"Outside-in" dependencies in Nuu-chah-nulth affixation

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This paper addresses the linearization of affixes. The empirical focus of the study is Nuu-chah-nulth (nuučaan̓uł), a Southern Wakashan language. Affixal predicates in Nuu-chah-nulth exhibit a suffixation pattern reminiscent of the “affix-hopping” behaviours in Indo-European (cf. Nakayama 1998). I propose that affixal predicates “incorporate” a host from their complement, a morphological arrangement which I liken to an “outside-in” dependency.

1 Introduction

This paper proposes a new view of the means by which affixes in natural language come to be linearized. Affixal elements, whether prefixal or suffixal, share the property of requiring a morphological “host” with which they may form a word. An affix is not permitted to stand on its own. For example, the English morpheme un- must occur as an affix (specifically, a prefix), and not as an independent word.

(1) a. I am unhurried. cf. I am not rushed.
b. * I am un. cf. I am not.

It is often said that morphology governs affixation, as it imposes restrictions on the internal composition of words. It is this aspect of the grammar which distinguishes between “bound” morphemes (such as un-), which form subparts of words, and “free” morphemes (such as not), which are permitted as independent words. The system of syntax, on the other hand, can be understood to be the means by which words are grouped together to form larger phrases.

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This paper presents an argument that syntax plays a determining role in the combinatory properties not only of words, but of affixes. According to the analysis, affixes have a syntax. I propose that the syntactic frame of a morpheme restricts the available patterns of affixation. Under this view, affixes are subject to the same sorts of structural relationships in the syntax as are non-affixes. However, morphemes with affixal status introduce a tension to the computational system in a way in which non-affixal elements do not. What this study undertakes is an examination of the way that this morphological “neediness” of affixes is resolved by the grammar.

The language of investigation for this study is Nuu-chah-nulth (Nootka), a member of the Wakashan family spoken on Vancouver Island, British Columbia. Nuu-chah-nulth has a class of typologically rare affixal predicates which participate in a suffixation strategy equivalent to noun incorporation (Wojdak 2003, 2004; see also Nakayama 1997, 1998; Woo 2000; Davis and Sawai 2001; Yiu 2001; Stonham 2004). In the following example, the affixal predicate –caas “bet” attaches to (or “incorporates”) the nominal ki~uuk “dishes”. The affixal predicate is indicated by highlighting.

(2)  
ki~uuk-caasmit-niš?-aaletal
hulu?ak-?uyiidee

dishes-bet-PST-1PL.IND-HABearly-ago

We always used to bet dishes long ago.

The incorporation pattern of Nuu-chah-nulth is linked to the affixal status of the predicate. Affixal predicates are obligatorily morphologically-bound, and may never occur independently. This is illustrated by the example in (3), which shows that it is impossible for the affixal predicate –caas “bet” to appear without a suitable morphological host.

(3)  
*caasmit-niš?-aaletal
ki~uukhulu?ak-?uyiidee

caanbet-PST-1PL.IND-HABdishesearly-ago

We always used to bet dishes long ago.

This paper develops the argument that incorporation in Nuu-chah-nulth occurs because of the need to linearize the affixal predicate with respect to its morphological host.

The remainder of this paper is organized into five parts. In §2, I present an overview of the Minimalist framework which is employed for the analysis of affixal predicates. The theoretical back-drop is further developed in §3, in which the linearization of syntactic constructs is discussed. This leads to a central claim of this paper: that incorporation in Nuu-chah-nulth is a reflex of the linearization of affixes. In §4, an analysis is presented of the Nuu-chah-nulth suffixation pattern which I label PF Incorporation. This is followed in §5 by discussion of the “outside-in” pattern of Nuu-chah-nulth affixation. Finally, §6 presents concluding comments.
This section lays out the Minimalist theoretical framework which this paper adopts. Following Chomsky (1995, 2001), I pursue a strongly derivational approach to syntactic structure.

2.1 Interface requirements

The grammar is charged with the task of delivering linguistic expressions which are serviceable to two external systems: the system of thought, and the sensorimotor system (Chomsky 1995, 2000). The grammar thereby allows spoken languages to map an abstract form to meaning and to sound. According to the Minimalist approach, a linguistic expression exiting the generative system is viable only if it meets the interface requirements imposed by these external levels. In Chomsky's terminology, linguistic expressions must be "legible" to each interface level, Logical Form (LF) and Phonetic Form (PF).

(4) The model of grammar

```
Lexicon
       ^--- spell-out
       |     |     |
       LF   PF
       meaning sound
```

In this system, the lexicon acts as the source of the elements which enter the computation. The lexicon codes the semantic and phonological properties which are specific to each lexical item. Lexical items enter the computation from the lexical array known as the numeration.

Syntactic structures are composed using the lexical building blocks provided by the numeration, and are interpreted at the LF and PF interfaces at the point of "spell-out". With the exception of the interfaces at LF and PF, no other levels exist in the Minimalist grammar. Representational levels such as "deep structure" and "surface structure", which existed in earlier principles-and-parameters models, are abandoned in favour of a more barebones model which contains only the conceptually necessary meaning/sound interfaces. This move away from representational levels corresponds to the minimalist ideal of simplifying the mechanisms of the grammar. Derivational filters and constraints are abandoned, in favour of the restriction that conditions on representations "hold only at the interface, and are motivated by the properties of the interface" (Chomsky 1995: 171). These interface requirements are known as bare output conditions. External to the syntax, these interpretative conditions mandate the
requirements of the conceptual and sensorimotor systems, and ensure that the requirements of lexical items are met over the course of the derivation.

2.2 “Bottom-to-top” syntactic derivation

This paper adopts from Chomsky (1995, 2001) the notion that syntactic derivations are built up from “bottom-to-top”, through successive applications of two concatenative operations: Merge and Move. Merge operates on elements selected from the numeration, and conjoins pairs of items in a binary fashion:

(5) Merge: concatenate \( \alpha \) with \( \beta \), forming \( \gamma \)

If \( X \) and \( Y \) are merged, the category label of one of these conjoined elements is projected.

(6) \( \text{Merge} (X, Y) \)

\[
\begin{array}{c}
\text{XP} \\
\text{X} \quad \text{Y}
\end{array}
\]

Merge applies iteratively, building a syntactic structure by pairing the output of a prior instance of Merge with a lexical item freshly introduced from the numeration. In the following representation, \( Z \) is added to the structure of (6) via an additional application of Merge.

(7) \( \text{Merge} (Z, \text{XP}) \)

\[
\begin{array}{c}
\text{ZP} \\
\text{Z} \quad \text{XP} \\
\text{X} \quad \text{Y}
\end{array}
\]

All binary merger creates two sisters – a pairing which Epstein et al. (1998) label “derivational sisterhood”. In the trees above, \([X, Y]\) are derivational sisters, as are \([Z, XP]\).

The operation of Move (or “remerge”) parallels Merge in that it also pairs two syntactic categories and projects a single category label (Kitahara 1994, 1995; Epstein et al. 1998). Move differs from pure Merge, however, in that it re-inserts a syntactic category already introduced in the derivation, rather than selecting a new item from the numeration. Like Merge, Move is an instance of binary concatenation. In this paper, I will abstract away from the differences between Move and Merge, and assume simply that Move can be captured by a restatement of the simple Move operation, such as in (8).
By reducing all operations of the syntax to operations of binary concatenation, non-branching nodes are eliminated from the syntax. That is, there will be no instances in which an element does not have a derivational sister (Epstein et al. 1998).

2.3 Syntax “all the way down”

Following Halle and Marantz (1993) and other work in the Distributed Morphology framework, I assume that word formation parallels sentence formation in that both occur outside of the lexicon. There is no independent module for word-forming operations: “morphology” is a cover term for syntactic or postsyntactic processes. That is, concatenation of morphemes may apply through syntactic processes of head movement, or it may be conditioned by the post-syntactic interface with PF (Embick and Noyer 2001).

Under this view, a complex morphological string such as Ḗaapinyic?is?a+t “they are eating apples”, as in (9), is composed of distinct syntactic elements.

(9) Ḗaapinyic?is?a+t
    Ḗaapinis-’ic-?is-?a+t
    apple-consume-3.IND-PL
    They are eating apples.

The structure is similar to a sentence in which the individual morphemes are expressed as separate words, as in the English sentence They are eating apples.²

(10) a. b.
    -?at
    -?is
    -’ic
    Ḗaapinis
    -?is(ʔat)
    they are eating apples

In each case, the morphemes occupy syntactic terminals.

3 Linearization

In the theoretical framework I have adopted, there are two sets of requirements which must be met over the course of the derivation by elements entering the syntactic computation. In the bifurcated model of the Minimalist

² The trees in (10) abstract away from several syntactically relevant properties. For one, I assume that Nuu-chah-nulth makes use of a covert pronominal (pro) in cases such as (10a) in which the 3rd person argument is phonologically null. The third person plural ending -ʔis(ʔat) is not to be taken to be equivalent to English “they”.

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grammar, requirements may be necessitated by the interface to LF, or the interface to PF.

With respect to the PF branch, how must elements be arranged so that the sensorimotor systems can make use of them? Crucially, a linguistic expression must be *sequentially ordered* so that it may be represented phono-temporally as a speech string. Linearization is a bare output condition on PF (Chomsky 1995). A linearization scheme is not provided by the inherent mechanics of the syntax. As described in §2.2, syntactic structure-building reduces to two concatenative operations, Merge and Move, which are not inherently oriented for directionality. When Merge unites two elements, α and β, there is no restriction whether α must precede β, or whether α follows β. All that binary concatenation requires is that α combine with β, joining an unordered set of \{α, β\}. Given the unordered nature of binary concatenation, the representations in (11) are therefore to be interpreted as syntactically equivalent.

\begin{align*}
\text{(11)} & \quad \alpha \quad \beta \\
& \quad \gamma
\end{align*}

3.1 Proposal: local spell-out

If one or the other of the nodes \{α, β\} are to be understood to be an affix, then a specific type of linearization requirement is imposed on the orientation of these elements. I hypothesize that this requirement applies at spell-out, the point at which syntactic structures as in (11) take on a phono-temporal realisation. Affixation forces a particular linearization of terminal elements: if an element α is an affix, it must realised as a suffix (-α) or as a prefix (α-). Suffixation occurs when the affix is pronounced to the right of a host with which it forms a word; prefixation takes place when the affix forms a word with a host by attaching to its left. I take the choice of prefixation or suffixation for a given bound element to be spell-out convention, relatable to language- or morpheme-specific considerations. The logical possibilities for linearization of the syntactic terminals in (11) are listed in the following table:

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3 I do not consider "infix" to be a distinct boundedness requirement, as I assume that infixation is reducible to either prefixation or suffixation. In Nuu-chah-nulth, for example, the plural "infix" -t- (eg. *fi-t-niix* "dogs") can be analysed as a suffix which is positioned prosodically following the first syllable of its host (Stonham 1999, Wojdak 2002).

4 This can be considered to be on par with syntactic headedness parameters.
Linearization of bound and free elements

<table>
<thead>
<tr>
<th></th>
<th>α</th>
<th>-α</th>
<th>α-</th>
</tr>
</thead>
<tbody>
<tr>
<td>β</td>
<td>α β</td>
<td>β-α</td>
<td>α-β</td>
</tr>
<tr>
<td>-β</td>
<td>α-β</td>
<td>-α-β</td>
<td>α-β</td>
</tr>
<tr>
<td>β-</td>
<td>β-α</td>
<td>β-α</td>
<td>α-β-</td>
</tr>
</tbody>
</table>

In three cases (shaded in the above table), there is more than one option available for linearization. When neither α nor β is an affix, affixation can not serve as an ordering mechanism. When both α and β are suffixes, their relative orientation is underspecified; the same sort of underspecification applies when both α and β are prefixes. In these cases, one or the other of the affixes does not receive its required type of host. In the case of (-α-β), for example, the element -α is not bound as a suffix. Underspecification in this sense therefore entails that the affixation requirement of the elements is not met: no appropriate host has been provided for the affixes. As such, no morphological dependency obtains.

The remaining, fully specified, orientations of affixes have just two surface realisations: α-β or β-α. Underlying these linearization patterns are six distinct types of morphological dependency:

1. α is free; β is a suffix: α-β
2. α is free; β is a prefix: β-α
3. α is a suffix; β is free: β-α
4. α is a suffix; β is a prefix: β-α
5. α is a prefix; β is free: α-β
6. α is a prefix; β is a suffix: α-β

Thus, although the syntactic device of binary concatenation in itself provides no instructions for linearization, a restricted set of linearizations is enforced when the merged element is an affix. This linearization is, by its very nature, non-syntactic. I refer to the means by which the relative ordering of affixes is fixed as a local spell-out instruction. This mechanism provides instructions for spell-out to PF (and LF) based on strictly minimal domains. This linearization mechanism is defined in the following statement:

Local spell-out instruction: at Merge (α, β), interpret α with respect to β

The “interpretation” of α with respect to β can be denoted by (α ≃ β).

In the PF branch, interpretation necessarily induces linearization. Thus, when the syntactic derivation attains spell-out, the two elements designated in the local spell-out instruction are forced to undergo linearization with respect to
each other. This instruction is "local" in that it is hypothesized to apply at each minimal step of the syntactic derivation, to derivational sisters conjoined by Merge. It is inherently a pairwise function, because each step of the derivation is an operation of binary concatenation. According to the local spell-out instruction hypothesis, spell-out receives instructions on how to resolve affixation requirements each time the syntactic tree is expanded, as indicated in (15). We can take the diagram in (15) to be the output of three successive applications of Merge: the first uniting $\delta$ and $\pi$ ($\text{Merge } \delta, \pi$); the second uniting $\theta$ and $\phi$ ($\text{Merge } \theta, \phi$); the third uniting $\alpha$ and $\beta$ ($\text{Merge } \alpha, \beta$).

(15) Iterative application of local spell-out instructions

\[
\gamma \leftarrow \text{local spell-out instruction } (\alpha \rightsquigarrow \beta) \\
\alpha \quad \beta \leftarrow \text{local spell-out instruction } (\theta \rightsquigarrow \phi) \\
\theta \quad \phi \leftarrow \text{local spell-out instruction } (\delta \rightsquigarrow \pi) \\
\delta \quad \pi
\]

The syntactic derivation is therefore "phonologized" over the course of the syntactic derivation, via addition of instructions for pair-wise interpretations at PF (cf. Epstein et al. 1998). Let us assume that spell-out applies at the root node $\gamma$. At $\gamma$, the instructions are translated to PF by a summation of local spell-out instructions. For the tree in (15), spell-out at $\gamma$ would entail satisfaction of the following instructions:

(16) $(((\delta \rightsquigarrow \pi) \rightsquigarrow \theta) \rightsquigarrow \alpha)$

Note that this formulation has internal structure, denoted by bracketing. The elements ($\delta \rightsquigarrow \pi$) and ($\theta$) are grouped together (at the exclusion of $\alpha$) because of the mid-derivational instruction ($\theta \rightsquigarrow \phi$). The element $\phi$ is equivalent to ($\delta, \pi$).

In the Minimalist framework, the necessity of orienting an affix with respect to a host is a consequence of spell-out to PF. Affixes require linearization so that the arrangement may be phono-temporally ordered. An earlier formulation of this affixation requirement is the Stranded Affix Filter of Lasnik (1981). Although this filter does not make reference to phono-temporal sequencing, it does capture the notion that a derivation is not viable if an affix does not find a morphological host. A mechanical apparatus for affixation is supplied by the Morphological Merger operation of Marantz (1988, 1989; see also Bobaljik 1994), and its more recent incarnates, Lowering and Local dislocation (Embick and Noyer 2001). In each of these variations, an affixation rule forces two elements to "switch places", with a single word resulting.

(17) Morphological Merger: $X \ldots Y \rightarrow [Y+X]$
In the Minimalist program, bare output conditions are adopted in favour of derivational filters such as the Stranded Affix Filter or rules such as Morphological Merger. The local spell-out instruction hypothesis provides a minimalist alternative to these filter- or rule-based mechanisms for affixation.

The local spell-out instruction hypothesis shares certain features with the hypothesis of multiple spell-out. According to the multiple spell-out hypothesis, spell-out applies cyclically in the course of a derivation (Uriagereka 1997, Chomsky 2001) — in contrast to earlier models in which mapping between syntax and phonology takes place at a single point, after the completion of the syntactic derivation. Multiple spell-out entails that phonological operations have access to mid-derivational units formed by syntactic structure-building. This is the aspect that the local spell-out instruction hypothesis shares with the multiple spell-out hypothesis: PF and LF operations are limited by the same derivational mechanisms which constrain the syntax, because mid-derivational constructs created by the syntax are translated simultaneously to the PF and LF components. The local spell-out instruction hypothesis takes this isomorphism one step further by forcing phonological-semantic integrity at each step of the derivation.

Where the local spell-out instruction and multiple spell-out hypotheses differ, however, is the point at which spell-out to the interfaces obtains. In a multiple spell-out system, it is proposed that spell-out occurs at certain designated syntactic nodes, such as CP, vP and possibly DP (Chomsky 2001). In the local spell-out instruction hypothesis, there is no such stipulation. I assume that spell-out occurs at the root node, after completion of the derivation. It is at this root node that the local spell-out instructions are tallied. Thus, while instructions are assessed locally, it is not until completion of the derivation that these instructions are implemented at the interfaces.

Although local spell-out instruction is itself non-syntactic, the notion of derivational sisterhood conditions linearization opportunities at PF via the composition of instruction domains. In the next section, I introduce the empirical grounds on which this hypothesis will be tested.

3.2 Affixal predicates in Nuu-chah-nulth

Affixal predicates in Nuu-chah-nulth participate in two types of morphological dependencies. An affixal predicate (-α) suffixes to a free (β) or bound (-β) host. In either case, the surface realisation is β-α. The place of these Nuu-chah-nulth linearization patterns within the typology of morphological dependencies is indicated (by shading) in (18).
Typology of morphological dependencies

<table>
<thead>
<tr>
<th>boundedness status</th>
<th>linearization</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ( \alpha ) is free; ( \beta ) is a suffix</td>
<td>( \alpha-\beta )</td>
</tr>
<tr>
<td>b. ( \alpha ) is free; ( \beta ) is a prefix</td>
<td>( \beta-\alpha )</td>
</tr>
<tr>
<td>c. ( \alpha ) is a suffix; ( \beta ) is free</td>
<td>( \beta-\alpha )</td>
</tr>
<tr>
<td>d. ( \alpha ) is a suffix; ( \beta ) is a prefix</td>
<td>( \beta-\alpha )</td>
</tr>
<tr>
<td>e. ( \alpha ) is a prefix; ( \beta ) is free</td>
<td>( \alpha-\beta )</td>
</tr>
<tr>
<td>f. ( \alpha ) is a prefix; ( \beta ) is a suffix</td>
<td>( \alpha-\beta )</td>
</tr>
</tbody>
</table>

An illustration of the morphological dependency of (18c) is supplied by the following examples. In (19a), the affixal predicate \(-siik \) “make” suffixes to the host \( \hat{t}uc\hat{\textit{n}} \) “dress”, a free noun. In (19b), the affixal predicate \(-mahsa \) “want to” suffixes to the host \( wa\hat{t}\hat{s}\hat{\textit{k}} \) “go home (PERF)”, a verbal complex which is likewise morphologically independent.

(19) a. \( nupititsa \)
    \( nupit-mit-sa \)
    once-PST-1SG.DEP  dress-\textit{make}
    I made a dress once.

b. \( wa\hat{t}\hat{s}\hat{\textit{k}}-mahsak \)
    \( wa\hat{t}\hat{s}\hat{k}-mahsa-k \)
    go.home-PERF-\textit{want.to}-2SG.Q
    Do you want to go home?

Descriptively, these suffixation patterns may be labelled as “noun incorporation”, and “verb incorporation”, respectively. That is, in one case the affixal predicate suffixes to a noun, while in the other, it suffixes to a verb. However, despite the difference in these descriptive labels, both types of incorporation share an identical morphological dependency: the affixal predicate suffixes to a free host.

In contrast, an example of the dependency of (18d) is given in (20). Here, the affixal predicate \(-'iic \) “consume” suffixes to a bound nominal host, \( suuh \) “spring salmon”.

(20) \( suuw\hat{iic}s\hat{iis} \)
    \( suuh-’iic-siis \)
    salmon-\textit{consume}-1SG.IND
    I’m eating salmon.

This pattern, too, is a type of “noun incorporation”, since the predicate has suffixed to a noun. However, the morphological dependency in (20) is not identical to the “noun incorporation” pattern of (19a). In (20), the nominal is bound; in (19a), it is free.
Bound hosts in Nuu-chah-nulth, as in (20), are limited to the closed-class set of nominals which have been referred to in the Nuu-chah-nulth literature as “non-stem roots” (Rose 1981) or “combining forms” (Davidson 2002). These bound nominals are truncated versions of free-standing nominals in the language, but do not appear to be entirely predictably derivable from them (Rose 1981). For example, the bound nominal suulf- “spring salmon” is a truncated form of the free-standing nominal suulaa “spring salmon”, while the bound nominal čapx- “man” is related to the free form čakup “man”. The bound alternant occurs if and only if it is suffixed to an affixal predicate. However, not all free nominals have a bound allomorph. In fact, for the youngest generation of Nuu-chah-nulth speakers, free nominal allomorphs are often preferred over bound variants. For the remainder of this paper, I set aside the issue of allomorphic alternation of bound and free nominals, and focus instead on the properties of affixal predicates.

Affixal predicates in Nuu-chah-nulth do not show an allomorphic alternation with free predicates. Instead, free predicates constitute a distinct class, morphologically unrelated to affixal predicates.

(21) **Morphological classes of predicates in Nuu-chah-nulth**

I label this class of free elements independent predicates. While affixal predicates require suffixation to a host, independent predicates never occur as suffixes. For example, although an affixal predicate such as -siik “make” incorporates a host (here, tuc?in “dress”), this option is unavailable to a non-affixal predicate such as nīčīk “sew”.

(22)  tuc?insiikitsiś
      tuc?in-siik-mit-siis
      dress-**make**-PST-1SG.IND
      I made a dress.

(23) * tuc?inničīaksitsiś
      tuc?in-hti-čīk-mit-siis
      dress-**sew**-PERF-PST-1SG.IND
      I sewed a dress.

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5 This is testament to the productive nature of Nuu-chah-nulth incorporation.
As indicated by the ungrammaticality of (23), the independent predicate *niči:* “sew” cannot suffix to the host nominal *tučín* “dress”. Instead, the nominal necessarily appears as a word separate from the independent predicate:

\[(24)\]  
\[\begin{array}{ll}
\text{niči:kitsiš} & \text{tučín?akqs} \\
\text{niči:-čik-mit-siis} & \text{tučín-ʔak-qs} \\
\text{sew-PERF-PST-1SG.IND} & \text{dress-POSS-1SG.PS} \\
\text{I sewed my dress.} & \\
\end{array}\]

It would be ungrammatical for an affixal predicate to appear in such an environment.

\[(25)\]  
\[\begin{array}{ll}
\text{siikitsiš} & \text{tučín?akqs} \\
\text{siik-čik-mit-siis} & \text{tučín-ʔak-qs} \\
\text{make-PST-1SG.IND} & \text{dress-POSS-1SG.PS} \\
\text{I sewed my dress.} & \\
\end{array}\]

The example in (25) is ruled out because the affixal predicate –*siik* “make” must always be a suffix.

A parallel distinction must be drawn between the affixal predicate –*maḥsa* “want to” and the independent predicate *šapaak* “willing to”. As noted earlier, the affixal predicate –*maḥsa* “want to” takes a verbal host, in a suffixation pattern I descriptively labelled “verb incorporation”. I repeat here the example in (19b).

\[(26)\]  
\[\begin{array}{ll}
\text{waši:maḥsak} & \\
\text{waši:-maḥsa-k} & \\
\text{go.home-PERF-want.to-2sG.Q} & \\
\text{Do you want to go home?} & \\
\end{array}\]

This example may be contrasted with the one in (27), which shows the independent predicate *šapaak* “willing to”. As an independent predicate, *šapaak* “willing to” is incompatible with being linearized as a suffix. It is ungrammatical for an independent predicate to suffix to a verbal host such as *waši:* “go home”.

\[(27)\]  
\[\begin{array}{ll}
\text{waši:šapaakk} & \\
\text{waši:-šapaak-k} & \\
\text{go.home-PERF-willing-2sG.Q} & \\
\text{Are you willing to go home?} & \\
\end{array}\]

Instead, the verb *waši:* “go home” follows the independent predicate, as a separate word.
Are you willing to go home?

In turn, an affixal predicate is impossible in an environment such as (28), since this would entail that it would not be linearized as a suffix. The ungrammaticality of (29) confirms that the affixal predicate –*mahsa* “want to” must appear as a suffix.

(29) *

Do you want to go home?

I hypothesize that the classes of affixal and independent predicates are lexically differentiated. In particular, I propose that affixal predicates in Nuu-chah-nulth are marked in the lexicon with an [affix] requirement.

(30) [affix]: * [α]w

This lexical specification states that the morpheme (α) requires a morphological host with which it may form a phonological word (ω). This lexical requirement must be met over the course of the derivation. Specifically, since this lexical requirement involves morpho-phonological instructions, this requirement must be met in the PF branch.

To foreshadow the content of the following section, we will see how the affixation requirement of Nuu-chah-nulth is met via spell-out, resulting in a type of incorporation termed PF Incorporation. This incorporation process is sensitive to linear adjacency. That is, an affixal predicate “incorporates” any element which abuts it, showing an insensitivity to syntactic constituency (eg. the Coordinated Structure Constraint), as well as syntactic category. Yet, this strict locality condition will be shown to exist hand-in-hand with a “complement” restriction on incorporation: an affixal predicate only incorporates an element from its syntactic complement, and not from projections which c-command the predicate. I will argue that the local spell-out instruction hypothesis allows an elegant means of reconciling these dual sensitivities to linear adjacency and syntactic configuration.

4 PF Incorporation

This section develops the notion that spell-out induces in Nuu-chah-nulth a particular morphological arrangement which I refer to as PF incorporation. In this linearization, an affixal predicate (–*α*) suffixes to a host (*β(–)*), yielding an ordered morphological dependency of β–α. The affixal predicate “incorporates” its host in order to achieve a pronounceable form, that of a linearized affix. In (31), this pattern is exemplified by the string *kwaqqaqaaqa*
“busy with spawned herring eggs”, which is comprised of the affixal predicate
-caaqa “busy with” and its nominal host kʷaq “spawned herring eggs”.

(31) kʷaaqcaaqaʔis ʔaaʔuusʔath
kʷaq-caaqa[+L]-ʔiʔis ʔaaʔuusʔath
s.h.eggs-busy.with-3.IND place.name-from
The Ahousahts are busy with spawned herring eggs.

According to my analysis, the string kʷaaqcaaqa emerges as a reflex of the need
to linearize the affixal predicate -caaqa “busy with”. The host chosen for the
affix is its derivational sister, the nominal kʷaq “spawned herring eggs”.

(32) -caaqa kʷaq
“busy with” “s.h.eggs”

The resulting dependency is a case of PF Incorporation.

The term “incorporation” has a lengthy history in Amerindian
linguistics. In the context of what has been referred to as “noun incorporation”,
this label applies to instances in which a noun and verb are combined into a
single word. Over the past century, a series of high-profile debates have
occurred over the precise definition for this phenomenon. In an early round of
discourse, Kroeber (1909, 1911) and Sapir (1911) capitalize on the free-bound
contrast to make a distinction between noun incorporation languages in which
the verb is a free stem, and those “verbalizing suffix” languages in which the
verb is bound. This notion resurfaces in an exchange between Mithun (1984,
1986) and Sadock (1980, 1986). My contribution to this discussion is to specify
the range of morphological relationships which exist in the typology of noun­verb
dependencies. The Nuu-chah-nulth language instantiates two of these
dependencies.

(33) Morphological typology of noun-verb dependencies

<table>
<thead>
<tr>
<th></th>
<th>bound noun</th>
<th>free noun</th>
</tr>
</thead>
<tbody>
<tr>
<td>bound verb</td>
<td>Nuu-chah-nulth</td>
<td>Nuu-chah-nulth</td>
</tr>
<tr>
<td>free verb</td>
<td>Mohawk</td>
<td>English</td>
</tr>
</tbody>
</table>

In a Nuu-chah-nulth complex denoted by β-α, the bound verb (-α) takes
a bound or free nominal (β(-)) as its host. In the Mohawk (Iroquian) language,
in contrast, a free verb (α) takes a bound noun (-β) as its host (Rose-Marie
Déchaine, p.c). The incorporation pattern of Mohawk is indicated in (34a), in
which the nominal -nuhws “house” is incorporated into the inflected verb ye-
nuhweʔ-s “like 3rS/3N”. Note that in Mohawk the verb can surface detached
from the noun, as in (34b).
(34) Mohawk (from Postal 1962, as cited in Baker 1988: 81-82, ex. 14a-b)

a. Yao-wir-a?a ye-nuhs-nuhwe?-s
   PRE-baby-SUF 3FS/3N-house-like-ASP
   The baby house-likes.

b. Yao-wir-a?a ye-nuhwe?-s ne ka-nuhs-a?
   PRE-baby-SUF 3FS/3N-like-ASP DET PRE-house-SUF
   The baby likes the house.

In Nuu-chah-nulth, however, the “incorporating verb” requires a different arrangement. Because the affixal predicate is obligatorily bound, it can never go without a host. The example in (34a) indicates a grammatical instance of the affixal predicate -?aap “buy” suffixing to the bound nominal maht’?a- “house”. In (35b), even though the free form of “house”, maht’ii, is used, it is not possible for the noun and verb to be separated.

(35) a. maht’?a?amit?iS čakup
    maht’?a-?aap-mit-?iS čakup
    house-buy-PST-3.IND man
    A man bought a house.

b. * ?aamit?iS maht’ii čakup
    ?aap-mit-?iS maht’ii čakup
    buy-PST-3.IND house man
    A man bought a house.

The example in (35b) is ruled out because the affixal predicate -?aap “buy” must be linearized as a suffix.

A purely syntactic account of incorporation, such as Baker (1988), does not adequately capture the significance of the morphological dependencies which exist between the noun and verb. These dependencies are correlated with distinct morphological properties, which go beyond that of the interdependence itself between the bound form and its host. In languages in which the “incorporating verb” is obligatorily bound, the possibility arises for an expletive or “empty stem” to act as a morphological host for the verb. Greenlandic (Eskimo) provides one example of this. In the Greenlandic language, “incorporating verbs” are suffixes, just as in Nuu-chah-nulth (Waldie 2004). There is a placeholder morpheme, pi-, in Greenlandic which surfaces in contexts in which no incorporation occurs (Sadock 1980). The following examples are adapted from Sadock (1980: 306, ex. 18a and 307, ex. 24).
Greenlandic

a. Qimmeqarpok
dog-have-INDIC-3SG
He has a dog.

b. Qimmimik peqarpoq
dog-INST Ø-have-INDIC-3SG
He has a dog.

In (36a), incorporation unites the nominal qimmeq “dog” with the suffixal verb -qarp “have”. In (36b), in contrast, no incorporation of the nominal occurs, and instead, the bound verb is attached to the empty form pi- (surfacing as pe-).

In Nuu-chah-nulth, the expletive host for an affixal predicate is ?u-. An example is given below, in which ?u- acts as a host for the affixal predicate -?aap “buy”.

(37) ?uʔamitʔiš
maht’ii čakup

?u-ʔaap-mitʔiš
maht’ii čakup

Ø-buy-PST-3.IND house
A man bought a house.

In (37), ?u-support occurs as an alternative to the noun incorporation of (35a). This expletive is also used in cases in which the affixal predicate takes a sentential, rather than nominal, complement. In (38), for example, the expletive ?u- appears as a host for the affixal predicate -cuk “necessary”. This predicate takes a conditional complement, as in čukʷiʔatquu qaawicʔi “that the potatoes be washed”.

(38) ?uʔcukʔiš čukʷiʔatquu qaawicʔi

?u-ʔcukʔiš čukʷiʔatquu qaawicʔi

Ø-need-3.IND wash-PERF-PAS-3.COND potato-DET
It is best to wash the potatoes.

(lit: “it is necessary that the potatoes be washed”)

The expletive ?u- in Nuu-chah-nulth is regularly used in the citation forms of affixal predicates, as in ?u-ʔaap “buy” and ?u-cuk “need”.

Unlike in languages with bound verbs, noun-incorporating languages such as Mohawk make no use of an expletive host for a verb. Recall the examples in (34a-b). When incorporation of the noun into the verb doesn’t occur, the Mohawk verb simply stands on its own, as in (34b). There is no process similar to ?u-support for the inflected verb ye-nuhweʔ-s “like”. This difference symbolizes a key morphological contrast between the Nuu-chah-nulth and Mohawk patterns of incorporation.
To summarize the preceding discussion, we have seen two ways in which the affixation requirement of an affixal predicate may be met in Nuu-chah-nulth. On one hand, spell-out may attach an affixal predicate to an incorporated host, yielding \textit{PF Incorporation}. On the other hand, the expletive element \textit{\textalpha{}} may be introduced as a host. In the framework of Distributed Morphology, \textit{\textalpha{}} in Nuu-chah-nulth qualifies as a "dissociated" morpheme that is inserted at the point of spell-out (Embick 1997, Noyer and Embick 2001). Under this view, \textit{\textalpha{}}-insertion receives an analysis parallel to that which Lasnik (1981) proposes for \textit{do}-support in English: the "dummy" is inserted to meet the requirements of a potentially stranded affix. In §4.4, we will return to the discussion of \textit{\textalpha{}}-support as a spell-out solution which applies in cases in which an "edge effect" separates the affixal predicate from a potential incorporatable host.

For either \textit{\textalpha{}}-support or incorporation, the satisfaction of the affixation requirement in Nuu-chah-nulth constitutes a bare output operation on PF. An incorporated or inserted host allows the bound predicate to meet its linearization requirement. Bound morphological status and linearization are not relevant to the syntax proper; instead, these are conditions on phonological representation.

We now turn to discussion of the trademark properties of Nuu-chah-nulth \textit{PF Incorporation} which serve to corroborate the claim that this phenomenon belongs to the realm of the post-syntactic.

4.1 Morpho-phonological dependency

The analysis which I am proposing states that an affixal predicate is united with a host at spell-out so that it may be linearized. This \textit{local spell-out instruction} proposal argues that an affixal predicate -\textalpha{}} is "interpreted" with respect to its host \(\beta(-)\), a spell-out which induces a \(\beta-\alpha\) linearization. This section presents independent evidence for a phonological dependency between \(\alpha\) and \(\beta\). This evidence comes from the morpho-phonological "subcategorization" of affixal predicates.

In Nuu-chah-nulth, a striking property of bound morphemes is their ability to prosodically condition their morphological hosts (Sapir and Swadesh 1939, Rose 1981, Davidson 2002, Kim and Wojdak 2002, Kim 2003). For example, the "repetitive iterative" suffix -(\(y\))a causes vowel lengthening and reduplication of the first syllable of a monosyllabic root, as well as vowel lengthening of both the base and the reduplicant (Sapir and Swadesh 1939, Wojdak 2002, Kim and Wojdak 2003).

\begin{align*}
(39) & \quad \text{a. } \textit{\textalpha{}}\text{uus\textalpha{}}usa & \quad \text{b. } \textit{\textalpha{}}\text{uus-}\text{[+R+L]} & \quad \textit{\textalpha{}}\text{ki"\textalpha{}}\text{ka} & \quad \text{ki"\textalpha{}}\text{-}\text{a[+R+L]} & \quad \text{break-IT} & \quad \text{breaking continuously'} \\
& \quad \text{\textit{\textalpha{}}}\text{uus}\text{-}\textit{\textalpha{}} & \quad \text{\textit{\textalpha{}}}\text{a[+R+L]} & \quad \text{\textit{\textalpha{}}}\text{\textit{\textalpha{}}} & \quad \text{\textit{\textalpha{}}}\text{\textit{\textalpha{}}} & \quad \text{\textit{\textalpha{}}}\text{\textit{\textalpha{}}} & \quad \text{\textit{\textalpha{}}}\text{\textit{\textalpha{}}}
Affixal predicates share this ability to prosodically condition their morphological hosts. Each affixal predicate is associated with a characteristic pattern, although many affixal predicates are “neutral” in that they do not impose changes on their host. A given affixal predicate may impose reduplication, a long vowel, a short vowel, or some combination of the three.

(40) Prosodic conditioning

a. [+R] reduplication
b. [+L] long vowel
c. [+S] short vowel

Both the expletive morpheme ?u- and incorporated hosts are affected by the prosodic requirements of affixal predicates.

The examples below illustrate the behaviour of the affixal predicate ?uu-?waf "use", which triggers vowel lengthening of the first syllable of its host. In (41a), the vowel of the expletive morpheme ?u- is lengthened to ?uu-, while in (41b) the first vowel of yaaxyak "broom" is lengthened to yaaxyak.

(41) a. ?uu-?waf?i yaaxyak
    ?u-?waf[+L]-?i yaaxyak
    ?-use-2SG.IMP>3OBJ broom
    Use a broom!

b. yaaxyak?waf?i
    yaaxyak-?waf[+L]-?i
    broom-?use-2SG.IMP>3OBJ
    Use a broom!

The following example shows how reduplication is triggered by the affixal predicate ?u?u-q "travel with (in a vessel)". In (42a), the expletive morpheme ?u- surfaces as ?u?u-, while in (42b), the morpheme ?uus "someone" appears as ?u?uus. In this pattern, the first consonant and vowel of the host are reduplicated. The vowel length of the reduplicant is determined by the underlying vowel length of the morpheme which serves as the base.

    ?u-q[+R]-?i?i Louis huupu?w as-uk-?i Robin
    ?-travel.with-3.IND Louis car-POSS-DET Robin
    Louis is travelling in Robin’s car.

---

6 Independent predicates never induce prosodic conditioning.
Some affixal predicates impose restrictions both on vowel length and reduplication. I refer the reader to Kim and Wojdak (2002) and Kim (2003) for a detailed description of the available patterns in Ahousaht.

Only in the “neutral” pattern is the host prosodically unaffected by the affixal predicate. As the examples in (43) show, the phonemically contrastive vowel lengths of the host are unaltered by the affixal predicate -uʔaat “find”, and no reduplication is triggered. Accordingly, in (43a), ?u- surfaces without reduplication or a change in vowel length, and in (43b), the same applies for taanaq- “money”.

\[
\begin{align*}
\text{(43) a. } & \quad \text{?uyu?aat-siš} & \text{taana} \\
& \quad \text{?u-ʔaat-siš} & \text{taana} \\
& \quad \emptyset-\text{find}-1\text{SG.IND} & \text{money} \\
& \text{I found money.}
\end{align*}
\]

\[
\begin{align*}
\text{b. } & \quad \text{taanaq-uʔaat-siš} \\
& \quad \text{taanaq-ʔaat-siš} \\
& \quad \text{money-\text{find}-1\text{SG.IND}} \\
& \text{I found money.}
\end{align*}
\]

Many affixal predicates in the language display this neutral pattern, and impose no prosodic conditioning (see Sapir and Swadesh 1939).

Kim (2003) provides an analysis of the reduplicative patterns triggered by affixal predicates within the framework of Optimality Theory. It is beyond the scope of the present study to re-articulate an analysis in accordance with Minimalist assumptions. Instead, I simply present this prosodic conditioning as independent evidence for the idea that local spell-out instructions link an affixal predicate with its host. The prosodic conditioning of a host by an affixal predicate indicates that the two must be interpreted together at the point of spell-out. In effect, prosodic conditioning leaves a detectable “footprint” of local spell-out instruction.

### 4.2 Sensitivity to linear adjacency

When an element reaches spell-out, it must be linearized with respect to its neighbour. This is the essence of the local spell-out instruction proposal. In the discussion up until this point, the locality constraint on this linearization process has been trivial in that only two syntactic terminals, α and β, were represented as the input to the spell-out rule:
The syntactic configuration in (44) can be considered to be the basic step of the syntactic derivation, equivalent to a single application of Merge ($\alpha, \beta$). An example of this simple arrangement is when an affixal predicate selects a bare noun complement, as in *taanaq-*ụ?aat* "find money" (from 43b).

The linearization forced at spell-out for *taanaq-*ụ?aat* is a case of PF Incorporation.

In this section, we take a first step towards defining the linearization of more complex syntactic constructs. As we will see in this section, the linearization of affixal predicates in Nuu-chah-nulth is strictly local. For an explanation of this locality constraint, consider the following syntactic construct:

This configuration is derived via two separate applications of binary concatenation. In the first, $\delta$ and $\pi$ are selected from the numeration $[\alpha, \delta, \pi]$ and are joined through Merge ($\delta, \pi$). The output of Merge ($\delta, \pi$) is $\beta$, the abstract node label designating the contents of the pairing. For the second concatenation, $\alpha$ is introduced from the numeration. This concatenation unites $\alpha$ with $\beta$, through Merge ($\alpha, \beta$). The syntactic output of this sequence of operations is $\gamma$, the root node label.

Let us assume that after the first round of Merge, local spell-out instruction applies to specify the relative ordering of $\delta$ and $\pi$. (The means by which this ordering takes place is addressed in Wojdak 2005, but here we can adopt this as a simple assumption.) Take this ordering to be specified left-to-right as $<\delta, \pi>$. When the next element, $\alpha$, enters the computation and receives instructions for spell-out, $\alpha$ must be linearized with respect to $\beta$, just as it was in the simpler case of (44).

(47) *Local spell-out instruction*: at Merge ($\alpha, \beta$), interpret $\alpha$ with respect to $\beta
With the derivation in (46), however, $\beta$ is not a simplex construct; in (46), $\beta$ is the object $<\delta, \pi>$.

Assume that $\alpha$ is an affixal predicate (-a). At spell-out, an ordering of $\alpha$ with respect to $\beta$ requires that the affixal predicate (-a) must be linearized with respect to the ordered object $<\delta, \pi>$. The claim that this section makes is that spell-out of this arrangement consistently yields in Nuu-chah-nulth a linearization of $<(\delta, \alpha), \pi>$. An affixal predicate in Nuu-chah-nulth only ever suffixes to the left-most element in its derivational sister. For the linearized object $<\delta, \pi>$, the host for an affixal predicate is identified as $\delta$. The alternative of $<\delta, (\pi, \alpha)>$ never arises in Nuu-chah-nulth.

Furthermore, when even larger derivational samples $<\theta, \delta, \pi>$ are considered, we will also see that linearization never "skips" a potential host. Take $<\theta, \delta, \pi>$ to be the linearized object which results from two initial applications of Merge. These two concatenations (and corresponding local spell-out instructions) are following by a third application of Merge, introducing the affixal predicate $\alpha$.

(48) 

At the spell-out point of $\gamma$, the affixal predicate -a must be linearized with respect to the ordered object $<\theta, \delta, \pi>$. Affixation is strictly local in that the resulting linearization is $<(\theta, \alpha), \delta, \pi>$ and not $<\theta, (\delta, \alpha), \pi>$. It is the single leftmost element which can serve as the host for the affixal predicate. I label this constraint in Nuu-chah-nulth the linear adjacency restriction:

(49) linear adjacency restriction:

An affixal predicate (-a) must be linearized as a suffix to the single leftmost element in its derivational sister $<\delta, \pi>$, resulting in $<(\delta, \alpha), \pi>$. 

I consider this restriction to be a reflex of the spell-out of the affix. It arises from local spell-out instructions, in which the affixal predicate is evaluated relative to its derivational sister. In the following sub-sections, we will see evidence for this linear adjacency restriction.

I start in §4.2.1 by showing that affixation in Nuu-chah-nulth does not skip potential hosts, but instead feeds a potentially iterative affixation process.
4.2.1 Iterativity

This section discusses the make-up of complex strings of morphological dependencies. Consider (50), in which a sequence of affixes (including two affixal predicates, -’iih “try to” and -mahsa “want to”) are suffixed to the verb huuhtak “know”.

(50)  

huuhtak-šiihmahsaʔiš  Lucy  quuquuʔaca  
huuhtak-šik- ’iih-mahsaʔiš  Lucy  quuʔac[-R]-ya  
know-PERF-try.to-want.to-3.IND  Lucy  person-speak-CONT  
Lucy wants to learn how to speak Nuu-chah-nulth.

I have described the process of affixation in Nuu-chah-nulth as one applying to pairs of items: an affix and a host. If the linearization specified by local spell-out instructions is a pairwise function, then how are complex sequences such as (50) able to be formed? It seems on the surface that there are many affixes, and only a single host (the verb huuhtak “know”). If the host for an affixal predicate must be linearly adjacent to the affixal predicate, then why is that -mahsa “want to” is attaching to another bound element (-’iih “trying to”), and not attaching directly to the free form huuhtak “know”? Strictly speaking, the affixal predicates -mahsa and -’iih cannot be serving as hosts for each other. Each of these affixal predicates are suffixes, so if they must find a host between them, then one will necessarily be left without. Recall from §3.1 that the combination of two suffixes, -α and -β, results in an indeterminate ordering of (-α-β) or (-β-α). Their relationship is inherently underspecified, and as such, no morphological dependency obtains.

The solution to this problem is iterative application of local spell-out instructions. In the framework I am assuming, spell-out applies after each occurrence of Merge. I therefore propose that successive applications of local spell-out instruction enforce a build-up of hosts, induced when one affixal predicate finds a host, and then this affix-host complex in turn serves as the host for another affix. We can take the data in (51) as an illustration of this process.

(51)  

čamas-pat-čuqšiʔin  
čamas-pat-čuq-šik-’in  
sweet-taste-in.mouth-PERF-1PL.IMP
Let us put something sweet in our mouths.

In (51), there are two affixal predicates: ʔu-pat “taste of” and ʔu-čuq “in mouth”. The affixal predicates are followed by the perfective marker -šik (PERF), and the imperative marking -’in (1PL.IMP).

Recall that syntactic derivations are built from bottom-to-top. We can assume the first step of the syntactic derivation to be one in which the predicate ʔu-pat “taste of” joins with čamas “sweet” via Merge (pat, čamas).
Because $\text{-}\hat{p}a\hat{t}$ is a suffix, this arrangement is linearized at spell-out as $\text{camas}\hat{p}a\hat{t}$ "sweet-tasting". Successive steps of Merge build on this linearization to produce a longer string of morphemes. In the next stage, $\hat{p}u\hat{c}\hat{u}q$ “in mouth” is merged into the derivation, via Merge ($\hat{c}\hat{u}q$, $\text{camas}\hat{p}a\hat{t}$). Because $\text{-}\hat{c}\hat{u}q$ is a suffix, this string is linearized as $\text{camas}\hat{p}a\hat{t}\hat{c}\hat{u}q$ “something sweet tasting in the mouth”.

The non-predicative suffixes, $\text{-}\hat{s}\hat{i}\hat{k}$ (PERF) and $\text{-}\hat{\text{in}}$ (IPL.IMP), are also eligible for positioning through local spell-out instructions. When the perfective suffix $\text{-}\hat{s}\hat{i}\hat{k}$ (PERF) is merged into the derivation, it is instructed to be “interpreted” with respect to its derivational sister $\text{camas}\hat{p}a\hat{t}\hat{c}\hat{u}q$, inducing a linearization of $\text{camas}\hat{p}a\hat{t}\hat{c}\hat{u}q\hat{s}\hat{i}\hat{k}$ “put something sweet tasting in the mouth”. Finally, the imperative suffix $\text{-}\hat{\text{in}}$ (IPL.IMP) is then positioned at spell-out after it has been merged. As a suffix, the imperative marker is spelt-out following the previously linearized components. The resulting arrangement is $\text{camas}\hat{p}a\hat{t}\hat{c}\hat{u}q\hat{s}\hat{i}\hat{k}\hat{\text{in}}$ “let us put something sweet in our mouths”. The principles of iterative local spell-out instructions therefore resemble the effects of the Mirror Principle of Baker (1988): the left-to-right arrangement of suffixes reflects the first-to-last steps of the syntactic derivation. Suffixes introduced later in the derivation will be linearized towards the end of the word. In effect, each step of the syntax induces a “phonologization” of the elements of the syntactic tree.

According to my proposal, the “phonologizing” effects of spell-out are sensitive to linear adjacency. Sensitivity to linear adjacency is a property of the phonological system, not the syntax. As I have described, the syntax does not operate on the basis of linear arrangements: it is simply a device of binary concatenation. The next sections add weight to the argument that PF Incorporation is a non-syntactic phenomenon. The data which I will present demonstrates that PF Incorporation operates in Nuu-chah-nulth on linearly adjacent items, irrespective of the internal syntactic dependencies of these items. In §4.2.2, I present evidence that PF incorporation targets non-heads of a syntactic constituent, so long as these elements are spelt-out contiguous to the affixal predicate. In §4.2.3, it is shown that this operation breaks up coordinated objects – disregarding the Coordinated Structure Constraint – by targeting the conjoined element which abuts the affixal predicate at spell-out.

4.2.2 Modifier incorporation

We first examine the phenomenon of modifier incorporation as evidence for sensitivity to linear adjacency. Two types of modifier incorporation will be considered: the first, targeting adjectives; the second, targeting adverbials. This section is intended as an overview only: I refer the reader to Wojdak (2005) for a more thorough analysis.
4.2.2.1 Adjective incorporation

Within nominal phrases in Nuu-chah-nulth, there is a strict ordering relationship between constituent elements, such that a modifier necessarily precedes the nominal. A modifier such as ha?um “tasty” must obligatorily precede a nominal such as ?aapinis “apples”.

Let us assume for the present discussion that in (53), the affixal predicate ?u-?ic “consume” takes the nominal phrase ha?um ?aapinis “tasty apples” as its complement. (I refer the reader to Wojdak 2005 for an analysis of the syntactic configuration of arguments of affixal predicates.) In this section, we will see that the choice of host for an affixal predicate is determined by the linear ordering of elements with the nominal phrase that it takes as a complement. An affixal predicate incorporates whatever host is “leftmost in the order Q[uantifier] > Q[quantity] > A[jective] > N[oun]” (Rose 1981: 294). In other words, an affixal predicate obligatorily attaches to the element in the complement which is linearly adjacent to the affixal predicate.

It is this sensitivity to linear ordering which determines that PF incorporation is not “noun incorporation” in a strict sense. Although affixal predicates may select a noun as host in a simplex nominal complement, this preference switches once a pre-nominal constituent enters the picture. For example, although the nominal ?aapinis “apples” is the host for ?u-?ic “consume” in (54a), it cannot act as a host when the prenominal modifier ha?um “tasty” appears, as in (54b).

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In this context, adjectives are obligatorily determined to be the host, rather than the modified noun. In (55), the affixal predicate *ʔu-*ʔic “consume” suffixes to the modifier haʔum “tasty”.

(55) haʔumʔicʔisʔaʔt ʔaapinis
haʔum-ʔiic-ʔiis-ʔaʔt ʔaapinis
tasty-consume-3.INO-PL apples
They are eating delicious apples.

The restriction which Nuu-chah-nulth incorporation has on targetting the “leftmost element” (Rose 1981: 295) is not in the vocabulary of the syntax. This is because incorporation in Nuu-chah-nulth is not a syntactic process. Syntactic processes operate on the basis of hierarchical relationships – created by binary concatenation – while PF processes operate on the basis of linear relationships. I refer the reader to Wojdak (2005) for evidence that an adjective does not syntactically head an adjective-noun complement of an affixal predicate.

4.2.2.2 Adverbial incorporation

This sensitivity to linear ordering may also be observed with affixal predicates which take propositional, rather than nominal, complements. Affixal predicates in this class include –qaath “claim” and ʔu-ʔiic “come upon”. These predicates allow incorporation of a verb from their logical complement.

(56) a. waʔtšiʔqathsiš
waʔt-šiʔ-qaath-siš
go.home-PERF-claim-1SG.IND
I claimed I went home.

b. waʔičʔičitsiš
Ken
waʔič-ʔič-mit-siš
Ken
sleep-come.upon-PST-1SG.IND
I came upon Ken sleeping.

This section considers the pattern of adverbials which respect to these “verb-incorporating” affixal predicates.

Outside of incorporation contexts, adverbials in Nuu-chah-nulth split into two classes, depending on whether they are subject to flexible or rigid positioning relative to the main predicate. “High” adverbials (Cinque 1999), such as subject-oriented or temporal adverbs, have a flexible order, and may either precede or follow a main predicate. This class includes subject-oriented qʷaʔuʔh “purposely” and temporals čaani “first” and naʔiik “immediately”. The two patterns for these flexibly-positioned adverbs are shown in the examples below. In each of the (a) cases, the adverb appears before the main verb. In the (b) examples, the adverb follows the main verb. (Inflectional morphemes, as
“second position” enclitics, suffix to whatever word is first in the clause; see Davidson 2002 for discussion.)

(57)  
a. ĉaaniʔaqʔ?iš waʔič  
獠aaniʔaqʔ?iiš waʔič  
first-FUT-3.IND sleep  
He will sleep first (ie. before doing something else).

b. waʔičʔaqʔ?iš  
waʔičʔaqʔ?iiš  
sleep-FUT-3.IND first  
He will sleep first (ie. before doing something else).

(58)  
a. naʔiikʔaqʔ?isiš waʔšišk hawiiʔaš-quu  
nəʔiikʔaqʔ?isiš waʔšišk hawiiʔaš-quu  
immediately-FUT-1SG.IND go.home-PERF finish-TEMP-3.COND  
I will immediately go home when it’s finished.

b. waʔšiškʔaqʔ?isiš naʔiik hawiiʔaš-quu  
waʔšiškʔaqʔ?isiš naʔiik hawiiʔaš-quu  
go.home-PERF-FUT-1SG.IND immediately finish-TEMP-3.COND  
I will immediately go home when it’s finished.

(59)  
a. qʷaʔuuʔʔ?iš Florence nunuuk  
qʷaʔuuʔʔ?iiš Florence nunuuk  
purposely-3.IND Florence sing  
Florence is purposely singing.

b. nunuuk?iš Florence qʷaʔuuħ  
nunuukʔiiš Florence qʷaʔuuħ  
sing-3.IND Florence purposely  
Florence is purposely singing.  
(context: Florence’s neighbour kept her awake last night and now she wants to get even by being loud)

Manner adverbials, in contrast, belong to a second class which must rigidly precede the main predicate. As shown in the following (a) examples, it is grammatical for the manner adverbial to precede the predicate it modifies. In the (b) examples, in contrast, ungrammaticality arises when the manner adverbial follows the main predicate.

(60)  
a. wityaxits waʔšišk  
wityax-mit-s waʔ-[+L]-šišk  
slow-PST-1SG.ABS go.home-CONT-PERF  
I was going home slowly.
(61) a. čamaqk?iš titiqs Florence
camaqk-?iiš titiqs Florence
properly-3.IND dry Florence
Florence is drying dishes properly.

b. * titiqs?iš čamaqk Florence
titiqs-?iiš čamaqk Florence
dry-3.IND properly Florence
Florence is drying dishes properly.

(62) a. ḥacukʷit?iš waʔič Ken
ḥacuk-mit-?iiš waʔič Ken
deeply-PST-3.IND sleep Ken
Ken was sleeping deeply.

b. * waʔičit?iš ḥacuk Ken
waʔič-mit-?iiš ḥacuk Ken
sleep-PST-3.IND deeply Ken
Ken was sleeping deeply.

What is the suffixation pattern of affixal predicates which take adverbially-modified complements? Rose (1981: 296) makes the following general statement about sentential complements: “[p]arallel to NP incorporation, it is the left-most and highest constituent of the clause governed by the suffix which serves as base to the suffix”. Rose’s generalisation makes the correct predictions about the incorporation pattern of adverbials. In the case of flexibly positioned adverbials, an affixal predicate has the option of attaching to either the adverbial or the verb.

(63) a. waʔšiʔqathsiš naʔiik ?atquu wiktumsa
waʔ-šiʔ-qaath-siš naʔiik ?atquu wik-tum-sa
go.home-PERF-claim-1SG.IND immediately although NEG-PST-1SG.DEP
I claimed I went home immediately, but I didn’t.

b. naʔiikqathsiš waʔšiʔ ?atquu wiktumsa
naʔiik-qaath-siš waʔ-šiʔ ?atquu wik-tum-sa
immediately-claim-1SG.IND go.home-PERF although NEG-PST-1SG.DEP
I claimed I went home immediately, but I didn’t.
(64) a. čaaniwičəssìš  waʔič
čaani-wičəs-siš  waʔič
first-gonna-1SG.IND  sleep
I will sleep first (ie. before doing something else)

b. waʔičwičəssìš  čaani
waʔič-wičəs-siš  čaani
sleep-gonna-1SG.IND  first
I will sleep first (ie. before doing something else)

(65) a. qʷaʔuuʔqathʔiš  taʔɪt  kən
qʷaʔuuʔ-qaathʔiš  taʔɪt  kən
purposely-claim-3.IND  sick  kən
Ken is pretending to be sick on purpose.

b. taʔɪtqathʔiš  kən  qʷaʔuuʔ
taʔɪt-qaathʔiš  kən  qʷaʔuuʔ
sick-claim-3.IND  kən  purposely
Ken is pretending to be sick on purpose.

For adverbials which rigidly precede a predicate, however, the choice of host for the affixal predicate is inflexible: the affix must attach to the adverbial, rather than the verb.

(66) a. čamaqʷqathʔiš  titiqs  Flərence
čamaqʷ-qaathʔiš  titiqs  Flərence
properly-claim-3.IND  dry  Flərence
Florence is pretending to dry dishes properly.

b. * titiqsqathʔiš  čamaqʷ  Flərence
titiqs-qaathʔiš  čamaqʷ  Flərence
dry-claim-3.IND  properly  Flərence
Florence is pretending to dry dishes properly.

(67) a. hačukśiš-kitsiš  waʔič  kən
hačuk-siš-miš-siš  waʔič  kən
deeply-come_upon-PST-1SG.IND  sleep  kən
I came upon kən in a deep sleep.

b. * waʔičśiš-kitsiš  hačuk  kən
waʔič-śiš-miš-siš  hačuk  kən
sleep-come_upon-PST-1SG.IND  hačuk  kən
I came upon kən in a deep sleep.
I want to go home slowly.

This difference in the incorporation pattern of the two sets of adverbials follows from an analysis in which incorporation is sensitive to the linear ordering of elements. If an adverbial permits a preverbal syntactic positioning, then it is allowed as a host for an affixal predicate which takes a sentential complement.

4.2.3 Coordinated objects

The behaviour of coordinated objects provides further proof that incorporation in Nuu-chah-nulth operates on the basis of linear adjacency. The conjunction *ub?iis (CONJ) is used exclusively to conjoin nominals in Nuu-chah-nulth. Its use is shown in (69), in which it appears between the two conjuncts, baakwa*“girl” and ma?J*qac “boy” in (69a) and Bill and Mary in (69b).

I caught a glimpse of a girl and a boy.

b. huu+huu+amit?is Bill ?uh?iiis Mary
huu-a[+R]-mit-?ii Bill ?uh?iiis Mary
dance-IT-PST-3.IND Bill CONJ Mary
Bill and Mary were dancing.

First, we must note that the Coordinate Structure Constraint (CSC) is operative in syntactic movement in Nuu-chah-nulth, as with the wh-questions shown below. The examples in (70) are object wh-questions, while the examples in (71) are subject wh-questions. In the (a) examples, we have a grammatical case of wh-movement which does make use of conjunction. In the (b) and (c) examples, however, it is shown that it is ungrammatical for wh-movement to target a single conjunct of the argument. These CSC-violating examples are ruled out in Nuu-chah-nulth, parallel to the English cases which are given as their literal translation.

(70) a. ?aaaciiqit haac-piiha
?aa-?iiqit-k haac-piiha
who-AUX-PST-2SG.Q see-glimpse
Who did you catch a glimpse of?
In the case of PF incorporation, however, a different pattern emerges. In the Ahousaht dialect of Nuu-chah-nulth, the first word of a coordinated object is chosen to host an affixal predicate, in striking contrast to the pattern of CSC-obeying syntactic movement. Examples of this characteristic of PF Incorporation are shown below. For example, in (72b), the affixal predicate ʔukʷist‘ap “take away” incorporates the nominal hamuut “bones”, leaving stranded the remainder of the conjunction ʔuḥʔiʔs kuuna “and gold”. Parallel cases of incorporation targetting the first word of the conjunct are shown in (73b) and (74b).

(71)  

a. ?aćaqith  
    huur̓-hur̓ta   
who-PST-3.Q dance-IT  
Who was dancing?

b. * ?aćaqith  
    huur̓-hur̓ta ʔuḥʔiʔs Mary  
who-PST-3.Q dance-IT CONJ Mary  
(lit: “who and Mary was dancing?”)

c. * ?aćaqith  
    huur̓-hur̓ta Bill ʔuḥʔiʔs  
who-PST-3.Q dance-IT Bill  
(lit: “Bill and who was dancing?”)

In the Ahousaht dialect of Nuu-chah-nulth, the first word of a coordinated object is chosen to host an affixal predicate, in striking contrast to the pattern of CSC-obeying syntactic movement. Examples of this characteristic of PF Incorporation are shown below. For example, in (72b), the affixal predicate ʔukʷist‘ap “take away” incorporates the nominal hamuut “bones”, leaving stranded the remainder of the conjunction ʔuḥʔiʔs kuuna “and gold”. Parallel cases of incorporation targetting the first word of the conjunct are shown in (73b) and (74b).

(72)  

a. ʔukʷist’amitʔiʔs  
    mamaʔni hamuut ʔuḥʔiʔs kuuna  
ʔu-ʔukʷist‘ap-mitʔiʔs mamaʔni hamuut ʔuḥʔiʔs kuuna  
MOVE.AWAY-TR-PST-3.IND white.people bones CONJ gold  
White people took away the bones and gold.

b. hamuuktʔukʷist’amitʔiʔs  
    mamaʔni ʔuḥʔiʔs kuuna  
hamuut-ʔukʷist‘ap-mitʔiʔs mamaʔni ʔuḥʔiʔs kuuna  
bones-MOVE.AWAY-TR-PST-3.IND white.people CONJ gold  
White people took away the bones and gold.
(73) a. ḥuʔaamitsis č'apac ḥuʔiis čima
   ḥuʔ-ʔaap-mit-siiš č'apac ḥuʔiis čima
   ḥuʔ-ʔaap-PST-1SG.IND canoe CONJ net
   I bought a canoe and a net.

b. č'apacʔamitsis č'apac-ʔaap-mit-siiš ḥuʔiis čima
   canoe-ʔaap-PST-1SG.IND ḥuʔiis čima
   I bought a canoe and a net.

(74) a. ḥuʔaayasči jiyjickukʔuhiis šuuk*aa
   ḥuʔ-haa-'as-či jiyjickukʔuhiis šuuk*aa
   ḥuʔ-ʔaap-go-2SG.DIR>3OBJ flour CONJ sugar
   Go buy flour and sugar!

b. jiyjickukhhaayasči jiyjickuk-haa-'as-či ḥuʔiis šuuk*aa
   flour-ʔaap-go-2SG.DIR>3OBJ CONJ sugar
   Go buy flour and sugar!

Under a purely syntactic analysis of incorporation, examples such as (72-74) should be banned by the Coordinate Structure Constraint. However, since incorporation in Nuu-chah-nulth is sensitive to linear adjacency, this behaviour is directly predicted. According to the PF Incorporation analysis, an affixal predicate incorporates whatever word from its complement abuts it. This linearization mechanism is not sensitive to the internal syntactic composition of the complement.

In this section, we saw that PF Incorporation shows an insensitivity to syntactic constituency. The next section discusses the observation that this process is similarly blind to syntactic category.

4.3 Insensitivity to syntactic category

The process of PF Incorporation is unselective for the syntactic category of its host: an incorporee is selected based on its linear adjacency to the affixal predicate. Affixal predicates which select nominal complements may incorporate a noun, adjective, quantifier, wh-pronoun or relative pronoun. This range of possible hosts is illustrated for the affixal predicate ḥuʔ-ʔaap “buy”.

(75) a. č'upč'upšumtʔamitsis
   č'upč'upšumtʔaap-mit-siis
   sweater-ʔaap-PST-1SG.IND
   I bought a sweater.
b. ƛ̣iƛ̣-ʔaamitsiš  č’up’č’upšumit-̱ siya
ƛ̣iƛ̣-ʔaap-mit-siis  č’up’č’upšumit-̱ siya
red-buy-PST-1SG.IND sweater 1SG
I bought a red sweater.  (adjective)

c. hiyaapatuk?iš  nuutinum(ⴳ⴬mính)
hiƛ̣-ʔaap-ʔat-uk-ʔiš nuutinum(-mính)
all-buy-PASS-POSS-3.IND necklace(-PL)
All his/her necklaces were bought.  (quantifier)

d. ?aqiʔamith Louis
ʔaqi-ʔaap-mit-h Louis
what-buy-PST-3.Q Louis
What did Louis buy?  (wh-pronoun)

e. kʷiʔiʔat?iš John ʔučʔiʔn yaʔaamitʔitk
kʷiʔʔat-mit-ʔiš John ʔučʔiʔn yaq-ʔaap-mitʔitk
like-PST-3.IND John dress  REL-buy-PST-2SG.RL
John liked the dress you bought.  (relative pronoun)

In a strict sense, PF incorporation is therefore not equivalent to “noun incorporation”. Although an affixal predicate (which takes a nominal complement) is capable of incorporating a noun, elements with a range of other syntactic categories can serve the role of host.

The same is true for the phenomenon described as “verb incorporation” in Nuu-chah-nulth. As previously discussed, adverbial modifiers show the ability to incorporate, along with verbs.

(76)  

a. kamatqukmahsaʔiš Florence
kamatq-uk-mahsaʔiš Florence
run-DUR-want.to-PST-3.IND Florence
Florence wants to run.

b. kʷaʔiʔxmahsaʔiš  kamatquk Florence
kʷaʔiʔx-mahsaʔiš kamatq-uk Florence
fast-want.to-PST-3.IND run-DUR Florence
Florence wants to run fast.

The negative particle wik can also incorporate into an affixal predicate. However, this applies only in contexts of VP negation, and not sentential negation. In (77), the affixal predicate –qaatḥ “claim” show flexibility between suffixing to wik (NEG) (77a), and suffixing to the verb ʔuuc “own” (77b).
As with adverbial incorporation, the availability of wik (NEG) to incorporate relates to linear ordering restrictions on the incorporation process. Recall that as Rose (1981: 296) describes, “it is the left-most and highest constituent of the clause governed by the suffix which serves as base to the suffix”. With VP-level negation, wik (NEG) hosts the affixal predicate, while in sentential negation, a verb takes over as host. This can be related to the spell-out position of the respective hosts. In VP-level negation, the negative particle wik is spelled-out adjacent to the affixal predicate -qaath “claim”. In sentential negation, the affixal predicate is spelled-out adjacent to the verb luuc “own”. The following diagram illustrates the syntactic position of wik (NEG) and luuc “own” relative to the affixal predicate -qaath “claim”. (Wojdak 2005 provides argumentation for the syntactic representation that I assume here.) Only in VP negation does the negation particle wik (NEG) fall into a position where it is the left-most element in the derivational sister of -qaath “claim”, as shown in (78a). In (78b), in contrast, it is the verb luuc “own” which is the left-most element of the derivational sister of -qaath “claim”.

Thus, due to the linear adjacency restriction on incorporation, for (78a), a linearization of <wik-qaath luuc šuwis?i Ken> is anticipated. In (78b), the ordering of <luuc-qaath šuwis?i Ken> is predicted. This linearization mechanism
is not sensitive to a difference in syntactic category between the negation host \textit{wik} (NEG) and the verbal host \textit{\textipa{\text{i\text{uu}c}} “own”}.

4.4 “Edge” effects

As I have described, an affixal predicate in Nuu-chah-nulth incorporates a host chosen from its derivational sister, the complement of the verb. This affixation has been stated to be insensitive to syntactic category. All else being equal, we should therefore expect that incorporation should be possible when any of NP, DP, \(vP\) or CP are the complements of the affixal predicate.

(79) a. \quad \quad b. \quad \quad c. \quad \quad d. \quad \quad
\begin{align*}
&V \quad NP & V \quad DP & V \quad vP & V \quad CP
\end{align*}

This section presents evidence that not all else is equal. I hypothesize that DP and CP differ from other projections in that they are “self-contained” units in the syntax. The borders of DPs and CPs therefore constitute “edges”. Intuitively, this corresponds to the propositional independence of DPs and CPs.

(80) a. I recalled [the city’s destruction]_{DP}.
   b. I recalled [that the city was destroyed]_{CP}.

Furthermore, a variety of syntactic evidence has been presented for an inherent symmetry between DPs and CPs, at the exclusion of other categories (Abney 1987, Szabolcsi 1994).

In Nuu-chah-nulth, there is independent prosodic evidence that DPs and CPs constitute “impenetrable” domains. This evidence comes from the two distinct cliticization domains found in Nuu-chah-nulth. Clitic strings may be built up within a DP, or at a clausal level which excludes the DP(s).

(81) \[\text{[\text{hiixtaq\textipa{\text{c}mit\textipa{\text{s}}}}]}_{\text{CP.DOMAIN}}\quad \quad \text{[\text{huupuk\textipa{\text{w}asuk\textipa{\text{t}}tik}}]}_{\text{DP.DOMAIN}}\]

\begin{align*}
\text{hiixtaq-\textipa{\text{c}mit-si\text{s}}} & \quad \quad \text{huupuk\textipa{\text{w}as-\textipa{\text{u}k-\textipa{\text{t}}tik}}}
\text{have.accident-BEN-PST-1SG.IND} & \quad \quad \text{car-POS\$-2SG.}\text{PS}
\end{align*}

I had an accident with your car.

In §4.4.1 and §4.4.2, I show that \textit{PF Incorporation} can never cross a DP or CP in Nuu-chah-nulth.

4.4.1 DP edge

Incorporation is possible out of indefinite nominal complements in Nuu-chah-nulth, but not out of definite ones (Rose 1981). This bare nominal requirement is illustrated in (82). In (82a), incorporation targets the bare nominal \textit{\textipa{\text{tuc\textipa{\text{p}}}in}} “dress”. The example in (82b) indicates that a nominal marked with the determiner \(-\text{\textipa{\text{u}}}\) cannot be incorporated. Furthermore, as shown in (82c), the determiner cannot itself act as a host for the affixal predicate. When the
nominal complement of an affixal predicate is definite, \( \mathfrak{u} \)-support must occur, as shown in (82d).

(82)  

a. \( \mathfrak{u} \text{uc}\text{?i} \text{nsiikitsi}\text{s} \)  
\( \mathfrak{u} \text{uc}\text{?i} \text{-siik-mit-si}\text{s} \)  
\( \text{dress-}\text{make-}\text{PST-1SG.IND} \)  
I made a dress.  

b. * \( \mathfrak{u} \text{uc}\text{?i} \text{-siik-mit-si}\text{s} \)  
\( \text{dress-}\text{DET-}\text{make-}\text{PST-1SG.IND} \)  
I made the dress.  

c. * \( \text{n-siik-mit-si}\text{s} \)  
\( \mathfrak{u} \text{uc}\text{?i} \text{in} \)  
\( \text{DET-}\text{make-}\text{PST-1SG.IND} \)  
I made the dress.  

d. \( \mathfrak{u} \text{siikitsi}\text{s} \)  
\( \mathfrak{u} \text{uc}\text{?i} \text{-in\text{?i}} \)  
\( \text{n-siik-mit-si}\text{s} \)  
\( \text{O-}\text{make-}\text{PST-1SG.IND} \)  
\( \text{dress-DET} \)  
I made the dress.

In Wojdak (2005), I attribute this restriction to the identity of DPs as “edged” units in the syntax.

4.4.2 CP edge

Parallel examples may be supplied for the ban on incorporation across CPs. In (83a), an example is given showing a full CP complement for the affixal predicate \( \mathfrak{u}\text{u-u}\text{n-kuuh} \) “observe”. This full complement contains the complementizer \( \?\text{en} \), the past tense marker \(-\text{mit}\), and the 2\textsuperscript{nd} person singular “dependent” mood inflection \(-\text{suuk}\). In contexts of verb incorporation, it is ungrammatical for such clausal demarcations to appear, as indicated in (83b). The grammatical instance of verb incorporation in (83c) shows no complementizer, no tense marking, and no dependent mood inflection.

(83)  
a. \( \mathfrak{u}\text{u-n\text{a-kuuh}u}\text{hitsi}\text{s} \)  
\( \?\text{en} \)  
\( \text{tuuxtuuxx\text{a}mit\text{a-kuuh}u}\text{hitsi}\text{s} \)  
\( \?\text{en} \)  
\( \text{tuuxx\text{x-a}+\text{R}-mit-suuk} \)  
\( \text{O-}\text{observe-}\text{PST-1SG.IND} \)  
\( \text{COMP} \)  
\( \text{jump-IT-PST-2SG.DEP} \)  
I observed that you were jumping.  

b. * \( \text{tuuxtuuxx\text{a}mit\text{a-kuuh}u}\text{hitsi}\text{s} \)  
\( \?\text{en} \)  
\( \text{suwa} \)  
\( \text{tuuxx\text{x-a}+\text{R}-mit-\text{n\text{k\text{a}}\text{kuuh}u}+\text{L}-mit-si}\text{s} \)  
\( \?\text{en} \)  
\( \text{suwa} \)  
\( \text{jump-IT-PST-}\text{observe-}\text{PST-1SG.IND} \)  
\( \text{COMP} \)  
\( \text{you} \)  
I observed you jumping.
Wojdak (2005) analyses the verb incorporation case in (83c) as having a vP complement, rather than the sort of CP complement in (83a). The inability of incorporation to occur across a CP complement may be attributed to the status of CP as an “edged” domain.

5 “Outside-in” dependencies

According to the local spell-out instruction hypothesis, the relationship between a Nuu-chah-nulth affixal predicate and its host is necessarily “outside-in”.7 An affix (α) is always “outside”, or higher than, the syntactic terminals contained within its derivational sister (β):

(84)

In Nuu-chah-nulth, an affixal predicate (−α) must be linearized with respect to a host from its derivational sister β. If its derivational sister is linearized as <δ, π>, then the host for an affixal predicate is determined to be δ, due to its linear adjacency to this morpheme (<(δ-α), π>).

What about “inside-out” dependencies? Could such an affixation arrangement exist? In this configuration, an affix would “climb up” to find a host higher in the tree. In the illustration below, let us take α to be an affix, and δ to be its host. In an “inside-out” dependency, an affix α attaches to the host δ, even though δ is not contained within its derivational sister. In the tree below, π is the derivational sister of α, not δ:

(85)

7 Thanks to Gunnar Hansson for suggesting this term to me.
5.1 "Inside-out" effects are achieved by global spell-out

I propose that "inside-out" dependencies such as (85) do occur in natural language. However, they do not arise from local spell-out instruction. Instead, I hypothesize that this arrangement is necessarily achieved by global spell-out. This linearization device is defined by the following statement:

(86)  Global spell-out: interpret \( \alpha \) with respect to \( \delta \)

Global spell-out is done on full assemblies of derivations, rather than in the incremental steps taken by local spell-out instruction. The need for the postulation of such a global representation of linguistic outputs is intuitively clear: intonational contours, for example, must be represented over a large spread of constituents.

5.2 Evidence from Kwakw'ala (Northern Wakashan)

Evidence for the existence of "inside-out" dependencies comes from the Northern Wakashan language Kwakw'ala (Anderson 1984, Klavens 1985). As Anderson (1984) notes, in Kwakw'ala, determiners are enclitics, and they attach to the right edge of a preceding word. The following example is slightly modified from Anderson (1984: 21, ex. 1) to match the morpheme gloss conventions of this paper:

(87)  Kwakwala "inside-out" enclitic determiner

\[
\begin{align*}
\text{kwiX?id-ida} & \quad \text{bag*anema-x-a} & \quad \text{qasa-s-is} & \quad \text{t?olwag*ayu} \\
\text{clubbed-DET} & \quad \text{man-OBJ-DET} & \quad \text{otter-INST-POSS} & \quad \text{club}
\end{align*}
\]

The man clubbed the sea-otter with his club.

In this example, the determiner \(-ida\) (DET) is to be semantically construed as the marker for the nominal \(\text{bag "anema "man"}\). Yet instead of attaching to this nominal, it attaches leftward to the preceding word, the verb \(\text{kwiX?id "clubbed"}\). The same leftward pattern is also exhibited by the other determiner in the sentence, \(-a\) (DET). Although this determiner should be semantically construed with the object nominal \(\text{qasa "otter"}\), it nonetheless attaches to the right edge of a different nominal, the subject nominal \(\text{bag "anema "man"}\), which happens to precede the object.

The Kwakw'ala example can be contrasted with the following example from Nuu-chah-nulth, which shows an "outside-in" dependency. In Nuu-chah-nulth, the determiner \(-?i\) reliably suffixes to the right edge of the first word in its complement. (This distribution is identical to that of a Nuu-chah-nulth affixal predicate.) Here, \(-?i\) suffixes to the nominal \(\text{huupuuk*as "car"}\).
The cases in (87) and (88) constitute a minimal pair for the “inside-out”/“outside-in” distinction. The difference between these two types of dependencies is represented syntactically below:


In (89a), the Kwak’ala determiner orients itself leftward to attach to the verb. In (89b), the Nuu-chah-nulth determiner positions itself rightward to attach to the nominal.

In each case, the determiner takes a single step to attach to a neighbouring word. Why, then, is (89a) to be analysed as “global”, while (89b) qualifies as “local”? Recall that local spell-out instruction applies only to derivational sisters. Only in (89b) does the affix attach to a host within its derivational sister: in (89a), the derivational sister of the enclitic determiner D is N, not the V which it takes as a host. Therefore, (89a) does not satisfy this strict definition of derivational locality.

5.3 Affix: primitive or derived?

What may condition the choice between local and global instructions for spell-out for an affix? I suggest that it may reduce to whether affixal status is primitive or derived in the language. Recall that in Nuu-chah-nulth, affixal predicates are lexically specified as affixes. This lexical distinction serves to differentiate them from independent predicates in the language, which never occur as suffixes.

The difference between affixal and independent predicates is not independently reducible to a factor distinct from affixhood, such as prosodic weight. With respect to the prosodic heaviness, affixal predicates come in a range of types – from the non-syllabic to the polysyllabic – and, as such, overlap with the syllabic and polysyllabic forms of non-affixal predicates. Examples of the different weights of affixal and independent roots are given below.
Polysyllabic affixal predicates
a. -iakuu:h [+L] "observe"
   b. -bahur: [+L] "on front"

Polysyllabic independent predicates
a. kuuw‘it "steal"
b. pawa+ "to lose s/t"

Monosyllabic affixal predicates
a. -naab "trying to locate"
b. -pa+ "be present"

Monosyllabic independent predicates
a. ri'a "to bite"
b. k'wix "to kiss"

Non-syllabic affixal predicates
a. -q [+R] "travelling with in vessel"
b. -s [+L] "asking for"

Affix, in Nuu-chah-nulth, must therefore be a morphological primitive. It is not the case that affixation takes place because of a deficiency in prosodic weight: affixal predicates may be weighty or weightless.

If affixal status is a lexical property of an affix in Nuu-chah-nulth, rather than a contextually prosodic characteristic, then it constitutes a bare output requirement for that morpheme. It is a tenet of the Minimalist grammar that the lexically-specified properties of an element must be satisfied by the point of spell-out, so that the features of the lexical item may receive an appropriate interface interpretation. Under this view, it is lexical specification that forces affixation in Nuu-chah-nulth to emerge locally in the minimal domain defined by local spell-out instruction.

According to this line of reasoning, the lexical entry for the Nuu-chah-nulth determiner must come equipped with an affix specification, in the same way that affixal predicates’ do. In other words, affixal status in Nuu-chah-nulth is a primitive, for affixal predicates or for determiners. The prediction of this analysis is that, conversely, the affixal status of determiners in Kwakw’ala must be derived, not inherent. Only for derived affixes will “inside-out” dependencies be tolerated. Only for derived affixes will affixation not be a requirement at the stage of local spell-out. Instead, if affixal status is prosodically determined, and established at a derivationally later stage, then global spell-out will apply to find a host for the derived affix.

There is independent evidence that affixation of the Kwakw’ala determiner applies later in the derivation than affixation in Nuu-chah-nulth. The key to this idea is the observation that a Kwakw’ala determiner construed with the subject attaches leftward to the verb. That is, in the VSO word order of Kwakw’ala, the determiner of the S attaches to the V, as we saw in example (87). Crucially, VSO is not possible as an underived word order for a language, since the verb and object must form a constituent (see Wojdak 2005). Instead, VSO order must always be derived. The fact that affixation takes place in Kwakw’ala only after VSO order has been established entails that it must be occurring at a derivationally later stage than in Nuu-chah-nulth. In Nuu-chah-nulth, an affixal predicate can only ever find a host from the object, never the
subject, even though either VOS or VSO surface orders are permitted (Wojdak 2005).

The contrast between the “inside-out” linearization of Kwakw’ala affixes and the “outside-in” pattern of Nuu-chah-nulth affixes constitutes a typological split between the Northern and Southern branches of the Wakashan family.

6 Conclusion

This paper has proposed that the positioning of affixal predicates in Nuu-chah-nulth is a reflex of the need to linearize these bound morphemes. At spell-out, the affixal predicate must find a host from within its derivational sister. This derivational sister is a linearized object, leading to the restriction that suffixation operates on the basis of linear adjacency. The syntax conditions the input to the linearization process in this multiple spell-out system, through its composition of local spell-out instruction domains.

Two conditioning effects of the syntax were emphasized: the first is the locality requirement induced by the binary concatenation of the syntax, which yields a complement restriction in Nuu-chah-nulth; the second, the creation of DP and CP domains which form impenetrable domains for affixation processes.

I have argued that the derivational sisterhood requirement on Nuu-chah-nulth affixation gives rise to an “outside-in” morpho-phonological dependency. In this arrangement, the affixal predicate is always syntactically higher than its chosen host, and so must reach within its complement to meet its affixation requirement. This relationship is strictly local in nature, and has been shown to contrast with a “global” affixation which does not occur with a derivational sister.

References


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