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

Rachel Wojdak
University of British Columbia

This paper addresses the linearization of affixes. The empirical focus of the study is Nuu-chah-nulth (nuučaaʔuɬ), 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.

* Data presented here is from the Ahousaht dialect. I am very grateful to my Nuu-chah-nulth consultants Mary Jane Dick, Katherine Fraser and Sarah Webster for their patience and enthusiasm in sharing their language with me. Fieldwork on Nuu-chah-nulth was partially funded by the Jacobs Research Fund (Whatcom Museum Society) and Phillips Fund (American Philosophical Society). This work is supported by SSHRC and Killam doctoral fellowships. All errors are my own.

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 *–ċaas* "bet" attaches to (or "incorporates") the nominal *kiƛuuk* "dishes". The affixal predicate is indicated by highlighting.

(2) kiƛuukċasitniš?aaɬ huu?ak?uyii
kiƛuuk-**ċaas**-mit-niš-?aaɬ huu?ak-?uyii
dishes-**bet**-PST-1PL.IND-HAB early-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 *–ċaas* "bet" to appear without a suitable morphological host.

(3) * ċaasitniš?aaɬ kiƛuuk huu?ak?uyii
ċaas-mit-niš-?aaɬ kiƛuuk huu?ak-?uyii
bet-PST-1PL.IND-HAB dishes early-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.

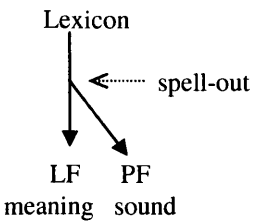
2 Theoretical assumptions

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*



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.

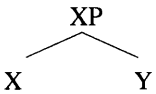
2.2 "Bottom-to-top" syntactic derivation

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 α with β, forming γ

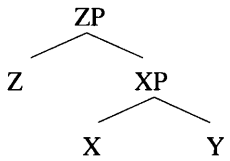
If X and Y are merged, the category label of one of these conjoined elements is projected.

(6) *Merge (X, Y)*



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) *Merge (Z, XP)*



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).

(8) *(re)Merge*: concatenate α (where α is an existing terminal) with β, forming γ

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"

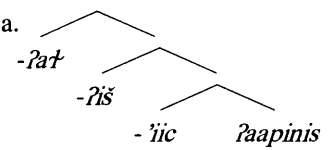
Following Halle and Marantz (1993) and other work in the Distributed Morphology framework, I assume that word formation parallels sentence formation in that both occur outside of the lexicon. There is no independent module for word-forming operations: "morphology" is a cover term for syntactic or postsyntactic 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 *ʔaapinyʼicʔišʔaɬ* "they are eating apples", as in (9), is composed of distinct syntactic elements.

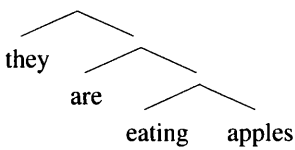
(9) ʔaapinyʼicʔišʔaɬ
ʔaapinis-**ʼiic**-ʔiš-ʔaɬ
apple-**consume**-3.IND-PL
They are eating apples.

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.



In each case, the morphemes occupy syntactic terminals.

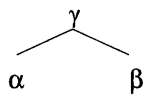
3 Linearization

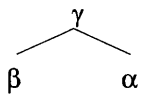
In the theoretical framework I have adopted, there are two sets of requirements which must be met over the course of the derivation by elements entering the syntactic computation. In the bifurcated model of the Minimalist

[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 *-ʔiš(ʔaɬ)* is not to be taken to be equivalent to English "they".

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.

(11) a. 

b. 

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-).[3] 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.[4] The logical possibilities for linearization of the syntactic terminals in (11) are listed in the following table:

[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. *ƛi-t-niiƛ* "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.

(12) *Linearization of bound and free elements*

	α	-α	α-
β	α β β α	β-α	α-β
-β	α-β	-α-β -β-α	α-β
β-	β-α	β-α	α-β- β-α-

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:

(13)

a.	α is free; β is a suffix:	α-β
b.	α is free; β is a prefix:	β-α
c.	α is a suffix; β is free:	β-α
d.	α is a suffix; β is a prefix:	β-α
e.	α is a prefix; β is free:	α-β
f.	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:

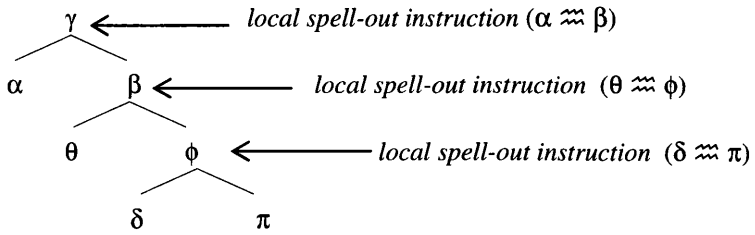
(14) *Local spell-out instruction*: at Merge (α, β), interpret α with respect to β

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 δ and π (Merge δ, π); the second uniting θ and ϕ (Merge θ, ϕ); the third uniting α and β (Merge α, β).

(15) *Iterative application of* local spell-out instructions



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 γ. At γ, the instructions are translated to PF by a summation of *local spell-out instructions*. For the tree in (15), spell-out at γ would entail satisfaction of the following instructions:

(16) (((δ ≋ π) ≋ θ) ≋ α)

Note that this formulation has internal structure, denoted by bracketing. The elements (δ ≋ π) and (θ) are grouped together (at the exclusion of α) because of the mid-derivational instruction (θ ≋ ϕ). The element ϕ is equivalent to (δ, π).

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 .... Y → [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 ($-\alpha$) suffixes to a free (β) or bound ($-\beta$) host. In either case, the surface realisation is $\beta-\alpha$. The place of these Nuu-chah-nulth linearization patterns within the typology of morphological dependencies is indicated (by shading) in (18).

(18) *Typology of morphological dependencies*

boundedness status	*linearization*
a. α is free; β is a suffix	α-β
b. α is free; β is a prefix	β-α
c. α is a suffix; β is free	β-α
d. α is a suffix; β is a prefix	β-α
e. α is a prefix; β is free	α-β
f. α is a prefix; β is a suffix	α-β

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 *ɬučʔin* "dress", a free noun. In (19b), the affixal predicate *–maḥsa* "want to" suffixes to the host *waɬšiƛ* "go home (PERF)", a verbal complex which is likewise morphologically independent.

(19) a. ƞuƀititsa ɬučʔinsiik
ƞuƀit-mit-sa ɬučʔin-**siik**
once-PST-1SG.DEP dress-**make**
I made a dress once.

b. waɬšiƛmaḥsak
waɬ-šiƛ-**maḥsa**-k
go.home-PERF-**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, *suuƛ-* "spring salmon".

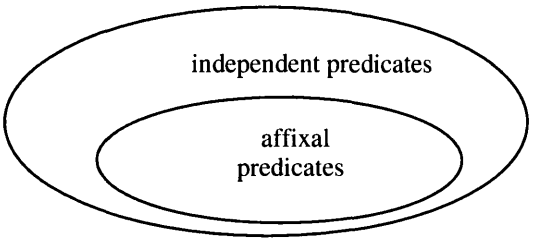
(20) suuẘiicsiš
suuƛ-'**iic**-siiš
salmon-**consume**-1SG.IND
I'm eating salmon.

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 *suuḥ-* "spring salmon" is a truncated form of the free-standing nominal *suuḥaa* "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.[5] 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, *ɬučʔin* "dress"), this option is unavailable to a non-affixal predicate such as *ńičiƛ* "sew".

(22) ɬučʔinsiikitsiš
ɬučʔin-siik-mit-siiš
dress-**make**-PST-1SG.IND
I made a dress.

(23) * ɬučʔinńičiƛitsiš
ɬučʔin-ńi-čiƛ-mit-siiš
dress-sew-PERF-PST-1SG.IND
I sewed a dress.

[5] This is testament to the productive nature of Nuu-chah-nulth incorporation.

As indicated by the ungrammaticality of (23), the independent predicate *ƛičiƛ* "sew" cannot suffix to the host nominal *ɬučʔin* "dress". Instead, the nominal necessarily appears as a word separate from the independent predicate:

(24) ƛičiƛitsiš ɬučʔinʔakqs
ƛi-čiƛ-mit-siiš ɬučʔin-ʔak-qs
sew-PERF-PST-1SG.IND dress-POSS-1SG.PS
I sewed my dress.

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

(25) * siikitsiš ɬučʔinʔakqs
siik-mit-siiš ɬučʔin-ʔak-qs
make-PST-1SG.IND dress-POSS-1SG.PS
I sewed my dress.

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 *ʕapaak* "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) waɬšiƛmaḥsak
waɬ-šiƛ-**maḥsa**-k
go.home-PERF-**want.to**-2SG.Q
Do you want to go home?

This example may be contrasted with the one in (27), which shows the independent predicate *ʕapaak* "willing to". As an independent predicate, *ʕapaak* "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 *waɬšiƛ* "go home".

(27) * waɬšiƛʕapaakk
waɬ-šiƛ-ʕapaak-k
go.home-PERF-willing-2SG.Q
Are you willing to go home?

Instead, the verb *waɬšiƛ* "go home" follows the independent predicate, as a separate word.

(28) ʕapaakk waɬšiƛ
ʕapaak-k waɬ-šiƛ
willing-2SG.Q go.home-PERF
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 *-maḥsa* "want to" must appear as a suffix.

(29) * maḥsak waɬšiƛ
maḥsa-k waɬ-šiƛ
want.to-2SG.Q go.home-PERF
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]: * $[\alpha]_{\omega}$

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

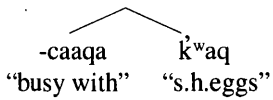
This section develops the notion that spell-out induces in Nuu-chah-nulth a particular morphological arrangement which I refer to as *PF incorporation*. In this linearization, an affixal predicate ($-\alpha$) suffixes to a host ($\beta(-)$), yielding an ordered morphological dependency of β-α. The affixal 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 *k'ʷaaqcaaqa*

"busy with spawned herring eggs", which is comprised of the affixal predicate *–caaqa* "busy with" and its nominal host *k'ʷaq* "spawned herring eggs".

(31) k'ʷaaqcaaqa?iš ʕaaḥuus?atḥ
k'ʷaq-**caaqa**[+L]-?iiš ʕaaḥuus-?atḥ
s.h.eggs-**busy.with**-3.IND place.name-from
The Ahousahts are busy with spawned herring eggs.

According to my analysis, the string *k'ʷaaqcaaqa* 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 *k'ʷaq* "spawned herring eggs".

(32)



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 noun-verb dependencies. The Nuu-chah-nulth language instantiates two of these dependencies.

(33) *Morphological typology of noun-verb dependencies*

	bound noun	*free noun*
bound verb	Nuu-chah-nulth	Nuu-chah-nulth
free verb	Mohawk	English

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 *–nuhs* "house" is incorporated into the inflected verb *ye-nuhwe?-s* "like 3FS/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 *-ʔaap* "buy" suffixing to the bound nominal *maḥtʔa-* "house". In (35b), even though the free form of "house", *maḥtʔii*, is used, it is not possible for the noun and verb to be separated.

(35) a. maḥtʔaʔamitʔiš čakup
maḥtʔa-**ʔaap**-mit-ʔiiš čakup
house-**buy**-PST-3.IND man
A man bought a house.

b. * ʔaamitʔiš maḥtʔii čakup
ʔaap-mit-ʔiiš maḥtʔii čakup
buy-PST-3.IND house man
A man bought a house.

The example in (35b) is ruled out because the affixal predicate *-ʔaap* "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).

(36) *Greenlandic*

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

b. Qimmimik peqarpoq
dog-INST ∅-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 *ʔu-*. An example is given below, in which *ʔu-* acts as a host for the affixal predicate *-ʔaap* "buy".

(37) ʔuʔaamitʔiš maḥt̓ii čakup
ʔu-ʔaap-mit-ʔiiš maḥt̓ii čakup
∅-**buy**-PST-3.IND house man
A man bought a house.

In (37), *ʔu-*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 *ʔu-* appears as a host for the affixal predicate *–cuk* "necessary". This predicate takes a conditional complement, as in *c̓ukʷiʔatquu qaawicʔi* "that the potatoes be washed".

(38) ʔucukʔiš c̓ukʷiʔatquu qaawicʔi
ʔu-cuk-ʔiš c̓u-kʷiƛ-ʔat-quu qaawic-ʔi
∅-**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 *ʔu-* in Nuu-chah-nulth is regularly used in the citation forms of affixal predicates, as in *ʔu-ʔaap* "buy" and *ʔu-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 *ʔu-*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 *PF Incorporation*. On the other hand, the expletive element *ʔu-* may be introduced as a host. In the framework of Distributed Morphology, *ʔu-* 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, *ʔu-*insertion receives an analysis parallel to that which Lasnik (1981) proposes for *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 *ʔu-*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 *ʔu-*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 *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 than an affixal predicate is united with a host at spell-out so that it may be linearized. This *local spell-out instruction* proposal argues that an affixal predicate -α is "interpreted" with respect to its host β(-), a spell-out which induces a β-α linearization. This section presents independent evidence for a phonological dependency between α and β. 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).

(39)	a.	c̓uusc̓uusa		b.	kiiƛ̓kiiƛ̓a
		c̓us-a[+R+L]			kiƛ̓-a[+R+L]
		dig-IT			break-IT
		'digging continuously'			'breaking continuously'

Affixal predicates share this ability to prosodically condition their morphological hosts.[6] 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 *ʔu-* and incorporated hosts are affected by the prosodic requirements of affixal predicates.

The examples below illustrate the behaviour of the affixal predicate *ʔuu-ḥwaɬ* "use", which triggers vowel lengthening of the first syllable of its host. In (41a), the vowel of the expletive morpheme *ʔu-* is lengthened to *ʔuu-*, while in (41b) the first vowel of *yaxy̓ak* "broom" is lengthened to *yaaxy̓ak*.

(41) a.

ʔuuḥw̓aɬʔi	yaxy̓ak
ʔu-**ḥw̓aɬ**[+L]-'i	yaxy̓ak
Ø-**use**-2SG.IMP>3OBJ	broom
Use a broom!	

b.

yaaxy̓akḥwaɬʔi
yaxy̓ak-**ḥwaɬ**[+L]-'i
broom-**use**-2SG.IMP>3OBJ
Use a broom!

The following example shows how reduplication is triggered by the affixal predicate *ʔuʔu-q* "travel with (in a vessel)". In (42a), the expletive morpheme *ʔu-* surfaces as *ʔuʔu-*, while in (42b), the morpheme *ʔuuš* "someone" appears as *ʔuuʔuuš*. 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.

(42) a.

ʔuʔuqʔiš	Louis	huupuk̓ʷasukʔi	Robin
ʔu-**q**[+R]-ʔiiš	Louis	huupuk̓ʷas-uk-ʔi	Robin
Ø-**travel.with**-3.IND	Louis	car-POSS-DET	Robin
Louis is travelling in Robin's car.			

[6] Independent predicates never induce prosodic conditioning.

b. ʔuuʔuušqʔiš Louis
ʔuuš-q[+R]-ʔiiš Louis
someone-**travel.with**-3.IND Louis
Louis is travelling with someone (eg. in his canoe).

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 *-uʔaaɬ* "find", and no reduplication is triggered. Accordingly, in (43a), *ʔu-* surfaces without reduplication or a change in vowel length, and in (43b), the same applies for *taanaq-* "money".

(43) a. ʔuyuʔaaɬsiš taana
ʔu-**uʔaaɬ**-siiš taana
∅-**find**-1SG.IND money
I found money.

b. taanaquʔaaɬsiš
taanaq-**uʔaaɬ**-siiš
money-**find**-1SG.IND
I found money.

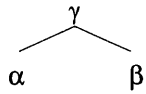
Many affixal predicates in the language display this neutral pattern, and impose no prosodic conditioning (see Sapir and Swadesh 1939).

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

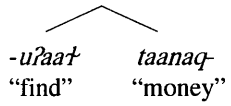
When an element reaches spell-out, it must be linearized with respect to its neighbour. This is the essence of the *local spell-out instruction* proposal. In the discussion up until this point, the locality constraint on this linearization process has been trivial in that only two syntactic terminals, α and β, were represented as the input to the spell-out rule:

(44)



The syntactic configuration in (44) can be considered to be the basic step of the syntactic derivation, equivalent to a single application of Merge (α, β). An example of this simple arrangement is when an affixal predicate selects a bare noun complement, as in *taanaq-u?aaɬ* "find money" (from 43b).

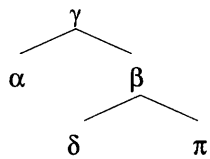
(45)



The linearization forced at spell-out for *taanaq-u?aaɬ* 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:

(46)



This configuration is derived via two separate applications of binary concatenation. In the first, δ and π are selected from the numeration [α, δ, π] and are joined through Merge (δ, π). The output of Merge (δ, π) is β, the abstract node label designating the contents of the pairing. For the second concatenation, α is introduced from the numeration. This concatenation unites α with β, through Merge (α, β). The syntactic output of this sequence of operations is γ, 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 δ and π. (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 <δ, π>. When the next element, α, enters the computation and receives instructions for spell-out, α must be linearized with respect to β, just as it was in the simpler case of (44).

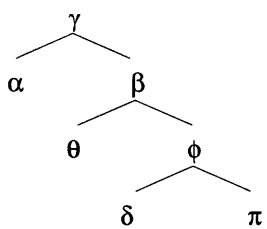
(47) *Local spell-out instruction*: at Merge (α, β), interpret α with respect to β

With the derivation in (46), however, β is not a simplex construct; in (46), β is the object <δ, π>.

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

Furthermore, when even larger derivational samples <θ, δ, π> are considered, we will also see that linearization never "skips" a potential host. Take <θ, δ, π> 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 α.

(48)



At the spell-out point of γ, the affixal predicate -α must be linearized with respect to the ordered object <θ, δ, π>. Affixation is strictly local in that the resulting linearization is <(θ-α), δ, π> and not <θ, (δ-α), π>. 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 (-α) must be linearized as a suffix to the single leftmost element in its derivational sister <δ, π>, resulting in <(δ-α), π>.

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, *-'iiḥ* "try to" and *-maḥsa* "want to") are suffixed to the verb *huuḥtak* "know".

(50)	huuḥtakšiiḥmaḥsaʔiš	Lucy	quuquuʔaca
	huuḥtak-šiƛ-'iiḥ-maḥsa-ʔiiš	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 *huuḥtak* "know"). If the host for an affixal predicate must be linearly adjacent to the affixal predicate, then why is that *–maḥsa* "want to" is attaching to another bound element (*-'iiḥ* "trying to"), and not attaching directly to the free form *huuḥtak* "know"? Strictly speaking, the affixal predicates *–maḥsa* and *–'iiḥ* 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.

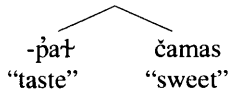
The solution to this problem is iterative application of *local spell-out instructions*. In the framework I am assuming, spell-out applies after each occurrence of Merge. I therefore propose that successive applications of *local spell-out instruction* enforce a build-up of hosts, induced when one affixal 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)	čamasp̓aɬc̓uqšiʔin
	čamas-**p̓aɬ**-**c̓uq**-šiƛ-'in
	sweet-**taste**-**in.mouth**-PERF-1PL.IMP
	Let us put something sweet in our mouths.

In (51), there are two affixal predicates: *ʔu-p̓aɬ* "taste of" and *ʔu-c̓uq* "in mouth". The affixal predicates are followed by the perfective marker *–šiƛ* (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-p̓aɬ* "taste of" joins with *čamas* "sweet" via Merge (*p̓aɬ*, *čamas*).

(52)



Because *-ƛ̓aɬ* is a suffix, this arrangement is linearized at spell-out as *čamas-ƛ̓aɬ* "sweet-tasting". Successive steps of Merge build on this linearization to produce a longer string of morphemes. In the next stage, *ʔu-c̓uq* "in mouth" is merged into the derivation, via Merge (*c̓uq, čamas-ƛ̓aɬ*). Because *-c̓uq* is a suffix, this string is linearized as *čamasƛ̓aɬ-c̓uq* "something sweet tasting in the mouth".

The non-predicative suffixes, *-šiƛ* (PERF) and *-ʔin* (1PL.IMP), are also eligible for positioning through *local spell-out instructions*. When the perfective suffix *-šiƛ* (PERF) is merged into the derivation, it is instructed to be "interpreted" with respect to its derivational sister *čamasƛ̓aɬc̓uq*, inducing a linearization of *čamasƛ̓aɬc̓uq-šiƛ* "put something sweet tasting in the mouth". Finally, the imperative suffix *-ʔin* (1PL.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 *čamasƛ̓aɬc̓uqšiʔin* "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 arrangments: 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 targetting 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, targetting adjectives; the second, targetting 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 *haʔum* "tasty" must obligatorily precede a nominal such as *ʔaapinis* "apples".

(53) a.
ʔuʔiicʔišʔaɬ haʔum ʔaapinis
ʔu-ʔiic-ʔiiš-ʔaɬ haʔum ʔaapinis
∅-**consume**-3.IND-PL tasty apples
They are eating delicious apples.

b. * ʔuʔiicʔišʔaɬ ʔaapinis haʔum
ʔu-ʔiic-ʔiiš-ʔaɬ ʔaapinis haʔum
∅-**consume**-3.IND-PL apples tasty
They are eating delicious apples.

Let us assume for the present discussion that in (53), the affixal predicate *ʔu-ʔiic* "consume" takes the nominal phrase *haʔum ʔaapinis* "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[uantity] > A[djective] > 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 *ʔaapinis* "apples" is the host for *ʔu-ʔiic* "consume" in (54a), it cannot act as a host when the prenominal modifier *haʔum* "tasty" appears, as in (54b).

(54) a.
ʔaapinyʔicʔišʔaɬ
ʔaapinis-ʔiic-ʔiiš-ʔaɬ
apples-**consume**-3.IND-PL
They are eating apples.

b. * ʔaapinyʔicʔišʔaɬ haʔum
ʔaapinis-ʔiic-ʔiiš-ʔaɬ haʔum
apples-**consume**-3.IND-PL tasty
They are eating delicious apples.

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

(55) haʔumʔicʔišʔaɬ ʔaapinis
haʔum-**ʔiic**-ʔiiš-ʔaɬ ʔaapinis
tasty-**consume**-3.IND-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 *–qaatḥ* "claim" and *ʔu-ʕiƛ* "come upon". These predicates allow incorporation of a verb from their logical complement.

(56) a. waɬšiƛqatḥsiš
waɬ-šiƛ-**qaatḥ**-siiš
go.home-PERF-**claim**-1SG.IND
I claimed I went home.

b. waʔičʕiƛitsiš Ken
waʔič-**ʕiƛ**-mit-siiš Ken
sleep-**come.upon**-PST-1SG.IND Ken
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 *qʷaʔuuḥ* "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. čaaniʔaqƛʔiš waʔič
čaani-ʔaqƛ-ʔiiš waʔič
first-FUT-3.IND sleep
He will sleep first (ie. before doing something else).

b. waʔičʔaqƛʔiš čaani
waʔič-ʔaqƛ-ʔiiš čaani
sleep-FUT-3.IND first
He will sleep first (ie. before doing something else).

(58) a. naʔiikʔaqƛsiš waɬšiƛ hawiiʔaƛquu
naʔiik-ʔaqƛ-siiš waɬ-šiƛ hawii-ʔaƛ-quu
immediately-FUT-1SG.IND go.home-PERF finish-TEMP-3.COND
I will immediately go home when it's finished.

b. waɬšiʔaqƛsiš naʔiik hawiiʔaƛquu
waɬ-šiƛ-ʔaqƛ-siiš naʔiik hawii-ʔaƛ-quu
go.home-PERF-FUT-1SG.IND immediately finish-TEMP-3.COND
I will immediately go home when it's finished.

(59) a. qʷaʔuuḥʔiš Florence nunuuk
qʷaʔuuḥ-ʔiiš Florence nunuuk
purposely-3.IND Florence sing
Florence is purposely singing.

b. nunuukʔiš Florence qʷaʔuuḥ
nunuuk-ʔiiš Florence qʷaʔuuḥ
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. witɣaxits waaɬšiƛ
witɣax-mit-s waɬ-[+L]-šiƛ
slow-PST-1SG.ABS go.home-CONT-PERF
I was going home slowly.

b. * waaɬšiƛits witɣax
waɬ-[+L]-šiƛ-mit-s witɣax
go.home-CONT-PERF-PST-1SG.ABS slow
I was going home slowly.

(61) a. čamaqƛ?iš titiqs Florence
čamaqƛ-?iiš titiqs Florence
properly-3.IND dry Florence
Florence is drying dishes properly.

b. * titiqs?iš čamaqƛ Florence
titiqs-?iiš čamaqƛ 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. waɬšiƛqaṯḥsiš naʔiik ʔatquu wiktumsa
waɬ-šiƛ-**qaaṯḥ**-siiš naʔiik ʔatquu 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. naʔiikqaṯḥsiš waɬšiƛ ʔatquu wiktumsa
naʔiik-**qaaṯḥ**-siiš waɬ-šiƛ ʔatquu 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. čaaniẇiťassiš waʔič
čaani-**ẇiťas**-siiš waʔič
first-**gonna**-1SG.IND sleep
I will sleep first (ie. before doing something else)

b. waʔičẇiťassiš čaani
waʔič-**ẇiťas**-siiš čaani
sleep-**gonna**-1SG.IND first
I will sleep first (ie. before doing something else)

(65) a. qʷaʔuuḥqatḥʔiš taʔiɬ k̓en
qʷaʔuuḥ-**qaatḥ**-ʔiiš taʔiɬ Ken
purposely-**claim**-3.IND sick Ken
Ken is pretending to be sick on purpose.

b. taʔiɬqatḥʔiš Ken qʷaʔuuḥ
taʔiɬ-**qaatḥ**-ʔiiš Ken qʷaʔuuḥ
sick-**claim**-3.IND Ken 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. čamaqƛqatḥʔiš titiqs Florence
čamaqƛ-**qaatḥ**-ʔiiš titiqs Florence
properly-**claim**-3.IND dry Florence
Florence is pretending to dry dishes properly.

b. * titiqsqatḥʔiš čamaqƛ Florence
titiqs-**qaatḥ**-ʔiiš čamaqƛ Florence
dry-**claim**-3.IND properly Florence
Florence is pretending to dry dishes properly.

(67) a. ḥacukʕiƛitsiš waʔič Ken
ḥacuk-**ʕiƛ**-mit-siiš waʔič Ken
deeply-**come.upon**-PST-1SG.IND sleep Ken
I came upon Ken in a deep sleep.

b. * waʔičʕiƛitsiš ḥacuk Ken
waʔič-**ʕiƛ**-mit-siš ḥacuk Ken
sleep-**come.upon**-PST-1SG.IND ḥacuk Ken
I came upon Ken in a deep sleep.

(68) a.

witʔaxmaḥsasiš	waaɬšiƛ
witʔax-**maḥsa**-siiš	waɬ-[+L]-šiƛ
slow-**want.to**-1SG.IND	go.home-CONT-PERF

I want to go home slowly.

b. *

waaɬšiƛmaḥsasiš	witʔax
waɬ-šiƛ[+L]-**maḥsa**-siiš	witʔax
go.home-CONT-PERF-**want.to**-1sg.IND	slow

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 *ʔuḥʔiiš* (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, *ḥaakʷaaƛ* "girl" and *maʔiƛqac* "boy" in (69a) and *Bill* and *Mary* in (69b).

(69) a.

ṅaačp̓iiḥamitsiš	ḥaakʷaaƛ	ʔuḥʔiiš	maʔiƛqac
ṅaač-p̓iiḥa-mit-siš	ḥaakʷaaƛ	ʔuḥʔiiš	maʔiƛqac
see-glimpse-PST-1SG.IND	girl	CONJ	boy

I caught a glimpse of a girl and a boy.

b.

huuɬhuuɬamitʔiš	Bill	ʔuḥʔiiš	Mary
huuɬ-a[+R]-mit-ʔiiš	Bill	ʔuḥʔiiš	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.

ʔaačičiɬitk	ṅaačp̓iiḥa
ʔača-čiɬ-mit-k	ṅaač-p̓iiḥa
who-AUX-PST-2SG.Q	see-glimpse

Who did you catch a glimpse of?

b. * ʔaačičɬitk ƛaačp̓iiƛa ʔuƛ̓ʔiiš maʔiƛ̓qac
ʔača-čiɬ-mit-k ƛaač-p̓iiƛa ʔuƛ̓ʔiiš maʔiƛ̓qac
who-AUX-PST-2SG.Q see-glimpse CONJ boy
(*lit*: "who did you catch a glimpse of and a boy?")

c. * ʔaačičɬitk ƛaačp̓iiƛa ƛaakʷaaƛ̓ ʔuƛ̓ʔiiš
ʔača-čiɬ-mit-k ƛaač-p̓iiƛa ƛaakʷaaƛ̓ ʔuƛ̓ʔiiš
who-AUX-PST-2SG.Q see-glimpse girl CONJ
(*lit*: "who did you catch a glimpse of girl and?")

(71) a. ʔačaqiƛ̓ huuɬhuuɬa
ʔačaq-mit-ƛ̓ huuɬ-a[+R]
who-PST-3.Q dance-IT
Who was dancing?

b. * ʔačaqiƛ̓ huuɬhuuɬa ʔuƛ̓ʔiiš Mary
ʔačaq-mit-ƛ̓ huuɬ-a[+R] ʔuƛ̓ʔiiš Mary
who-PST-3.Q dance-IT CONJ Mary
(*lit*: "who and Mary was dancing?")

c. * ʔačaqiƛ̓ huuɬhuuɬa Bill ʔuƛ̓ʔiiš
ʔačaq-mit-ƛ̓ huuɬ-a[+R] Bill ʔuƛ̓ʔiiš
who-PST-3.Q dance-IT Bill CONJ
(*lit*: "Bill and who was dancing?"

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 *ʔukʷist̓ap* "take away" incorporates the nominal *hamuut* "bones", leaving stranded the remainder of the conjunction *ʔuƛ̓ʔiiš kuuna* "and gold". Parallel cases of incorporation targetting the first word of the conjunct are shown in (73b) and (74b).

(72) a. ʔukʷist̓amitʔiš mamaɬn̓i hamuut ʔuƛ̓ʔiiš kuuna
ʔu-**kʷist**-'ap-mit-ʔiiš mamaɬn̓i hamuut ʔuƛ̓ʔiiš kuuna
∅-**move.away**-TR-PST-3.IND white.people bones CONJ gold
White people took away the bones and gold.

b. hamuutkʷist̓amitʔiš mamaɬn̓i ʔuƛ̓ʔiiš kuuna
hamuut-**kʷist**-'ap-mit-ʔiiš mamaɬn̓i ʔuƛ̓ʔiiš kuuna
bones-**move.away**-TR-PST-3.IND white.people CONJ gold
White people took away the bones and gold.

(73) a. ʔuʔaamitsiš č̓apac ʔuḥʔiiš čima
ʔu-**ʔaap**-mit-siiš č̓apac ʔuḥʔiiš čima
∅-**buy**-PST-1SG.IND canoe CONJ net
I bought a canoe and a net.

b. č̓apacʔamitsiš ʔuḥʔiiš čima
č̓apac-**ʔaap**-mit-siiš ʔuḥʔiiš čima
canoe-**buy**-PST-1SG.IND CONJ net
I bought a canoe and a net.

(74) a. ʔuḥaay̓asči ƛ̓iƛ̓ick̓ukʔuḥʔiiš šuukʷaa
ʔu-**ḥaa**-**'as**-či ƛ̓iƛ̓ick̓ukʔuḥʔiiš šuukʷaa
∅-**buy**-**go**-2SG.DIR>3OBJ flour CONJ sugar
Go buy flour and sugar!

b. ƛ̓iƛ̓ick̓ukḥaay̓asči ʔuḥʔiiš šuukʷaa
ƛ̓iƛ̓ick̓uk-**ḥaa**-**'as**-či ʔuḥʔiiš šuukʷaa
flour-**buy**-**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 *ʔu-ʔaap* "buy".

(75) a. č̓upc̓upšumɬʔamitsiš
č̓upc̓upšumɬ-**ʔaap**-mit-siiš
sweater-**buy**-PST-1SG.IND
I bought a sweater. *(noun)*

b. ƛ̓iḥʔaamitsiš č̓upč̓upšumɬ siy̓a
ƛ̓iḥ-ʔaap-mit-siiš č̓upč̓upšumɬ siy̓a
red-**buy**- PST-1SG.IND sweater 1SG
I bought a red sweater. *(adjective)*

c. hiy̓aap̓atukʔiš nuutinum(m̓inḥ)
hiš-ʔaap-'at-uk-ʔiš nuutinum(-m̓inḥ)
all-**buy**-PASS-POSS-3.IND necklace(-PL)
All his/her necklaces were bought. *(quantifier)*

d. ʔaqiʔamitḥ Louis
ʔaqi-ʔaap-mit-ḥ Louis
what-**buy**-PST-3.Q Louis
What did Louis buy? *(wh-pronoun)*

e. kʷinʔaɬitʔiš John ɬučʔin yaʕaamitʔitk
kʷinʔaɬ-mit-ʔiiš John ɬučʔin yaq-ʔaap-mit-ʔitk
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. kamatqukmaḥsaʔiš Florence
kamatq-uk-maḥsa-ʔiiš Florence
run-DUR-**want.to**-3.IND Florence
Florence wants to run.

b. ƛ̓aʔixmaḥsaʔiš kamatquk Florence
ƛ̓aʔix-maḥsa-ʔiiš kamatq-uk Florence
fast-**want.to**-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).

(77) a.

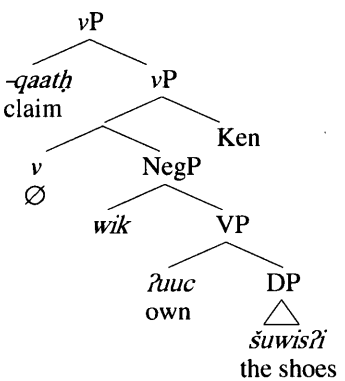
wikqaatḥʔiš	ʔuuc	šuwisʔi	Ken
wik-**qaatḥ**-ʔiiš	ʔu-ic	šuwis-ʔi	Ken
NEG-**claim**-3.IND	∅-own	shoes-DET	Ken
Ken claims he doesn't own the shoes.			*(VP negation)*

b.

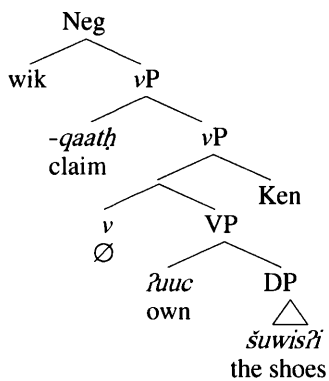
wikʔiiš	ʔuucqaatḥ	šuwisʔi	Ken
wik-ʔiiš	ʔu-ic-**qaatḥ**	šuwis-ʔi	Ken
NEG-3.IND	∅-own-**claim**	shoes-DET	Ken
Ken doesn't claim to own the shoes.			*(sentential negation)*

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 *–qaatḥ* "claim". In sentential negation, the affixal predicate is spelled-out adjacent to the verb *ʔuuc* "own". The following diagram illustrates the syntactic position of *wik* (NEG) and *ʔuuc* "own" relative to the affixal predicate *–qaatḥ* "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 *–qaatḥ* "claim", as shown in (78a). In (78b), in contrast, it is the verb *ʔuuc* "own" which is the left-most element of the derivational sister of *–qaatḥ* "claim".

(78) a. *VP negation*



b. *sentential negation*

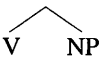


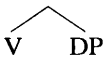
Thus, due to the linear adjacency restriction on incorporation, for (78a), a linearization of <*wik-qaatḥ ʔuuc šuwisʔi Ken* > is anticipated. In (78b), the ordering of <*ʔuucqaatḥ šuwisʔi Ken*> is predicted. This linearization mechanism

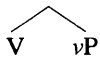
is not sensitive to a difference in syntactic category between the negation host *wik* (NEG) and the verbal host *ʔuuc* "own".

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, *v*P or CP are the complements of the affixal predicate.

(79) a. 

b. 

c. 

d. 

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) [hiixtaqči*mitsiš*] $_{CP\ DOMAIN}$ [huupuuk^{w}as*ukʔitk*] $_{DP\ DOMAIN}$
hiixtaq-čip-*mit-siiš* huupuuk^{w}as-*uk-ʔitk*
have.accident-BEN-PST-1SG.IND car-POSS-2SG.PS
I had an accident with your car.

In §4.4.1 and §4.4.2, I show that *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 *ɬučʔin* "dress". The example in (82b) indicates that a nominal marked with the determiner -*ʔi* 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, *ʔu*-support must occur, as shown in (82d).

(82) a. ɬučʔinsiikitsiš
ɬučʔin-**siik**-mit-siš
dress-**make**-PST-1SG.IND
I made a dress.

b. * ɬučʔin-ʔi-**siik**-mit-siš
dress-DET-**make**-PST-1SG.IND
I made the dress.

c. * ʔi-**siik**-mit-siš ɬučʔin
DET-**make**-PST-1SG.IND ɬučʔin
I made the dress. dress

d. ʔusiikitsiš ɬučʔinʔi
ʔu-**siik**-mit-siš ɬučʔin-ʔi
∅-**make**-PST-1SG.IND 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 *ʔuu-ƛaƛ̓uuḥ* "observe". This full complement contains the complementizer *ʔen*, the past tense marker *–mit*, and the 2nd person singular "dependent" mood inflection *–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. ʔuuƛaƛ̓uuḥitsiš ʔen tuuxtuuxʷamitsuk
ʔu-**ƛaƛ̓uuḥ**[+L]-mit-siš ʔen tuuxʷ-a[+R]-mit-suuk
∅-**observe**-PST-1SG.IND COMP jump-IT-PST-2SG.DEP
I observed that you were jumping.

b. * tuuxtuuxʷamitƛaƛ̓uuḥitsiš (ʔen) suẃa
tuuxʷ-a[+R]-mit-**ƛaƛ̓uuḥ**[+L]-mit-siš (ʔen) suẃa
jump-IT-PST-**observe**-PST-1SG.IND (COMP) you
I observed you jumping.

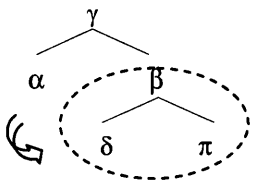
c.	tuuxtuux^{w}aƛ̓aq̓uuƛ̓itsiš	suwa
	tuux^{w}-a[+R]-ƛ̓aq̓uuƛ̓[+L]-mit-siš	suwa
	jump-IT-**observe**-PST-1SG.IND	you
	I observed you jumping.	

Wojdak (2005) analyses the verb incorporation case in (83c) as having a *v*P 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):

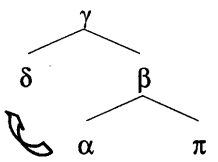
(84)



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 α with respect to δ

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*

kʷixʔid-ida	bəgʷanəma-x̌-a	q̓asa-s-is	t̓əlwagʷayu
clubbed-DET	man-OBJ-DET	otter-INST-POSS	club

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 *bəgʷanəma* "man". Yet instead of attaching to this nominal, it attaches leftward to the preceding word, the verb *kʷixʔid* "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 *q̓asa* "otter", it nonetheless attaches to the right edge of a different nominal, the subject nominal *bəgʷanəma* "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 *-ʔi* 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, *-ʔi* suffixes to the nominal *huupuuk̓ʷas* "car".

(88) *Nuu-chah-nulth "outside-in" enclitic determiner*

kuuẃiɬitʔiš	čakup	huupuukʷasʔi
kuuẃiɬ-mit-ʔiiš	čakup	huupuukʷas-ʔi
steal-PST-3.IND	man	car-DET

The man stole the 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:

(89) a. *"Inside-out" Kwakw'ala* b. *"Outside-in" Nuu-chah-nulth*

In (89a), the Kwakw'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.

(90) Polysyllabic affixal predicates
a. *-ƛ̓akʷuuƛ̓* [+L] "observe"
b. *-ƛ̓aƛ̓uɬ* [+L] "on front"

(91) Polysyllabic independent predicates
a. *kuuƛ̓iɬ* "steal"
b. *paƛ̓aɬ* "to lose s/t"

(92) Monosyllabic affixal predicates
a. *-ƛ̓aaƛ̓* "trying to locate"
b. *-paɬ* "be present"

(93) Monosyllabic independent predicates
a. *ƛ̓a* "to bite"
b. *kʼʷix* "to kiss"

(94) Non-syllabic affixal predicates
a. *-q* [+R] "travelling with in vessel"
b. *-š* [+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 occuring 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

Abney, Steven. 1987. The English noun phrase in its sentential aspect. Doctoral dissertation, MIT.

Anderson, Stephen R. 1984. Kwakwala syntax and the Government-Binding theory. In The syntax of Native American Languages, Eung-Do Cook and Donna B. Gerdts (eds). vol. 16 of *Syntax and Semantics* 21-75. Orlando: Academic Press.

Baker, Mark C. 1988. *Incorporation: A theory of grammatical function changing*. Chicago: University of Chicago Press.

Bobaljik, Jonathan David. 1994. What does adjacency do? In *MIT Working Papers in Linguistics* 21: The morphology-syntax connection, 1-32. Cambridge, Mass.: MITWPL.

Bresnan, Joan. 1971. Sentence stress and syntactic transformations. *Language* 47: 257-281.

Chomsky, Noam. 1995. *The Minimalist Program.* Cambridge, Mass: MIT Press.

Chomsky, Noam. 2001. Derivation by phase. In *Ken Hale: A life in language*, ed. by Michael Kenstowicz, 1-52. Cambridge, Mass.: MIT Press.

Davidson, Matthew. 2002. Studies in Southern Wakashan (Nootkan) Grammar. Doctoral dissertation, SUNY at Buffalo.

Davis, Henry and Naomi Sawai. 2001. Wh-movement as Noun Incorporation in Nuu-chah-nulth. In *WCCFL 20 Proceedings*, Karine Megerdoomian and Leora Anne Bar-El (eds.), 123-136. Somerville, MA: Cascadilla Press.

Embick, David and Rolf Noyer. 2001. Movement operations after syntax. *Linguistic Inquiry* 32: 555-595.

Epstein, Samuel David, Erich Groat, Ruriko Kawashima, and Hisatsugu Kitahara. 1998. *A derivational approach to syntactic relations.* Oxford: Oxford University Press.

Halle, Morris and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In *The view from Building 20.* Kenneth Hale and Samuel Jay Keyser (eds). Cambridge, Mass: MIT Press.

Kitahara, Hisatsugu. 1994. Target α: A unified theory of movement and structure-building. Doctoral dissertation, Harvard University, Cambridge, Mass.

Kitahara, Hisatsugu. 1995. Target α: Deducing strict cyclicity from derivational economy. *Linguistic Inquiry* 26: 47-77.

Kim, Eun-Sook. 2003. Theoretical issues in Nuu-chah-nulth phonology and morphology. Doctoral dissertation, University of British Columbia.

Kim, Eun-Sook and Rachel Wojdak. 2002. A survey of Nuu-chah-nulth reduplication. In *Papers for the 37th ICSNL.* UBCWPL 9: 189-202.

Klavans, Judith L. 1985. The independence of syntax and phonology in cliticization. *Language* 61: 95-120.

Kroeber, A. L. 1909. Noun incorporation in American languages. *XVI Internationaler Amerikanisten-Kongress* 569-76.

Kroeber, A. L. 1911. Incorporation as a Linguistic Process. *American Anthropologist* 13: 577-584.

Lasnik, Howard. 1981. Restricting the theory of transformations. In N. Hornstein and D. Lightfoot, eds., *Explanation in Linguistics*. Longmans.

Marantz, Alec. 1988. Clitics, morphological merger, and the mapping to phonological structure. In *Theoretical morphology: approaches in modern linguistics.* M. Hammond and M. Noonan (eds.) , pp. 253-270. Academic Press, San Diego.

Marantz, Alec. 1989. Clitics and phrase structure. In *Alternative conceptions of phrase structure.* M. Baltin and A Kroch (eds.). Chicago: University of Chicago Press.

Nakayama, Toshihide. 1997. *Discourse-Pragmatic Dynamism in Nuu-chah-nulth (Nootka) Morphosyntax.* Doctoral dissertation, University of California, Santa Barbara.

Nakayama, Toshihide. 1998. Lexical suffixes in Nuuchahnulth: An overview. In *Languages of the North Pacific Rim* 5, Osahito Miyaoka (ed), 19-41. Suita, Japan: Osaka Gakuin University.

Rose, Suzanne M. 1981. Kyuquot Grammar. Doctoral dissertation, University of Victoria.

Sadock, Jerrold M. 1980. Noun incorporation in Greenlandic: A case of syntactic word formation. *Language* 56: 300-319.

Sadock, Jerrold M. 1986. Some notes on noun incorporation. *Language* 62: 19-31.

Sapir, Edward. 1911. The problem of noun incorporation in American languages. *American Anthropologist* 13: 250-282

Sapir, Edward and Morris Swadesh. 1939. *Nootka Texts, Tales and Ethnological Narratives.* Philadelphia/Baltimore, MD: Linguistic Society of America.

Stonham, John. 2004. *Linguistic Theory and complex words: Nuuchahnulth word formation.* New York: Palgrave MacMillan.

Szabolcsi, Anna. 1994. The noun phrase. In *Syntax and Semantics 27: The Syntactic Structure of Hungarian*, Ferenc Kiefer and Katalin E. Kiss (eds), 179-274. San Diego: Academic Press.

Uriagereka, Juan. 1999. Multiple Spell-out. In *Working Minimalism*, Samuel David Epstein and Norbert Hornstein (eds), 251-282. MIT Press.

Waldie, Ryan. 2004. Nuu-chah-nulth denominal verbs. M.A. thesis, University of Victoria.

Wojdak, Rachel. 2002. Dissimilation in Nuu-chah-nulth reduplicative fixed segmentism. Paper presented at the 38th Meeting of the Chicago Linguistic Society: Main Session.

Wojdak, Rachel. 2003. Predicative lexical suffixes in Nuu-chah-nulth. In *Papers for the 38th ICSNL*, J.C. Brown and Michele Kalmar (eds.). UBCWPL 11: 275-289.

Wojdak, Rachel. 2004. On the classification of Wakashan lexical suffixes. Paper presented at the 30th Meeting of the Berkeley Linguistics Society.

Wojdak, Rachel. 2005. Local spell-out: Evidence from Nuu-chah-nulth. Doctoral dissertation, University of British Columbia.

Woo, Florence. 2000. Predicative Governing Suffixes and Incorporation in Nuu-chah-nulth. Ms., University of British Columbia.

Yiu Sze Man. 2001. Incorporation in Nuuchahnulth. M.A. thesis, University of Manchester.