Prosodic Noun Incorporation: The Relationship between Prosody and Argument Structure in Niuean

Abstract. This paper argues for a uniform X^0-raising analysis of VSO and VOS word order in Niuean. Accounting for VSO via X^0-raising has a strong foundation in the V1 literature; the claim that X^0-raising can also underlie VOS word order—as in Niuean's pseudo-noun incorporation (PNI) construction—is more controversial. 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.

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 2016; 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 optimization of prosodic phrasing plays a role in determining the linear order of the sentence (e.g. Bennett et al., 2015, 2016, and Sabbagh 2014).

Cross-linguistically, different factors influence optimal prosodic phrasing. This paper develops the prosodic well-formedness constraint, ARGUMENT-φ (1), which captures the intuition that head-argument pairs should be phrased together.

(1)   The Argument Condition on Phonological Phrasing (ARGUMENT-φ):

A head and its internal argument(s) must be adjacent sub-constituents of a φ-phrase.[1]

I argue that ARGUMENT-φ can influence the linear order of sentential constituents. In this paper, the context for this larger goal is the problem of Niuean pseudo noun incorporation, but see Clemens 2014a and Clemens and Coon 2018 for an ARGUMENT-φ-based account of word order variation in Mayan more generally and Ch'ol in particular.

Niuean is a VSO language (2-a) with a basic clause structure that I straightforwardly capture with successive cyclic head movement (X^0-raising), although an XP-raising analysis has been the standard for Niuean syntax since Massam's (2001) seminal paper on pseudo-noun incorporation. PNI sentences have VOS word order (2-b), which X^0-raising cannot account for directly.[2]

(2)   a.   Ne fakahū a   tama fifine **e   tohi.**
             PST send   ERG child female ABS letter
             'The girl sent the letter.'

       b.   Ne fakahū **tohi** e   tama fifine.
             PST send   letter ABS child female
             'The girl sent a letter.'[3]

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

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[1]In §§4 and 5, ARGUMENT-φ will be reformulated in a way that is compatible with a Y-model 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.

[2]Unless otherwise noted, Niuean data were collected between 2013 and 2016. Three Niuean speakers, born in Niue and residing in Auckland, New Zealand provided the majority of the data and judgements found in the new examples in this paper, which were collected remotely (via video call) and in Auckland. Sound files recorded for the purpose of acoustic analysis were collected locally in Auckland and were first published in Clemens 2014b.

[3]Abbreviations in interlinear glosses follow the Leipzig Glossing Rules in all cases except: COMPTV – 'comitative'; DEP.T – 'dependent tense'; DIR – 'directional'; EMPH – 'emphatic'; GL – 'goal'; and RP – 'resumptive pronoun'.

clauses is the result of a prosodic restructuring motivated by the condition in (1). Thus, the present analysis breaks from the assumption that VSO/VOS alternations are syntactically motivated.

The remainder of the paper is organized as follows. Section 2 reviews the Niuean PNI construction and Massam's (2001) syntactic analysis of Niuean PNI. Section 3 develops an X^0-raising approach to Niuean clause structure, comparing it directly to an XP(-remnant)-raising approach. Once VSO is accounted for, the challenge becomes accounting for the VOS order of Niuean PNI in the context of X^0-raising. Section 4 bridges the syntactic and prosodic components of the analysis by introducing a number of key assumptions about the syntax-prosody interface. Section 5 discusses certain observations about sentential prosody in Niuean and develops an account of the linear order and prosodic realization of both VSO and VOS clauses, which is based on ARGUMENT-φ and STRONG START (Selkirk 2011). Section 6 concludes the paper.

2. Niuean Basics and PNI

Niuean is a dependent-marking ergative language that employs two case-marking paradigms: *he* and *e* with ergative and absolutive common nouns; *e* and *a* with ergative and absolutive proper nouns/pronouns. The data in (3)-(4) illustrate these characteristics, as well as the fact that the Niuean verb precedes the subject, the object (in bold), and any oblique arguments or adverbial phrases. In other words, Niuean's most basic word order is VSOX.

(3) Transitive clause (VSOX)

   a. Kua kitia he   tama **e**   **puaka** he   pā.
       PFV see   ERG child ABS pig   LOC pen
       'The child saw the pig in the pen.'

   b. Kua kitia e   au   **a**   **Fiti** he   kātene.
       PFV see   ERG 1SG ABS Fiti   LOC garden
       'I saw Fiti in the garden.'

(4) Intransitive clause (VSX)

    a. To fano e   tama ke he   kātene.
        FUT go   ABS child GL LOC garden
        'The child will go to the garden.'

    b. To fano a   Fiti ke he   kātene.
        FUT go   ABS Fiti GL LOC garden.
        'Fiti will go to the garden.'

2.1 Niuean PNI

While the 'basic' word order in Niuean is VSO, VOS order arises in PNI contexts (Massam 2001; see also Seiter 1980 for 'noun incorporation' and Whittaker 1982 for 'semi-transitive verbs'). This section reviews the relevant morphosyntactic characteristics of Niuean PNI constructions.

The most common type of PNI construction involves the incorporation of a direct object (PNI-DIR). An example of a PNI-DIR structure and its VSO counterpart is shown in (5).

(5) a. Ne aka *mai* he   tama **e**   **patuō.**
        PST kick DIR ERG child ABS stone
        'The child kicked the stone towards me.'

    b. Ne aka **patuō** *mai* e   tama.
        PST kick stone DIR ABS child
        'The child kicked a stone/stones towards me.'

In (5-a), the object follows the subject and the directional particle *mai* appears to the immediate right of the verb. In contrast, in (5-b), the object precedes the subject and the particle surfaces to the right of the object, rather than in its canonical position adjacent to the verb. The inability of the particle to surface in the postverbal position provides syntactic evidence that the verb and the object in PNI constructions form a surface constituent.

VSO and PNI constructions also differ in terms of the functional morphology associated with the object. Objects in VSO clauses are obligatorily marked for case. In (5-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 (5-b). In fact, no functional material may

precede the object in a PNI construction, although the object may *contain* functional material, as shown by examples (6-b) and (6-c)

(6) a. Ne onoono **vaka mahaki toili** a   Fisi he   uaafo.
         PST watch   canoes huge   large ABS Fisi LOC wharf
         'Fisi is watching extremely large canoes at the wharf.'

     b. Ne tō   **talo mo**   **e**   **tau futi**   **kehekehe**   a   Togia.
         PST plant taro comptv ABS PL   bananas different.varieties ABS Togia
         'Togia planted taro and different kinds of bananas.'

     c. Ne kumi   **mena ke**   **kai ai** a   lautolu.
         PST look.for thing DEP.T eat RP ABS 3PL
         'They looked for something to eat.'

In light of the fact that functional material may not precede the head noun in PNI sentences, Massam (2001) reasons that the incorporated argument is smaller than DP. Incorporated arguments are nonetheless phrasal, as they can be modified by adjectives (6-a), coordinate phrases (6-b), and nonfinite relative clauses (6-c). As such, incorporated arguments must be NPs (Massam 2001).

Finally, Niuean PNI is not restricted to direct objects. All of Niuean's internal arguments that can enter the derivation as NPs can surface in PNI constructions. These include direct, applicative (see 3.1.2), "middle," and instrumental objects; the latter two are discussed below. Other internal arguments—pronominal objects, unaccusative subjects, and CP complements—never surface without any functional structure, and as such, never surface in PNI constructions. External arguments and adjuncts, e.g. the subjects of transitive clauses and oblique PPs, are also excluded from PNI constructions.

The term "middle object" comes from the Polynesian literature and denotes a constituent that behaves midway between a canonical argument and canonical adjunct. In other words, they act like arguments with respect to some criteria, e.g. c-selection and participation in PNI constructions, whereas they act like adjuncts with respect to some other criteria, e.g. case-marking and relative clause formation. Verbs that combine with middles are typically psych verbs, i.e. verbs of perception, cognition, and emotion, although not all psych verbs take middle objects and not all

verbs that take middle objects are psych verbs (Chung 1978; Seiter 1980; Massam 2001).

In VS clauses, e.g. (7), middle objects are marked with the same case as goal DPs: typically *ki a* for proper nouns/pronouns and *ke he* for common nouns.

(7)   Ne fifitaki tūmau e   tama fifine tote **ke he   tama fifine   lahi.**
       PST copy   always ABS girl   female small GL LOC girl   female big
       'The little girl always copied the big girl.'

Together with instruments, middles are unique among arguments with prepositional case for participating in PNI constructions. Middles can surface as incorporated NPs, as *vaka* 'canoe' does in (8-a), or with the same case as goal PPs, as in *ke he tau vaka* 'at the canoes' (8-b). Similarly, instruments surface as incorporated NPs, see *vakelele* 'airplane' in (9-a), or as instrumental PPs, as in *he vakalele* 'on the airplane' in (9-b). Other types of PPs, e.g. *he uaafo* 'at the wharf' (8-a) and *ki Niue* 'to Niue' (9-a), do not have the option of incorporating, as shown in (9-b) and (8-b).

(8)   a.   Ne onoono **vaka** a   au   he   uaafo.
             PST watch   canoe ABS 1SG LOC wharf
             'I watched canoes at the wharf.'

       b.   Ne onoono (***uaafo)** a   au   ke he   tau vaka.
             PST watch   wharf   ABS 1SG GL LOC PL canoe
             Intended: 'I watched the canoes at the wharf.'

(9)   a.   Ne fano **vakalele** a   Togia ki Niue.
             PST go   airplane ABS Togia GL Niue
             'Togia went to Niue by airplane.'

       b.   Ne fano (***Niue)** a   Togia he   vakalele.
             PST go   Niue   ABS Togia LOC airplane
             Intended: 'Togia went to Niue on the airplane.'

In total, the characteristics of PNI relevant to the present discussion are the following: (a) internal arguments incorporate; (b) the incorporated argument is not preceded by functional morphology; (c) the incorporated argument surfaces immediately to the right of the verb; and (d) postverbal

particles, e.g. the particle *mai* in (5) above, surface after the incorporated argument.

The literature reports that the incorporated argument is non-specific and the event is durative or frequentative, which are properties Massam (2001) connects to the lack of DP.[4] However, according to my primary language consultants, who are in their 20s, the durative or frequentative interpretation of PNI clauses is non-obligatory and the PNI argument is only interpreted as non-specific if there is no specific referent in the discourse. If the judgments of these individuals represent pervasive change, the grammar of younger speakers allows for a specific interpretation of bare NPs, which is unexpected if specificity and definiteness are uniquely associated with D^0. So while an in-depth discussion of the semantics of nominal reference would take this paper too far afield, I direct the reader to the literature on 'NP' languages, including Chierchia 1998 and Bošković 2005, 2008, in which the semantic properties of noun phrases, including definiteness and specificity, have been accounted for in the absence of D^0-level material.[5]

2.2 *The Prosody of Niuean PNI*

Just as different types of PNI structures have uniform morphosyntactic profiles, they have uniform prosodic profiles as well.[6] In a study of sentence-level prosody in Niuean, Clemens (2014b) analyzes the speech of five Niuean speakers recorded in Auckland, New Zealand and finds that the verb and the incorporated argument form a prosodic constituent in PNI clauses, whereas the verb and the subject are phrased separately in VSO clauses, as schematized in (10-a). Evidence supporting this analysis comes from pitch maxima and duration; numeric details are given below.

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[4]For more on PNI semantics, see Seiter 1980, Dayal 2003, Asudeh and Ball 2005, and Collins to appear.

[5]See also Coon 2010 and Clemens and Coon 2018 for a discussion of nominals in Mayan languages that surface with or without DPs, and in either case, can receive a specific interpretation given an appropriate context.

[6]The uniformity of the phonological phrasing of PNI sentences on one hand, and VSO sentences on the other, is likely exaggerated by the methods used to collect the data reported in Clemens 2014b, which was a reading-based study with highly controlled stimuli. Richer, more naturalistic data would likely reveal variation conditioned by factors including focus structure and eurythmic considerations sensitive to variables such as word size (see Gussenhoven 2004 for an introduction to the factors that contribute to this type of variable phrasing). An investigation into variation in phonological phrasing would result in a more nuanced understanding of Niuean's sentence phonolgoy, but I must leave it for future work. Still, the data discussed in this section reveal robust generalizations, as will be shown.
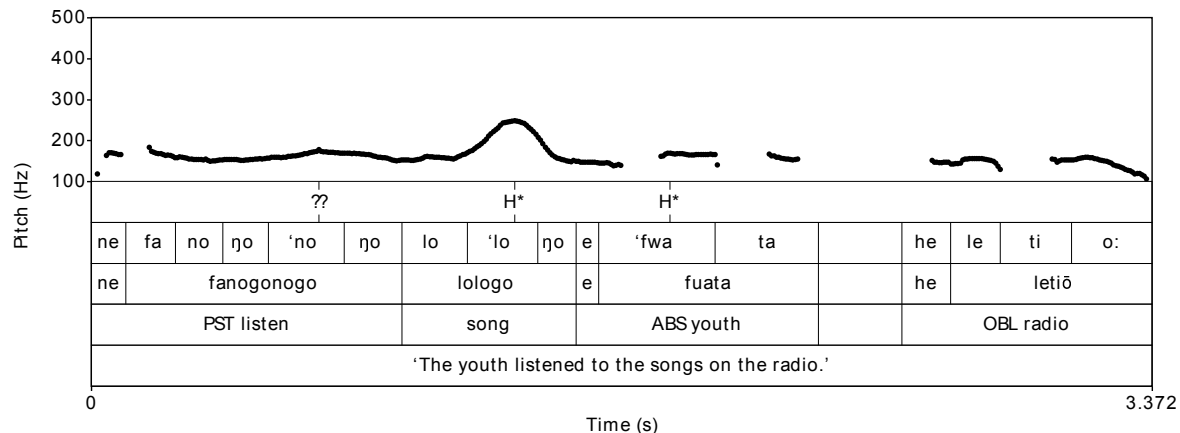
Figure 1: Example pitch track PNI-mid

(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

Niuean clauses are produced with a series of H*L- tunes corresponding to phonological phrases (φ-phrases).[7] 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 (Rolle and Starks 2014). Thus, a H* tone can serve as a diagnostic for the right edge of Niuean φ-phrases.

For each type of PNI structure under consideration in Clemens 2014b—PNI-DIR, PNI-MID, and PNI-INST—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. An example of a PNI-MID clause and its VS counterpart are given below. Note that there is a pitch excursion on the VS verb 'fanogonogo' *listen* in 2 that is absent from the PNI verb in 1. Furthermore, the H* on the post-verbal constituent is higher in PNI conditions 1 than it is in VSO conditions 2, presumably on account of downdrift: the H* on the subject in VSO clauses is the second tonal event of the clause.

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[7]Brown and Tukuitonga (2018) describe the H* pitch accent as anchored to the predicate, not the φ-phrase. Crucially, on either account, verbs and NP arguments are marked by a single H*, unlike verbs and DP arguments. Future work should investigate whether the relevant accent is a property of the predicate or φ-phrases more generally.
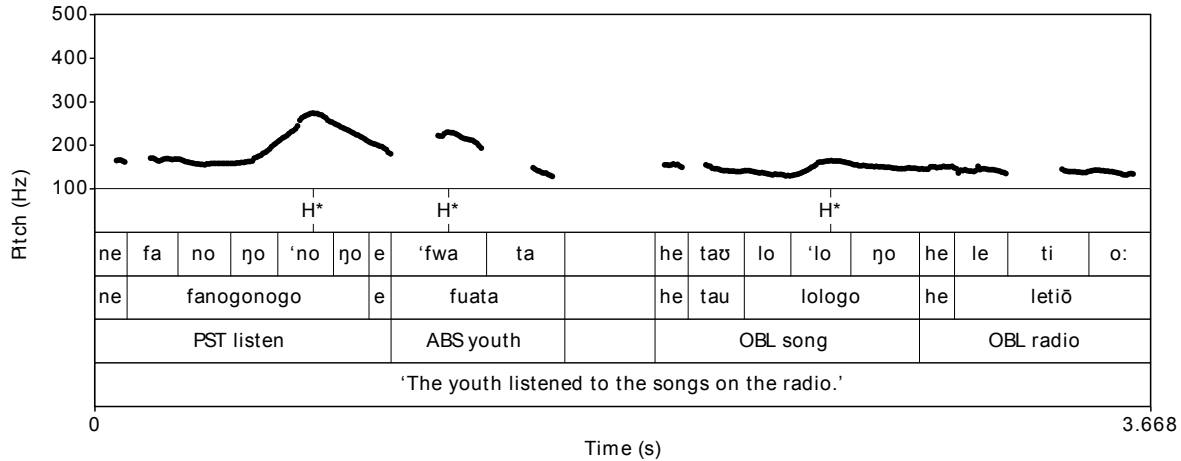
Figure 2: Example pitch track VS-mid

Clemens (2014b) reports robust findings: on a direct comparison of the PNI condition and the VS condition (101 PNI/VS minimal pairs), the maximum F_0 on the verb is higher in VS clauses than it is in PNI clauses (Paired *t*-Test; p < 0.0001). The maximum F_0 on the constituent that follows the verb is lower in VS clauses than it is in PNI clauses (Paired *t*-Test; p < 0.0001). These statistically significant findings represent perceptually salient differences of approximately 21 and 15 Hz, respectively (see Stevens 2017 for just-noticeable difference).

Evidence from duration also supports the prosodic phrasing given in (10). Clemens (2014b) reports that the verb in VOS clauses is significantly longer than the verb in VSO clauses (Paired *t*-Test; p < 0.0005). Thus the verb is longer when it is at the right-edge of a φ-phrase than when it is in a medial position (Clemens 2014b). While the difference in duration reaches statistical significance, the size of the effect is below the perceptibility threshold (Stevens 2017), which is consistent with the idea that phrase-final lengthening is a mechanical effect of prosodic planning (Myers and Hansen 2007).

Establishing that the verb and the incorporated element form a unique φ-phrase is critical, because the prosodic account of PNI developed in §§4–5 is based on that finding. Note, however, that this finding is also consistent with the syntactic analysis of PNI/VSO alternations.

2.3   A Syntactic Analysis of PNI

The syntactic analysis of PNI 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
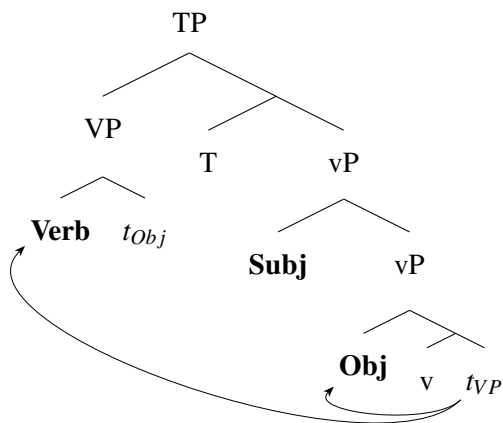
The differences between VSO and PNI structures stem from the type of object that the verb selects. Massam proposes that Niuean transitive verbs may select either DP or NP objects. Unlike their DP counterparts, NP objects do not require case; hence, they have no reason to leave the VP. If V^0 selects 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
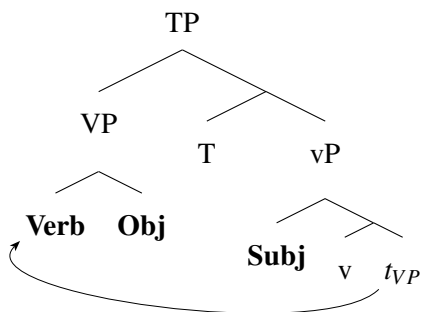
Massam's account of Niuean V1 eloquently captures many of the differences between VSO and PNI highlighted in the previous section, including the fact that particles surface between the verb and the subject in VSO structures but follow the incorporated argument in PNI contexts.

2.3.1 *Different Types of PNI under Massam's (2001) Analysis*

Massam's account applies straightforwardly to PNI-DIR and PNI-MID, since direct and middle objects are in complementary distribution; however, a few challenges arise when applying this analysis to PNI-INST. As the example in (13) illustrates, the instrument *titipi* 'knife' can incorporate even when the sentence also includes a direct object (shown in bold):

(13) Ne hele *titipi* e   Fiti **e**   **fua vine.**
      PST cut   knife ERG Fiti ABS fruit passionfruit
      'Fiti cut the passionfruit with a knife/by knife.'

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
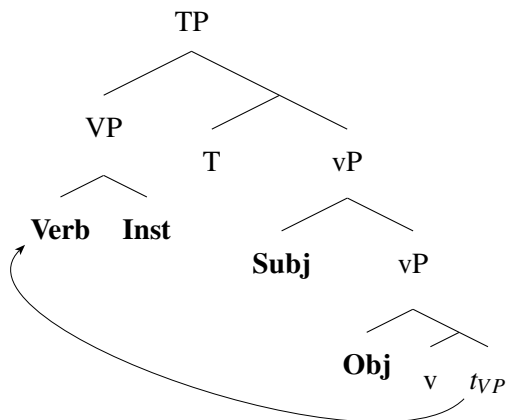

For this analysis to hold, Massam (2001) must allow direct objects to be generated somewhere other than sister to V^0, since i) PNI-INST constructions can contain direct objects, and ii) the incorporated argument is always sister to V^0. To address this problem, Massam postulates that VSO objects are 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* instrument. Likewise, it is unclear why an instrument should be generated as sister to V^0 only when it is only a NP, as in (14), but adjoined higher when it is a PP, as in (15).

(15)   PNI-abs with an instrumental PP
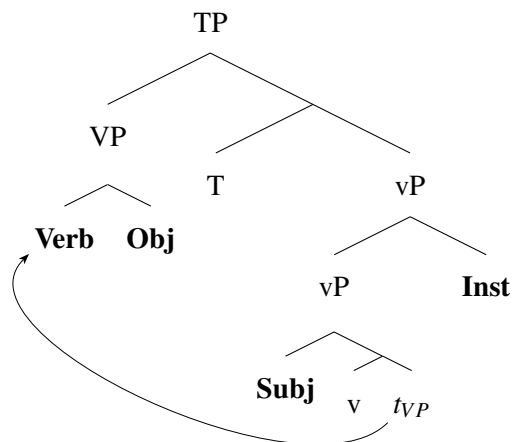
Note that the solution to this problem cannot be a matter of lexical subcategorization, because the locus of the generation of the direct object (as the sister to V^0 or in a higher specifier position) does not depend on the particular verb. The same verb, with the same arguments, can surface in VSO, PNI-DIR, and PNI-INST constructions, as illustrated by the examples in (16), in which instruments are italicized and direct objects are shown in bold:

(16)   a.   Kua fakafano laia e   au   **e**   **numela haaku** *he*   *melihila*.
              PFV send   just ERG 1SG ABS number POSS   LOC email
              'I just sent my number by email.'

        b.   Kua fakafano **numela** laia a au   *he*   *melihila*.
              PFV send   number just 1SG LOC email
              'I just sent a number by email.'[8]

        c.   Kua fakafano *melihila* laia e   au   **e**   **numela haaku**
              PFV send   email   just ERG 1SG ABS number POSS
              'I just sent my number by email.'

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[8]Depending on the context this can also receive the same translation as (16-a), 'I just sent *my* number by email.'

2.3.2 *Interim Discussion*

We have seen how different types of PNI constructions have similar morphosyntactic and prosodic profiles. Massam (2001) accounts for the morphosyntactic uniformity 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. Direct objects can be selected by V^0 (as in PNI-DIR 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 when they surface as NPs, but they are adjoined to vP when they surface as 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 in §5 offers a solution to the problem of the structural encoding of thematic relationships.

The standard approach to Niuean clause structure adopts a VP-(remnant)-raising analysis, following Massam (2001, 2005, et seq.). This style of analysis is in large part motivated by the PNI construction, which will be given an alternative prosodic account in §5. In the next section, we put aside the question of Niuean PNI to consider the derivation of Niuean's canonical VSO word order, concluding that a X^0-raising is both possible and preferable to the XP-raising analysis.

3. An X^0-raising analysis of Niuean clause structure

In this section I propose an X^0-raising analysis of Niuean clause structure, paying particular attention to Niuean's postverbal particles, which surface in a linear order corresponding to a bottom-up hierarchical order, also known as 'inverse scope'. The type of inverse scope found in Niuean is more commonly accounted for via 'roll-up' movement (Koopman and Szabolcsi 2000; Rackowski and Travis 2000; Pearson 2001; Cinque 2005), which is easily combined with the VP-(remnant)-raising analysis introduced in §2.3 (Massam 2010, 2013). In particular, Massam (2013) merges these particles in a top-down order and then inverts them through a series of successive roll-up

movements of XPs, which is discussed in more detail in §3.2. I argue that it is possible and indeed preferable to account for the inverse order of Niuean's postverbal particles via X^0-raising as opposed to XP-raising.

The syntactic components of the proposal are expressed within the Minimalist Framework (Chomsky 1995 et seq.). Along with its predecessor, Government and Binding, Minimalism is the framework in which the most theoretically influential work on Niuean has been carried out (Massam 1985 et seq.). In this regard, the choice of Minimalism as the operative framework can be seen as an expository one. However, the analysis proposed here also stands to solve some nagging conceptual problems with the existing Minimalist analysis of Niuean word order. It is thus of particular interest to practitioners of Minimalism, specifically as it pertains to the status of roll-up movement, namely argument evacuation and the proliferation of otherwise unmotivated null functional heads. Looking ahead, the prosodic component of the analysis is expressed in the framework of Optimality Theory for reasons discussed at length in §4. However, as should be clear from the discussion in §§4-5, the crucial observations concerning the role of prosodic factors in determining Niuean word order transcend any particular framework.

3.1   Inverse Order and X-Raising: Verbal Projections

This section focuses on three categories of postverbal elements in Niuean: i) manner and directional predicates (referred to as 'adverbs' elsewhere in the literature), ii) the applicative head *aki*, and iii) the particle *oti* 'all.' The components of the verbal complex that are associated with tense and aspect are discussed in §3.3.

3.1.1   *Manner and Directional Predicates*

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 surface between the main verb and the applicative head *aki* when modifying the main verb and have been treated as 'adverbs' in the literature. They can also act as the main verb of the clause. In (17-a), the directional predicate *mai* indicates movement towards the speaker, while in (17-b), it is the main verb. In

(18-a), the manner predicate *lahi* modifies the main verb and is translated as 'greatly,' while in

(18-b), it is the main predicate.

(17) a. Fakafano **mai** lā   e   numela foni haau,   fakamolemole.
          send   DIR EMPH ABS number phone 2SG.POSS please
          'Send me your phone number, please.'

      b. **Mai** lā   e   numela foni haau,   fakamolemole.
          give EMPH ABS number phone 2SG.POSS please
          'Give me your phone number, please.'

(18) a. Manako **lahi** a   au   ke   gahua tupe.
          want   great ABS 1SG DEP.T work money
          'I want a lot to work for money'

      b. Ne **lahi** e   tupe.
          PST great ABS money
          'The money was great (a lot).'

Seiter (1980) reports that directional predicates tend to follow manner predicates, as in (18-a), but

that the opposite order is also attested. For example, manner predicates formed with the causative

marker *faka* tend to follow directional predicates (see Gould et al. 2009). This variation suggests

that directional and manner predicates have the same structure, for which there are two possible

accounts: an adjunction analysis and a complex verb analysis:

(19) a. Adjunction analysis   b. Complex verb analysis
                    VP V^0

              VP   AdvP V^0 V^0
              | | | |
            gigiti   *lahi*   *gigiti*   *lahi*

            'gush'   'great'   'gush'   'great'

Certain observations suggest that manner 'adverbs' and directional particles are sub-constituents

of a complex verb, in the spirit of Baker's (1998) theory of morphosyntactic incorporation. First,

as shown above, they can function as the sole predicate of the clause. Next, manner predicates and causative verbs can have similar internal structures,[9] again suggesting that they are verbs.

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 postverbal particles do (see §§3.1.2–3.1.3). Finally, this type of analysis explains why manner and directional predicates surface between the main verb and the applicative head *aki*, which selects VP.

3.1.2   Aki *Applicative*

The applicative head *aki* surfaces within the verbal complex, before the core arguments, as shown in (20). Note also that the object of the applicative *e vai* 'the water' precedes the direct object *e afi* 'the fire.' In other words, the object of the applicative is in a position ordinarily reserved for the direct object of a transitive clause, i.e. following the subject.[10]

(20)   Ne tamate **aki**   he   tagata e   vai   e   afi.
        PST kill   APPL ERG person ABS water ABS fire
        'The person put out the fire with water.'

In a related construction, *aki* surfaces as the head of a prepositional phrase 'with,' in which case the instrument must follow the direct object, as in (21-a). An example of PNI-INST is shown in (21-b). Note that *aki* is disallowed in this example, suggesting that the VSO counterpart of (21-b) is (21-a), as opposed to the true applicative in (20).

(21)   a.   Ne tamate he   tagata e   afi **aki** e   vai.
             PST kill   ERG person ABS fire with ABS water
             'The person put out the fire with water.'

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

[10]Massam (1998,2015) reports that while V-*aki*-S-Inst-DO is more widely accepted, V-*aki*-S-DO-ApplO is possible. In keeping with the analysis presented below, V-*aki*-S-DO-ApplO is presumably derived via scrambling.

b.   Ne tamate vai   (***aki**) he   tagata e   afi e   vai.
     PST kill   water APPL ERG person ABS fire ABS water
     'The person put out the fire with water.'

Applicative and direct objects behave similarly with respect to i) raising; ii) the resolution of long-distance dependencies; and iii) the possibility of being modified by *oti* 'all.' See Seiter 1979, 1980, Massam 1998, Ball 2010, and Longenbaugh and Polinsky to appear for more discussion of these constructions; here, I will briefly review the most relevant examples.

Like direct objects (22-a), applicatives are found in what have typically been called raising constructions for the reason that the relevant DPs are interpreted as an argument of an embedded predicate even though they surface in the matrix clause.[11] In contrast, obliques are not (23).

(22)   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)

(23)   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/e   tagata ia]$_i$ ke   matematekelea a   Maka e_i.
        PFV possible OBL/ABS man DEM DEP.T be.in.trouble   ABS Maka
        Intended: 'Maka might be in trouble on account of that man.'

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. Applicative objects (24-b) pattern with direct objects (24-a) in relativizing with a gap. In contrast, oblique arguments relativize with a resumptive pronoun (25).

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[11]See Longenbaugh and Polinsky to appear for an account that base-generates the 'raised' DP in the matrix clause, from where it is co-indexed with a null pronominal in the embedded clause.

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

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

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

Oti 'all' can modify applicatives and direct objects from a position internal to the verbal complex (26). In contrast, *oti* must surface next to an oblique in order to modify it (27).

(26)   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 3SG ABS building with ABS PL thing work DEM
                'He's going to build the house with all those tools.' (Seiter 1980:251)

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

Examples (22)–(27) demonstrate that applicative objects behave more like arguments than adjuncts. Based on this property as well as word order considerations, the Niuean applicative is analyzed according to the general structure Pylkkänen (2002) proposes for high applicatives, where ApplP merges above VP (see also Marantz 1993).[12] According to the locality condition on head movement (Travis 1984; Matushansky 2006), a head cannot pass over an intervening head. Thus,

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

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).

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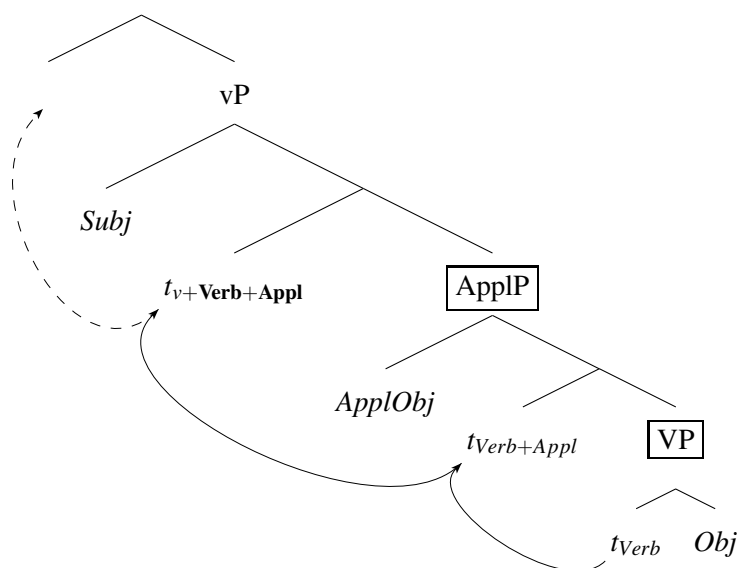
Surface order: Verb—APPL

Scope order: APPL > Verb

As shown above, X^0-raising successfully captures the order of the verb and the applicative head *aki*, while offering a straightforward account of the applicative object, also generated in ApplP.

3.1.3 *Postverbal Particle* Oti *'All'*

As mentioned above, the particle *oti* 'all' can surface internal to the verbal complex. As part of the verbal complex, *oti* modifies subjects (29-a), direct objects (29-b), and instrumentals (29-c). When multiple arguments are plural, *oti* is interpreted as modifying the highest argument (Seiter 1980).

(29) 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.**
    FUT build all ERG 3SG ABS building with ABS PL thing work
    'He's going to build the house with all the tools.' (Seiter 1980:251)

Generating *oti* in a relatively high position of the clause captures the fact that *oti* can modify core arguments in a number of positions. The order of elements internal to the verb phrase supports the idea: *oti* takes a more peripheral position relative to the applicative head, as illustrated by (30).

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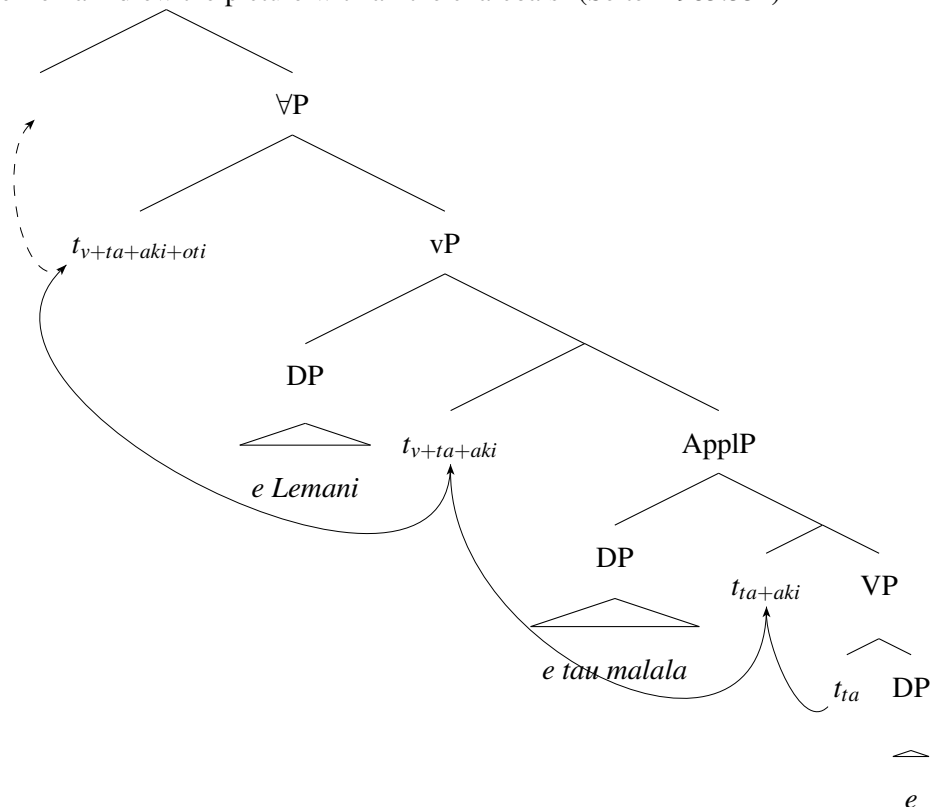
Surface order: Verb—APPL—∀

Scope order: ∀ > APPL > Verb

As shown in (30), X^0-raising can account for the order of the verb, the applicative *aki*, and *oti*

'all.' By allowing *oti* to be generated above the external argument, this analysis captures the fact that *oti* can modify all core arguments of the verb.

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 applicative objects, whereas *oti* 'all' can modify any of the core arguments of the verb. 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.

Before turning to the postverbal elements associated with TAM projections, §3.2 discusses the VP-(remnant)-raising analysis combined with "roll-up" movement and compares it to the X^0-raising analysis articulated above.

3.2   *An Explicit Comparison between Head and Phrasal Movement*

The tree in (32), which represents the bold portion of the attested example (31), illustrates the type of structure Massam (2013) proposes for a predicate that includes postverbal particles; here, directional *mai* and *oti* 'all.' Postverbal particles are sandwiched between vPs: they select a vP and are selected by a v^0. Each vP rolls up to the next highest specifier of vP, with the result that the vP elements surface in the opposite order from which they were generated.

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

(32)   Roll-up movement account of postverbal particles
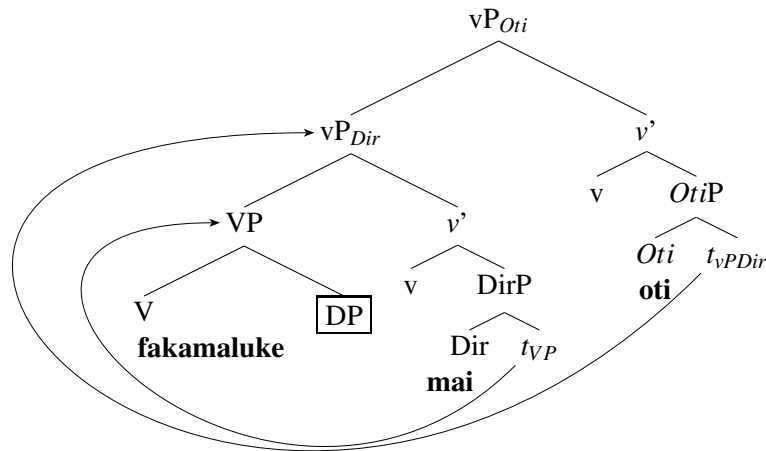
The roll-up analysis requires that a fair amount of null structure be stipulated for purely theoretical reasons. The postverbal manner and directional heads are selected by null v^0s; these v^0s, in turn, project specifier positions that serve as landing sites for the lower XPs, thereby allowing them 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.

The roll-up analysis also faces the problem of object evacuation, which is discussed at length by Massam (2010, 2013).[13] The object, shown in a box in (32), 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, as in (32), 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.

Applicatives present a similar problem for the roll-up analysis. Recall from §3.1.2 that the

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[13]Massam (2010) notes that one way to evade the problem of object evacuation is to adopt an X^0-raising analysis, although she ultimately dismisses this solution.

applicative head *aki* does not surface next to the argument it licenses. On the account presented here, e.g. see (28), *aki* is implicated in X^0-raising, because it is the head of a phrase. X^0-raising causes *aki* to surface inside of the verbal complex instead of next to the applicative object. Thus, the X^0-raising account allows *aki* and its object to originate together in ApplP, while still generating the attested word order. A similar result would be more difficult to achieve in the context of a roll-up analysis, where the applicative object would need to be evacuated from ApplP.

As discussed in §3.1.3, another benefit of the X^0-raising account is that *oti* can be generated in a position from where it can modify any of the core-arguments, i.e. above the external subject (30). In contrast, on the roll-up analysis (32), postverbal particles such as *oti*, are generated above the lexical verb, but below the external argument. If, on a roll-up analysis, *oti* were generated above the external argument, the external argument would be predicted to roll up with its vP, or it would also have to be evacuated.

Thus, the problem of argument evacuation applies not only to direct objects, but also to applicative objects and external arguments, depending on the structural context. A response to the argument-evacuation problem that we have not yet considered is to generate all DP arguments outside of the VP (Massam 2010, 2013; Longenbaugh and Polinsky to appear).[14] This is only a tenable solution if arguments are generated above the highest projection implicated by movement. However the fact that certain postverbal particles modify arguments suggests that those particles are generated *higher* than the arguments they modify. In addition, it would be difficult to generate arguments above the postverbal heads related to TAM projections, discussed in the next section, while still below the final position of the rolled-up verbal complex (see (11)).

3.3   *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 in bold in (33).

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[14]These are essentially non-configurational accounts; however, Niuean displays many configurational tendencies i) subject/object asymmetries, albeit fewer than one might expect (Longenbaugh and Polinsky to appear), ii) argument/adjunct asymmetries with respect to relativization and raising (Seiter 1979, 1980; Massam 2002, 2013); and iii) isolating morphology and strict word order (cf. Jelinek 1984; Baker 1996).

(33)   Inverse scope of postverbal particles

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

    b.   Hierarchical order: **PFV** > **ASP Adv** > ∀ > APPL > MAN/DIR

There are two different approaches to analyzing the perfect in Niuean. For Seiter (1980) and Massam (2009b), the perfect is encoded by two particles: preverbal *kua* and postverbal *tuai*. In favor of this analysis is the fact that *tuai* most commonly surfaces in clauses that also contain *kua*, as in (34-a), however both *kua* (34-b) and *tuai* (34-c) can appear alone.

(34)   a.   **Kua** tele oti **tuai** e   lautolu a   au.
             PFV kick all TUAI ERG 3PL   ABS 1SG
             '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   TUAI ERG 1SG
             'I've found it.' (Haia 2010: 263)

While both *kua* and *tuai* surface alone, perfect constructions without *tuai* are more common than ones without *kua*. This observation, together with the fact that TAM markers in Niuean are generally preverbal, forms the basis of Matthewson et al.'s (2015) claim that the Niuean perfect is encoded by *kua* alone. Although their work focuses on the semantics of *kua*, they propose that *tuai* is a particle meaning 'recent past.' As such, *tuai* is highly compatible with perfect constructions, but does not directly contribute to perfect semantics (Matthewson et al. 2015).

The analysis that I propose here attempts to unify insights from both types of approaches. On one hand, Matthewson et al. (2015), argue convincingly that *kua* is responsible for perfect semantics. On the other hand, *tuai* is clearly closely associated with *kua*. The distribution of *tuai* and *kua* is reminiscent of negation in Standard French, where two negative markers flank the verb.

According to one classic analysis of French *ne* and *pas* (Pollock 1989), *ne* alternates with a

null head in Neg⁰, 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 postverbal.

Adopting a similar analysis for the disjoint particles associated with the Niuean perfect makes it possible to capture the surface position of *tuai* while allowing both perfect markers to be generated in a single projection. The adaptation of the *ne...pas* analysis for *kua...tuai* is shown in (35).

(35) **Kua** tele oti **tuai** e   lautolu a   au.
    PFV kick all TUAI ERG 3PL   ABS 1SG
    'They've all kicked me.' (Seiter 1980: 66).
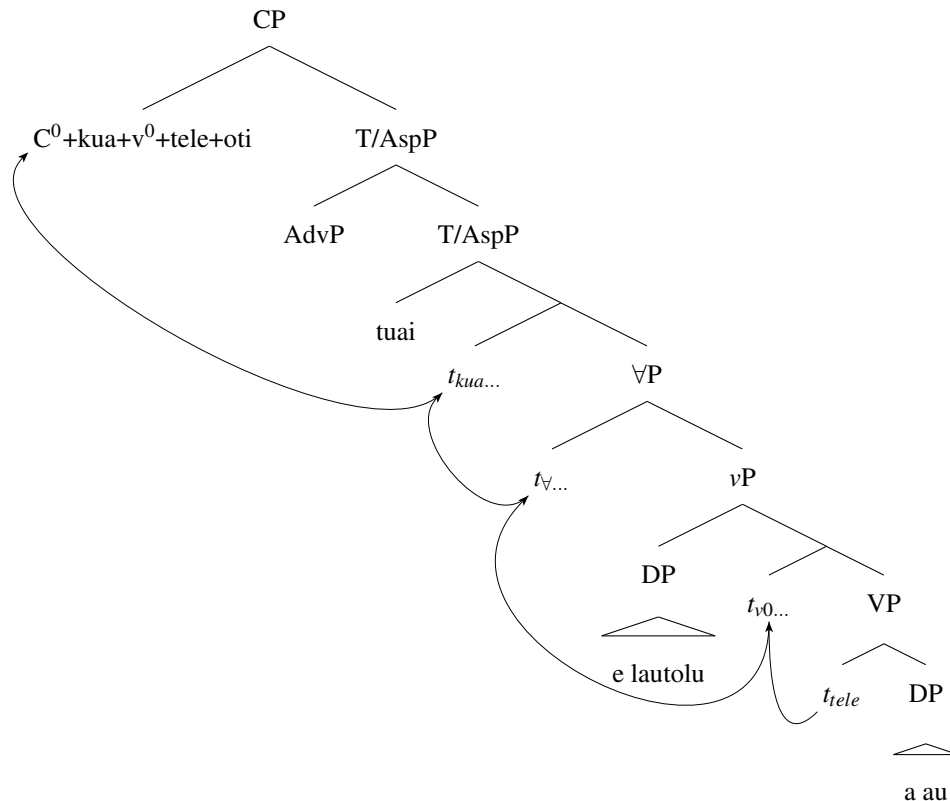
Surface order: Verb—APPL—∀—PFV

Scope order: PFV > ∀ > APPL > Verb

In (35), *tele* 'kick,' *oti* 'all,' and *tuai* are generated in an order that reflects their hierarchical

positions. Their linear order is the result of movement above the position of *tuai*. The structure above also includes a place for adjoining aspectual/temporal adverbs. These items include *agaia* 'still,' *agataha* 'immediately,' and *tūmau* 'always.' As with *tuai*, the order of these adverbs can be explained by movement of the complex head into a position higher than the site of adverbial adjunction. Note that these adverbs obligatorily precede *tuai* (36), so they are adjoined higher.

(36)   a.   Kua fano tumau   tuai a   Tom ki Hawaii.
                PFV go   regularly TUAI ABS Tom GL Hawaii
                'Tom has been to Hawaii a lot.' (Matthewson et al. 2015)[15]

        b.   *Kua fano tuai   tumau   a   Tom ki Hawaii.
                PFV go   TUAI regularly ABS Tom GL Hawaii
                Intended: 'Tom has been to Hawaii a lot.'

In (35), the verb is shown to be as high C^0. Certain elements can intervene between the verb and the left edge of the clause, e.g. speaker oriented adverbs and focused constituents. These elements are presumably still higher than C^0, e.g. adjoined to CP.

3.4 Interim Discussion

This section has demonstrated that it is possible to achieve inverse scope via X^0-raising. In addition, the X^0-raising account developed here allows different postverbal particles to be generated in structural positions that fit squarely with their compositional semantics (viz. argument modifiers, event modifiers, temporal modifiers, etc.). In contrast, generating the applicative *aki* and the quantifier *oti* in positions where they can c-command the DPs they modify introduces the need to evacuate additional arguments on a roll-up movement account. Second, the final landing site for the raised remnant-XP is below the *pre*verbal tense/aspect particles on an XP-raising account, which necessarily precludes *post*verbal aspectual particles and adverbials from being generated in projections associated with tense and aspect (see discussion in Massam 2001, 2009b, 2010 and Clemens 2014a)

By way of transition to the syntax-prosody component of the proposal, I will briefly discuss

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[15]In the original, *tuai* is written as *tei*, which reflects dialectal variation.

the relationship between syntactic and prosodic words, because the X^0-raising analysis presented in this section results in highly complex syntactic words. One line of thought maintains that a complex X^0 is so reliably produced as a single prosodic-ω, that this type of prosodic constituency can be used as a litmus test for X^0-raising (see Collins 2016 for a recent example). In contrast, I take the perspective that a one-to-one mapping of X^0 to prosodic-ω, as in (37-a) is common, but that one-to-many and many-to-one mappings also occur, as in (37-b) and (37-c):

(37)   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 (37-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 is flattened, so that a complex X^0 might correspond to a single prosodic-ω. Clemens (2014a: 114-116) demonstrates that the Niuean tense marker, e.g. *kua* and the verb are realized as a single prosodic-ω for the relatively simple constructions discussed in that study.

However, in this section, I advocated 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 (37-b). When complex X^0s map onto more than one prosodic-ω, a maximal size restriction on prosodic-ωs likely prevents 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 (de Lacy 2002, 2008; Ketner 2006; Itô and Mester 2007).

4.   The Syntax-Prosody Interface

The previous section straightforwardly accounted for Niuean's basic VSO order via X^0-raising. Section 5 presents an account of the VOS order of PNI structures based on a high-ranking prosodic

constraint requiring heads and c-selected arguments to be realized in a single φ-phrase. Before turning to the specifics of the prosodic proposal, I will discuss key features of the syntax-prosody interface that allow me to bridge the syntactic and prosodic accounts:

(38)   Key components of the prosodic analysis of PNI

    a.   Match Theory

    b.   Connecting argument structure to prosodic constituency

    c.   C-selection as feature sharing

    d.   Multiple Spell-Out

4.1   Match Theory

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 Theory posits a series of input-output correspondence constraints (McCarthy and Prince 1995) that call for isomorphism between syntactic and prosodic constituents:

(39)   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)

Where α in (39) is a syntactic head (X^0), π is a prosodic word (prosodic-ω); where α is a syntactic phrase (XP), π is a phonological phrase (φ-phrase); and where α is a clause with illocutionary force (TP/CP), π is an intonational phrase (ι-phrase).

Although Match Constraints call for isomorphism between syntactic and prosodic structure, in practice, 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 faithfulness constraints.

Match Theory preserves the long-standing tradition that prosodic constituents are hierarchically organized (Selkirk 1978, 1986; Nespor and Vogel 1986; Inkelas and Zec 1990; among others); however, because there is a many-to-one correspondence between syntactic and prosodic constituents, e.g. VP $\rightarrow$ φ-phrase; vP $\rightarrow$ φ-phrase; AspP $\rightarrow$ φ-phrase, and because syntactic structure is recursive, Match Theory necessarily breaks with the traditional analysis of prosodic structure as non-recursive (Selkirk 1981, 1984; Nespor and Vogel 1986; Pierrehumbert and Beckman 1988; Inkelas and Zec 1990; Vogel 2009; among others). This departure represents a positive development for prosodic theory; recent evidence strongly indicates the existence of recursive prosodic structure (e.g. Wagner 2005, et seq.; Krivokapić 2007; Ladd 2008; Féry and Schubö 2010; Itô and Mester 2007, 2010, 2013; Selkirk 2011).

4.2   Argument Structure and Prosodic Constituency

ARGUMENT-φ (1), repeated in (40) and discusssed at length in §5, represents a new instantiation and application of an idea that has existed in the literature for some time.

(40)   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.

Selkirk (1984) argues 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 her proposal to be involved in linearization.

Although the *Sense Unit Condition* has fallen out of favor (for reasons discussed in 4.3), proposals that share Selkirk's basic insight continue to surface in the literature, which suggests that the basic intuition remains sound and that the problematic aspects of formalizing the theory are worth solving. Related proposals include Gussenhoven's (1983, 1992, 1999) Sentence Accent Assignment Rule (SAAR), which also assigns prosodic structure based on argument structure. According to SAAR, all focused constituents carry an accent except for focused verbs that are adjacent to their arguments, which are deaccented and phrased with the object they select.

Truckenbrodt's (1999, 2007) well-known WRAP-XP constraint – "for each XP, there must be a single φ-phrase that contains it" is most famously used to account for verbs that are 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 proposals, a theory that makes the correct predictions for i) lexical and functional heads and their arguments as well as ii) focused and unfocused heads and their arguments would represent a significant advancement. ARGUMENT-φ aims to accomplish this task.

A final member of this class of contraints is *Selectional Contiguity* (Richards 2016), which states that pairs of heads in a selection relation must be contiguous. Richards' understanding of *Selectional Contiguity* 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, even when those two elements are nonadjacent at some point in the derivation. One difference between *Selectional Contiguity* and ARGUMENT-φ is that the former diverges from the view that the syntactic component of the grammar does not access phonological information.

4.3 *C-selection as Feature Sharing*

Recall that the proposal to be developed in §5 is based on Selkirk's (1984) *Sense Unit Condition*. Her proposal states that prosodic phrases are comprised of "Sense Units," which are 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) C1 modifies C2 or (b) C1 is an argument of C2.

One concern 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.

Steedman (1991) offers a solution to this problem. He argues that the prosodic grammar need not have access to the 'semantic connection' between, e.g. a verb and its direct object, because it is possible to account for both the attested and unattested patterns in prosodic phrasing while only allowing the prosodic component of the grammar access to the information available from surface constituency. In fact, on Steedman's theory, the prosodic component of the grammar can *only* access linear, i.e. non-hierarchical, information about the syntax. For that reason, a prosodic account of PNI based on a syntax in which the verb has undergone X^0-raising to a position that is nonadjacent to its complement (see §3) would be incompatible with Steedman's theory of PF.

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 *categorical* features, are accessible to prosodic structure as it is being constructed. Granting the prosodic grammar access to lexical class information does not entail the existence of lexical class-based prosodic constraints.[16] 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).

Here, I adopt the position that c-selection shares its implementation mechanism with feature valuation more generally (see Svenonius 1994 and sources cited therein; 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. In other words, it becomes possible to capture the essence of Selkirk's proposal in the context of a grammatical model where LF and PF do not interact.

Turning to the specifics of c-selection as feature sharing, Pesetsky and Torrego (2007) propose a modification to Chomsky's (2000, 2001) definition of AGREE, which is given in (41).

(41)   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. Here, the

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

important difference between Pesetsky and Torrego's (2007) definition of AGREE and Chomsky's (2000, 2001) version is that Pesetsky and Torrego's AGREE establishes a lasting link between the probe and the goal. I differ from Pesetsky and Torrego in adopting the more general definition of 'probe' 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.

Under an analysis that subsumes c-selection under feature-checking (e.g. Chomsky 1965; Emonds 2000; Adger and Svenonius 2011; among others), the selecting head enters the derivation with a feature that needs to be checked with a c-selected categorial feature. Following Pesetsky and Torrego's AGREE, after the verb merges with a head bearing the relevant categorial feature and AGREE takes place, the two heads share the categorial feature between them, as indicated by the broken line linking the [N]-feature to the verb and the NP in (42).

(42)   Feature sharing and c-selection

                        VP
                       ⌒
                  Verb   NP

                       [N]
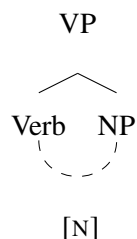
If the verb in (42) then undergoes head movement to a position higher in the clause, the feature [N] will be shared by heads in two non-adjacent positions (43):

(43)   Feature sharing and V^0-raising
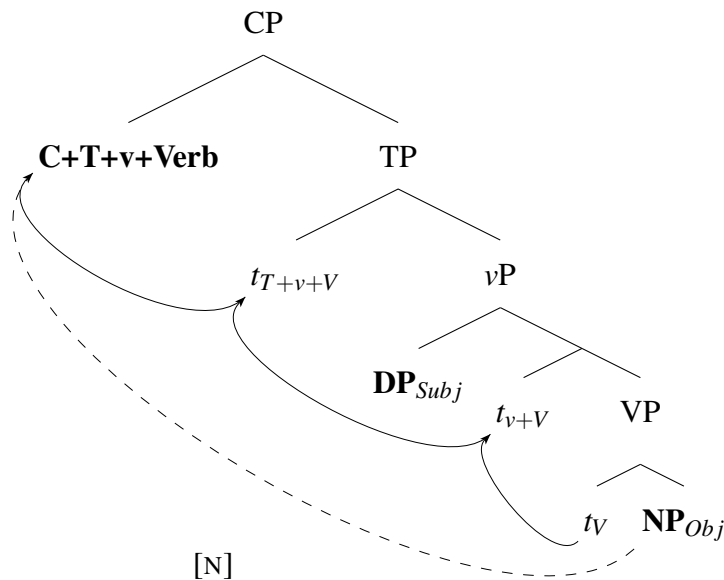
The version of c-selection and AGREE outlined in this section shape the final form of ARGU-MENT-φ presented in 5.

4.4 *Multiple Spell-Out*

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; among others).

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 Mul-

tiple 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.[17] For example, 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.

On one hand, Multiple Spell-Out and Phase Theory have informed important work in nearly every module of the grammar. On the other hand, the nature of phases and the timing of spell-out are notorious for being poorly defined. In what follows, I make my assumptions explicit.[18] I adopt the position that D^0 and P^0—in addition to C^0 and v^0—are phase heads (Chomsky 2001; Dobashi 2003; Svenonius 2004; Hiraiwa 2005); as will become clear, the prosodic analysis depends on the fact that phasal and non-phasal XPs, e.g. NP and DP objects, differ in the timing of Spell-Out.[19] Next, I adopt the view that an entire phase–not just the complement of the phase head–spells out when its trigger is merged. For more on the consequences of this implementation, see Svenonius 2004 and Ott 2011. Finally, I adopt Chomsky's revised PIC, in which the spell-out domain is transferred when the next c-commanding phase head is introduced:

(44)   The Phase Impenetrability Condition (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.

The revised version of the PIC, which differs from the original with respect to what triggers the transfer of a spell-out domain to the interfaces, was proposed in part to account for the possibility

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[17]Examples of prosodic work that makes use of Phase theory include Kahnemuyipour 2003, Kratzer and Selkirk 2007, and Ishihara 2007.

[18]See Ott 2012 and the papers in Gallego 2012 for a broad perspective on the research seeking to define the constraints of phase-based syntax more precisely.

[19]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)

of raising out of an infinitive. It also ensures that phase theory is compatible with head movement, at least when it occurs cyclically. 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.

4.5   *Interim Summary*

In §4.3, I defended the position that at least certain syntactic features, such as those pertaining to lexical class, are visible to PF at the point when prosodic structure is first assigned. This position is essential to the prosodic account of Niuean PNI (see §5), because it allows PF to identify a head-argument relationship between two non-adjacent syntactic constituents based on lexical features. However, all syntactic features, including those pertaining to lexical class, are invisible to subsequent Spell-Out cycles once prosodic structure has been assigned. Subsequently, if two instances of a single lexical feature—such as the one shared between a complement-head pair—are spelled-out in separate domains, any prosodic constraint that might have made reference to the relevant shared feature would be rendered inactive.

In more general terms, the prediction of this proposal is that prosodic constraints that rely on syntactic features (lexical or otherwise) should only affect prosodic structure assignment at the point in the derivation where the spell-out domain containing the relevant feature is first assigned prosodic structure. Spelled-out portions of the derivation might still be affected by prosodic restructuring, e.g. when prosodic restructuring is driven by eurythmic constraints, which make reference to prosodic (as opposed to syntactic) categories. Finally, the present proposal has no bearing on the syntactic movement of DPs; which are as free as ever to move through phase edges. As such, the present proposal is compatible with both movement and base-generation accounts of object raising, object constituent questions, and object focus fronting.

5.   **A Prosodic Approach to PNI**

The prosodic approach to PNI is based on ARGUMENT-φ, initially formulated as in (45):

(45)   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.

Treating c-selection as feature sharing (see §4.3) makes it possible to revise the definition of (45) in such a way as to allow the prosodic component of the grammar to make reference to head-argument pairs, even when the selecting head has moved out of the position in which it selected its internal arguments. The final version of the constraint is given in (46).

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

The purpose of this section is to demonstrate how prosodic structure is assigned to transitive clauses with NP as compared to DP objects, i.e. PNI and VSO clauses, respectively. In what follows, the process of prosodic structure assignment is modeled in Optimality Theory (Prince and Smolensky 1993/2004). The input to the prosodic component of the grammar is represented as a bracketed syntactic structure, which has been simplified considerably. The term 'verb' is shorthand for the complex predicate head formed via X^0-raising (see Section 3). Terminal nodes without phonologically overt material are not included. Projections that would result in redundant recursive structure are also not shown (see discussion in Elfner 2012, Bellik & Kalivoda 2016, and sources cited therein). All else being equal, a sentence with the structure of (43) would be assigned the prosodic structure given in (47).

(47)   Prosodic structure of (43)
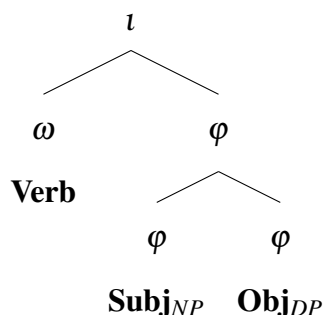
5.1   ARGUMENT-φ *in PNI Contexts*

The candidates in (48) represents three ways the VSO input might be linearized and assigned prosodic structure. The prosodic structure of candidate (a) is the most faithful to the syntactic input, but it does not obey ARGUMENT-φ, because the verb and the object, which share a single instance of the categorial feature [N] (shown in both locations), are not phrased in a single φ-phrase. In contrast, both candidate (b) and (c) satisfy ARGUMENT-φ.

(48)

Input: [$_{CP}$ Verb$_N$ [$_{vP}$ [$_{DP}$ Subject] [$_{NP}$ Object$_N$]]]]	ARG-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	

ARGUMENT-φ is clearly not the only constraint at play in determining output structure; there must also 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).

Match Constraints (Selkirk 2011) are incorporated into the analysis (see §4.1), in order to capture the fact that it is the object, not the subject, that undergoes prosodic restructuring, resulting in VOS as opposed to SVO. One or more syntax-prosody (input-output) and prosody-syntax (output-input) correspondence constraint penalizes instances of syntax-prosody nonisomorphism, e.g. the type of prosodic restructuring shown in candidates (b) and (c).[20]

The first pair of input-output MATCH constraints to consider in accounting for Niuean PNI is MATCH (XP, φ) and MATCH (φ, XP).

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

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[20]Previous work on the topic of prosodic restructuring posits distinct constraints penalizing syntax-prosody non-isomorphism, e.g. LINEAR CORRESPONDENCE (Elfner 2012) and NO SHIFT (Bennett et al. 2016). In the context of Match Theory, however, these specialized constraints are somewhat redundant: whenever prosodic restructuring occurs above the level of the word, at least one member of the family of MATCH constraints is necessarily violated.

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 (50) introduces these constraints into the analysis. Candidates (b) and (c) each incur one violation of MATCH (φ, XP), because the φ-phrase comprised of the verb and the object does not correspond to a syntactic XP in the input.[21] Candidates (b) and (c) also incur one violation of MATCH (XP, φ), because for both of these candidates, the object XP in the input does not correspond to a φ-phrase in the output. Below, I will introduce an argument to support the ranking of MATCH (φ, XP) above MATCH (XP, φ). For now, note that both MATCH (XP, φ) and MATCH (φ, XP) must be ranked below ARGUMENT-φ for prosodic restructuring to occur.

(50)

Input: $[_{CP} \text{Verb}_N [_{vP} [_{DP} \text{Subject}] [_{NP} \text{Object}_N]]]]$	ARG-φ	MATCH (φ, XP)	MATCH (XP, φ)
a. $(\text{Verb}_N ((\text{Subject})\varphi(\text{Object}_N))\varphi)\iota$	*!		
b. ☞ $((\text{Verb}_N \text{ Object}_N)\varphi(\text{Subject})\varphi)\iota$		*	*
c. ☞ $((\text{Subject})\varphi(\text{Verb}_N \text{ Object}_N)\varphi)\iota$		*	*

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.[22] 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)

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[21]Recall from §3 that in VSO clauses, the verb and object originate in VP, but the verb ultimately moves to CP, while the object remains in VP. In other words, the syntactic input to the prosodic component of the grammar does not include a VP constituent comprised of the verb and the object.

[22]Recall that 'Verb' in these tableaux refers to a complex head located in C^0, so this is not to say that the verb is the locus of illocutionary force, but rather the verb has moved into the locus of illocutionary force

from candidate (c):

(51)   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.

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. 2012). Therefore, it is not unexpected that syntax-prosody isomorphism would be preferentially protected at the clause-initial boundary, as I posit here.

Tying together the discussion of MATCH-$\iota_{INITIAL}$, all else being equal, CPs and ι-phrases correspond. In Niuean, the lexical verb undergoes successive cyclic head-raising all the way to C^0 (see §3 and the simplified tree in (43)). In candidate (b), the complex verb in C^0 is located in a position corresponding to the initial edge of the ι-phrase. If instead the verb were realized in a phrase-medial position, as in (c), the candidate would incur a violation of MATCH-ι_I, because the verb, moved to the CP in the syntax, does not correspond to the initial edge of ι-phrase.[23]

(52)

Input: [$_{CP}$ Verb$_N$ [$_{vP}$ [$_{DP}$ Subject] [$_{NP}$ 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		*!	*	*

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.

The next question to answer is why the phrasing shown in (53-a) is preferred over other pos-

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[23]Here, a nondirectional 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)).

sibilities that satisfy both ARGUMENT-φ and MATCH-ι_I. For example, in (53-b), the object is pronounced in a nested φ-phrase, while in (53-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.

(53)   a.   Attested phrasing:

           ((Verb Object)φ(Subject)φ)ι

       b.   Nested object:

           ((Verb (Object)φ)φ(Subject)φ)ι

       c.   Nested verb and object:

           (((Verb)φ (Object)φ)φ(Subject)φ)ι

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 attested (a) candidate.

(54)

| Input: [$_{CP}$ Verb$_N$ [$_{vP}$ [$_{DP}$ Subject] [$_{NP}$ Object$_N$]]]	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			**!	

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 the attested candidate (a) satisfies the constraint STRONG START (Selkirk 2011), which is defined in (55).

(55)   STRONG START: assign one violation mark for every prosodic constituent whose left-most daughter constituent is lower in the Prosodic Hierarchy than its sister constituent immediately to its right: *$(\kappa_n \ \kappa_{n+1} \ ...$ (Elfner 2012: 157)[24]

Candidate (b) violates STRONG START because it begins with a prosodic constituent, a prosodic-ω, that is lower on the prosodic hierarchy than the following constituent, a φ-phrase. The prosodic structure of candidate (b) is schematized in a (56).

(56)   Prosodic structure of candidate (b) from (54)

φ-phrase violating
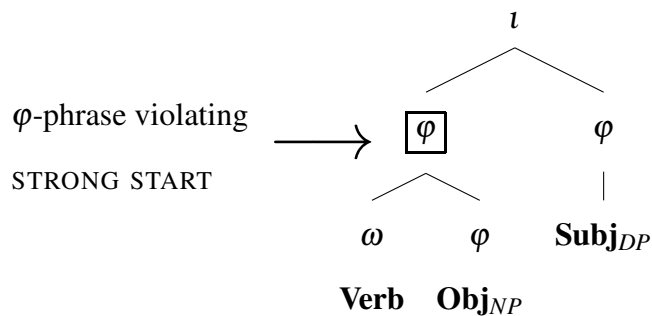
STRONG START $\longrightarrow$

In contrast, the prosodic structure of Candidate (a) satisfies STRONG START (57). The difference between (56) and (57) is that the object in (57) is realized as a prosodic-ω, which is equal on the Prosodic Hierarchy to its sister constituent.

(57)   Prosodic structure of candidate (c) from (54)

STRONG START

now satisfied $\longrightarrow$

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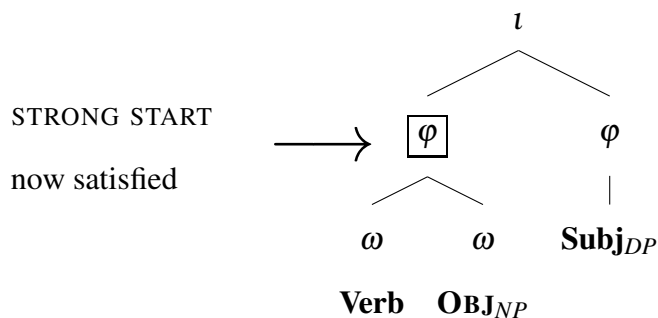
[24]Elfner (2012) proposes a slightly different version of STRONG START that is interchangeable with Selkirk's (2011) configuration for the purposes of this analysis (cf. Bennett et al. 2016 and Harizanov 2013).

Independent evidence supporting the high ranking of STRONG START in Niuean comes from the prosodic phrasing of the verb in VSO examples, which will be addressed in §5.2. In the tableau in (58), high-ranking STRONG START rules out the most isomorphic candidate under consideration, candidate (b), in which the object XP is contained within a nested φ-phrase.

(58)

Input: $[_{CP}$ Verb $[_{vP}$ $[_{DP}$ Subject] $[_{NP}$ 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		**!	

Also note that the tableau in (58) 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.[25]

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. In other words, ARGUMENT-φ determines the linear order of the PNI clause. I have also appealed to MATCH constraints and STRONG START (Selkirk 2011) to account for other aspects of the prosodic structure assigned to PNI clauses once ARGUMENT-φ is satisfied.

5.2   ARGUMENT-φ *in VSO Contexts*

One problem remains: based on the account presented thus far, we expect ARGUMENT-φ to trigger PNI between a verb and any internal argument. The account as it has been presented thus far cannot capture the fact that PNI only occurs with internal arguments of the category NP, but not DP or CP. The tableau in (59) presents an example with a DP object to illustrate the problem.

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[25]An anonymous reviewer suggests that the alternative constraint ranking, MATCH (XP, φ) > MATCH (φ, XP), might arise in the context of slow speech, in which each word is likely realized as a unique prosodic phrase. More broadly, it is worth considering whether the relative ranking of input-output MATCH constraints might be connected to particular stylistic choices, such as this.

(59)

Input: [CP VerbD [vP [DP Subject] [DP Object]]]	STR START	ARG-φ	MATCH (φ, XP)	MATCH (XP, φ)
a. (VerbD ((Subject)φ(ObjectD))φ)ɩ	*!			
b. ☺ ((VerbD)φ ((Subject)φ(ObjectD))φ)ɩ		*!	*	
c. ☞ ((VerbD ObjectD)φ(Subject)φ)ɩ			*	*

The tableau in (59) is similar to the previous tableaux with the exception that the categorial feature of the internal argument is [D] as opposed to [N]. However, it incorrectly predicts that the VOS order of PNI clauses should also arise when the object is a DP, despite the fact that PNI clauses never occur with DP arguments. The attested contrast between the linearization of DP as compared to NP arguments arises naturally from an analysis based on Multiple Spell-Out, assuming the following (see §4.4):

(60)   Multiple Spell-Out

   a. D^0, P^0, v^0, and C^0 are phase heads (Chomsky 2001; Hiraiwa 2005; a.o.)

   b.   The entire phase spells out when the trigger is merged (Svenonius 2004; a.o.)

   c.   The spell-out domain is transferred to the interfaces when the next phase head is introduced (Chomsky 2001; a.o.)

The spell-out of a DP argument is triggered by the introduction of the phase head v^0, while the spell-out of an NP argument is not triggered until C^0 enters the derivation. The difference in spell-out timing for NP and DPs is schematized in (61) and (62). Spelled-out material is represented with the empty set symbol, and phases are shown in bold

(61)   Spell-out timing for NP complement

    a.   [$_{VP}$ V [$_{NP}$ N]]

    b.   [$_{vP}$ v[$_{VP}$ V [$_{NP}$ N]]]

    c.   [$_{CP}$ C [$_{TP}$ T [∅]]]]]]

(62)   Spell-out timing for DP complement

    a.   [$_{VP}$ V [$_{DP}$ D [$_{NP}$ N]]]

    b.   [$_{vP}$ v [$_{VP}$ V [∅]]]

    c.   [$_{CP}$ C [$_{TP}$ T [∅]]]]]]

The mock derivations shown above differ crucially at step (b), where the internal argument is spelled out in (62) but not in (61). Consequently, the verb and its argument are not visible during the same PF cycle in (62), rendering ARGUMENT-φ inactive. This is shown in (63), a version of (59), in which material that has already been assigned prosodic structure is crossed out.

(63)

Input: [$_{CP}$ Verb$_D$ [$_{vP}$ [$_{DP}$ Subject] [$_{DP}$ Object]]]	STR START	ARG-φ	MATCH (φ, XP)	MATCH (XP, φ)
a. (Verb$_D$ ((~~Subject~~)φ(~~Object$_D$~~))φ)ι	*!			
b. ☞ ((Verb$_D$)φ ((~~Subject~~)φ(~~Object$_D$~~))φ)ι			*	
c. ((Verb$_D$ ~~Object$_D$~~)φ(Subject)φ)ι			*	*!

In cases, where the internal argument is a DP (or PP, CP, etc.) lexical features that would have been relevant to the evaluation of ARGUMENT-φ are invisible to PF and are subsequently not taken into consideration when prosodic structure is assigned. As such a more isomorphic output is the winning candidate. However, note that *most* isomorphic candidate is not chosen; but rather the one that obeys STRONG START, which is compatible with the acoustic data discussed in §2.2.

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 necessary to account for certain cases where syntactic structure and prosodic structure do not correspond. I have 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 prosodic aspects of the proposal are presented in an OT framework, because OT offers a way to evaluate prosodic structure in comparison to the underlying syntax. Constraint rankings in an OT analyses predict alternative grammars, which is a topic this paper leaves largely unaddressed. The strongest statement of the implications of the proposal–combining X^0-raising in the syntax and the prosodic well-formedness constraint ARGUMENT-φ–is to say that for languages with both VSO and VOS word orders, VSO is derived in the syntax and VOS arises for prosodic reasons. Clemens and Coon (2018) discuss the word order typology predicted by this analysis at length in the context of the Mayan language family (See §6 in particular). I leave to future work the consideration of other Polynesian languages and the implications of the analysis for non-V1 languages, and argument-initial word orders in V1 languages.

The main components of the analysis presented here fit together as follows. In order to satisfy ARGUMENT-φ, 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. By the time the verb spells out, the DP object has already received prosodic structure, so 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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