subjects (DP) and clausal complements (CP). Subjects of transitive clauses are assumed to be external arguments, and all other PPs, i.e. non-middle and non-instrumental, are not selected by the verb.

Cross-linguistically, instrumentals are among the prepositional phrases adjoined in the lowest positions (Schweikert 2005). More significantly, an analysis of instrumental arguments as syntactically distinct from other classes of PPs is necessary elsewhere in the grammar of Niuean: all instrumental arguments, not only those in applicative constructions, behave like subjects and direct objects with regard to relative clause formation and the ability to scope under *oti* 'all' (see Seiter

1979, 1980; Massam 2013, and Section 5).

Middle objects fall somewhere between instrumentals and other obliques in terms of their behavior as core arguments. Verbs that select middle objects are psych verbs, i.e., verbs of perception, cognition, and emotion (although not all psych verbs take middle objects). Because middle objects behave like absolutive and instrumental objects (i.e., like internal arguments) in PNI constructions, I generate them VP-internally. This aspect of the analysis – that middle objects are VP-internal and are selected by the verb – is consistent with Chung (1978) and (Longenbaugh and Polinsky (2016) (see Seiter 1980 and Massam 2001 for more discussion).

Foreshadowing the next section where PNI constructions are discussed in depth, most of Niuean's internal arguments surface in PNI constructions, but only when they are not associated with any functional structure, i.e. when they surface as NPs. (5) summarizes which of Niuean's arguments can surface as an NP, making them available for PNI.

(5)

		Can surface as NP	Available for PNI
External	Transitive Subject	*	*
	Unergative Subject	*	*
Internal	Unaccusative Subject	*	*
	CP Complement	*	*
	Direct Object	✓	✓
	Middle Object	✓	✓
	Instrumental Object	✓	✓

Section 4.2 accounts for the fact that even internal arguments associated with any functional structure (DP, PP, and CP) are incompatible with PNI.

2.2 Niuean PNI

While the 'basic' word order in Niuean is VSO, the major sentential constituents can also surface in VOS order under pseudo noun incorporation (PNI). Although the incorporated argument in PNI constructions may at first appear to form some sort of compound with the verb, these constructions are distinct from 'true' incorporation structures (cf. Baker 1988, 2009).[2] This section reviews the

[2]In contrast, the existential incorporation structure in Niuean is perhaps an instance of 'true' incorporation (see Massam 2001, 2009).

relevant morphosyntactic characteristics of Niuean PNI constructions, originally introduced to the literature by Seiter (1980) and Massam (2001).

The most common type of PNI construction involves the incorporation of an absolutive object (PNI-abs). An example of a PNI-abs structure and its VSO counterpart is shown in (6), same as (1). In terms of word order, VSO (6-a) and PNI (6-b) constructions differ according to (a) the relative order of subject and object and (b) the position of postverbal particles relative to the verb.

(6) Absolutive Object

a. Kua fakahū he ekekafo **e** **tohi.**
PFV send ERG doctor ABS letter
'The doctor sent the letter.' Niuean VSO

b. Kua fakahū **tohi** e ekekafo.
PFV send letter ABS doctor
'The doctor sent the letter.' Niuean VOS/PNI

In the VSO structure in (6-a), the object follows the subject. Particles, such as the italicized directional particle *hake*, must appear to the immediate right of the verb. In contrast, in (6-b), the object precedes the subject. Furthermore, the particle in this example appears to the right of the object, rather than in its canonical position adjacent to the verb. The inability of the particle to surface in its preferred postverbal position provides syntactic evidence that the verb and the object in PNI constructions form a surface constituent.

In the domain of morphosyntax, VSO and PNI constructions differ in terms of the functional morphology associated with the object. Objects in VSO clauses are obligatorily marked for case. In (6-a), for example, the object is preceded by *e*, the absolutive marker for common nouns. In contrast, no case morphology is associated with the object in the PNI construction in (6-b). In fact, the object in a PNI construction may not be preceded by any functional material, although it may *contain* functional material, as shown by the modified examples in (7).

(7) PNI with complex objects

a. Kua onoono **fakatino mahaki toili** e tama he aoga.
pfv look.at pictures huge large ABS child LOC school
'The child is looking at extremely large pictures at school.'

b. Ne tō **talo mo e tau fiti** e magafaoa.
PST plant taro comptv ABS pl flower ABS family
'The family planted taro and flowers.'

c. ...ke kumi **mena ke nonofo ai** a lautolu.
DEP.T seek thing DEP.T settle RP ABS 3.PL
'...they sought a place to settle.' (Massam 2001:160)

In light of the patterns illustrated in (6)–(7), which disallow functional material preceding the head noun, Massam (2001) concludes that the incorporated argument in PNI constructions is smaller than a DP. Incorporated arguments are nonetheless phrasal, since they can be modified by adjectives (7-a), coordinate phrases (7-b), and nonfinite relative clauses (7-c). As such, incorporated arguments must be NPs (Massam 2001).

Finally, Niuean PNI is not restricted to direct objects. In total, three types of arguments incorporate in this manner: (a) direct objects (shown in (6)), (b) middle objects (PNI-mid), shown in (8), and (c) instrumental objects (PNI-inst), shown in (9). Example (8-b) shows the incorporation of a middle object. Middle objects in VSO clauses (8-a) are marked with the same case as goal DPs: *ki a* for proper nouns/pronouns and *ke he* for common nouns.

(8) Middle objects

a. Kua fakalilifu e tau momotua **ke he ekekafo.**
PFV respect ABS PL old.PL GL LOC doctor
'The old people respect the doctor.' VSO

b. Kua fakalilifu **ekekafo** e tau momotua.
PFV respect doctor ABS PL old.PL
'The old people respect the doctor.' PNI

Example (9-b) shows the incorporation of an instrumental argument. In the VSO clause in (9-a), the instrumental is marked with *he*, the locative case for common nouns.

(9) Instrumental arguments

a. Kua fakahū he ekekafo e tohi **he vakalele.**
PFV send ERG doctor ABS letter LOC airplane
'The doctor sent the letter on the airplane.'

b. Kua fakahū **vakalele** he ekekafo e tohi.
PFV send airplane ERG doctor ABS letter
'The doctor sent the letter on the airplane.'

In sum, the characteristics of PNI that are most relevant to our discussion are the following: (a) direct, middle and instrumental arguments can incorporate; (b) the incorporated argument surfaces immediately to the right of the verb; (c) postverbal particles surface after the incorporated argument; and (d) the incorporated argument is not preceded by functional morphology.[3]

2.3 The Prosody of Niuean PNI

In a study of sentence-level prosody in Niuean, Clemens (2014) finds that Niuean clauses are produced with a series of H*L- tunes, which correlate with phonological phrases (φ-phrases). The H* for each φ-phrase is located on the rightmost prosodic word (PWd) of the phrase. H* tones are anchored to stressed syllables; stress is located on the penultimate syllable of most words and the final syllable of words that end with a long vowel or a diphthong (see also Rolle and Starks 2014). Thus, a H* tone can serve as a diagnostic for the right edge of Niuean φ-phrases.

This study of sentential prosody in Niuean concerns three factors: i) clause structure (PNI vs. VSO); ii) argument type (absolutive vs. middle vs. instrumental); and iii) argument complexity (modified vs. unmodified). For each type of PNI structure, the verb and the incorporated argument form a prosodic constituent of the sort delimited by a H*L- tune. In contrast, a prosodic boundary demarcates the verb and the subject in each type of VSO clause. Evidence supporting the analysis comes from a comparison of phrase-final lengthening and pitch maxima in PNI and VSO clauses.

[3]The incorporated argument tends to be non-specific and the event tends to be interpreted as durative or frequentive. Massam (2001) connects the semantic properties of PNI clauses to the lack of DP structure. For more discussion of PNI semantics, see Seiter (1980), Massam (2001), Dayal (2003), Asudeh and Ball (2005), and Collins (to appear a).

(10) Basic prosodic structure of Niuean VSO and PNI

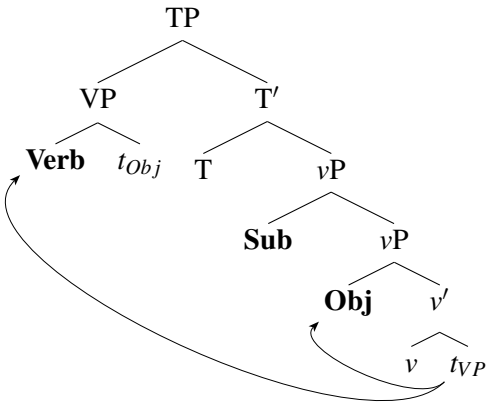
a. VSO: (Verb)φ (Subject)φ (Object$_{DP}$)φ
b. PNI: (Verb Object$_{NP}$)φ (Subject)φ

It is important to establish that the verb and the incorporated element form a unique φ-phrase, inasmuch as the prosodic account of PNI developed in sections 3–4.2 is based on that finding. Note, however, that this finding is also consistent with the syntactic analysis of PNI/VSO alternations.

2.4 A Syntactic Analysis of VSO/PNI alternations

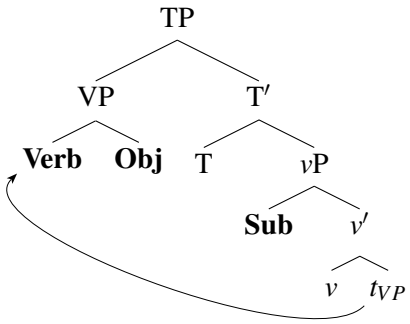
The syntactic analysis of VSO/PNI alternations in Niuean comes from Massam (2001), who argues that the derivation of PNI is tightly connected to the general derivation of verb-initial word order (V1). In the case of canonical VSO, Massam proposes that, when a transitive verb selects a DP object, the object leaves the VP for case-checking purposes. V1 is subsequently achieved by fronting the remnant VP to the specifier of TP, as in (11). Movement of the predicate to the specifier of T^0 is motivated by T^0's EPP feature [EPP-pred], which attracts predicates.

(11) VSO via VP-remnant movement



The differences between VSO and PNI structures stem from the type of object that the verb selects. Massam proposes that Niuean transitive verbs may select either DP or NP objects. Unlike their DP counterparts, NP objects do not require case; hence, they have no reason to leave the VP. If V^0 selects an NP, both the V^0 and the NP move when the VP moves. As shown in (12), this derivation results in the VOS order of PNI clauses.

(12) VOS via VP-movement



Massam's VP/VP-remnant account of Niuean V1 eloquently captures many of the differences between VSO and PNI structures highlighted in the previous section, including the fact that postverbal particles surface between the verb and the subject in VSO structures but follow the incorporated argument in PNI structures (6).

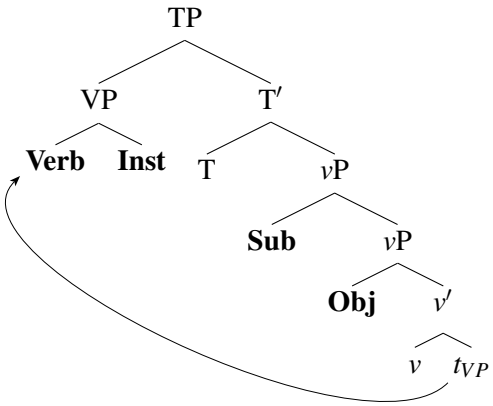
2.4.1 *Different types of PNI under Massam's (2001) analysis*

Massam's account applies straightforwardly to PNI-abs and PNI-mid, since middle objects are VP-internal. However, a few challenges arise when applying this analysis to PNI-inst. Instruments can incorporate even when the sentence also includes a direct object, as in (9-b), repeated below:

(13) Kua fakahū *vakalele* he ekekafo e tohi.
PFV send airplane ERG doctor ABS letter
'The doctor sent the letter on the airplane.'

Recall that, on Massam's account, each PNI construction consists of a verb that selects an NP. In the PNI-inst construction, therefore, it must be the instrumental NP that the verb selects (14):

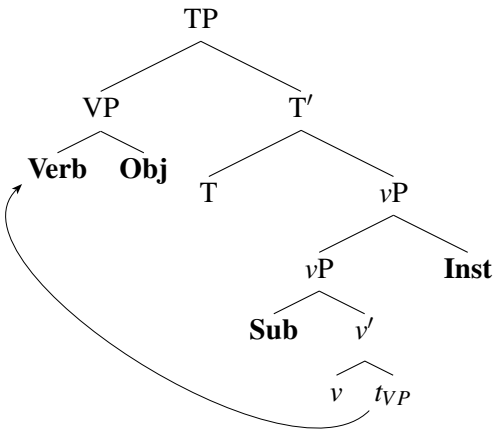
(14) PNI-inst with an absolutive object



For this analysis to hold, Massam (2001) must allow direct objects to be generated somewhere other than sister to V^0, since i) PNI-inst constructions can contain both ergative and absolutive arguments, and ii) the incorporated argument is always generated as sister to V^0 on Massam's account. To address this problem, Massam postulates that direct objects can also be generated in a specifier of VP, where they are accessible for case checking, but not implicated in VP movement.

However, it is unclear why a direct object should be generated as sister to V^0 only when the clause does not *also* contain an NP instrumental. Likewise, it is unclear why an instrumental argument should be generated as sister to V^0 only when it projects no higher than NP (14), but adjoined higher in the clause when it surfaces as a PP, as shown in (15).

(15) VSO with an instrumental PP



Note that the solution to this problem cannot be a matter of lexical subcategorization, because the locus of direct object generation (as the sister to V^0 or in a higher specifier position) does not depend on the particular verb. The same verb, with the same arguments, can surface in VSO, PNI-abs, and PNI-inst constructions, as shown in (16-a)–(16-c):

(16) VSO, PNI-abs, and PNI-inst with the verb *fakalilifu* 'send'

a. Kua fakahū he ekekafo *e* *tohi* *he* *vakalele*.
PFV send ERG doctor ABS letter LOC airplane
'The doctor sent the letter on the airplane.'

b. Kua fakahū *vakalele* he ekekafo e tohi.
PFV send airplane ERG doctor ABS letter
'The doctor sent the letter on the airplane.'

c. Kua fakahū *tohi* e ekekafo he vakalele.
PFV send letter ABS doctor LOC airplane
'The doctor sent the letter on the airplane.'

2.4.2 *Interim Discussion*

We have seen that different types of PNI constructions have similar syntactic and morphosyntactic profiles. Massam accounts for this similarity by proposing that all PNI constructions contain a VP consisting of a V^0 and an NP; however, this surface uniformity necessitates a considerable degree of variation in the generation of arguments for each PNI/VSO pair. Absolutive objects can be selected by V^0 (as in PNI-abs and VSO clauses) or they can be generated in the specifier of the projection associated with absolutive case (as in PNI-inst constructions). Instrumentals are selected by V^0 in PNI-inst constructions, but adjoined to *v*P when they surface in PPs.

We must conclude that the syntactic analysis of PNI is incompatible with the idea that thematic relationships between predicates and arguments are structurally encoded (Perlmutter and Postal 1984; Baker 1988, 1997; among others). The prosodic account of Niuean PNI presented below offers a solution to the problem of the structural encoding of thematic relationships.

3. A Prosodic Approach to PNI

3.1 Theoretical orientation

The present proposal adopts the position that the relationship between syntax and prosody is one of indirect reference: syntactic structure is converted into phonological constituents before phonological rules apply. Indirect Reference Theory, is supported by (i) instances of non-isomorphism between syntactic and prosodic structure, and (ii) the observation that non-syntactic factors contribute to the building of prosodic constituents. Indirect reference theories include, but are not limited to, Selkirk (1978; et seq.), Nespor and Vogel (1986), Beckman and Pierrehumbert (1986), Zec and Inkelas (1990), Truckenbrodt (1999; et seq.), Ladd (2008), and Gussenhoven (2004).

The specific theory of the syntax-prosody interface that I adopt is known as Match Theory (Selkirk 2011). Match Constraints call for isomorphism between syntactic and prosodic structure. In practice, however, this isomorphism need not always materialize; since Match Theory is set

in the context of Optimality Theory (Prince and Smolensky 1993/2004), Match Constraints are violable. This violability gives rise to non-isomorphism between syntactic and prosodic structure in situations where prosodic well-formedness constraints outrank isomorphic faithfulness constraints.

3.2 The proposal

The prosodic approach to PNI is based on a constraint mandating that verbs and their internal arguments be parsed into a single phonological phrase (φ-phrase). When head-argument pairs are separated by a syntactic operation, they can be be rearranged post-syntactically, so that it is possible to produce them in a prosodic unit.

Example (17) introduces the *Argument Condition on Phonological Phrasing* (ARGUMENT-φ).

(17) The Argument Condition on Phonological Phrasing (*to be revised*): A head and its internal argument(s) must be adjacent sub-constituents of a φ-phrase.[4]

Note that (17) is intentionally stated in terms of 'internal arguments' rather than 'complements.' In one sense, 'complement' is too restrictive: a head can only have one complement, whereas it can have multiple internal arguments. In another sense, 'complement' is to broad: for example, TP is the complement of C^0, but it is not generally thought of as the 'argument' of C^0. This distinction becomes particularly important when ARGUMENT-φ is redefined according to categorial selection.

Recall that Massam (2001) proposes that, for all PNI structures, the incorporated NP is generated as sister to V^0. As discussd in 2.4.1, this means that direct-object DPs are generated in a different position than direct-object NPs and instrumental NPs. In contrast, the present proposal preserves the traditional notion that thematic relationships are structurally encoded, because on this account, PNI targets any NP argument that is in a selectional relationship with V^0, not only those NPs that are sister to V^0.

[4] ARGUMENT-φ is defined broadly enough to apply to both verbal and nonverbal clauses. However, PNI does not arise with nominal or adjectival predicates. Presumably, this is because nonverbal predicates only select DPs.

3.3 Implementing ARGUMENT-φ

ARGUMENT-φ (17) requires prosodic structure to correspond to argument structure by ensuring that the verb and the object are phrased together, as shown in (18). In this example and those that follow, 'verb' refers to a complex predicate head formed via X^0-raising (see Section 5).

(18)

Input: [$_{CP}$ Verb [$_{DP}$ Subject] [$_{VP}$ t_V [$_{NP}$ Object]]]		ARG-φ
a.	(Verb (Subject)φ(Object)φ)ι	$*$!
b. ☞	((Verb Object)φ(Subject)φ)ι	
c. ☞	((Subject)φ(Verb Object)φ)ι	

ARGUMENT-φ is clearly not the only constraint at play in determining output structure; there also needs to be a way to distinguish between candidates (b) and (c). Although both (b) and (c) satisfy ARGUMENT-φ, PNI structures always surface as VOS (as in b), rather than SVO (as in c). Below, I introduce the constraints of Match Theory (Selkirk 2011) into the analysis in order to capture the fact that it is the object, and not the subject, that undergoes prosodic restructuring.

3.3.1 *Constraining prosodic restructuring*

Previous work on the topic of prosodic restructuring posits a distinct constraint that penalizes non-isomorphism between prosody and syntax, as in (b) and (c) in (18). For example, Bennett et al. (to appear) introduce the constraint NO SHIFT to deter the restructuring of prosodic constituents; Elfner (2012) introduces LINEAR CORRESPONDENCE to perform the same function. In the context of Match Theory, however, these specialized constraints somewhat redundant: whenever prosodic restructuring occurs above the level of the word, at least one member of the family of MATCH constraints (Selkirk 2011) is necessarily violated.

(19) a. MATCH (α, π): The left and right edges of a constituent of type α in the input syntactic representation must correspond to the left and right edges of a constituent of type π in the output phonological representation.

b. MATCH (π, α): The left and right edges of a constituent of type π in the output phonological representation must correspond to the left and right edges of a constituent of type α in the input syntactic representation (Selkirk 2011: 20)

This analysis of PNI utilizes both syntax-prosody (input-output) and prosody-syntax (output-input) correspondence constraints. The first pair to consider in accounting for Niuean PNI is MATCH (XP, φ) and MATCH (φ, XP).

(20) 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.

The tableau in (21) introduces these constraints into the analysis of PNI. Candidates (b) and (c) incur one violation each of MATCH (XP, φ) and MATCH (φ, XP), because the object XP does not correspond to a φ-phrase and $\varphi_!$ does not correspond to a syntactic XP. Below, I will introduce an argument to support the ranking of MATCH (φ, XP) above MATCH (XP, φ). For now, suffice it to note that both MATCH (XP, φ) and MATCH (φ, XP) must be ranked below ARGUMENT-φ or prosodic restructuring cannot occur.

(21)

Input: [$_{CP}$ Verb [$_{DP}$ Subject] [$_{VP}$ t_V [$_{NP}$ Object]]]		ARG-φ	MATCH (φ, XP)	MATCH (XP, φ)
a.	(Verb (Subject)φ(Object)φ)ι	∗!		
b. ☞	((Verb Object)$\varphi_!$(Subject)φ)ι		∗	∗
c. ☞	((Subject)φ(Verb Object)$\varphi_!$)ι		∗	∗

Moving to the level of the intonational phrase, MATCH (CP, ι) requires that the left and right edges of syntactic constituents with illocutionary force correspond to the left and right edges of ι-constituents, according to Selkirk's (2011) formulation.

Whereas pronouncing the object in the attested location – adjacent to the verb – avoids a violation of MATCH (CP, ι) from the perspective of the left edge, it incurs a violation of MATCH (CP, ι) from the perspective of the right edge. Supposing that CP/ι-phrase isomorphism is of greatest import at the initial edge of the ι-phrase, MATCH-ι can be adapted to differentiate candidate (b) from candidate (c):

(22) MATCH-$\iota_{INITIAL}$: The initial edge of an ι-phrase and the initial edge of a syntactic phrase with illocutionary force (CP/IP) must correspond.

Adapting a MATCH constraint to make specific reference to a particular edge may seem questionable, given that a major theoretical contribution of MATCH theory is its movement away from individualized edge-alignment constraints. However, it has long been acknowledged that initial positions are privileged at different levels of the prosodic hierarchy (e.g., see Beckman 1997, Becker 2009, Becker et al. 2011). Therefore, if syntax-prosody isomorphism at one boundary were to be preferentially protected we should expect it to be the clause-initial boundary, as I posit here.

If the verb is not at the left edge of the ι-phrase, the candidate incurs a violation of MATCH-ι_I.[5] In (c), the initial edge of CP does not correspond to the left edge of ι-phrase, while it does in (b).

(23)

Input: $[_{CP}$ Verb $[_{DP}$ Subject$]$ $[_{VP}$ t_V $[_{NP}$ Object$]]]$		ARG-φ	MATCH-ι_I	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		$*$!	$*$	$*$

Thus, together, ARGUMENT-φ and MATCH-ι_I account for the restructuring of the internal argument into a position where it can be pronounced within the same φ-phrase as the verb.

3.3.2 *Other candidates that satisfy* ARGUMENT-φ *and* MATCH-ι_I

The next question to answer is why, at least in cases where the incorporated argument is unmodified, the phrasing shown in (24-a) is preferred over other possibilities that satisfy both ARGUMENT-φ and MATCH-ι_I. For example, in (24-b), the object is pronounced in a nested φ-phrase, while in (24-c), both the verb and the object are contained within unique φ-phrases. In each of these cases, the verb and the object are pronounced as adjacent subconstituents of the same φ-phrase, but the specific constituency of that φ-phrase differs.

(24) a. Attested phrasing:
((Verb Object)φ(Subject)φ)ι
b. Nested object:
((Verb (Object)φ)φ(Subject)φ)ι

[5] Here, a unidirectional version of the MATCH ι-phrase constraint is used, because it is not necessary to distinguish between syntax-prosody correspondence (MATCH (CP, ι)) and prosody-syntax correspondence (MATCH (ι, CP)).

c. Nested verb and object:
(((Verb)φ (Object)φ)φ(Subject)φ)ι

The supremacy of (24-a) is particularly perturbing in light of the tableau below. Under the current constraint ranking, the (b) candidate, in which the object is contained in its own φ-phrase, incurs one less violation that the (a) candidate.

(25)

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

Note that the object XP in (a) does not correspond to a φ-phrase; whereas the object XPs in (b) and (c) do. Thus, only candidate (a) violates MATCH (XP, φ).

One additional difference between candidates (a) and (b) is that candidate (a) – the attested example – satisfies STRONG START.[6]

(26) 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.

Evidence supporting the high ranking of STRONG START in Niuean comes from the prosodic phrasing of the verb in VSO examples. In Section 4.3 below, I will show that the verb in VSO structures constitutes its own φ-phrase.

In the next tableau, the high-ranking constraint STRONG START rules out the most isomorphic candidate under consideration, candidate (b), in which the object XP, but not the verb, is contained within a nested φ-phrase.This violation of STRONG START arises because the prosodic constituent that begins candidate (b) (TAM+verb) is lower in the prosodic hierarchy than the following φ-phrase (object).

[6]Elfner (2012) proposes a slightly different version of STRONG START that is interchangeable with Selkirk's (2011) configuration for the purposes of this analysis (cf. Bennett et al. to appear and Harizanov 2013).

(27)

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

Incidentally, note that the tableau in (27) provides a ranking argument for MATCH (φ, XP) over MATCH (XP, φ). If the order were reversed, candidate (c), in which both the verb and the object are produced in their own φ-phrase, would be predicted to surface.

So far, this section has demonstrated how ARGUMENT-φ guarantees that the verb and its internal argument surface as adjacent subconstituents of the same prosodic phrase, despite their non-adjacency in the input. I have also appealed to MATCH constraints and STRONG START (Selkirk 2011) to determine the specifics of how ARGUMENT-φ is satisfied.

Recall that the basic intuition behind ARGUMENT-φ – that prosodic structure reflects argument structure – surfaces regularly in constraints on prosodic phrasing. The next subsection reviews one such constraint, COMPLEMENT-φ (Henderson 2012). Henderson's data from K'ichee' are particularly relevant to this discussion, because they appear to require a constraint that targets only functional categories, as opposed to both functional and lexical ones.

3.4 K'ichee' and COMPLEMENT-φ (Henderson 2012)

As mentioned in Section 1, the literature contains a number of proposed conditions on prosodic constituency that reflect the intuition behind Selkirk's (1984) *Sense Unit Condition*. One such constraint, COMPLEMENT-φ is introduced by Henderson (2012) to explain the distribution of a series of prosodically conditioned verbal suffixes in K'ichee'. Like other Mayan languages, K'ichee' has a set of "status suffixes" that serve to indicate the verb's valency, among other things.

The status suffix *-ik* has traditionally been described as surfacing at the right edge of an intonational phrase (ι-phrase) (Henderson 2012 and sources cited therin). In (28-a), *-ik* (shown in bold) surfaces in clause-final position, corresponding to the ι-phrase's right edge. When the verb is followed by an inflecting preposition embedding a DP (28-b), *-ik* fails to surface, presumably be-

cause the verb is no longer located at the ι-phrase's right edge. However, when the same inflecting preposition embeds a CP (28-c), *-ik* must be present.

(28) a. X-in-kos-**ik**
COM-1SG.ABS-tire-**SS**
'I am tired.'

b. X-in-kos-(*__ik__) r-umal nu-chaak.
COM-1SG.ABS-tire-**SS** 3SG-P 1SG-work
'I am tired because of my work.'

c. X-in-kos-**ik** r-umal [$_{CP}$ x-in-chakun-ik]
COM-1SG.ABS-tire-**SS** 3SG-P COM-1SG.ABS-work-SS
'I am tired because I worked.' (Henderson 2012: 5a-b, 12d)

The appearance of *-ik* in this example is surprising, since we expect the embedded CP to project an intonational phrase (ι-phrase) of its own. Hence, (28-c), appears to constitute a counterexample to the generalization that *-ik* only surfaces at the edge of an ι-phrase. The expected phrasing of (28-c) is schematized below:

(29) Expected phrasing of (28-c)
(X-in-kos-**ik** r-umal)ι (x-in-chakun-ik)ι

Henderson (2012) accounts for this puzzle with the constraint COMPLEMENT-φ:

(30) COMPLEMENT-φ
A functional head (P^0, in the present case) is parsed into the same phonological phrase as its syntactic complement (here, CP) (Henderson 2012: 68).

K'ichee' satisfies COMPLEMENT-φ by phrasing the inflecting preposition (a functional head) in the ι-phrase projected by its complement CP. This phrasing leaves the matrix verb at the right edge of the ι-phrase, thus conditioning the appearance of the status suffix, as schematized in (31):

(31) Actual phrasing of (28-c)
(X-in-kos-**ik**)ι ([$_{P0}$ r-umal] [$_{CP}$ x-in-chakun-ik])ι

These data appear problematic for ARGUMENT-φ, which is shown in (31) to be satisfied with respect to the relational noun and and its complement, but not with respect to the verb and its complement. In contrast, (31) does not pose a problem for an analysis like Henderson's, which

distinguishes between lexical and functional projections: COMPLEMENT-φ applies to P^0 and its CP complement, but not V^0 and its PP complement.

In accordance with the Strict Layer Hypothesis (Nespor and Vogel 1986; Selkirk 1986; a.o.), Henderson (2012) assumes that recursive prosodic phrasing in K'ichee' is disallowed. This assumption allows the left edge of the ι-phrase that corresponds to the left edge of the embedded CP conditions the projection of the preceding ι-phrase's right-edge, which does not actually correspond to the right edge of any CP. Yet, it is this ι-phrase's right-edge that conditions the appearance of the status suffix.

Whether or not K'ichee' allows recursive structure is an empirical question. In light of recent findings that prosodic recursion is actually quite common cross-linguistically (e.g., see Féry and Truckenbrodt 2007, Wagner 2005, 2010, Selkirk 2009, 2011, Itô and Mester 2013, and Elfner 2012, 2015), it is quite possible that an example like (28-c) be assigned a nested prosodic structure like the one shown in (32):

(32) Alternative phrasing of (28-c)
(X-in-kos-**ik** ($_{P0}$[r-umal] $_{CP}$[x-in-chakun-ik])ι)ι

Positing such a structure would require restating the generalization about the distribution of *-ik* so that its appearance were conditioned by the presence of any ι-phrase edge, i.e., not only a right edge. In addition, if K'ichee' allows recursive structure, there would cease to be any reason to specify that the relevant prosodic well-formedness constraint apply only to functional categories.

4. An identity problem

The next section turns to the foundational question: how does the prosodic grammar "know" when a verb has an internal argument? Recall that Selkirk's (1984) *Sense Unit Condition* is defined in terms of head dependencies at the level of Logical Form. Two constituents (C1 and C2) in a sentence form a Sense Unit if either (a) or (b) is true.

(33) Conditions on forming a Sense Unit (Selkirk 1984: 291)
a. C1 modifies C2 (a head)
b. C1 is an argument of C2 (a head)

Steedman (1991) argues that the prosodic component of the grammar can account for attested and unattested patterns in prosodic phrasing with only the information available from surface constituency; i.e. the prosodic grammar need not have access to the 'semantic connection' between, e.g., a verb and its direct object, because their syntactic head-complement relationship suffices to determine the prosody. However, Steedman's solution only holds when the head and the complement surface in their original configuration. As such, it does not apply to the present case study.

A second problem with the *Sense Unit Condition* is that it would be difficult to define it in terms of head dependencies at the level of Logical Form, as Selkirk does, in the context of the Y-Model of grammar (Chomsky and Lasnik 1977; Chomsky 1995) where LF and PF do not interact.

How, then, can the prosodic grammar determine whether or not a verb has any internal arguments, especially in cases when the verb has moved out of its base position? One possibility is that the prosodic grammar can access the base position of the verb. This line of reasoning would require that the prosodic grammar be able to i) reference syntactic positions without phonological exponents and ii) infer a head-argument relationship based on the structural configuration of the verb and any VP-internal nominals. In addition to challenging the idea that prosody does not have access to unpronounced syntactic objects (Nespor and Vogel 1986), this type of solution would result in undesirable PF/LF redundancy, since LF also needs to be able to access the base position of moved constituents for reasons of interpretation (e.g., in cases of A′-movement).

Instead, I pursue an analysis that relies on features; crucially, it relies on the idea that at least some morphological features, specifically categorial features, are accessible to prosodic structure as it is being constructed. This position is potentially inconsistent with approaches to PF in which vocabulary insertion takes place before prosodic domains are built, as in Embick and Noyer (2001).

Vocabulary insertion is often conceptualized as the replacement of morphological features with phonological exponents. Since morphological features and phonological exponents do not coexist on this view, it is unclear how the shape of sentence-level prosodic constituents, which are built on phonological exponents, could be influenced by abstract morphological features. Yet, we have seen that, in certain cases, vocabulary insertion actually depends on prosodic structure; recall

the K'ichee' data discussed in 3.4.[7] Examples like these cast doubt on the idea that vocabulary insertion is complete before prosodic domains are built.

If the prosodic analysis of Niuean PNI proposed here is going to be successful, the prosodic grammar needs access to at least one type of morphological feature, in addition to phonological exponents, at the point when prosodic constituency is established. Specifically, the prosodic grammar needs access to features that designate lexical class.

Granting the prosodic grammar access to lexical class information does not entail the existence of lexical class-based prosodic constraints.[8] However, there is considerable cross-linguistic evidence for category-specific effects in prosodic phenomena (Kaisse 1985; Nespor and Vogel 1986; Smith 2011 and sources cited therein). In any case, it is necessary to posit that at least some prosodic structure is built with access to at least some features. For this reason, an OT model of PF was chosen over a strictly derivational one, as it is not clear how a strictly derivational model of PF could account for situations where vocabulary insertion is dependent on prosodic structure and the building of prosodic domains is sensitive to syntactic features.

In the analysis pursued here, I posit that c-selection shares its implementation mechanism with feature valuation more generally (see Chomsky 1965 for an early formulation of this idea; see also Emonds 2000 and Adger and Svenonius 2011). In turn, feature valuation is realized as feature sharing (as in Pesetsky and Torrego 2007). With these two mechanisms in place, the prosodic grammar can connect the ex-situ verb and its internal argument via a common lexical feature.

4.1 C-selection and feature sharing

This section illustrates how i) treating categorial selection (c-selection) as an instance of AGREE (Emonds 2000; Adger and Svenonius 2011; among others) and ii) adopting a feature sharing approach to AGREE (Pesetsky and Torrego 2007) makes it possible to capture the essence of Selkirk's

[7] See Gribanova and Harizanov (to appear) for further discussion on whether morphological features remain visible after vocabulary insertion and Henderson (2012) for a discussion of the implications of the K'ichee' data for a derivational model of the PF branch of the grammar.

[8] For two different perspectives on the issue of lexical class at the syntax-prosody interface, see Truckenbrodt (2007), in which the relevance of lexical class distinctions to the prosodic grammar is embraced, and Selkirk (2011), in which the relevance of lexical class distinctions is minimized.

proposal in the context of a grammatical model where LF and PF do not interact.

Pesetsky and Torrego (2007) propose the following modification to Chomsky's (2000, 2001) definition of AGREE:

(34) AGREE (Pesetsky and Torrego 2007)

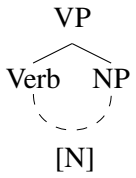
a. An unvalued feature F (a *probe*) on a head H at syntactic location α (F_α) scans its c-command domain for another instance of F (a *goal*) at location β (F_β) with which to agree.

b. Replace F_α with F_β so that the same feature is present in both locations.

In Chomsky's (2000, 2001) AGREE, F_α is deleted once it receives a value from F_β. For present purposes, the important difference between Pesetsky and Torrego's (2007) definition of AGREE and Chomsky's (2000, 2001)'s version is that Pesetsky and Torrego's AGREE establishes a lasting link between the probe and the goal. Where I differ from Pesetsky and Torrego in adopting the more general definition of 'probe', i.e., not just as an instance of an unvalued feature, but as any instance of an unvalued, uninterpretable, or strong feature. Once such a general definition of *probe* is adopted, it is possible to combine Pesetsky and Torrego's (2007) definition of AGREE with an early account of c-selection that has recently regained favor.

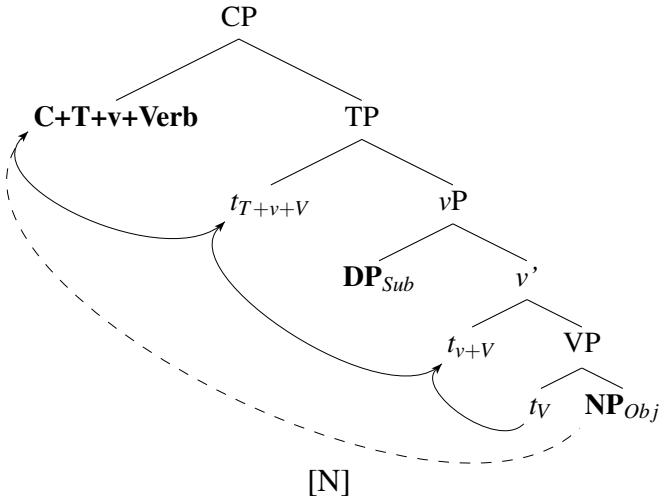
C-selection refers to the process whereby a head merges with a particular lexical category (or categories, in some cases). One way to treat c-selection syntactically is to subsume it under feature-checking (e.g., Chomsky 1965; Emonds 2000; Adger and Svenonius 2011, among others). Under this sort of analysis, the selecting head enters the derivation bearing an uninterpretable feature that matches its c-selectional category. Chomsky's definition of AGREE dictates that the uninterpretable (categorial) feature on the selecting head is deleted after merging with a head bearing an interpretable version of the matching feature. Pesetsky and Torrego's AGREE, however, allows this feature to persist on the selcting head: after the verb merges with a head bearing the interpretable version of the c-selected categorial feature and AGREE takes place, the verb and its complement share the complement's categorial feature between them. This second scenario is represented in (35), where the verb and the noun are shown to share the noun's [N] feature.

(35) Feature sharing and c-selection



To extend this analysis into the realm of verb raising: if a verb enters the derivation with a [*u*N] feature, selects an NP with the feature [N], and then undergoes head movement to a position higher in the clause, the feature [N] will be shared by the following positions (36):

(36) Feature sharing and V^0-raising



Next, let us revise the definition of (Argument-φ) so that PF, in a Y-Model of the grammar, can make reference to head-argument pairs, even when the selecting head has moved out of the position from which it selected its internal arguments.

(37) Argument Condition on Phonological Phrasing (Argument-φ): A head H with a categorial feature [C] and head C with the same [C] feature must constitute a φ-phrase.

The tableau in (38) is an updated version of (23). We can see here how the extension of the categorial feature [N] favors the assignment of a prosodic structure that complies with ARGUMENT-φ. For ease of explication, the relevant feature is shown in two locations in (38), representing the fact that syntactic constituents at these two locations share a single feature.

(38)

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

For each of the candidates in (38), two constituents (the verb and the object) bear matching [N] features. Therefore, in order to satisfy ARGUMENT-φ, these constituents must surface as adjacent sub-constituents of a common φ-phrase. Both candidates (b) and (c) satisfy this constraint. As before, the object shifts to the verb and not vice versa, in order to preserve isomorphism with the initial edge of the CP/ι-phrase. As such, candidate (b) is the optimal candidate.

This section has provided an explanation for PF's ability to recognize non-adjacent syntactic constituents in a head-argument pair. The account presented in this section does not rely on the introduction of a new feature or the assignment of a new role to an existing feature. C-selection has always referred to the process whereby a head selects an internal argument. The particular take on the mechanics of c-selection presented in this section extends the idea of feature sharing (Pesetsky and Torrego 2007), to allow PF to acknowledge the unique relationship between a head and its (non-adjacent) internal argument(s), in addition to the exclusively local configurations, that PF could previously account for (Steedman 1991).

One problem remains: based on the account presented thus far, we should expect ARGUMENT-φ to trigger PNI between a verb and any internal argument. The account as presented cannot capture the fact that PNI only occurs with internal arguments of the category NP but not DP and CP. The tableau in (39) presents an example with a DP object to illustrate the problem.

(39)

Input: $[_{CP}$ Verb$_D$ $[_{DP}$ Subject$]$ $[_{VP}$ t_V $[_{NP}$ Object$_D]]]$		ARG-φ	MATCH-ι_I	MATCH (φ, XP)	MATCH (XP, φ)
a. ☹	((Verb$_D$)φ (Subject)φ(Object$_D$)φ)ι	$*$!			
b. ☞	((Verb$_D$ Object$_D$)φ(Subject)φ)ι			$*$	$*$
c.	((Subject)φ(Verb$_D$ Object$_D$)φ)ι		$*$!	$*$	$*$

The only difference between the tableau in (39) and the one in (38) is that the categorial feature

of the internal argument is [D] as opposed to [N]. However, PNI only occurs with NP internal arguments. The next section presents a phase-based account of where PNI fails to occur.

4.2 Multiple Spell-Out

In what follows, I elaborate on the prosodic account of Niuean PNI, incorporating the notion that Multiple Spell-Out renders certain constituents invisible to prosodic restructuring. Specifically, the syntactic features of constituents that have already been assigned prosodic structure become invisible to any subsequent assignment of prosodic structure. In the previous section, I posited that certain syntactic features, such as those pertaining to lexical class, are visible to PF at the point when prosodic structure is first assigned. Recall that this position is essential to the prosodic account of Niuean PNI, because it allows PF to identify head-argument relations between non-adjacent syntactic constituents.

The basic intuition behind Multiple Spell-Out (Uriagereka 1999), the Phase Impenetrability Condition (Chomsky 2000, 2001), and earlier renditions of similar ideas is that the clausal derivation proceeds in stages. Syntactic domains are not transferred to the interfaces all at once when the clausal derivation is complete, but are instead transferred one phase at a time.

From the perspective of syntax, the major consequence of Multiple Spell-Out is that syntactic objects become inaccessible once they begin the process of becoming phonological objects. However, syntactic objects at the edge of a phase remain available for participation in the full range of syntactic processes. Syntacticians have focused primarily on developing this idea into accounts of successive cyclic movement and related phenomena (Uriagereka 1999, Chomsky 2000, 2001, Fox and Pesetsky 2005, a.o.).

Multiple Spell-Out has had arguably less effect on prosodic theories as compared to syntactic ones, perhaps because phonological operations tend to be more locally construed. But just as Multiple Spell-Out offers a phrase-level structural explanation for why certain syntactic constituents are unavailable to certain syntactic processes, e.g., movement, it has the potential to do the same for syntactic constituents that are invisible to the application of certain prosodic rules. [9] For exam-

[9]Examples of prosodic work that makes use of Phase theory include Kahnemuyipour (2003), Kratzer and Selkirk

ple, a syntactic object that has already been parsed into prosodic structure should be inaccessible to the computation of the next phase of prosodic structure. This does not mean that prosodic structure cannot be reanalyzed as the derivation progresses – perhaps for eurhythmic reasons – just that there is a point after which prosodic restructuring can no longer access syntactic objects.

Turning to the specifics of the proposal, I adopt the position that D^0 – in addition to C^0 and v^0 – is a phase head (Chomsky 2001; Dobashi 2003; Svenonius 2004; Hiraiwa 2005); this is necessary to my analysis that NP and DP objects differ in the timing of Spell-Out.[10] Next, I adopt the position that an entire phase, and not just the complement of the phase head, spells out when its trigger is merged.[11] With respect to what triggers the transfer of a spell-out domain to the interfaces, the literature on Multiple Spell-Out offers two possibilities: the spell-out domain is transferred when (i) its phase head is introduced, as in the original PIC (Chomsky 2000), or (ii) the next phase head is introduced, as in the revised PIC (Chomsky 2001):

(40) The Phase Impenetrability Condition

a. Phase Impenetrability Condition (original) (Chomsky 2000):
In phase α with head H, the domain of H is not accessible to operations outside of α, only H and its edge [its specifier(s)] are accessible to such operations.
(Chomsky 2000: 108)

b. Phase Impenetrability Condition (revised) (Chomsky 2001):
The domain of H is not accessible to operations at ZP [a phase]; only H and its edge are accessible to such operations.
(Chomsky 2001: 14)

The revised version of the PIC was proposed in part to account for the possibility of raising out of an infinitive. Asarina and Hartman (to appear) argue for the revised PIC based on data from Uyghur showing that agreement and genitive case assignment can cross a CP boundary, while Richards (2004, 2011) argues for the revised PIC on conceptual grounds. I adopt the latter version

(2007), and Ishihara (2007).

[10] Note that nothing in the analysis presented in this paper depends on whether or not unaccusative v^0 is a phase head. However, if unaccusative constructions were to differ from unergative constructions such that unaccusative verbs were phrased with their arguments, while unergative verbs were not, this fact could be construed to support the position that unaccusative v^0 is not a phase head (Chomsky 2001; cf. Legate 2003 and Gallego 2010)

[11] See Svenonius (2004) for confirmation that edge effects can still be accounted for even when the whole phase is spelled out, as long as the revised version of the PIC is adopted.

of the condition in my analysis below.

Note that the original formulation of the PIC cannot capture the contrast between nominal arguments headed by D^0 and those headed by N^0. If transitive v^0 were to trigger the spell-out of its complement, the spell-out timing for NP and DP complements would be the same. However, if a phase's spell-out is triggered by the following phase entering the derivation, then a contrast between DP and NP arguments arises naturally: the spell-out of a DP complement is triggered by the introduction of the phase head v^0, while the spell-out of an NP complement is not triggered until C^0 enters the derivation. The difference in spell-out timing for NP complements and DP complements is schematized in (41) and (42). Spelled-out material is represented with the empty set symbol, and phases are underlined.

(41) Spell-out timing for NP complement

a. $[_{VP}$ V $[_{NP}$ N]]
b. $[_{\underline{vP}}$ v $[_{VP}$ V $[_{NP}$ N]]]
c. $[_{TP}$ T $[_{\underline{vP}}$ v $[_{VP}$ V $[_{NP}$ N]]]]
d. $[_{\underline{CP}}$ C $[_{TP}$ T [$\emptyset$]]]]]]

(42) Spell-out timing for DP complement

a. $[_{VP}$ V $[_{\underline{DP}}$ D $[_{NP}$ N]]]
b. $[_{\underline{vP}}$ v $[_{VP}$ V [$\emptyset$]]]]
c. $[_{TP}$ T $[_{\underline{vP}}$ v $[_{VP}$ V [$\emptyset$]]]]]
d. $[_{\underline{CP}}$ C $[_{TP}$ T [$\emptyset$]]]]]]

The mock derivations shown above differ crucially at steps 'b' and 'c,' where the verbal complement is spelled out in (42) but not in (41). Now that all of the components of the analysis have been introduced, the next section works through a derivation of the prosodic analysis of Niuean PNI. I also show that the derivation of a VSO clause where PNI fails to apply, despite the presence of a head-argument pair.

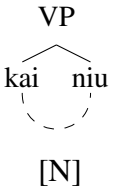
4.3 Sample derivations

This section reviews the prosodic account of Niuean PNI, as in (43), from start to finish.

(43) Kua kai niu e tama.
PFV eat coconut ABS child.
'The child ate coconut.'

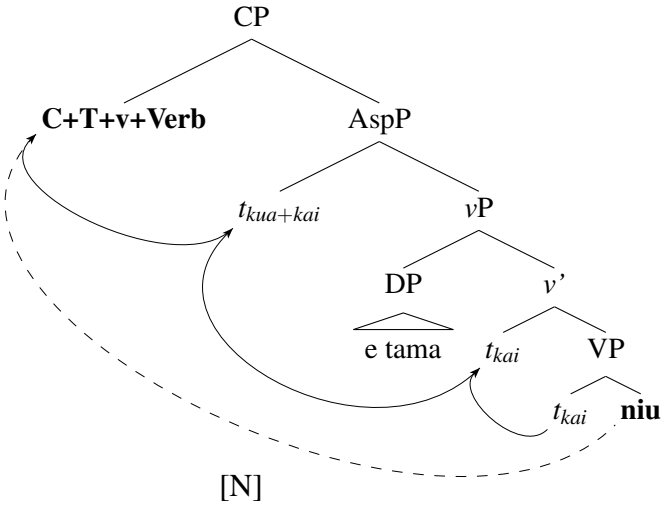
The verb *kai* 'eat' enters the derivation with a [*u*N] feature. Once the verb merges with *niu* 'coconut,' the same [N] feature is present in both locations:

(44) *In situ* location of verb and NP object



The verb undergoes a series of X^0-movements, eventually landing in CP.

(45) Feature sharing and X^0-raising with NP object



Once C^0, which is null in this example, is merged, the clause spells out. The tableau in (46) demonstrates the role of ARGUMENT-φ in determining the prosodic structure.

(46)

Input: $[_{CP}$ kua kai$_N$ $[_{DP}$ e tama$]$ $[_{VP}$ t_V $[_{NP}$ niu$_N]]]$		STR START	ARG-φ	MATCH-ι_I	MATCH (φ, XP)	MATCH (XP, φ)
a.	(kua kai$_N$ (e tama)φ (niu$_N$)φ)ι	$*$!	$*$			
b.	((kua kai$_N$)φ (e tama)φ (niu$_N$)φ)ι		$*$!			
c.	((kua kai$_N$ (niu$_N$)φ)φ (e tama)φ)ι	$*$!			$*$	
d.	(((kua kai$_N$)φ (niu$_N$)φ)φ (e tama)φ)ι				$* *$!	
e.	☞ ((kua kai$_N$ niu$_N$)φ (e tama)φ)ι				$*$	$*$
f.	((e tama)φ (kua kai$_N$ niu$_N$)φ)ι			$*$!	$*$	$*$

Thus, examples like the one below are assigned the following prosodic structure:

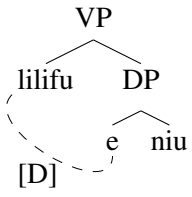
(47) ((Kua kai niu)$_\varphi$ (e tama)$_\varphi$)$_\iota$.
PFV eat coconut ABS child.
'The child ate coconut.'

Next, we will take a look at a derivation of an instance where PNI fails to occur. In this case, prosodic domains are assigned without restructuring, and VSO surfaces (48).

(48) Kua kai he tama e niu.
PFV eat ERG child ABS coconut.
'The child ate coconut.'

The verb *kai* 'eat' enters the derivation with a [*u*D] feature. Once the verb merges with the DP *e niu* 'the coconut,' the feature [D] is present in both locations:

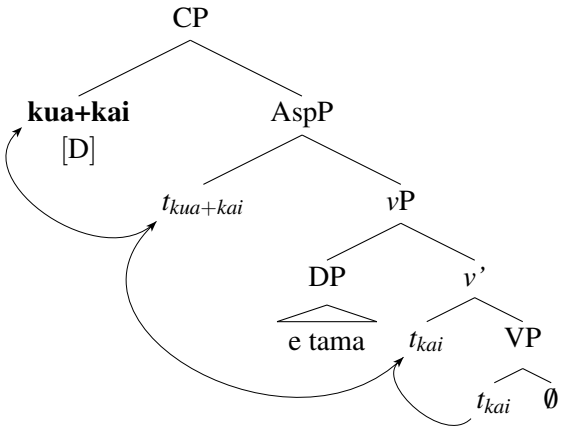
(49) *In situ* location of verb and DP object



As in the derivation of PNI-abs, the verb in the incipient VSO structure undergoes a series of X^0-movements, eventually landing in CP. The DP object is represented with the empty-set symbol,

as it was spelled out with the completion of the phase headed by v^0.

(50) Feature sharing and X^0-raising with DP object



Once C^0 is merged, the clause spells out. As the tableau in (51) shows, ARGUMENT-φ does not influence the way prosodic structure is built in this example. None of the candidates in (51) violate ARGUMENT-φ, because at this point, there is only one instance of [D]. The object is represented by an empty-set symbol contained in a φ-phrase to emphasize the fact that the DP object's syntactic features are no longer visible; it was assigned prosodic structure in an earlier phase.

(51)

Input: $[_{CP}$ kua kai$_D$ $[_{DP}$ e tama$]$ $[_{VP}$ t_V $[_{DP}$ ∅$]]]$		STR START	ARG-φ	MATCH-ι_I	MATCH (φ, XP)	MATCH (XP, φ)
a.	(kua kai$_D$ (e tama)φ (∅)φ)ι	*!				
b. ☞	((kua kai$_D$)φ (e tama)φ (∅)φ)ι				*	
c.	((kua kai$_D$ (∅)φ)φ (e tama)φ)ι	*!			*	
d.	(((kua kai$_D$)φ (∅)φ)φ (e tama)φ)ι				**!	
e.	((kua kai$_D$ ∅)φ (e tama)φ)ι				*	*!
f.	((e tama)φ (kua kai$_D$ ∅)φ)ι			*!	*	*

In order to satisfy the highly-ranked constraint STRONG START, the winning candidate in (51) includes a φ-phrase that does not correspond to a syntactic XP. In other words, this candidate violates MATCH (φ, XP) by 'adding' a φ-phrase. The phonetic data support this analysis (Clemens 2014a, 2014b). In PNI examples, the winning candidate satisfies STRONG START by including

a syntactic XP with no corresponding φ-phrase in violation of MATCH (XP, φ). The fact that different strategies are employed to repair violations of STRONG START supports the claim that STRONG START is a high-ranking constraint in Niuean.

Finally, examples like the one in (48) are assigned the following prosodic structure:

(52) ((Kua kai)φ (he tama)φ (e niu)φ)ι.
PFV eat ERG child ABS coconut.
'The child ate coconut.'

5. An explicit comparison between head and phrasal movement

The derivations of the previous sections have assumed an X^0-raising account of Niuean V1, but the standard approach to Niuean is one that adopts a VP-(remnant)-raising analysis, following Massam (2001, 2005, et seq.). This style of analysis is in large part motivated by the morphosyntax of PNI, which was given an alternative prosodic account in Sections 3 – 4.2. In this section, I will show that, when we revisit Niuean clause structure in light of the prosodic account of PNI, we find that a head movement analysis of Niuean V1 is preferable to the standard phrasal movement analysis.

The VP-(remnant)-raising analysis, together with so-called "roll up movement" has been promoted on the basis of its treatment of Niuean's postverbal particles. These particles have been described as taking inverse scope (Rackowski and Travis 2000; Massam 2010) because their linear order (left-to-right) corresponds to a bottom-up hierarchical order (as opposed to top-down). Below, I will demonstrate that a X^0-raising account of Niuean V1 can also derive the inverse scope of Niuean's postverbal particles, and furthermore, that it can do so while solving the problem of object evacuation created by the VP-(remnant)-raising analysis. In addition, the head-raising analysis accounts for several facts that the roll-up movement analysis cannot: i) applicative *aki* licenses instrumental objects; ii) the particle *oti* 'all' can scope over any of the core arguments of the verb, i.e., subjects, direct objects and instrumental objects; and iii) manner and directional heads do not interact with individual arguments at all, but instead form a compound with the main verb.

5.1 The relationship between syntactic heads and prosodic words

Before delving into the syntactic analysis, a disclaimer is in order: the X^0-raising account of Niuean V1 presented here assumes that a one-to-one mapping of X^0 to prosodic-ωs might be most frequent (53-a), but that one-to-many and many-to-one mappings also occur (53-b)-(53-c):

(53) From X^0 to ω

a. $[_{X^0}\ X^0\ [_{X^0}\ X^0\ X^0]] \longrightarrow ((\omega\ \omega)_\omega\ \omega)_\omega$
b. $[_{X^0}\ X^0\ [_{X^0}\ X^0\ X^0]] \longrightarrow (\omega)_\omega\ (\omega)_\omega\ (\omega)_\omega$
c. $[_{X^0}\ X^0\ X^0] \longrightarrow \omega$

The mapping in (53-c) is uncontroversial in cases where the phonological size of X^0 (possibly an affix, clitic, or light verb) does not meet the minimal size requirement for prosodic-ω in a given language. In these cases, the prosodic structure of certain complex X^0s (possibly even derived via head movement) is flattened, so that a complex X^0 might correspond to a single prosodic-ω.

Clemens (2014b) demonstrates that the Niuean tense marker and the verb are realized as a single prosodic-ω for the relatively simple constructions discussed in that study. However, in what follows, I advocate for V^0 to v^0 to T^0 to C^0 movement even in cases where the resulting complex X^0 does not correspond to single complex prosodic- ω, as in (53-b). Others assume that a complex X^0, like one derived via head movement, is so reliably produced within a common prosodic-ω, that this aspect of prosodic constituency is a litmus test for X^0-raising (e.g., see Collins to appear b). When complex X^0s map onto more than one prosodic-ω, a maximal size restriction on prosodic-ωs might prevent them from surfacing as a single prosodic-ω. Just as there are minimal size restrictions on prosodic-ωs, languages are also known to display maximal size restrictions on prosodic-ωs (DeLacy 2008; Ketner 2006; Itô and Mester 2007).

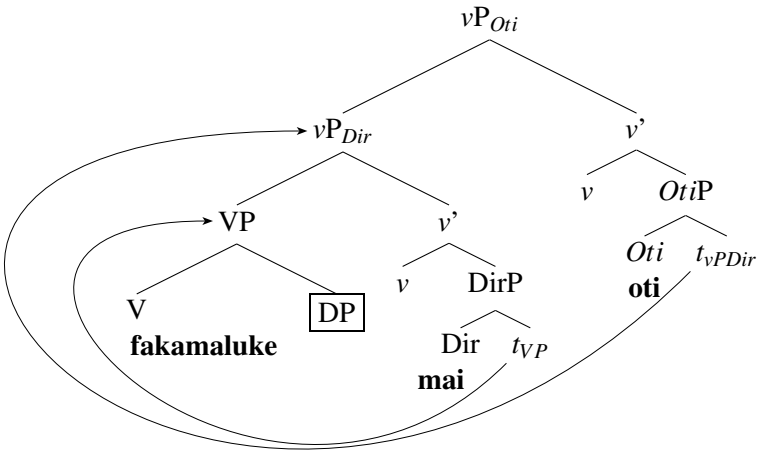
5.2 XP roll-up movement and object evacuation

Massam (2013) solves the problem of inverse scope by merging the particles in the normal (top-down) order and then inverting that order through a series of successive roll-up movements of XPs (see also Rackowski and Travis 2000, Koopman and Szabolcsi 2000, Pearson 2001, Cinque 2005, Massam 2010, and sources cited therein).

The tree in (55) illustrates a portion of the structure Massam (2013) proposes for a complex predicate consisting of a main verb and two postverbal particles: a directional particle and *oti* 'all.' The tree in (55) represents a portion (shown in bold) of the attested example (54).

(54) Kua **fakamaluke mai oti** e ia haana a tau mena tui ki fafo.
PFV throw DIR all ERG 3.SG POSS ABS PL thing cloth GL outside
'He threw his clothes outside.' (Sperlich 1977: 190)

(55) Roll-up movement account of postverbal particles



In (55), postverbal secondary predicates are sandwiched between *v*Ps: both predicates select a *v*P and are selected by a v^0. Each *v*P "rolls up" to the next highest specifier of *v*P, with the result that the *v*P elements surface in the opposite order from which they were generated.

The roll-up analysis requires that a fair amount of null structure be stipulated for purely theoretical reasons. The postverbal manner and directional heads are selected by null v^0s; these v^0s, in turn, project specifier positions that serve as landing sites for the lower XPs, thereby allowing them to avoid anti-locality effects. Under anti-locality, the distance between the complement of X^0 and the specifier of XP is too short to support raising (Grohman 2003; Abels 2003). Facilitation of a movement operation that is needed for theory-internal reasons is not a particularly strong reason to postulate null structure. More importantly, Niuean has overt v^0s, for example, light verbs, which do not select manner and directional heads. It is unclear how a structure like the one above could prevent a particular particle from combining with an overt v^0.

A bigger problem faced by the roll-up analysis concerns object evacuation. The object, shown in a box in (55), is deeply embedded in a moved constituent under this analysis. In order to derive canonical VSO word order, that object DP must evacuate the VP. If complex predicates were derived by XP-roll-up movement, subsequent movement of the object out of the complex predicate should violate the Freezing Principle, which holds that moved constituents are islands to extraction (e.g., Wexler and Culicover 1980). As such, any time a clause with a complex predicate surfaces in VSO order, it violates this principle.

A'-movement brings the problem of object evacuation to the forefront. Some of the strongest evidence in support of the VP-raising account of V1 in Austronesian comes from island constraints on VPs in VOS clauses. Researchers have argued that the well-documented subject-only restriction in Austronesian follows from the VP-raising account of VOS word order (e.g., Aldridge 2002 for Seediq; Cole and Hermon 2008 for Toba Batak, see also discussion in Clemens and Polinsky to appear). The essence of this restriction is that only one argument (the external argument, or possibly the subject) is accessible to A'-movement, whereas all other arguments are ineligible to A'-move (see sources in Chung and Polinsky 2009). This line of reasoning predicts a correlation between VP-raising and the subject-only restriction; however, in Niuean, both subjects and objects are eligible for A'-movement.

5.3 Inverse order and X-raising: verbal projections

This section demonstrates how an X^0-raising analysis captures the inverse order of three postverbal components of Niuean's verbal complex: i) manner and directional predicates (referred to as 'adverbs' elsewhere in the literature), ii) the applicative head *aki*, and iii) the particle *oti* 'all.'

(56) Inverse scope of postverbal particles

a. Surface order: MAN/DIR—APPL—$\forall$
b. Scope order: $\forall >$ APPL $>$ MAN/DIR

5.3.1 *Manner and directional predicates*

Manner and directional predicates surface between the main verb and the applicative head *aki*. Directional predicates orient the action of the verb with respect to the position of the interlocutors. Manner predicates describe the manner in which an event takes place. Both manner and directional predicates can either modify the main verb or be the main verb. In (57-a), the directional predicate *mai* modifies the main verb, indicating movement towards the speaker, while in (57-b), it functions as the main verb and is translated as 'give.' In (58-a), the manner predicate *lahi* modifies the main verb and is translated as 'greatly,' while in (58-b), *lahi* is the main predicate and means 'big.'

(57) a. Ta **mai** e mena nā.
give DIR ABS thing DEM
'Give me that thing.' (Seiter 1980:21)

b. **Mai** lā taha vala vai tote!
give EMPH NSP piece water little
'Give me some water!' (Seiter 1980:21)

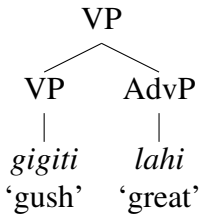
(58) a. Ne gigiti **lahi** mai e toto he ulu haana ne maihi.
PST gush greatly DIR ABS blood LOC head POSS REL.PRS cut
'The blood gushed from the cut on his head.' (Sperlich 1997:100)

b. Ne **lahi** e fale haana.
PST big ABS hous POSS
'His house was big.' (Seiter 1980:17)

Seiter (1980) reports that directional predicates tend to follow manner predicates, as in (58-a) where *lahi* 'great' precedes the directional particle *mai*, but that the opposite order is also attested. For example, manner predicates formed with the causative marker *faka* tend to follow directional predicates. The word order variation suggests that directional and manner predicates have similar structural properties (see also Gould et al. 2009).

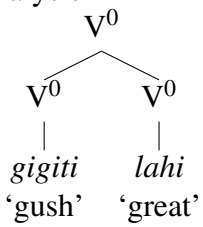
The fact that these items are often referred to as 'adverbs' suggests an adjunction analysis along the lines of (59); at least for modificational forms like those in (57-a) and (58-a):

(59) Adjunction analysis:



These observations, however, argue against this analysis: i) some manner 'adverbs' and causative verbs have similar structures;[12] ii) these so-called adverbs can function as the sole predicate of the clause, as shown in (57-b) and (58-b); and iii) lexical categories are generally difficult to distinguish in Polynesian languages. These facts suggest that manner 'adverbs' and directional particles are actually sub-constituents of a complex verb, in the spirit of Baker's (1998) theory of morphosyntactic incorporation:

(60) Complex verb analysis



A complex verb analysis is consistent with the head-initial nature of Niuean compounds and the fact that manner and directional predicates follow the verb. It also allows us to account for the fact that both manner and directional predicates modify the main verb, but do not interact with verbal arguments in the way that other post-verbal particles do. Finally, an analysis like the one in (60) explains why manner and directional predicates surface between the main verb and the applicative head *aki*, which selects VP.

5.3.2 Aki *applicative*

The applicative head *aki* surfaces within the verbal complex, as shown in (61).[13] In (61), the instrument *e pelu* 'ABS bush knife' (shown in bold) precedes the direct object *e fua loku* 'ABS fruit

[12] See Gould et al. (2009) for an in-depth discussion of verbs and 'adverbs' formed with *faka*.

[13] This section is only concerned with examples like (61), but note that *aki* may also surface as the head of a prepositional phrase.

pawpaw.' In other words, the instrument is in a position ordinarily reserved for the direct object of a transitive clause, i.e., immediately following the subject.

(61) Fakaugauga aki e ia **e** **pelu** e fua loku.
cut APPL ERG 3.SG ABS bush knife ABS fruit pawpaw.
'He cut the pawpaw with his bush knife.' (Sperlich 1997:66)

Applicative objects pattern in the same was as direct objects with respect to i) raising; ii) the resolution of long-distance dependencies; and iii) the possibility of scoping under *oti* 'all.' These properties are discussed extensively in Seiter (1979, 1980), Massam (1998), and Ball (2010); here, I will quickly review the relevant examples.

Like direct objects, instrumental objects in applicative constructions participate in 'raising' constructions; where they are interpreted as the argument of an embedded predicate although they surface in the matrix clause (62). In contrast, oblique nominal arguments cannot 'raise' (63).

(62) a. To maeke [e tama ē]$_i$ ke lagomatai he ekekafo e_i.
FUT possible ABS child DEM DEP.T help ERG doctor
'This doctor could help this child.' (Seiter 1980:247)

b. Kua kamata [**e** **toki**]$_i$ ke hio aki e Sefa e akau motua e_i.
PFV begin ABS axe DEP.T cut APPL ERG Sefa ABS tree old
'Sefa began to chop down the old tree with the axe.' (Seiter 1980:250)

(63) a. Kua maeke ke matematekelea a Maka he tagata ia.
PFV possible DEP.T be.in.trouble ABS Maka OBL man DEM
'Maka might be in trouble on account of that man.' (Seiter 1980:248)

b. *Kua maeke [he tagata ia]$_i$ ke matematekelea a Maka e_i.
PFV possible OBL man DEM DEP.T be.in.trouble ABS Maka
Intended: 'Maka might be in trouble on account of that man.' (Seiter 1980:248)

In Niuean, long-distance dependencies of the type found in relative clauses, topicalization, and *wh*-questions are resolved with either a gap or a resumptive pronoun, depending on the status of the argument. Instrumental objects in the applicative pattern with direct objects in relativizing with

a gap (64-a)-(64-b). In contrast, oblique arguments relativize with a resumptive pronoun (65).

(64) a. ...mo [e tagata]$_i$ ne moto e koe e_i (*a ia).
COMTV ABS person PST punch ERG 2.SG ABS 3.SG
'...with the person who you punched.' (Seiter 1980:246)

b. ...[**e tagata**]$_i$ ne hukui aki e lautolu e_i (*a ia) a au he gahuaaga.
ABS man PST replace APPL ERG 3.PL ABS 3.SG ABS 1.SG LOC work
'...the man who they replaced me with at work.' (Seiter 1980:250)

(65) ...[e tama fifine]$_i$ ne taute e au e pasikala afi [ma-ana]$_i$.
ABS child female PST fix ERG 1.SG ABS bicycle fire BEN-3.SG
'...the girl I fixed the motorbike for.' (Seiter 1980:246)

Oti 'all' can scope over the instrumental argument in applicative constructions (66-b), just as it can scope over direct objects (66-a). In contrast, *oti* cannot scope over oblique arguments from a position internal to the verbal complex. The only way for *oti* to scope over an oblique argument is to surface next to it (67).

(66) a. Moua oti he tama e tau kato.
find all ERG child ABS PL basket
'The child found all the baskets.'

b. To tā oti e ia e fale aki **e tau mena gahua nā.**
FUT build all ERG 3.SG ABS building with ABS PL thing work DEM
'He's going to build the house with all those tools.' (Seiter 1980:251)

(67) a. Ne tutala a au ke he tau momotua oti.
PST talk ABS 1.SG GL LOC PL elder all
'I talked to all the elders.'

b. *Ne tutala oti a au ke he tau momotua.
PST talk all ABS 1.SG GL LOC PL elder
Intended: 'I talked to all the elders.' (Seiter 1980:249)

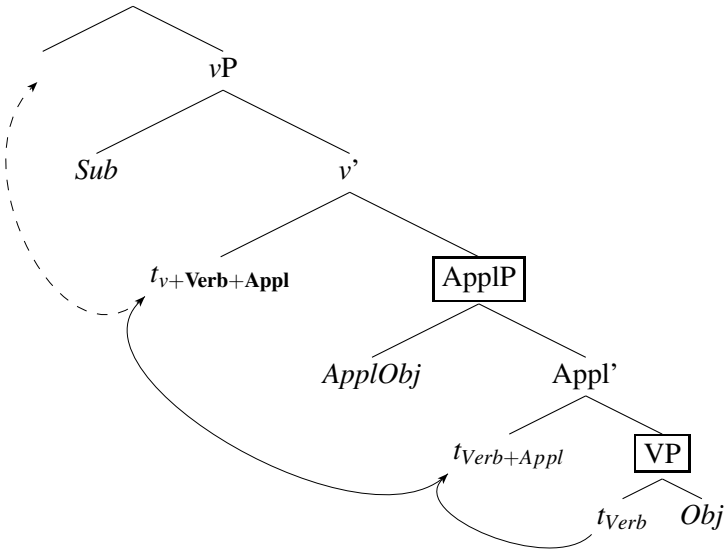
(69) presents an analysis of the Niuean applicative following the general structure that Pylkkänen (2002) proposes for high applicatives, where ApplP merges above VP (see also Marantz 1993).[14]

[14] I am following Massam (2006, 2010), who describes Niuean's applicative construction as a high applicative.

According to the locality condition on head movement (Travis 1984, Matushansky 2006), a head cannot pass over an intervening head. Thus, V^0 raises to $Appl^0$, resulting in the attested morpheme order internal to the verbal complex (V-*aki*), as well as the attested argument order (Inst-DO).

(68) Fakaugauga aki e ia **e** **pelu** e fua loku.
cut APPL ERG 3.SG ABS bushknife ABS fruit pawpaw.
'He cut the pawpaw with his bush knife.' (Sperlich 1997:66)

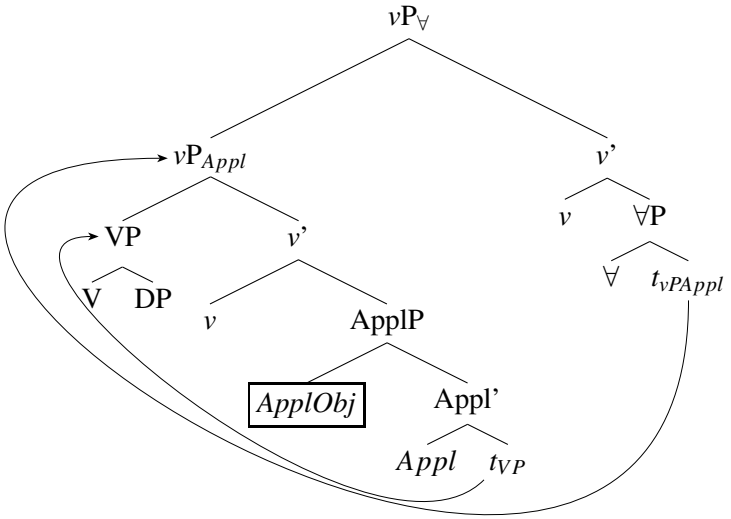
(69) Applicative



Surface order: Verb—APPL
Scope order: APPL > Verb

As shown in (68), X^0-raising successfully captures the inverse order of the verb and the applicative head, while offering a straightforward account of the licensing of the instrumental object. In the X^0-raising analysis, the instrumental object (*ApplObj*) is generated in the specifier of the projection headed by *aki*. A similar configuration would be more difficult to achieve in the context of a VP roll-up analysis: in particular, the evacuation of the instrument would need to be stipulated, lest it be predicted to surface internal to the verbal complex, as shown in (70).

(70) Roll-up movement and *aki*



This problem cannot be solved by generating the instrumental object in a position external to the verbal complex either (Massam 2010, 2013), since the VP roll-up analysis would then have to stipulate the relative order of the instrumental object and the direct object. In contrast, the attested order of the instrumental object and direct object is a natural consequence of V^0-raising.

5.3.3 *Postverbal particle* oti *'all'*

The particle *oti* 'all' surfaces internal to the verbal complex. From this position it can scope over external arguments (71-a) and internal arguments, such as direct objects (71-b) and instrumental arguments (71-c). While *oti* 'all' can scope over both internal and external arguments, if both arguments are plural, the subject interpretation of *oti* is preferred (Seiter 1980).

(71) a. Moua oti e lautolu e kato
find all ERG 3PL ABS basket
'They all found the basket.'

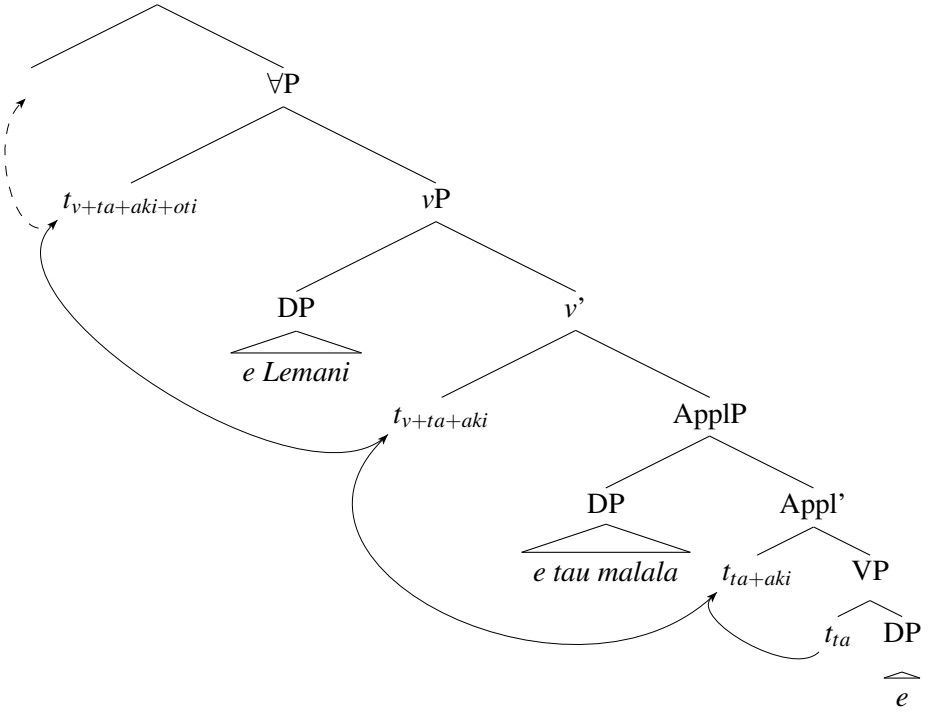
b. Moua oti he tama e tau kato.
find all ERG child ABS PL basket
'The child found all the baskets.'

c. To tā oti e ia e fale aki e tau mena gahua nā.
FUT build all ERG 3.SG ABS building with ABS PL thing work DEM
'He's going to build the house with all those tools.' (Seiter 1980:251)

The fact that *oti* can scope over external arguments can be captured by generating *oti* relatively high in the verb phrase and the order of elements internal to the verb phrase supports the idea that *oti* is generated in a relatively high position.[15]

Oti takes a more peripheral position relative to the applicative head when it co-occurs with *aki*, as illustrated by the example and tree structure in (72).

(72) Maeke e fakatino$_i$ ke tā aki oti e Lemani e tau malala e_i .
possible ABS picture DEP.T draw WITH all ERG Lemani ABS PL charcoal
'It's possible Lemani drew the picture with all the charcoals' (Seiter 1983:332)



Surface order: Verb—APPL—∀

Scope order: ∀ > APPL > Verb

As shown in (72), X^0-raising can account for the inverse order of the verb, the applicative *aki*, and *oti* 'all.' By allowing *oti* to be generated above the external argument, this analysis captures *oti*'s scope facts. In contrast, the VP roll-up movement analysis cannot generate *oti* above the external argument without implicating the external argument in the roll-up.

[15]This section focuses on constructions in which *oti* is part of the verbal complex; however *oti* can also surface within a particular nominal phrase.

In conclusion, this section has demonstrated that an X^0-raising analysis can account for differences between postverbal particles with regard to their relationship with verbal arguments. The applicative *aki* licenses only instrumental objects, whereas *oti* 'all' can take scope over any of the core arguments of the verb, i.e., subjects, direct objects, and instrumental objects. Thus, *aki* is generated below the external argument, while *oti* is generated above the external argument (if there is one). Finally, the manner and directional predicates do not interact with individual arguments at all, but instead form a compound with the main verb.

5.4 Inverse order and X-raising: TAM projections

This section demonstrates how an X^0-raising analysis captures the inverse order of two additional postverbal elements, shown underlined in (73).

(73) Inverse scope of postverbal particles

a. Surface order: MAN/DIR—APPL—∀—**ASP Adv**—**PFV**
b. Scope order: **PFV** > **ASP Adv** > ∀ > APPL > MAN/DIR

5.4.1 *Perfective marker* tuai

The perfective marker *tuai* is the only TAM particle that does not surface in clause-initial position. It occurs most commonly in clauses that also contain the clause-initial perfective marker *kua*, as in (74-a); however, both *kua* (74-b) and *tuai* (74-c) can appear alone.

(74) a. **Kua** tele oti **tuai** e lautolu a au.
PFV kick all PFV ERG 3.PL ABS 1.SG
'They've all kicked me.' (Seiter 1980: 66).

b. **Kua** fanogonogo a au ke he tau hūhū oti haau.
PFV listen ABS 1SG GL LOC PL questions all GEN.2SG
'I've already listened to all of your questions.' (Seiter 1980: 8)

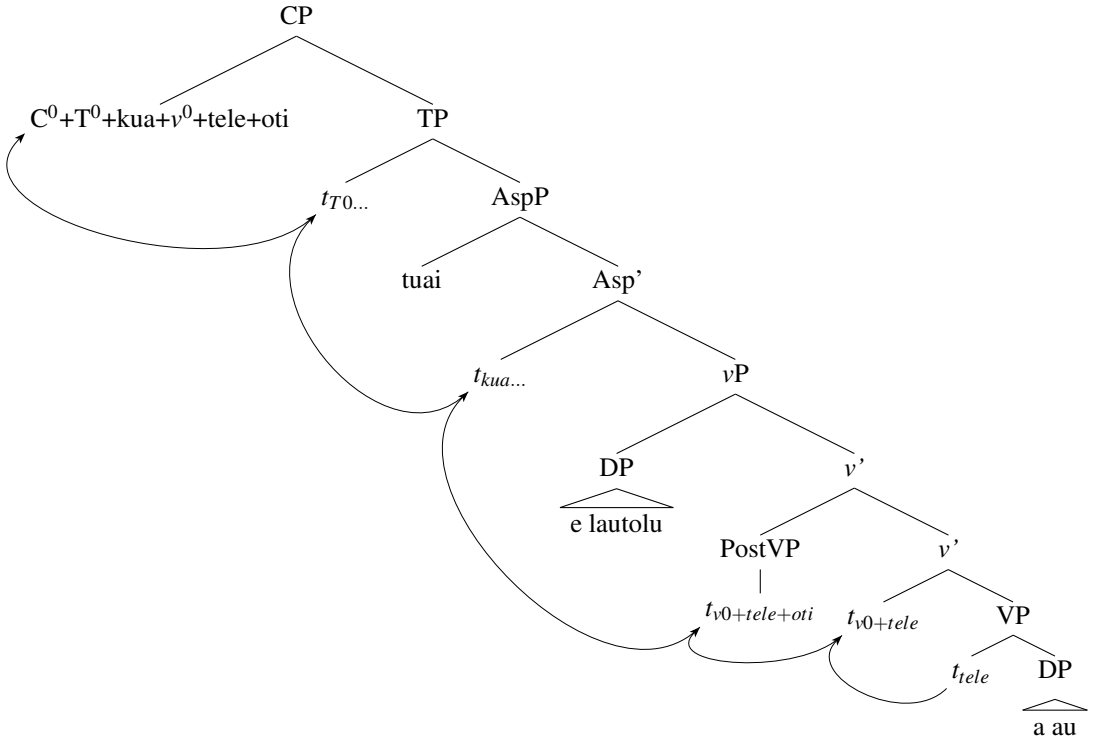
c. Moua **tuai** e au.
find PFV ERG 1SG
'I've found it.' (Haia 2010: 263)

The distribution of the Niuean perfective markers are reminiscent of negation in Standard French,

where two negative markers flank the verb. According to a classic analysis of French *ne* and *pas* (Pollock 1989), *ne* alternates with a null head in Neg^0, while the negative marker *pas* is generated in the specifier of NegP. The verb moves out of its base position below NegP and right-adjoins to *ne* (or ∅), forming the complex head *ne*+*v*+Verb. Subsequently, this complex head adjoins to the next available head, with the end result that *pas* is oriented to the right of the verb.

Adopting a similar analysis for the disjoint Niuean perfective makers *kua* and *tuai* allows us to capture the peculiar surface position of *tuai* while allowing both perfective markers to be generated in a single projection associated with aspect, located in a standard position below TP. The adaptation of the *ne...pas* analysis for *kua...tuai* is illustrated in (75).

(75) **Kua** tele oti **tuai** e lautolu a au.
PFV kick all PFV ERG 3.PL ABS 1.SG
'They've all kicked me.' (Seiter 1980: 66).



Surface order: Verb—APPL—∀—PFV
Scope order: PFV > ∀ > APPL > Verb

In this derivation, *tele* 'kick,' *oti* 'all,' and *tuai* PFV are generated in an order that reflects

their relative scope. The fact that they surface in inverse scope order is the result of the complex predicate *tele* 'kick' + *oti* 'all' moving above *tuai*.

5.4.2 *Aspectual/temporal adverbs*

Using a similar strategy to the one developed for *tuai*, it is also possible to account for the inverse order of aspectual/temporal adverbs. This small group of postverbal items includes *agaia* 'still' (76-a), *tūmau* 'always, constantly' (76-b), and *agataha* 'immediately.'

(76) a. Kua fā mafuti mai **agaia** nī e mamahi he haana a manava.
PFV HAB feel DIR still EMPH ABS pain LOC POSS LK stomach
'(She) can still feel the pain in her stomach.' (Sperlich 1997: 91)

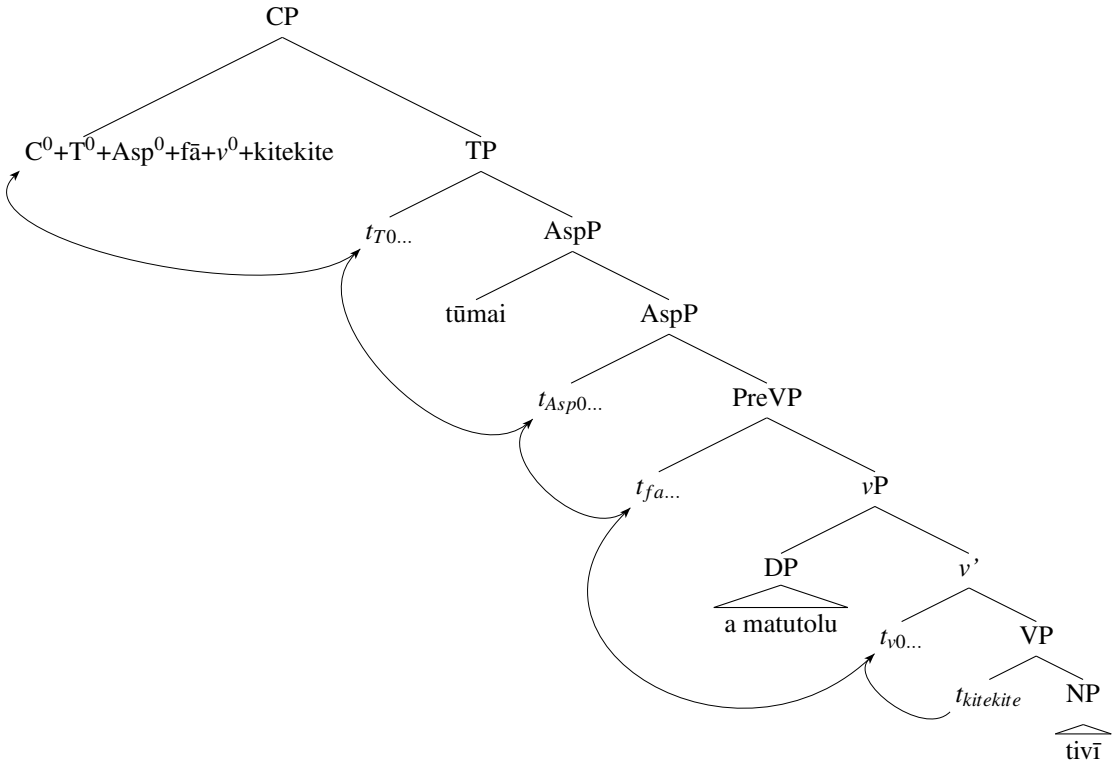
b. Fā kitekite tivī **tūmau** a matutolu.
HAB watch TV always ABS 2PL.EX
'We always watch TV together.' (Haia 2010: 126)

Many of the pre- and postverbal particles discussed in this chapter can function as main clausal verbs. As such, they are particularly amenable to a complex predicate analysis. Aspectual/temporal adverbs, on the other hand, are not related to verbs, and are instead treated as adjuncts. Note that it is difficult to determine whether these adverbs are adjoined to AspP or TP, because adjunction in either location would result in the attested word order, i.e., after the predicate and before the postverbal perfective marker *tuai*, as well as the attested scope, e.g., aspectual/temporal adverb > manner and directional predicates > main predicate.

A more thorough investigation of emphatic particles and the locative/temporal pronoun *ai* may prove useful in determining the exact location of aspectual/temporal adverbs. For now, I assume they are adjoined to AspP.

The tree in (77) represents the structure of (76-b), illustrating an example of PNI. Note that the NP object is shown in its θ-position, following the assumption adopted in this paper that the syntax of PNI and VSO clauses is the same.

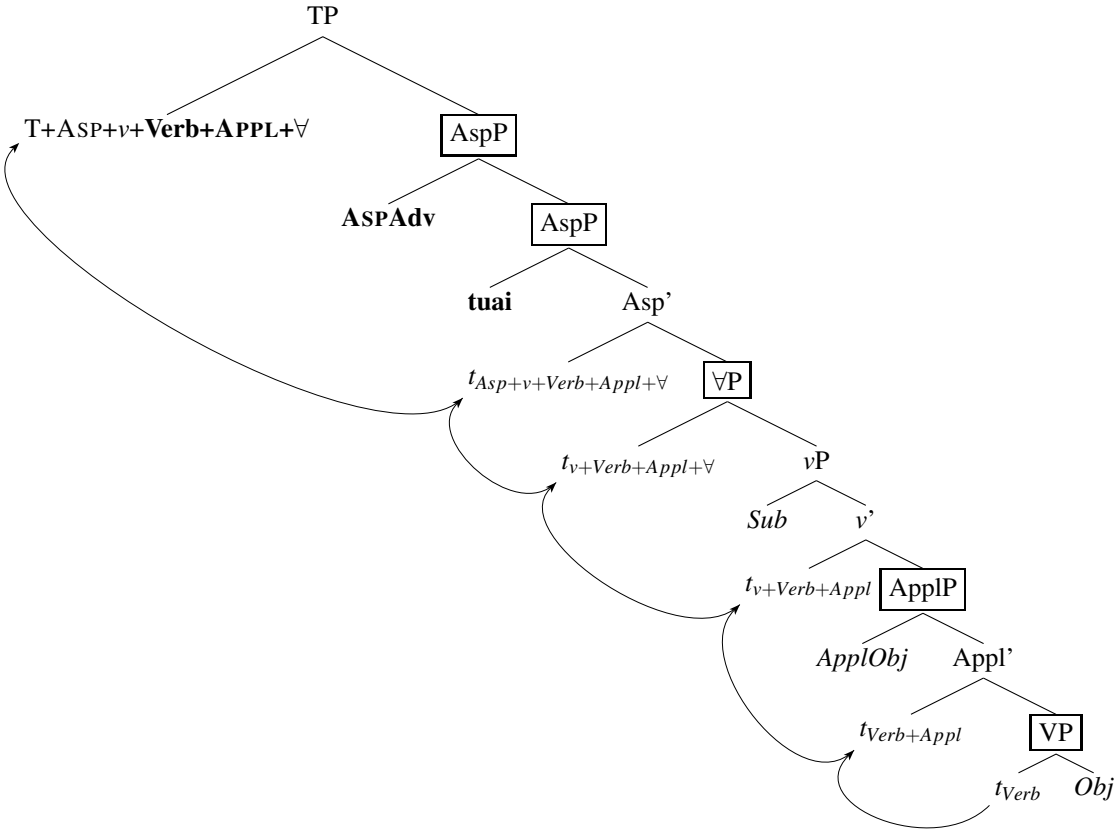
(77) Derivation of (76-b)



In (77), inverse order is achieved by generating *kitekite* 'watch' and *tūmai* 'always' in a "normal" scope order. The inverse linear order results from the predicate *fā kitekite* 'habitually watch' moving to C^0, which is higher than the position of the adverb.

Finally, the structure in (78) illustrates how the X^0-raising analysis can account for the inverse order of each component of the verbal complex discussed in this chapter: the verb, the applicative head, the postverbal particle *oti* 'all,' and the postverbal perfective marker.

(78) *Aki*, *oti*, *tuai*, aspectual adverb



Surface order: Verb—APPL—∀—ASPAdv—PFV
Scope order: ASPAdv/PFV > ∀ > APPL > Verb

This section has demonstrated that it is possible to achieve inverse scope without roll-up movement. The uniform X^0-raising analysis of postverbal particles requires less vacuous structure than the XP-raising analysis and generates postverbal particles in syntactic positions that fit their semantic identities to a greater extent than the XP-raising analysis can. Finally, the X^0-raising analysis eliminates the need to evacuate objects from a moved VP.

6. Conclusion

Recent proposals on the mapping between syntax and prosody have moved away from positing phenomenon-specific constraints to more generalized theories, such as Match Theory (Selkirk 2011), in which the proposed correlation of XPs and φ-phrases largely obviates the need for specific constraints focusing on individual phenomena. Even in the context of Match Theory, however,

it is widely acknowledged that eurythmic constraints are nonetheless necessary to account for certain cases where syntactic structure and prosodic structure do not correspond. I argued in this paper that prosodic theory continues to need ad hoc constraints mandating prosodic configurations that are sensitive to specific syntactic features. Cross-linguistic evidence reveals a preference for verbs to form a single prosodic phrase with their internal arguments; in the preceding sections, I have contended that prosodic restructuring can occur to preserve this phrasing when syntactic operations such as head movement conspire to separate a head from its complement.

The main components of the analysis presented here fit together as follows. A prosodic well-formedness constraint, ARGUMENT-φ, mandates that verbs be phrased in the same phonological phrase (φ-phrase) as their arguments. In order to satisfy this requirement, PNI objects – which are necessarily NPs – shift into a position that is adjacent to the verb at the point when prosodic structure is assigned. Even though the verb and its argument are not in their original structural configuration when they are sent to PF, positionally motivated categorical features encode their relationship in such a way that PF can make reference to it. Cyclic transfer of syntactic information to PF accounts for the fact that DP objects do not shift in the same way as NP objects: once a constituent receives prosodic structure, syntactic features are no longer visible, and by the time the verb spells out, the DP object has already received prosodic structure. Hence, PF can no longer see the original head-argument relationship between the verb and its object.

The prosodic account of Niuean PNI outlined above allows for a uniform V^0-movement analysis of Niuean, which in turn allows for a more parsimonious account of the formation of the verbal complex and a more nuanced representation of Niuean argument structure, especially when compared to a VP-movement analysis.

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