From head-final to head-initial in Algonquian: Evidence and implications*

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This paper shows that the Algonquian languages display evidence of a long-term shift from head-final to head-initial order in three domains: the PP, the DP, and the clausal spine. Each domain displays traces of an original analytic head-final construction whose head directionality became opaque when the heads became affixes. The new analytic constructions that have subsequently developed in each domain consistently display head-initial order rather than head-final order. The paper discusses the causes and implications of this shift in head directionality.

1 Introduction

The flexible word order of the Algonquian languages may give the impression that these languages have little to tell us about the issue of head directionality. The purpose of this paper is to show that this is not the case. I argue that there is diachronic evidence for a long-term change in head directionality in Algonquian, from head-final to head-initial. The recognition of this long-term change deepens our understanding of the synchronic structure of the Algonquian languages and connects to interesting theoretical questions. The proposal is speculative, however, due to its basis in internal reconstruction.

The paper has two goals. The first goal is descriptive. Building on work by Rhodes (2006) and Goddard (2007), I propose that a shift from head-final to head-initial order has taken place in three domains: PP, DP, and the clausal spine. The shift to head-initial order was well underway by the time of Proto-Algonquian (c. 1000–500 BCE; Foster, 1996: 99) and the evidence for an earlier head-final stage comes from internal reconstruction—in particular, from the morphological fossilization of an earlier head-final syntax. The second goal is theoretical. I show that the change from head-final to head-initial order connects to two questions of more general interest. One question involves a possible default preference for head-initial structures and the other involves what Bobaljik (1999) has dubbed the “hierarchy paradox”, in which a functional hierarchy appears to have more than one parallel instantiation within the same structure.

To address these goals, the paper takes a pan-Algonquian perspective, drawing on data from Arapaho, Blackfoot, Cree, Delaware, Innu, Kickapoo, Maliseet-Passamaquoddy, Menominee, Miami-Illinois, and Ojibwe. The discussion is laid out as follows. Section 2 sets out the theoretical assumptions. Sections 3, 4, and 5 examine change in the structure of the PP, the DP, and the clausal spine respectively. Each section shows that the morphology preserves traces of an earlier head-final order while the syntax exhibits a more recent head-initial order. Section 6 considers the implications of the Algonquian change for the two theoretical questions mentioned above: default head directionality and the hierarchy paradox.

2 Theoretical assumptions

I adopt two basic theoretical assumptions. First, I assume a traditional Head Parameter representation of the difference between head-initial and head-final structures (e.g. Chomsky, 1981), as in (1).

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Second, I assume that complex words are formed syntactically by Mirror Principle-style recursive head movement (Baker, 1985, 1988), with the moving head adjoining to the left of the target head regardless of the setting of the Head Parameter. The complex head created by V-to-T-to-C head movement is thus the same (V+T+C) regardless of the underlying head directionality, as illustrated in (2).

(2) a. Recursive head movement in a head-initial structure
   i. \[
   \text{CP} \ [\text{TP} \ [\text{VP} \ V]]
   \]
   ii. \[
   \text{CP} \ [\text{TP} \ [\text{VP} \ V+T \ [\text{VP} \ t]]]
   \]
   iii. \[
   \text{CP} \ [\text{TP} \ [\text{VP} \ V+T+C \ [\text{VP} \ t]]]
   \]

   b. Recursive head movement in a head-final structure
   i. \[
   \text{CP} \ [\text{TP} \ [\text{VP} \ V] \ T] \ C]
   \]
   ii. \[
   \text{CP} \ [\text{TP} \ [\text{VP} \ V] \ T] \ C]
   \]
   iii. \[
   \text{CP} \ [\text{TP} \ [\text{VP} \ V] \ T] \ C]
   \]

These two assumptions are quite familiar, and are perhaps even naïve, given the various more sophisticated approaches to head directionality (e.g. Kayne, 1994) and head movement (e.g. Koopman & Szabolcsi, 2000) that now exist. However, the simple theoretical framework adopted in this paper is sufficient to handle the data at hand. It can, if desired, be read as a shorthand for the reader’s preferred approach. The paper’s theoretical implications are independent of the representation of head directionality and head movement.

3 Change in PP structure

This section proposes that the structure of the PP has changed from head-final in pre-Proto-Algonquian to head-initial in some of the modern languages. The evidence for an early stage of head-final PP structure comes from the relative root construction, which Rhodes (2006) has shown to have arisen from the reanalysis of a postpositional structure (§3.1). This reanalysis caused the underlying head directionality of the pre-Proto-Algonquian PP to become ambiguous (§3.2). More recently, some of the Algonquian languages have developed a new transparently head-initial PP structure (§3.3).

3.1 Traces of head-final PP structure

Evidence for an early stage in which PPs were robustly head-final comes from relative roots (Bloomfield, 1946: 120), a special class of roots which occur as part of the verb and “license the appearance of an extra nominal or of an adverbial in their clause” (Rhodes, 2006: 10). In the Innu sentence in (3a), for example, the verb stem \textit{uêtshitshimê-} ‘travel from’ contains the relative root \textit{ûtshi-} ‘from’ (< PA \textit{*wenči-}), which licenses the locative nominal \textit{anítêshîpît} ‘the river’.\footnote{The relative root \textit{útshi-} appears as \textit{uêtshi-} in (3a) due to the application of an inflectional ablaut process known as initial change (Bloomfield, 1946; Costa, 1996).} Similarly, in (3b), the verb stem contains the relative root \textit{ishi-} ‘to’ (< PA \textit{*eši-}), which licenses the locative nominal \textit{Uâshikutêt} ‘Washicoutai’.\footnote{The following abbreviations occur: 1 first-person, 1s first-person singular, 1p first-person plural, 1>3 first-person subject on third-person object (etc. for other persons), 3’ obviative (on verbs), ABS absolutive, AN animate, AOR aorist, DU dual, DUB dubitative, EMPH emphatic, ERG ergative, FUT future, GEN genitive, IC initial change, IMP imperative, IN inanimate, INCL inclusive, LOC locative, MOD modal, NEG negative, NON3 non-third-person, OBV obviative (on nouns), PL plural, POSS possessed, PRET preterit, PRN pronoun, SFX derivation suffix, SG singular. Vowel length is marked with a circumflex, a macron, a colon, a middle dot (e.g. a·), or a double vowel, following the usage of the sources. Asterisks mark reconstructed proto-forms (not ungrammatical).}
In such examples, the relative root construction resembles a discontinuous PP, with the verb-internal relative root as P and the verb-external nominal as the complement of P. According to Rhodes (2006: 26), this resemblance is not coincidental. Rhodes proposes that relative roots originated in pre-Proto-Algonquian as postpositions, forming PPs that occurred in preverbal position, as in (4a). The relative root construction then arose through the reanalysis of the postposition as belonging to the following verb stem, as in (4b).

(4) Reanalysis of preverbal postpositions as part of the verb stem (Rhodes, 2006: 26)

a. *Ki:we:tenonki [PP ki:we:tenonki [V ki:we: -t -i]] [V return -3 -INDIC]
   ‘He goes back to the north.’ (pre-Proto-Algonquian, Stage I)

b. *Ki:we:tenonki [DP ki:we:tenonki] [V iši- ki:we: -t -i] [V to- return -3 -INDIC]
   ‘He goes back to the north.’ (pre-Proto-Algonquian, Stage II)

The relative root construction is thus a morphological fossil of an ancient stage of pre-Proto-Algonquian syntax in which PPs were robustly postpositional (and pre-verbal), as in the head-final structure in (5).

(5) VP
   PP
     PP
       V
         ki:we:
           ‘return’
       P
         iši
           ‘to’
     DP
       ki:we:tenonki
         ‘north’

The existence of an ancient postpositional stage is supported by the continued use of certain relative roots as postpositions in some Algonquian languages, albeit in an apparently archaic and diminishing capacity. In the Ottawa dialect of Ojibwe, for example, Rhodes (2006: 37) reports a single frozen expression noongo nji ‘from now on’, which fossilizes a postpositional occurrence of the relative root nji ‘from’ (< PA *wenči-, cognate with Innu uêtshi- in (3a)). No other postpositional uses of relative roots remain in Ottawa.

(6) noongo nji
   now from
   ‘from now on’

3Mailhot et al., 2013 is an online dictionary; utshitshimeu is the entry from which this example sentence is taken.
The loss of postpositional structure is less advanced in the Cree-Innu languages, which attest more regular use of some relative roots as postpositions, as illustrated for the relative roots *iši-* ‘to’ and *út-* ‘from’ in (7). However, even in Cree-Innu, the occurrence of this postpositional construction is outnumbered by an apparently more recent prepositional construction discussed in Section 3.3 below.

(7) a. *Nikî-kîwânân Kêšiciwanohkh iši.*
    ni- kî- kîwâ -nân [PP Kêšiciwanohkh iši]
    1- past return -1p [PP Kashechewan loc to]
    ‘We went back to Kashechewan.’ (Swampy Cree; Ellis, 1983: 605 cited in Rhodes, 2006: 26)

    b. *Akâmishktût ôt nâtikû nenua innu a.*
    [PP akâmishktût ôt] nât -ikû nenua innu -a
    [PP across.fire from] go.get -3’>3 that.obv person -obv
    ‘From the other side of the fire the Innu came to get it.’ (Innu; Mailhot, 1999)

In summary, this section has shown that the relative root construction allows us to internally reconstruct an ancient stage in which pre-Proto-Algonquian made frequent use of head-final PPs in pre-verbal position. This stage came to an end when pre-verbal postpositions underwent incorporation into the verb, giving rise to the modern relative root construction.

3.2 Ambiguous head directionality in PP

The incorporation of postpositions into the verb had an important consequence for learnability. I assume that when P-incorporation first arose in pre-Proto-Algonquian, it was a synchronic process in which the head of an underlying PP moved to adjoin to V, as in (8).4

(8) Incorporation from head-final PP

Prior to the development of the P-incorporation process in (8), the abundant occurrence of overt postpositions would have provided learners of pre-Proto-Algonquian with ample evidence that PPs are head-final. This evidence disappeared, however, when P-incorporation came to apply regularly, as the surface P+V string could derive equally well from either the head-final PP structure in (8) or the head-initial PP structure in (9). The outcome of P-to-V head movement is the same under either analysis.

(9) Incorporation from head-initial PP

4This analysis is intended to apply to pre-Proto-Algonquian only. I do not claim that a synchronic P-incorporation analysis is tenable for the relative root construction in the modern Algonquian languages. Rhodes (2006) identifies significant obstacles to such an analysis (though see Kim, 2013 for a PP-based analysis of relative roots in Blackfoot).
The P-incorporation process that gave rise to the relative root construction thus had the consequence of rendering ambiguous the underlying head directionality of pre-Proto-Algonquian PPs. In the absence of evidence from other contexts, learners would presumably be equally likely to settle on either a head-final underlying structure as in (8) or a head-initial underlying structure as in (9). This ambiguity would have persisted for as long as a PP constituent continued to be synchronically present in the underlying structure of the relative root construction. The ambiguous head directionality of the pre-Proto-Algonquian PP sets the stage for the development discussed in the following section: the emergence of head-initial PP structure.

3.3 Innovative head-initial PP structure

The relative root construction and the remaining attestations of postpositional relative roots in Cree and Ottawa provide evidence of an early stage in which Algonquian PPs were robustly head-final. In some of the modern Algonquian languages, however, a newer head-initial structure has emerged as the productive pattern for PPs. Due to the paucity of research on the syntax of Algonquian locatives, I am aware of only three languages for which a detailed description of PP structure is available: the Central Algonquian languages Innu (Oxford, 2011, 2014) and Menominee (Lundquist & Macaulay, 2013) and the Eastern Algonquian language Maliseet-Passamaquoddy (LeSourd, 2014). In all three of these languages, PPs have the basic head-initial structure shown in (10), in which P is followed by its nominal complement (which is inflected in the locative case) and optionally preceded by a locative demonstrative.

(10) PP
    Dem P′ P NP
    N + LOC

Examples of this head-initial PP structure are given in (11) for each of the three languages mentioned above.

(11) Head-initial PPs in Innu, Menominee, and Maliseet-Passamaquoddy

a. Ân kâtâu mîna anite shekʷ útí …
   Ann hide.3 berry.pl [PP anite shekʷ útí -it]
   ‘Ann hid the berries under the canoe…’ (Innu; Oxford, 2011: 141)

b. Eneq’s wēket enes āsaw mîhekaneh.
   eneq ’s wēket [PP enes āsaw mîhekan -eh]
   there aor live.3 [PP there across road -LOC]
   ‘She lives on the other side of the road.’ (Menominee; Lundquist & Macaulay, 2013)

c. … nit=oc nit ewepi ōpōisk wet-toqhuwalíhtok.
   nit =oc [PP nit ewepi ōpōisk -k] wet- toqhuwalíht -o -k
   then =FUT [PP there up tree -LOC] from- jump.on.it -IN -3
   ‘… it would jump on them (inanimate) from up in a tree.’ (Maliseet; LeSourd, 2014: 213)

For each of the above languages, the authors note a degree of flexibility in the structure of such PPs, with some instances of postpositional order attested. However, the prepositional order in (11) is by far the most prevalent and appears to be the default: 92% of the Maliseet-Passamaquoddy examples in LeSourd (2014) display prepositional order, as do 88% of those from Menominee in Lundquist and Macaulay (2013). In Innu, Oxford (2011) reports that the postpositional order is restricted almost exclusively to sentence-initial
position, where it appears to serve a focusing function; otherwise, the order is overwhelmingly prepositional.

There is evidence that the prepositional structure exemplified in (11) is a more recent development than the archaic postpositional structure that gave rise to the relative root construction (§3.1 above). The evidence involves the morphological forms of the prepositions themselves. LeSourd (2014: 227) notes that although the prepositions of Maliseet-Passamaquoddy are a unified syntactic class, they are morphologically diverse. Some consist of a bare root, others a stem plus the nominal locative-case suffix, others a root plus a concrete nominal element, and others a root plus a derivational suffix. This assortment is exemplified in (12) for Maliseet-Passamaquoddy and in (13) for Innu, whose prepositions display the same degree of morphological diversity. (The Maliseet-Passamaquoddy forms are from LeSourd (2014). The Innu forms are from Mailhot and MacKenzie’s (2012) dictionary and show only the prepositions themselves, not PPs.)

(12) P morphology in Maliseet-Passamaquoddy
a. Bare root
   [pp asit imiyew-ikŭwám-ok]
   [pp in.back pray-building -Loc]
   ‘at the rear of the church’ (p. 210)
b. Stem with locative-case suffix
   [pp pāhka-k tuhsán-ok]
   [pp back -Loc shed -Loc]
   ‘behind the shed’ (p. 227)
c. Root plus nominal element
   [pp lam-ikŭwàm imiyew-ikŭwám-ok]
   [pp in-building pray-building -Loc]
   ‘inside the church’ (p. 227)
d. Root plus derivational suffix
   [pp tehsahq -iw nil]
   [pp on -sfx me]
   ‘on me’ (p. 222)

(13) P morphology in Innu
a. Bare root
   [p âkau]
   [p hidden.behind]
   ‘hidden behind’ (p. 13)
b. Stem with locative-case suffix
   [p pîtu -kam -it]
   [p inside -space -Loc]
   ‘inside’ (p. 466)
c. Root plus nominal element
   [p akámi-shípu]
   [p across -river]
   ‘across the river’ (p. 12)
d. Root plus derivational suffix
   [p tâu -êu]
   [p middle -sfx]
   ‘in the middle of’ (p. 556)

I suggest that the morphological diversity of the class of prepositions is a reflection of the relatively recent emergence of this class, which appears to have involved the consolidation and reanalysis of an assortment of items with locative semantics, including roots, freestanding locative adverbs (Sherwood, 1986), and complement-taking locative nominals. This last possibility would explain why several Innu prepositions appear to carry the nominal locative-case suffix -ît, such as pítukamít ‘inside’ in (14).

(14) Pítukamít atâtutshuâpít nitaimiâu.
   [pp pítukam -it atâtutshuâp -it] nit- aimi -âu
   ‘I talked to her in the store.’ (Innu; author’s fieldwork)

If pítukamít originated as a locative nominal meaning ‘on the inside’, it would have obligatorily been marked with the locative case suffix -ît. The subsequent reanalysis of pítukamít as a preposition ‘inside’ would leave the -ît suffix as a functionless fossil of the form’s nominal origin.

In summary, the productive pattern for PP structure is head-initial in modern Innu, Menominee, and Maliseet-Passamaquoddy—the only three Algonquian languages for which a detailed description of the internal structure of the PP is available. The morphological diversity of the members of the class of prepositions suggests that this class is a relatively recent assemblage of forms with various grammatical origins.
3.4 Summary: Change in PP structure

This section has proposed that Algonquian PP structure has undergone a long-term change from head-final to head-initial. An early head-final PP structure can be internally reconstructed for pre-Proto-Algonquian on the basis of the relative root construction. The development of the relative root construction, however, had the effect of rendering the underlying head directionality of the PP ambiguous. A more recent head-initial PP structure is employed in some of the modern Algonquian languages.

4 Change in DP structure

Parallel to the PP, the Algonquian DP also displays traces of an early head-final structure (§4.1). The head-final determiner was eventually grammaticalized as an inflectional suffix, thereby causing the underlying head directionality of the pre-Proto-Algonquian DP to become ambiguous (§4.2). There are recent signs of the emergence of transparently head-initial DP structure (§4.3).

4.1 Traces of head-final DP structure

Evidence for reconstructing an early stage of head-final DP structure in pre-Proto-Algonquian comes from the peripheral suffix (Goddard, 1974, 2007), an agglutinative inflectional suffix that marks number, animacy, and obviations on both nouns and verbs. (Obviation is an obligatory contrast between two degrees of animate third-person reference: in a clause with two animate third persons, the more topical one is marked as proximate and the less topical one is marked as obviative.) The set of peripheral suffixes is shown for Proto-Algonquian in Table 1 and exemplified by the Kickapoo noun forms in Table 2.

The following five properties of the peripheral suffix, considered together, indicate that it originated in pre-Proto-Algonquian as a postnominal definite article or demonstrative (Goddard, 2007: 265).

1. The peripheral suffix always occurs in absolute word-final position, outside any other inflection, in both its nominal and verbal uses.

2. Nominal possessor marking is closer to the stem than the peripheral suffix, even though the peripheral suffix marks features of the noun itself. This unexpected order is exemplified by the Kickapoo possessed

Table 1: Proto-Algonquian peripheral suffix paradigm (Goddard, 2007: 208)

<table>
<thead>
<tr>
<th></th>
<th>ANIMATE PROXIMATE</th>
<th>ANIMATE OBVIATIVE</th>
<th>INANIMATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINGULAR</td>
<td>-*a</td>
<td>-*ari</td>
<td>-*i</td>
</tr>
<tr>
<td>PLURAL</td>
<td>-*aki</td>
<td>-*ahi</td>
<td>-*ari</td>
</tr>
</tbody>
</table>

Table 2: Peripheral suffixes in Kickapoo noun forms (Voorhis, 1967: 65–66)

<table>
<thead>
<tr>
<th></th>
<th>ANIMATE PROXIMATE</th>
<th>ANIMATE OBVIATIVE</th>
<th>INANIMATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINGULAR</td>
<td>koo khoos-&lt;a&gt;</td>
<td>koo khoos-&lt;ani&gt;</td>
<td>mahkezeeh-i</td>
</tr>
<tr>
<td></td>
<td>pig-AN.SG</td>
<td>pig-OBV.SG</td>
<td>shoe-IN.SG</td>
</tr>
<tr>
<td></td>
<td>‘a pig’</td>
<td>‘a pig’ (obv.)</td>
<td>‘a shoe’</td>
</tr>
<tr>
<td>PLURAL</td>
<td>koo khoos-&lt;aki&gt;</td>
<td>koo khoos-&lt;ahi&gt;</td>
<td>mahkezeeh-&lt;ani&gt;</td>
</tr>
<tr>
<td></td>
<td>pig-AN.PL</td>
<td>pig-OBV.PL</td>
<td>shoe-IN.PL</td>
</tr>
<tr>
<td></td>
<td>‘pigs’</td>
<td>‘pigs’ (obv.)</td>
<td>‘shoes’</td>
</tr>
</tbody>
</table>
noun form in (15): the possessor marker \text{-em} and the first-person plural possessor agreement suffix \text{-enaan} intervene between the noun stem ‘pig’ and the plural peripheral suffix \text{-aki}, which pluralizes ‘pig’.

(15) \text{N + Possessor + Num}_N \text{ in Algonquian}

\text{nekoohkoosemenaanaki}
\text{ne- kooihkoos -em -enaan -aki}
\text{1- pig -poss -lp -AN.PL}

‘our pigs’ (Kickapoo; Voorhis, 1967: 66)

Dékainé (1999) notes the unexpectedness of this order and contrasts it with the Yup’ik form in (16a), where nominal number marking is closer to the noun stem than possessor marking; the same pattern is also found in Finnish, as in (16b).

(16) \text{N + Num}_N \text{ + Possessor in other languages}

a. \text{angyagpuk}
\text{angya -g -puk}
\text{boat -3DU.ERG -1DU.ABS}

‘our boats’ (Yup’ik; Dékainé, 1999: 44)

b. \text{hänèn lapsensa}
\text{hänè -n laps -e -nsa}
\text{s/he -GEN child -PL -3.POSS}

‘his/her children’ (Finnish; Johns, 2007: 61)

3. In Blackfoot, the ordinary set of peripheral suffixes is absent from non-referring nouns, which instead take a “non-particular” suffix \text{-i} (Frantz, 2009: 11–12; Goddard, 2007: 265).

4. In Proto-Algonquian and some Eastern Algonquian languages such as Delaware, the use of the peripheral suffix as an agreement marker on verbs is restricted to agreement with definite nominals (Goddard, 1974, 1979, 2007). This is illustrated for Munsee Delaware in (17): when the obviative object ‘bear’ is definite, as in (17a), it is indexed by the obviative peripheral suffix \text{-al} on the verb, but when the object is indefinite, as in (17b), the peripheral suffix disappears from the verb.

(17) a. \text{wònihlàwal nèl màxkwal}
\text{wò- nihl -àw -al [DP nèl màxkw -al]}
\text{3- kill -3>3’ -OBV [DP that.OBV bear -OBV]}

‘He killed the bear.’ (Munsee; Goddard, 2007: 210)

b. \text{màxkwal nihlé w}
[DP màxkw -al] nihl -éw \text{(no peripheral suffix)}
[DP bear -OBV] kill -3>3’

‘He killed a bear.’ (Munsee; Goddard, 2007: 210)

5. The peripheral suffix does not appear on personal pronouns. To appreciate the significance of this fact, consider that the Algonquian personal pronoun morphologically resembles a possessed noun. The person and number of the pronoun are marked by the same morphology that indexes a nominal possessor, as illustrated by the pre-Proto-Algonquian forms in Table 3. (The shared morphology is underlined.)

According to Goddard (2007: 219), the personal pronoun resembles a possessed noun because it \text{was} a possessed noun in pre-Proto-Algonquian: the pronoun root *\text{-i-raw} originated as an obligatorily possessed noun stem meaning ‘body’. However, as Goddard (2007: 265) points out, the morphology of the personal pronoun diverges from that of typical possessed nouns in one way that is relevant to the present discussion: unlike a typical possessed noun, the pronoun does not take a peripheral suffix.
Table 3: Pre-Proto-Algonquian personal pronouns and possessed nouns

<table>
<thead>
<tr>
<th>PERSONAL PRONOUN</th>
<th>POSSESSED NOUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1s *n- i·raw</td>
<td>*ne- šiθ -a</td>
</tr>
<tr>
<td>1-prn</td>
<td>1-father.in.law-AN.SG</td>
</tr>
<tr>
<td>2s *k- i·raw</td>
<td>*ke- šiθ -a</td>
</tr>
<tr>
<td>2-prn</td>
<td>2-father.in.law-AN.SG</td>
</tr>
<tr>
<td>1p *n- i·raw-ena-n</td>
<td>*ne- šiθ-ena-n-a</td>
</tr>
<tr>
<td>1-prn -1p</td>
<td>1-father.in.law-1p-AN.SG</td>
</tr>
<tr>
<td>2p *k- i·raw-wa·w</td>
<td>*ke- šiθ-wa·w-a</td>
</tr>
<tr>
<td>2-prn -2p</td>
<td>2-father.in.law-2p-AN.SG</td>
</tr>
</tbody>
</table>

(Pronoun forms are from Goddard, 2007: 218; possessed noun forms are from Pentland, 1999: 228.)

The properties of the peripheral suffix are summarized in (18).

(18) a. The peripheral suffix marks the animacy, number, and obviation of a nominal, either on the nominal itself or on a verb that agrees with the nominal.

b. The peripheral suffix always occurs in absolute word-final position.

c. Nominal possessor agreement intervenes between the noun stem and the peripheral suffix.

d. In Blackfoot, the peripheral suffix is absent from non-referring nouns.

e. In Proto-Algonquian and some Eastern Algonquian languages, the verbal peripheral suffix is absent when the nominal it would otherwise index is indefinite.

f. On the personal pronoun, which is formally a possessed noun, the peripheral suffix is absent.

All of the properties in (18) can be explained if we adopt Goddard’s (2007: 265) proposal that the peripheral suffix originated as a postnominal definite article. The marking of animacy, number, and obviation on the peripheral suffix can then be understood as concord with the noun, as is the case for articles in many languages (e.g. French and German). The absolute word-final position of the peripheral suffix and the intervention of possessor agreement between the noun stem and the peripheral suffix both follow from the fact that the peripheral suffix was originally a separate determiner that followed the inflected noun. The absence of the peripheral suffix in some indefinite contexts is a holdover from its origin as a marker of definiteness, and its absence on the personal pronoun reflects the fact that definiteness is non-contrastive on personal pronouns, which inherently refer only to definite animates in Algonquian.

If the peripheral suffix originated in pre-Proto Algonquian as a definite article, then its development must have proceeded along the lines sketched in (19). At Stage I, the peripheral “suffix” was an independent word—a definite D that occurred in a head-final DP structure and displayed concord for the features of its nominal complement. At Stage II, D underwent grammaticalization, cliticizing onto the preceding nominal and being bleached of its definite semantics, leaving it as an all-purpose determiner compatible with all nominals. At this stage, D no longer makes a semantic contribution, but it still serves the important function of expressing the animacy, number, and obviation of the nominal through concord. Finally, at Stage III, which is the stage attested in Proto-Algonquian and the modern languages, D has been reanalyzed from an enclitic to an inflectional suffix and continues to express concord with the complement nominal, which is now analyzed as adjoining to D via N-to-D head movement in the spirit of the Mirror Principle.

5For simplicity, the diagrams in (19) show the complement of D as NP, but in reality this “NP” must be a more complex structure with projections for number and possession (see e.g. Ritter & Rosen, 2010 for Blackfoot).
Stages in the development of the peripheral suffix (=D)

**Stage I:** independent D  **Stage II:** enclitic D  **Stage III:** suffix D

(At all stages, D displays concord with the features of NP.)

In summary, this section has proposed that the peripheral suffix originated in pre-Proto-Algonquian as a definite determiner in a head-final DP structure, with grammaticalization leading to its modern-day status as an inflectional suffix with a somewhat peculiar set of formal, positional, and distributional properties.

### 4.2 Ambiguous head-directionality in DP

The reanalysis of D from a separate determiner to an inflectional affix would have created a learnability problem parallel to that which was created by the P-incorporation process that gave rise to the relative root construction (§3.2). As long as D was still an independent word or an enclitic, as in Stages I and II in (19), learners of pre-Proto-Algonquian would have had ample evidence that DPs are head-final. This evidence disappeared, however, when D was reanalyzed as an inflectional suffix in Stage III. The resulting surface string N+D could derive equally well from either the head-final DP structure in (20a) or the head-initial DP structure in (20b). The outcome of N-to-D head movement is the same—N+D—under either analysis.

(20) Ambiguous head directionality in DP after the development of N-to-D movement

a. N adjoins to head-final D  

b. N adjoins to head-initial D

At Stage III, then, we might expect learners to be equally likely to settle on either a head-final underlying structure as in (20a) or a head-initial underlying structure as in (20b), since the choice between the two structures is underdetermined by the data. This ambiguity in the head directionality of the DP sets the stage for a development discussed in the following section: the emergence of head-initial DP structure.

### 4.3 Innovative head-initial DP structure

Evidence for the emergence of head-initial DP structure comes from adnominal demonstratives. In most Algonquian languages, demonstratives ordinarily precede the noun they modify, as has been observed for Menominee (Bloomfield, 1962: 465–66), Cree (Ahenakew, 1987: 143; Déchaine, 1997: 115), Ojibwe (Kathol & Rhodes, 1999; Valentine, 2001: 550), Maliseet-Passamaquoddy (LeSourd, 2004: 245), Arapaho (Cowell & Moss, 2008: 309), and Blackfoot (Frantz, 2009: 67). Illustrative examples are given in (21).
Adnominal demonstratives precede N

a. *Nehe-h-noqnonam enoh apec·hsi·hsch.*
   nehe·h- noqnon -am [DP enoh apec·hsi·hsch]
   skillfully- swim -3s [DP that.AN boy]
   ‘That boy swims well.’ (Menominee; Bloomfield, 1962: 442)

b. *Nimiskêń ōma mōhkomân.*
   ni- misk -én [DP ōma mōhkomân]
   1- find -1s>IN [DP that.IN.SG knife]
   ‘I found the knife.’ (Plains Cree; Ahenakew, 1987: 144)

c. *Git·nbowan wgiitziman maaba gwizens.*
   gii- nbo -wan w- gitziim -an [DP maaba gwizens]
   PAST- die -3.OBV 3- parent -OVB [DP this.AN.SG boy]
   ‘This boy’s parents died.’ (Nishnaabemwin; Valentine, 2001: 558)

d. *Sepawónu nót skitápmacéhe.*
   sepawónu [DP nót skitáp] macé- he
tomorrow [DP that.AN man] start- go.3
   ‘That man is leaving tomorrow.’ (Passamaquoddy; LeSourd, 2004: 246)

e. *Hoonoyóóhowún hinee heebetéθ!*
   oonoyoohow -in [DP ínee eebet- eθ]
   watch.out.for -3.IMP [DP that big- dog]
   ‘Watch out for that big dog!’ (Arapaho; Cowell & Moss, 2008: 302)

f. *Amo(í)sti miiíístsi ikááhsiyaawa.*
   [DP amo íístsi mii- íístsi] iik- aahsii -yi -aawa
   [DP this -IN.PL berry -IN.PL] very- good -PL -PRN
   ‘These berries are good.’ (Blackfoot; Frantz, 2009: 65)

The prenominal position of the demonstrative in these languages does not necessarily reflect the head directionality of the DP, as the demonstrative could be a modifier adjoined to the DP rather than a determiner in D. It is well known, however, that demonstratives can grammaticalize into articles (e.g. Heine & Kuteva, 2002; Hopper & Traugott, 2008), as in the Romance languages (e.g. Giusti, 2001). If such grammaticalization were to occur in a modern Algonquian language, the result would be a clearly head-initial DP structure.

In a series of papers, Cyr (1993a, 1993b, 1996) argues that just such a reanalysis has taken place in the Cree-Innu language continuum. Cyr observes that demonstratives in Plains Cree and Innu display an overall high frequency of occurrence and a tendency to occur most frequently on the second and subsequent mentions of a given referent. Furthermore, in Innu, demonstratives occur almost as frequently with proper nouns, possessed nouns, and locative nouns as they do with ordinary nouns. Cyr takes these patterns to indicate that prenominal demonstratives have grammaticalized into definite articles in both Plains Cree and Innu, with Innu further along in the grammaticalization process than Plains Cree. If Cyr is correct that demonstratives have been reanalyzed as D in modern Plains Cree and Innu, then a consequence is that these languages have both developed a clear head-initial DP structure.6

4.4 Summary: Change in DP structure

This section has discussed a possible long-term change in Algonquian DP structure from head-final to head-initial. An early head-final DP structure can be internally reconstructed for pre-Proto-Algonquian

6It should be noted, however, that Cyr’s proposal is not universally accepted. Drapeau (2014: 100) argues that since the Innu demonstratives retain some deictic force and can occur pronominally, they should not be regarded as articles.
on the basis of the peripheral suffix, which appears to have originated as a postnominal definite article. The grammaticalization of this article into an inflectional suffix, however, had the effect of rendering the underlying head directionality of the DP ambiguous. A more recent head-initial DP structure may have emerged in the Cree-Innu languages through the grammaticalization of prenominal demonstratives into articles, and the widespread use of prenominal demonstratives throughout the Algonquian languages means that the potential for such grammaticalization exists across the family.

5 Change in the structure of the clausal spine

A change from head-final to head-initial structure can also be internally reconstructed for the sequence of functional heads that make up the clausal spine (e.g. NegP, TP, ModP). The evidence here is less focused than it was for PP and DP, however, as it rests solely on the known tendency for TAM suffixes to arise through the grammaticalization of TAM particles (§5.1). This grammaticalization would have been complete by a very early stage of pre-Proto-Algonquian, leaving the underlying head directionality of the clausal spine ambiguous (§5.2). A newer head-initial manifestation of the clausal spine consisting of the auxiliary-like items known as “preverbs” has since taken on increasing importance (§5.3).

5.1 Traces of head-final structure in the clausal spine

The order of inflectional suffixes on the verb provides a possible hint at an ancient stage of head-final structure in the clausal spine. As background, note that most Algonquian languages have two parallel sets of verb inflection: the “independent order” inflection, which is restricted to independent clauses, and the “conjoint order” inflection, which occurs obligatorily in subordinate clauses. The conjunct order is considered to be the more archaic of the two sets of inflection (Goddard, 1974, 2007), so I consider only conjunct forms here, although the relevant patterns are displayed by the independent inflection as well.

In the most conservative Algonquian languages, the template for conjunct inflection in simple intransitive forms is V–Neg–Agr–Mode, in which V is the verb stem, Neg is a negative marker, Agr is a subject agreement marker, and Mode is a “mode sign” (Bloomfield, 1946) which marks a range of TAM categories that vary across the languages. This template is illustrated by the examples from Miami-Illinois and Southwestern Ojibwe in (22).

(22) Conjunct intransitive inflection template: V–Neg–Agr–Mode

a. \textit{pyaahsiivaani}
   \begin{tabular}{ll}
   pyaa & -hsiwi-aan-i \\
   come & -NEG -1S -INDIC \\
   \end{tabular}
   ‘I do not come’ (Miami-Illinois; Costa, 2003: 339)

b. \textit{maacaassisiwaampaan}
   \begin{tabular}{ll}
   maacaa & -ssiw-aan-paan \\
   leave & -NEG -1S -PRET \\
   \end{tabular}
   ‘I had not left’ (Southwestern Ojibwe; Nichols, 1980: 304)

c. \textit{mayaacaassisiwaanen}
   \begin{tabular}{ll}
   mayaacaa & -ssiw-aan-en \\
   \textit{ic:} & leave -NEG -1S -DUB \\
   \end{tabular}
   ‘I must not be leaving’ (Southwestern Ojibwe; Nichols, 1980: 305)

d. \textit{maacaassisiwaampaanen}
   \begin{tabular}{ll}
   maacaa & -ssiw-aan-paan-en \\
   \end{tabular}
   ‘I must not have left’ (Southwestern Ojibwe; Nichols, 1980: 306)
The Ojibwe form in (22d) in fact contains two mode signs: -paan marks past tense (preterit) and -en marks dubitative modality. A finer-grained inflectional template would thus be V–Neg–Agr–T–Mod. Setting aside the agreement marker, the sequence V–Neg–T–Mod is entirely consistent with the order of functional heads that Cinque (1999) has shown to be predominant across languages.

Let us now make a leap of internal reconstruction. Given that inflectional suffixes are thought to arise diachronically from the encliticization and grammaticalization of postverbal particles, we might speculate that the inflectional template V–Neg–T–Mod arose from an ancient stage in which the verb was followed in the syntax by independent Neg, T and Mod particles. If this were indeed the word order at some stage, then the syntactic structure at that stage must have been as in (23)—which is a head-final structure.

\[(23) \text{ Syntactic structure for V Neg T Mod word order} \]

\[
\begin{array}{c}
\text{ModP} \\
\text{TP} \quad \text{Mod} \\
\text{NegP} \quad T \\
\text{VP} \quad \text{Neg} \\
V
\end{array}
\]

Subsequent encliticization of the Neg, T, and Mod particles onto V and their eventual reanalysis as inflectional suffixes would then give rise to the V–Neg–T–Mod template attested in the modern languages.

5.2 Ambiguous head directionality in the clausal spine

For as long as Neg, T, and Mod remained as independent particles, learners of pre-Proto-Algonquian would have had ample evidence that the functional projections along the clausal spine were head-final. This evidence would have disappeared, however, once the grammaticalization of these particles culminated in their reanalysis as inflectional suffixes. Assuming Mirror Principle-style head movement, the suffix order V–Neg–T–Mod could arise equally well from either the original head-final structure in (24a) or the head-initial structure in (24b). In either case, the outcome of successive-cyclic head-adjunction is the same.

\[(24) \text{ Ambiguous head directionality after grammaticalization of Neg, T, and Mod into suffixes} \]

a. Head-final: \([\text{ModP} [\text{TP} [\text{NegP} [\text{VP} V] \text{Neg}] T] \text{Mod}] \rightarrow V+\text{Neg}+T+\text{Mod by head movement} \]

b. Head-initial: \([\text{ModP} \text{ Mod} [\text{TP} T [\text{NegP Neg} [\text{VP} V]]]] \rightarrow V+\text{Neg}+T+\text{Mod by head movement} \]

After the grammaticalization of Neg, T, and Mod into inflectional suffixes, then, we might expect learners to be equally likely to settle on either a head-final underlying structure as in (24a) or a head-initial underlying structure as in (24b), since the choice between the two structures is underdetermined by the data. In a parallel fashion to that discussed for PPs and DPs above, this ambiguity sets the stage for a development discussed in the following section: the emergence and expansion of head-initial structure in the clausal spine.

5.3 Innovative head-initial structure in the clausal spine

In the modern Algonquian languages, evidence for head-initial structure in the clausal spine comes from a class of auxiliary-like bound morphemes known as \textit{abstract preverbs} (Wolfart, 1973: 77). Although abstract preverbs are grammatically bound, various properties indicate that they are in fact independent phonological words rather than prefixes—see, for example, the arguments in Russell (1999) as well as
the traditional Algonquianist description of preverbs as particles compounded with the verb stem (Bloomfield, 1946: 103; Wolfart, 1973: 76).

Abstract preverbs are relevant to the present discussion because their order is reminiscent of the crosslinguistically typical order of clausal functional heads (Cook, 2003, 2014; Shields, 2005, 2008; Branigan, 2012). The Nishnaabemwin data in (25), for example, indicate a Mod–T–Neg ordering. In (25a–b) the modal preverb *da-* precedes the tense preverbs *gii-* ‘past’ and *wii-* ‘future’ while in (25c) the tense preverb *wii-* ‘future’ precedes the negative preverb *bwaa-* ‘not, lest’.

(25) Examples of preverb order in Nishnaabemwin (Ojibwe) (Valentine, 2001)

   *endgwen da- gii- waabm -inang*
   whether MOD- PAST- see -3>1.INCL
   ‘I wonder whether he has seen us.’ (p. 781)

   *endgwen da- wii- ndawaabm -inang*
   whether MOD- FUT- look.for -3>1.INCL
   ‘I wonder whether he will be looking for us.’ (p. 781)

c. … *wii-bwaa-mwaanid niwi, …*
   *wii- bwaa- mw -aanid niwi*
   FUT- NEG- eat -3’>3’ that.OBV
   ‘… for him (obviative) not to eat it,…’ (p. 851)

While much more could be said about preverb order across Algonquian languages (see e.g. Clarke, MacKenzie & James, 1993; Costa, 2002; Jancewicz & MacKenzie, 1998; McCulloch, 2013; Slavin, 2006), the overall picture is that the order of abstract preverbs largely corresponds with standard models of the order of functional heads in a head-initial clausal spine (e.g. Cinque, 1999), as sketched in (26).


```
ModP
   Mod
      da-
   TP
      T
         *gii-*,
         *wii-*
      Neg
         …
   NegP
      *bwaa-*
```

Thus, while the order of inflectional suffixes may be a fossil of a long-ago stage in which the clausal spine was head-final (§5.1 above), the patterning of preverbs provides living evidence that the clausal spine is robustly head-initial in the modern languages.

If I am correct in speculating that there has been a long-term change from head-final to head-initial structure in the clausal spine, this would mean that that the use of preverbs as grammatical markers of TAM must be a more recent development than the use of suffixes. There are indications that this is indeed the case. While abstract preverbs do go back to Proto-Algonquian, there is internal evidence that they are less ancient than the equivalent inflectional TAM suffixes and that their use has been increasing over time.

1. In contrast to the inflectional TAM suffixes, each preverb is a separate phonological word (Bloomfield, 1962; Dahlstrom, 2003; Leavitt, 1985; Russell, 1999; Wolfart, 1996). A possible interpretation of this difference is that preverbs have existed for less time than inflectional suffixes and have thus had less time to
undergo the phonological effects of grammaticalization.

2. The inflectional TAM suffixes display extensive grammatically-conditioned allomorphy. The Southwestern Ojibwe dubitative inflection, for example, comprises various combinations of the elements -tok, -en, and -w depending on the particular paradigm in which it occurs and the agreement suffixes to which it is adjacent (Nichols, 1980: 124). The forms of the preverbs, in contrast, are much less variable, and the variation that does exist is typically a result of transparent phonological processes such as vowel coalescence (e.g. Plains Cree kâ- ‘complementizer’ + itwêt ‘s/he says’ → kêtwêt ‘as s/he says’ (Russell, 2008)). As in the previous point, this difference suggests that preverbs have had less time than inflectional suffixes to develop grammatically-conditioned allomorphs.

3. The morphological formation of preverbs is more transparent than that of inflectional suffixes. Many preverbs are derived from roots that are attested elsewhere in the language. For example, the past tense preverb gii- exemplified for Nishnaabemwin in (25a) above derives historically from the Proto-Algonquian root *kiš- ‘finish’, while the future preverb wii- in (25b) above derives from a volitional use of the root *wiňk- ‘pleasing’ (Pentland, 2005). Inflectional suffixes do not display the same transparency of derivation, an indication that they originated so long ago that all traces of their origins have become obscure.

4. While abstract preverbs have existed since the time of Proto-Algonquian, their use has been greatly expanded in some of the daughter languages at the expense of the TAM inflection. For example, while Meskwaki retains a rich array of TAM inflection (Goddard, 1994, 1995), its close relative Shawnee has lost nearly all of it and instead uses “an extensive system of preverbs marking a variety of different functions such as tense, aspect, subordination, and negation” (Costa, 2002: 120). Similarly, within the Cree-Innu language continuum, the rich TAM inflection retained in the dialects in the east such as Moose Cree (Ellis, 1971) and Innu (Clarke, 1982) has mostly disappeared in the westernmost dialects Plains Cree (Wolfart, 1973) and Woods Cree (Starks, 1987), leaving abstract preverbs with most of the responsibility for marking TAM. The pan-Algonquian trend for TAM preverbs to take over the functions of TAM inflection implies an earlier stage in which TAM preverbs did not perform the functions of TAM inflection.

Taken together, the above considerations indicate that the use of abstract preverbs as TAM markers originated more recently than the suffixal TAM inflection. A consequence of this conclusion is that the overtly head-initial clausal structure instantiated by the abstract preverbs is also a more recent development.

5.4 Summary: Change in the structure of the clausal spine

This section has raised the possibility of a shift in the structure of the Algonquian clausal spine from head-final to head-initial. An extremely ancient head-final structure can be internally reconstructed from the ordering of the TAM inflectional suffixes if we assume that these suffixes originated as independent particles. Once these particles had become grammaticalized as suffixes, learners would no longer receive clear evidence that the structure is head-final. A new head-initial structure for the clausal spine has subsequently emerged with the rise in use of abstract preverbs, which presumably originated as modifiers or reinforcers of the TAM heads. As the TAM inflectional suffixes have gradually been lost, the preverbs have taken on increasing importance as TAM markers, ultimately being reanalyzed as the TAM heads themselves and giving rise to a new overtly head-initial structure for the clausal spine.

6 Implications

The preceding sections have presented evidence that various Algonquian phrase types have undergone a long-term shift in head directionality. The evidence suggests that at some point in the extremely distant past, pre-Proto-Algonquian was a uniformly head-final language. However, as grammaticalization and reanalysis turned analytic syntactic constructions into synthetic morphological constructions, learners lost access to evidence regarding the underlying head directionality in PP, DP, and the clausal spine. New
analytic constructions eventually arose in all of these domains, often through the reanalysis of modifiers as heads, and these new constructions uniformly display head-initial word order.

This story is admittedly speculative, relying as it does on internal reconstruction, but it brings a useful diachronic perspective to our understanding of various idiosyncratic properties of modern Algonquian morphology and syntax. It also has two implications of broader theoretical interest, which this section will briefly highlight. The first implication involves the consistent shift to head-initial order across all phrase types after the original order became ambiguous, which raises the possibility that learners posit head-initial order by default (§6.1). The second implication involves the diachronic origins of what Bobaljik (1999) has called the “hierarchy paradox”, in which we observe more than one instantiation of the same functional hierarchy within a given structure (§6.2).

6.1 Default head-initial order?

I have shown that the shift from analytic to synthetic constructions in PP, DP, and the clausal spine caused the head directionality of the underlying structure to become opaque: once the heads had become affixes which unite with V or N through head movement, the same morpheme order could be derived from either a head-final or head-initial underlying structure (§3.2, 4.2, 5.2). It is interesting to consider the way in which this learnability issue has apparently been resolved. Whenever a new analytic construction has developed for a phrase type whose underlying head directionality had previously become ambiguous, the new analytic construction always displays head-initial word order. This outcome would be surprising if learners were equally predisposed to posit either head-initial or head-final underlying structures when presented with ambiguous input. The universal head-initial order of all the new analytic constructions instead seems to indicate that, given ambiguous input, learners are biased to assume underlying head-initial order.

If this head-initial bias were indeed to exist, then the loss of overt evidence for head-final order in pre-Proto-Algonquian DPs, PPs, and CPs would have had the de facto effect of making these structures underlyingly head-initial despite the absence of any overt evidence for head-initial order. The subsequent development of overtly head-initial analytic constructions would then be most properly characterized not as the cause of a shift to head-initial structure, but rather as a consequence of the earlier covert shift to head-initial structure due to the learning bias for such structures and the ambiguous input.

The suggested head-initial learning bias is consistent with much recent generative work, where it is often assumed, following Kayne (1994), that all phrase structure is in fact head-initial, with apparent head-final structures deriving from underlying head-initial structures through extensive syntactic movement. If we adopt this approach to head directionality, then the head-initial learning bias suggested by the Algonquian evidence can be recast in a less arbitrary way as a bias against positing unnecessary syntactic movement.

6.2 The hierarchy paradox

As a result of the diachronic developments discussed in Section 5, the Algonquian clause displays two layers of parallel hierarchical structure. Due to the ancient grammaticalization of postverbal particles (§5.1), an Algonquian verb can be followed by a series of inflectional suffixes which follow the crosslinguistically typical order of functional heads in the clausal spine: V–Neg–T–Mod. At the same time, due to the more recent emergence of head-initial structure (§5.3), the verb can be preceded by a series of abstract preverbs which also follow the typical order of functional heads: Mod–T–Neg–V. An Algonquian verb can thus be flanked by an apparent sequence of clausal functional heads on both sides, as in (27).

(27)  Mod–T–Neg–V–Neg–T–Mod

While it is unlikely to find a single verb form in which all of the structure in (27) is overtly realized, it is certainly the case that members of the preverb sequence and members of the suffix sequence can co-occur,
as illustrated by past-tense preverb and dubitative modal suffix in the Nishnaabemwin example in (28).

(28) ...gimaa go naa ngodwaasmidna gii-dichidgenag...
    gimaa go naa ngodwaasmidna gii- dchi -digen -ag
    perhaps EMPH EMPH sixty PAST- be.in.number -DUB -5p
    ‘…perhaps sixty formed a group…’ (Nishnaabemwin; Valentine, 2001: 832)

Under a syntactic approach to word-building (e.g. Baker, 1985, 1988; Halle & Marantz, 1993), the existence of these parallel functional sequences is problematic, as Branigan (2012) discusses for the equivalent data in Innu. If the past-tense preverb gii and the dubitative modal suffix -digen in (28c) both originate in the syntax, the underlying structure would be as in (29).

(29) ModP
    Mod
digen
    DUB
    T
    VP
    gii
    V
    dchi
    ‘number’

The problem here is obvious: if V raises high enough in the structure to pick up the Mod suffix -digen, then it must also raise past the position of the T marker gii. We would then expect T to appear in some position following the verb, either as a suffix or a postverbal particle, but it is instead realized to the left of the V–Mod combination. We therefore have a paradox: there is evidence that V is realized both higher than T (due to its combination with Mod) and lower than T (due to its position following T).

This problem is discussed by Bobaljik (1999) in relation to Cinque’s (1999) influential proposal that the positions of adverbs and clausal functional heads are determined by a fixed universal hierarchy. Cinque shows that in Italian, verbal elements (auxiliaries and participles) and adverbs are both ordered in accordance with the proposed functional hierarchy. However, Bobaljik points out that Italian verbal elements and adverbs actually pattern as two separate functional sequences. Although the verbal sequence and the adverb sequence conform to the same hierarchy, the two sequences can be interleaved. Thus, while it is true that there is a single functional hierarchy, the hierarchy appears to be instantiated in parallel fashion by two separate sequences within the same structure. Bobaljik refers to this problem as the “hierarchy paradox.”

There are various possible solutions to the hierarchy paradox as instantiated by Algonquian preverbs and suffixes, most of which are unsatisfactory. We could add a diacritic to stipulate whether each individual functional head is a preverb or a suffix. We could posit that preverbs are permitted to raise above suffixes in leapfrog fashion, subject to a constraint that such movement cannot change the relative order of preverbs (a suggestion that Bobaljik (1999) attributes to G. Cinque and C. Laenzlinger). We could envision a model of syntax in which preverb sequences and suffix sequences are built in parallel on separate tiers and subsequently combined in the manner of shuffling two stacks of cards together, as Bobaljik (1999) suggests. More drastically, we could abandon the idea of a hierarchy of functional heads and instead appeal to semantic scope as a source of ordering patterns (Ernst, 2002), or we could even abandon the syntactic approach to word-formation altogether and take the order of suffixes to be nothing more than a fossilized reflection of their diachronic origin in the syntax.

An alternative proposal has been made by Branigan (2012), who employs the mechanism of multiple head movement put forth by Collins (2002) to address the hierarchy paradox in Algonquian. Under multiple head movement, a functional head X can attract more than one lower head. The first attracted head, Y, left-
adjoins to X in the standard fashion, but all subsequent attracted heads “tuck in” between Y and X in the sense of Richards (1997). Branigan’s proposal is illustrated in (30), using the Nishnaabemwin structure in (29) above as an example. Let us assume that Mod triggers multiple head movement. Mod would first attract T, which adjoins to the left of Mod as in (30a). Mod would then go on attract V as well, which would tuck in between T and Mod as in (30b). The result is the attested order T–V–Mod.

(30)  a. ModP
      Mod  
      T   Mod
      gii  digen
      PAST  DUB
      TP  VP
      t  dchi
      ‘number’

b. ModP
      Mod  
      T   Mod
      gii  digen
      PAST  DUB
      TP  VP
      t  V
      dchi
      ‘number’

Multiple head movement succeeds in deriving the positions of the preverb and suffix from a single underlying sequence of heads without needing to stipulate that T is a preverb and Mod is a suffix. The multiple head movement approach thus has the potential to resolve the hierarchy paradox in Algonquian, although it remains to be demonstrated whether it can account for the full range of Algonquian data, such as forms with multiple preverbs and/or multiple TAM suffixes. I do not undertake such a demonstration here.

As a footnote to this discussion, it is worth observing that the hierarchy paradox in Algonquian may in fact be compounded by the existence of a third independent functional sequence. In addition to the sequence of inflectional suffixes and the sequence of bound preverbs, an Algonquian clause may contain a sequence of independent phrasal adverbs as well, and these adverb sequences also display Cinque-style ordering restrictions (see e.g. Shields (2008) for Menominee and Oxford (2008) for Innu). A single Algonquian clause can thus simultaneously display three iterations of the functional hierarchy. Diachronically, this state of affairs has arisen from the application of successive waves of grammaticalization, and we might imagine a distant future in which today’s suffixes have been lost completely, today’s preverbs have been worn down into inflectional affixes, and today’s adverbs have been worn down into another sequence of preverbs. This diachronic cycle inevitably gives rise to repeated synchronic instantiations of the hierarchy paradox.

7 Conclusion

This paper has raised the possibility of a long-term shift in head directionality in Algonquian. The putative shift was well advanced by the time of Proto-Algonquian and it is only through internal reconstruction that we find evidence of an earlier head-final stage. For PP and DP, the internal evidence for an early head-final stage is fairly strong. For the clausal spine, the sole internal evidence is the existence of a sequence of inflectional suffixes marking TAM. Across all phrase types, the original analytic head-final structures were lost when grammaticalization and reanalysis converted them into synthetic morphological structures. When new analytic structures later emerged, they have been head-initial rather than head-final. The shift to head-initial structure after the original head-final structure became ambiguous may indicate a learning bias in favour of head-initial structure. The overall cycle in which functional particles are grammaticalized as affixes and later supplemented by new functional particles creates parallel layers of functional structure that instantiate Bobaljik’s (1999) hierarchy paradox.
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