Possessive Prefixes across Algonquian

Evidence for Two Separate Paradigms

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This paper investigates possessive prefixes across Algonquian.[1] Possessive prefixes in Algonquian mark person features of the possessor on noun stems. Most independent nouns can be possessed, but possessor prefixes with independent nouns are nonobligatory—I will refer to these as *alienable possessive prefixes* (APPs). Algonquian languages also have a set of noun stems that are obligatorily possessed, i.e. they never occur without a possessive prefix. This set of dependent noun stems in Algonquian includes nouns referring to kinship terms, body parts, and some intimate possessions. This type of possessive construction is known as *inalienable possession,* and I will refer to these prefixes as *inalienable possessive prefixes* (IPPs).[2] Traditionally, it has been assumed that Algonquian has a single set of possessive prefixes that is used with both independent and dependent noun stems, presumably because possessive prefixes in these environments can sometimes (subject to phonological conditions, see below) look identical, see (1):[3]

(1) a. *Inalienable possession*　　b. *Alienable possession*

　　　ni-kosis　　　　　　　　　　**ni**-ciimaan

　　　1-son　　　　　　　　　　　　1-boat

　　　'my son'　　　　　　　　　　　'my boat'

(Woods Cree; Starks 1992:35, 64)

In the Woods Cree examples in (1), the first-person-possessive prefix surfaces as *ni-* with a dependent noun stem (1a) and with an independent noun stem (1b). A well-known contrast between the APPs and IPPs, however, arises when they precede a vowel-initial stem. Consider (2), where before a vowel-initial stem, the first-person agreement prefix surfaces as *n-* with a dependent noun stem (2a), but as *nit-* with an independent noun stem (2b):

(2) a. *Inalienable possession*   b. *Alienable possession*
          n-atay   **nit**-akohp
          1-belly   1-blanket
          'my belly'   'my blanket'

                                                    (Woods Cree; Greensmith 1985:65)

The contrast between IPPs and APPs illustrated in (2) is the main focus of this paper. This contrasting behavior of APPs vs. IPPs before a vowel-initial stem is most often described as an idiosyncratic phonological anomaly without any particular explanation (e.g., Fermino 2000:16–19 for Wampanoag; Frantz 1991:68–73 for Blackfoot; Starks 1992:22 for Woods Cree, among many others). Alternatively, a formal analysis of the contrast in (2) has been proposed in Newell and Piggott 2014 where the contrast is seen as evidence for distinct morphosyntactic positioning of the (same) possessive prefix when used with independent noun stems vs. dependent noun stems.[4]

The historical origin of these prefixes has also received conflicting analyses. Thus, Goddard (2007, 2015, and earlier works) reconstructs a single set of person agreement prefixes for Proto-Algonquian (PA); see Table 1. Under Goddard's analysis, which appears to have been assumed explicitly or implicitly in most descriptions of possessive prefixes in the Algonquianist literature, the APPs and IPPs are underlyingly and historically identical. Proulx (1989), on the other hand, taking into account the contrasting behavior of APPs and IPPs illustrated in (2), reconstructs two separate sets of prefixes: one marking inalienable possession and another one marking alienable possession. The latter set, under Proulx's reconstruction, is also used to mark agreement on verbs, as in Table 2. The question thus arises: How many paradigms of possessive prefixes are there in Algonquian languages, synchronically and diachronically? This paper argues that IPPs form a separate, underlyingly distinct paradigm from APPs.

TABLE 1. Reconstruction of a single set of PA agreement prefixes (based on Goddard 2007, 2015)

	1ST	2ND	3RD
Set 1	*ne-	*ke-	*we-

TABLE 2. Reconstruction of two sets of PA agreement prefixes (based on Proulx 1989)

	1ST	2ND	3RD
Set 1: Inalienable	*n-	*k-	*w-
Set 2A: Alienable & Verb Agr. before Vowel	*net-	*ket-	*wet-
Set 2B: Alienable & Verb Agr. before Cons.	*ne-	*ke-	*we-

The rest of this paper is structured as follows. In the next section, I present evidence for APPs and IPPs forming two separate paradigms. I argue that the APP paradigm has an additional underlying consonant (/t/ or /d/, depending on the language), which the IPP paradigm crucially does not have. A novel analysis in terms of *liaison* is proposed to account for the phonological behavior of APPs. I then offer a comparison of the current analysis and a formal account of the contrast between APPs and IPPs proposed in Newell and Piggott 2014. Finally, I briefly discuss the patterns found in verbal agreement prefixes across Algonquian and outline paths for future research.

APPs and IPPs Are Underlyingly Segmentally Different

In this section, I present the main argument for treating the APPs and the IPPs as two separate sets of morphemes. I will argue that APPs have an *underlying*, i.e., non-epenthetic, consonant—/t/ or /d/ (depending on the language)—which, crucially, the IPPs do not have as part of their underlying form.

The following alternation is observed across Algonquian. alienable possessive prefixes end in a consonant—/t/ or /d/ if the following stem begins with a vowel, but they end in a vowel if the following stem begins with a consonant. Consider the alternation found in Arapaho in (3)– (4) as an illustration, with a representation of the general rule in (5) (recall also (1b–2b)):

(3) a. biixuut   b. ne-biixuut
         shirt   1-shirt
         'a shirt'   'my shirt'

(4) a. hotii   b. not-otii
         car   1-car
         'a car'   'my car'[5]

(5) ne-, e-, i- /__-C . . .
     net-, et-, it- / __-V . . .   (Cowell and Moss 2011:61)

In (3), an independent noun is prefixed with an alienable possessive morpheme
ne- before a consonant-initial stem; in (4), an independent noun is prefixed with
an alienable possessive morpheme /net-/ (*not-*) before a vowel-initial stem. Impor-
tantly, this alternation is never found with IPPs, which before a vowel-initial stem
either remain the same as before a consonant-initial stem (cf. Arapaho examples
in (6) below) or delete their vowel (cf. Woods Cree examples in (2)).

(6) a. **ne**-biiˈʔoʔoo   b. ˈ**ne**-inoo
         1-sweetheart   1-mother
         'my sweetheart'   'my mother'   (Cowell and Moss 2011:266, 477)

The contrast between APPs and IPPs illustrated for Arapaho in (3)-(6) and in (1)-
(2) for Woods Cree is robust across Algonquian, i.e., we regularly find the /t, d/-∅
alternation in the possessive prefixes with independent nouns, but we never find
/t, d/-final possessive prefixes with dependent noun stems (cf. Table 3).[6] Previously,
the /t, d/ consonants in APPs have been almost exclusively described as epenthetic
to resolve vowel hiatus at the morpheme juncture (Cowell and Moss 2011; Goddard
2007, 2015; Newell and Piggott 2014; Oxford 2014, among many others; the only
exception being Proulx's reconstruction, cf. Table 2). In the remaining part of
this section, I argue that the /t, d/ consonants in APPs are underlying rather than
epenthetic. I propose a novel analysis of the /t, d/-∅ alternation in APPs in terms
of a liaison pattern. The evidence for analyzing the /t, d/ consonants in APPs as
underlying is threefold. First, the quality of the prefix-final consonant in APPs is
constant across languages: /t/ or /d/, suggesting a common diachronic source for
this consonant across Algonquian.[7] Such uniformity is unexpected if the consonant

TABLE 3. Possessive prefixes across Algonquian

	ARAPAHO	EAST CREE	PLAINS CREE	OJIBWE	PASS-MAL	WAMP.
Alienable Possession						
1ST	ne(t)-	ni(t)-	ni(t)-	ni(d)-	n(t)-	nu(t)-
2ND	e(t)-	chi(t)-	ki(t)-	gi(d)-	k(t)-	ku(t)-
3RD	i(t)-	u(t)-	o(t)-	o(d)-	w(t)-	wu(t)-
Inalienable Possession						
1ST	ne-	ni-	ni-	ni-	n-	nu-
2ND	e-	chi-	ki-	gi-	k-	ku-
3RD	i-	u- (__C) w- (__V)	o- (__C) w- (__V)	o-	w-	wu-

is not part of the underlying form of the alienable paradigm. Second, the insertion of /t, d/ is not a regular strategy to resolve vowel hiatus: Algonquian languages have a number of productive hiatus resolution strategies all of which are cross-linguistically widely attested. These include deletion of one of the vowels, resyllabification of two short vowels at a morpheme juncture as a single nucleus, and epenthesis of glottal consonants (/ʔ/, /h/) or glides (/j/, /w/) (on the typologically unmarked status of laryngeals and glides as a resolution for vowel hiatus, see, for example, Blevins 2008; Żygis 2010). In fact, the /t, d/-Ø alternation is *only* attested in Algonquian with the person prefixes, while in all other cases vowel hiatus is resolved via one of the regular typologically unmarked strategies listed above.[8]

The final, and the most important, piece of evidence against analyzing the /t, d/ consonants in APP as epenthetic comes from the fact that these consonants surface in person prefixes when there is NO vowel hiatus in a number of Algonquian languages, including Arapaho, Passamaquoddy-Maliseet, and Blackfoot. In the following sections, I first consider the Arapaho case in more detail, and I propose that the /t/-Ø alternation in APP can formally be analyzed as a case of liaison. I then turn to Passamaquoddy-Maliseet and Blackfoot and show how the liaison analysis can be extended to the patterns in these languages, which crucially cannot be captured with an epenthesis analysis.

The /t/-∅ Alternation in Arapaho: A Liaison Analysis

The /t/-∅ alternation in Arapaho is only ever attested with APPs, i.e., it is not found elsewhere in the language. Consonant epenthesis as a hiatus resolution strategy is only employed in Arapaho when a vowel sequence at the morpheme juncture cannot be resyllabified as a single nucleus, i.e., when a combination of two morphemes would result in an 'extra-long' trimoraic vowel sequence. In such cases, Arapaho employs epenthesis of typologically unmarked epenthetic consonants—glottal consonants or glides. Consider, for instance, (7) where a glottal fricative is epenthesized between a long vowel in the interrogative prefix *koo-* and the second-person possessive prefix *e-*:

(7) koo-**h**-e-θooxe
     Q-**EP**-2-glove
     'Is this your glove?'   (adapted from Cowell and Moss 2011:107)

Importantly, in all morphological contexts in the language, Arapaho allows for a combination of two short vowels at a morpheme juncture: consonant epenthesis never applies in such a phonological environment. Instead, two short vowels are always resyllabified as a single nucleus to avoid hiatus, cf. (8) below:

(8) his**i-i**   →   /hi.**sii**/
     tick-SG.OBV
     'a tick'   (Cowell and Moss 2011:59)

Crucially, the /t/-consonant in the APP surfaces before stems beginning with short vowels, i.e., in a phonological environment that does not warrant consonant epenthesis in Arapaho. Consider examples in (9); (9a) is repeated from (4); (9b) is adapted from Goddard (2015:362):

(9) a. **not**-otii   b. **net**-eneecee-b
         1-car   1-buffalo-POSS
         'my car'   'my buffalo'[9]

If the /t/-∅ alternation in APPs in Arapaho were to be analyzed as consonant epenthesis to resolve hiatus, it would thus be a unique and highly unexpected

process as (i) it would be a case of epenthesis of a consonant quality (i.e., /t/) that never occurs as epenthetic elsewhere in the language, and (ii) it would be a case of consonant epenthesis occurring in a phonological environment (i.e., between two short vowels) that never triggers epenthesis elsewhere in the language.

For these reasons, I propose that /t/ in APPs is underlying, i.e., it is not epenthetic. I further propose that the /t/-∅ alternation observed in these prefixes in Arapaho should be analyzed as a case of liaison. The current account is formulated within the CVCV Phonology framework (Lowenstamm 1996; Scheer 2004). Within this theory, the timing tier consists of sequences of onsets and nuclei (CV). C and V positions on the timing tier may be phonologically null if they lack a link to a segment on the segmental tier. On the other hand, a segment may be *floating* if it is unassociated to a position on the timing (CV) tier.[10] Floating elements have been proposed to account for multiple patterns cross-linguistically. One of the most well-known patterns is the liaison in French (Clements and Keyser 1983; Tranel 1986; Bennett 1991), as illustrated in (10).

In (10a), the final underlying consonant of the article is a floating element, and it remains silent as it is not associated with a position on the CV tier. In (10b), the following V-initial stem supplies an onset position for the floating final consonant of *les*, which results in it being pronounced.

(10) a. 'les garçons'

$$
\begin{array}{cccccccc}
\text{C} & \text{V} & & \text{C} & \text{V} & \text{C} & \text{V} & \text{C} & \text{V} \\
| & | & & | & | & | & | & | & | \\
\text{l} & \text{e} & \text{z} & \text{g} & \text{a} & \text{к} & \text{ø} & \text{s} & \text{ɔ̃}
\end{array}
$$

b. 'les amis'

$$
\begin{array}{ccccccc}
\text{C} & \text{V} & & \text{C} & \text{V} & \text{C} & \text{V} \\
| & | & \diagup & & | & | & | \\
\text{l} & \text{e} & \text{z} & & \text{a} & \text{m} & \text{i}
\end{array}
$$

(11)
$$
\begin{array}{cc}
\text{C} & \text{V} \\
| & | \\
\text{n} & \text{e} \quad \text{t}
\end{array}
$$
  - *net*- '1ST PERSON'

I propose that the /t/-Ø alternation in the alienable possessive prefixes in Arapaho (and more broadly, in Algonquian) should be analyzed in the same way. Thus, the prefix-final /t/ in Arapaho is a floating element, i.e., it is part of the underlying form of the morpheme, but it is not underlyingly attached to a skeletal position on the CV tier (11). The prefix-final /t/ then can only be pronounced if the following morpheme is V-initial and thus provides an empty onset slot for the /t/ to be associated with. Consider the schematic representation in (12)-(13):

(12) a. ne-biixuut
          1-shirt
          'my shirt'

      b. C V   C V C V C V C V C V
          | | | | \ / | \ / |
          n e t   b   i   x   u   t

(13) a. not-otii
          1-car
          'my car'

      b. C V   C V C V C V
          | | / | | | | \ /
          n o t   o   t   i

In (12), the final underlying consonant of the APP is silent, as it is not associated with a position on the CV tier. In (13), however, the following V-initial stem supplies an onset position for the floating final consonant of the APP, and it can be pronounced.

The representation of the APP in (11) not only provides a straightforward explanation for the /t/-Ø alternation in Arapaho, but it also makes the following prediction. Prefixes ending with a floating consonant are predicted to phonologically realize that consonant whenever they are followed by a vowel-initial morpheme because the floating consonant will be able to link to an open C-position on the timing tier. This prediction is crucially different from the prediction made by an analysis treating the /t, d/ consonants in APPs as epenthetic to resolve vowel hiatus; compare the two in (14)-(15):

(14) *Prediction of the epenthetic /t, d/ account*

/t, d/ will surface in a vowel hiatus environment:

$\emptyset]_{APP} \rightarrow$ t, d]$_{APP}$ / V__-V

(15) *Prediction of the liaison account*

/t, d/ will surface if followed by a vowel-initial morpheme:

$\emptyset]_{APP} \rightarrow$ t, d]$_{APP}$ / __-V

In the next section, I show that the prediction of the liaison analysis proposed here (15) is borne out in the Passamaquoddy-Maliseet patterns of the /t/-$\emptyset$ alternation in person prefixes, which, crucially, cannot be explained as a hiatus resolution strategy of /t/-epenthesis (14).

The /t/-Ø Alternation in Passamaquoddy-Maliseet: A Liaison Analysis

Passamaquoddy-Maliseet provides particularly clear evidence in favor of the liaison analysis of the /t/-$\emptyset$ alternation in Algonquian. Similar to other languages within the family, the /t/-$\emptyset$ alternation in Passamaquoddy-Maliseet is restricted to person prefixes. It is attested with APPs and with person-agreement prefixes with verbs (see discussion below), and it is not attested with IPPs.[11] Consider the examples in (16): in (16a), an independent noun stem begins with a consonant, and the first-person-possessive prefix surfaces as *n-*; in (16b), an independent noun stem begins with a vowel, and the first-person-possessive prefix surfaces as *nt-:*

(16) a. **n**-sakom-am   b.   **nt**-ipis-im

1-chief-POSS   1-whip-POSS

'my chief'   'my whip' (Passamaquoddy-Maliseet; PMLP)

Observe that the vowel hiatus environment is not present in Passamaquoddy-Maliseet even when the noun stem begins with a vowel (16b). Contrast examples of the alienable possession in (16) and the examples with inalienable possessive prefixes in (17) below. In (17), the first-person-possessive prefix is realized as *n-* before a consonant-initial dependent noun stem (17a) and before a vowel-initial dependent noun stem (17b):

(17) a. **n**-pihtin   b.   **n**-ikuwoss
           1-hand   1-mother
           'my hand'   'my mother'

(18) a. **n**-sakom-am
           1-chief-POSS
           'my chief'

      b. C   V   C   V   C   V   C   V
         | | | | | | | |
         n   t   s   a   k   o   m   a   m

(19) a. **nt**-ipis-im
           1-whip-POSS
           'my whip'

      b. C   V   C   V   C   V   C   V
         | | ╱ | | | | |
         n   t   i   p   i   s   i   m

We thus observe that in Passamaquoddy-Maliseet, like in other Algonquian languages, the contrast between APP and IPP is neutralized before a consonant-initial stem ((16a), (17a)), but the difference in their phonology is evident before a vowel-initial stem ((16b), (17b)).

   Importantly, Passamaquoddy-Maliseet provides crucial evidence against treating /t, d/ in APP as epenthetic consonants to resolve vowel hiatus because person prefixes in Passamaquoddy-Maliseet have no vowel (cf. (16b), Table 3 above), and thus there is no vowel hiatus environment to trigger consonant epenthesis. Crucially, however, when the stem begins with a vowel, it provides a phonological environment for liaison. Thus, the prediction in (15) is borne out. Consider representations in (18)-(1E9).In (18), the /t/ consonant in the APP is a floating element and cannot be pronounced as it lacks an association with a slot on the CV-tier. In (19), on the other hand, when the following morpheme begins with a vowel, it supplies an empty C-slot on the timing tier, and the floating /t/ of the APP can get linked to it and be pronounced. The /t/-∅ alternation in APPs thus is straightforward in Passamaquoddy-Maliseet if analyzed as a liaison pattern, but it is surprising and idiosyncratic otherwise.

TABLE 4. Alienable vs. Inalienable possessive prefixes in Blackfoot (based on Proulx 1989)

	ALIENABLE POSSESSIVE PREFIXES	INALIENABLE POSSESSIVE PREFIXES
1ST	nit-	n-
2ND	kit-	k-
3RD	ot-	o-

The /t/ in APPs in Blackfoot

While Arapaho and Passamaquoddy-Maliseet provide strong evidence for the liaison analysis of the /t/-∅ alternation in APPs because in both languages the regular phonological environment for epenthesis is not met, Blackfoot provides clear evidence for treating /t, d/ as part of the underlying shape of the APPs. Possessive prefixes used with independent noun stems ALWAYS have the final consonant /t/ in Blackfoot, i.e., there is no /t/-∅ alternation in this language. The set of APPs thus even on the surface looks quite different from the set of IPPs in Blackfoot; consider Table 4. The prefix-final /t/ in APPs cannot be analyzed as epenthetic in Blackfoot as there are no environments in which it would fail to surface as part of these morphemes. Consider the examples in (20) below. In (20a), the independent noun stem begins with a consonant, and an epenthetic vowel /i/ is inserted between the prefix and the stem;[12] in (20b), the independent noun stem begins with a vowel:

(20) a. **nits-i**-nʔixksinʔi   b. **nit**-oʔpiimʔa
       1-EP-song   1-rope
       'my song'   'my rope'
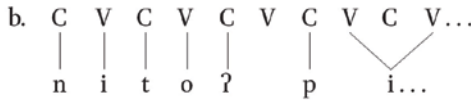
                                 (Blackfoot; adapted from Proulx 1989:56, 67)

The prefix-final /t/ in the APPs in Blackfoot must be analyzed as underlying rather than epenthetic. In contrast to the rest of Algonquian, the /t/ consonant in Blackfoot does not alternate with ∅. In the current analysis, this can be seen as a microparametric variation straightforwardly explained if /t/ in the Blackfoot prefixes is not a floating element; i.e., it is associated to a C-slot on the timing tier in all cases. Consider the representations in (21)-(22). Blackfoot thus provides particularly clear evidence for analyzing /t, d/ as part of the underlying form of the APPs across Algonquian and against treating these consonants as epenthetic.

(21) a. **nitsi-nʔixksinʔi**
1-song
'my song'

b.
```
C   V   C   V   C   V   C   V   C   V...
|   |    \ /    |   |        |   |
n   i    ts     i   n        ʔ   i...
```

(22) a. **nit-oʔpiimʔa**
1-rope
'my rope'

b.
```
C   V   C   V   C   V   C   V   C   V...
|   |   |   |   |        |      \ /
n   i   t   o   ʔ        p       i...
```

Discussion and Future Research

The proposals put forward in this paper have a number of theoretical consequences, some of which are considered briefly below.

Contrasting Formal Accounts: Epenthesis vs. Liaison

The account of the contrast between APPs and IPPs proposed in this paper suggests that there is a segmental difference between two sets of prefixes that leads to their differing phonological behavior.[13] This is markedly different from a previous formal account of the /t, d/ consonants in APPs, which derived the differences in the phonological behavior between APPs and IPPs from a morphosyntactic difference between alienable and inalienable possession (Newell and Piggott 2014, N&P henceforth).[14] Newell and Piggott claim that the contrasting behavior of (what they consider to be a single set of) possessive prefixes before vowel-initial stems is due to the possessive prefixes being structurally 'closer' to the noun in the inalienable environment than in the alienable environment. While possessive

prefixes are spelled out in the same phase (DP in Newell and Piggott's analysis) with a dependent noun, possessive prefixes and a possessed independent noun are spelled out in different phases (DP and nP respectively). Focusing on Ojibwe, Newell and Piggott argue that vowel hiatus within a phase, as with the IPPs and vowel-initial noun stems, triggers vowel deletion to resolve hiatus, as in (23) below (the underlying forms of morphemes are presented as they are given in the source, but see note 15 below):

(23) a. *IPP with C-initial stem* b. *IPP with V-initial stem*

SF	**ni**ka:d	**no**:s
UF	ni-ka:d	ni-o:s
	1-leg	1-father
	'my leg'	'my father' (N&P:346, 349)

On the other hand, when vowel hiatus emerges between morphemes spelled out in different phases, as with the APPs and vowel-initial noun stems, hiatus should be tolerated as a general rule. Newell and Piggott themselves note that the appearance of the /d/ consonant in APPs before a vowel-initial stem is "difficult to explain" within their analysis (N&P:352). They further propose that it is NOT tolerated with APPs, contrary to the predictions of their analysis, because of an independent structural complication arising from a syntax-phonology mismatch. They stipulate that APPs are morphosyntactically external to the prosodic word (i.e., the stem they combine with), but for phonological reasons, these prefixes must be part of the same prosodic word as the stem. Thus, while APPs are spelled out in the morphology as a PWd adjunct, they then undergo an 'adjustment process' that incorporates the APPs into the PWd formed by the stem (24):

(24) [APP [. . .$_{PWd}$]] → [~~APP~~ [APP . . .$_{PWd}$]] (adapted from N&P:353)

Such a mismatch between the morphosyntactic position and the 'surface' phonological position of the APPs then triggers the /d/-epenthesis with this particular class of morphemes, as in (25):

(25) a. *APP with C-initial stem*   b. *APP with V-initial stem*

      SF   **niʒiːʃiːbim**   **nid**ogimaːm

      UF   ni-ʒiːʃiːb-im   ni-ogimaː-m

               1-duck-POSS   1-leader-POSS

               'my duck'   'my chief, leader'

                                                                      (N&P:346, 351)

Newell and Piggott then take the asymmetry in the presence/absence of the /d/-Ø alternation in APPs vs. IPPs as evidence for a difference in morphosyntactic positioning of possessive prefixes when used with dependent vs. independent nouns. Recall, it is proposed here that the /d/-Ø alternation in APPs and the contrast between APPs and IPPs can be explained in purely phonological terms (i.e., without the need to appeal to morphosyntactic or morpho-prosodic factors). Further evidence is thus required to support the structural difference between APPs and IPPs which Newell and Piggott argue for, namely that one is interpreted inside the same phase as the noun, and the other one is not. Such evidence in fact may come from phonological differences between the two sets of prefixes other than the presence/absence of the /t, d/-Ø alternation. I discuss these briefly below.

    Both APPs and IPPs show phonological interactions with the stem they attach to. The nature of these interactions, however, differs in a systematic way that may point not only to the two sets of morphemes being segmentally different (as argued in this paper), but also to their differing morphosyntactic locality with respect to the noun stem (as proposed in N&P). While phonological interactions between APPs and the noun tend to be fully regular and transparent, the interactions between IPPs and the stem may not be transparent synchronically and exhibit idiosyncratic patterns that could potentially be explained by their morphosyntactic 'closeness' to the stem.

    Fully regular phonological effects of the stem shape on APP are found across Algonquian languages. These include, for example, vowel harmony spreading from the stem to the APP (recall the Arapaho examples in (9a)) and palatalization processes affecting the underlying /t/ consonant (recall, for instance, the Blackfoot example in (20a)). IPPs on the other hand show phonological idiosyncrasies both in their segmental shape and in their prosodic behavior across Algonquian. In Arapaho, for instance, in addition to the morphemes *ne-*, *e-*, *i-* (first, second, and third person respectively) exemplified above (in (6) and Table 3), IPPs can have the forms *nei-*, *ei-*, *inii-* or *nee-*, *ee-*, *ii-* for no synchronic phonological reasons. Consider

(26) below. The obligatory possessive prefix with this noun has a long vowel in all forms and carries lexical falling tone (marked with the circumflex diacritic over the vowel):

> (26)   a.   nêe-ˈcet   'my hand'
>   b.   hêe-ˈcet   'your hand'   (Arapaho; Goddard 2015:363)

The allomorphy of the IPP in forms like (26) is diachronically conditioned by the sensitivity of the possessive prefix to the phonological form of the particular noun root. Nouns like (26) historically had a root beginning with a cluster that became *ʔC in Proto-Arapaho-Gros Ventre and lengthened the vowel of the prefix when the glottal stop was lost, which in turn produced the idiosyncratic falling tone (Goddard 2015:363). The phonological shape of IPP in (27) below, similarly, cannot be explained by synchronic surface phonology, but is explained as a historical consequence of the phonological interaction between the particular noun root and the obligatory possessive prefix:

> (27)   a.   nei-hʔeh   'my son'
>   b.   hii-hʔeh   'his/her son'   (Arapaho; Goddard 2015:364)

According to Goddard (2015), the vowel in the IPP in (27) arose as a regular consequence of the loss of PA root-initial *k. A formal analysis of such a "fusion" of IPP and noun stems is beyond the scope of this paper, but capturing the allomorphy patterns like (26) and (27) would likely require positing morphological rules referring to structurally local interactions between a particular root and the possessive morphemes. The precise formulation of the locality conditions involved in these interactions is currently under investigation (see also Newell et al. 2018).

Possessive Prefixes and Person Agreement on Verbs

Another issue left for future research is the relation between possessive prefixes and person agreement prefixes found on verbs. Most Algonquian languages provide clear evidence that verbal agreement prefixes and APPs historically formed a single paradigm, and synchronically show no or minimal difference between the two. Thus, person prefixes marking agreement on verbs in most Algonquian languages show the /d, t/-∅ alternation found in the APPs and exhibit

phonologically transparent interactions with the stem they attach to. When the APP paradigm and the verbal paradigm do differ, interestingly, these differences are localized in the third person. For instance, the only difference between the APP paradigm and the verbal prefix paradigm in East Cree, Plains Cree, Ojibwe, Wampanoag, and Blackfoot is that they lack the third-person marker in the verbal paradigm, while the third-person morpheme is present in the APP paradigm (cf. Table 3). A small number of languages show more significant differences between the APP paradigm and the verbal agreement prefixes. For instance, while the APP prefixes are /t/-final in Arapaho, verbal prefixes are not; i.e., they never exhibit the /t/-∅ alternation. Another example of an interesting interaction between verbal and possessive prefixes comes from Woods Cree. The APP and the IPP paradigms in Woods Cree differ in way that is a familiar by now—while the APPs have an underlying /t/, the IPPs do not; this contrast is neutralized before a consonant-initial stem. Interestingly, the verbal paradigm makes use of both sets of the possessive prefixes; i.e., it fluctuates between using the APPs *nit-*, *kit-* and the IPPs *n-*, *k-* before a vowel-initial stem. Consider (28) below:

(28) a. **nit**-apin   b. **n**-aðahwa:w
          1-sit.down   1-bury.TA.1>3
          'I am sitting down.'   'I am burying him.'

(adapted from Greensmith 1985:64)

The 'fluctuating' Woods Cree pattern may suggest an ongoing language change and indicate that the two paradigms, IPPs and APPs, are undergoing a merger within the verbal agreement paradigm. A more precise description of the distribution of the alienable vs. inalienable paradigm to mark agreement on verbs in this language is left for future investigation.

Conclusion

In this paper, I have argued that Algonquian languages provide ample synchronic evidence in favor of analyzing the alienable possessive prefixes and the inalienable possessive prefixes as two separate paradigms. I have argued that APPs and IPPs are underlyingly segmentally different: while the APP paradigm contains an underlying consonant—/t, d/, the IPP paradigm does not. Crucially, I have argued that /t, d/ in

APPs cannot be analyzed as epenthetic consonants to resolve vowel hiatus. Instead, I have proposed that the phonological behavior of these consonants represents a pattern of liaison. I have shown that such an analysis offers a better empirical coverage when compared to the earlier epenthesis accounts.

NOTES

1. I am grateful to Paula Fenger, Robert M. Leavitt, Adrian Stegovec, and Saurov Syed for their comments on earlier versions of this work. I also thank Peter Bakker, an anonymous reviewer, the editors of this volume, and the audience at the 53rd Algonquian Conference for their insightful suggestions.

2. The question whether the pre-stem possessive morphemes (as well as the pre-stem morphemes marking person agreement in verbs) are affixes or clitics is not relevant for the current paper, and for ease of exposition I will be referring to them as PREFIXES (see, however, Déchaine 1999; Halle and Marantz 1993).

3. The following abbreviations used in this paper are not included in the Leipzig Glossing Rules: EP = epenthetic, IC = initial change, OBV = obviative, PWd = Prosodic Word, SF = surface form, TA = transitive animate, UF = underlying form. The orthography of the original is used in all examples except the IPA symbols for glottal stop /ʔ/ and voiceless dental fricative /θ/ are used here. The circumflex over a vowel marks lexical falling tone [ê]; vowel length is marked with colon [e:] or double vowels [ee], depending on the source; raised vertical line ['] marks primary stress.

4. See section below for further discussion of Newell and Piggott 2014.

5. Note that /h/ is regularly inserted as the word onset for underlyingly vowel-initial stems in Arapaho as onsetless syllables are banned in the language (Bogomolets 2020:46–50). The vowel alternation /e/-/o/ in the prefixes is due to a productive vowel harmony process; see Cowell and Moss (2011:20–22).

6. It should be noted that different dialects of the languages listed in Table 3 might show slight differences in these inventories, but the relevant pattern always remains the same where the APPs show the prefix-final /t, d/ before a vowel, and IPPs never do. The inventories of the possessive prefixes in Table 3 are based on the following sources: Cowell and Moss 2011 (Arapaho); Dahlstrom 1991 (Plains Cree); Fermino 2000 (Wampanoag); Junker 2000–2019 (East Cree); Leavitt 1996, Passamaquoddy-Maliseet Language Portal: PMLP, retrieved February 2022 (Passamaquoddy-Maliseet); Piggott 1980, Newell and Piggott 2014 (Ojibwe); Wolfart 1973 (Plains Cree).

7. I thank Peter Bakker who pointed out to me that these consonants appear to be an

ancient element dating back to Proto-Algic as the same -t- element appears in the alienable possession construction in Wiyot (see Bakker 2006; Goddard 1975).

8. Newell and Piggott (2014) analyze /d/ as epenthetic in Ojibwe in another environment, namely when the future tense morpheme *ga*(*d*)- is followed by a vowel-initial stem. Consider the underlying form (UF) of this morpheme as analyzed in Newell and Piggott (2014:355): in (i), *ga*(*d*)- is followed by a C-initial morpheme while in (ii) it is followed by a V-initial morpheme:

(i) SF   ni**ga**gi:we:se: (ii) SF   ni**ga**da:gamose:
    UF   ni-**ga**-gi:we:-ose: UF ni-**ga**-a:gam-ose:
    1-**FUT**-go.home-walk   1-**FUT**-snowshoe-walk
    'I will (probably) walk home.'   'I will (probably) walk in snowshoes.'

The analysis of /d/ in this environment as an epenthetic consonant to resolve hiatus is, however, incorrect since /d/ in *gad*- is present underlyingly and can be traced back to its Proto-Algonquian source (/t/, iii) as well as to the cognates in other modern Algonquian languages (iv). Importantly, the final consonant of the future tense prefix does not syncopate in other Algonquian languages when the following morpheme is consonant-initial:

(iii)   *kataw- 'want to, intend' ➜ *kata future tense
(iv)   PA *kata future tense > Ojibwe *gad*, Cree *kata*, Illinois *kata*, Arapaho *het*,
         Massachusett *kat*, Munsee *kata* (adapted from Pentland 2005:326)

A liaison analysis, parallel to the one proposed below for the /t, d/ consonants in person prefixes, can straightforwardly account for the /d/-Ø alternation in the future tense morpheme in Ojibwe (i)-(ii). Details are, however, beyond the scope of this paper.

9. A large number of independent nouns in Arapaho (and in Algonquian more generally), when possessed, are suffixed with the so-called 'possessive theme marker' *-w/-b* (9b). These nouns refer to animate objects, body parts, or commonly possessed referents (see Cowell and Moss 2011:63; Goddard 2015:362). This possessive suffix is not discussed in the current paper.

10. On the significance of empty elements in the CVCV Phonology as well as on the principles behind Government and Licensing within the model, I refer the reader to Scheer (2004 and subsequent work). Structures given in this paper are simplified for the sake of space, and Government and Licensing relations are not marked in the structures.

11. I am grateful to Robert M. Leavitt for bringing to my attention that a small number of exceptional dependent vowel-initial noun stems take the /t/-final possessive prefixes in Passamaquoddy-Maliseet either regularly or as a variant in addition to the non-exceptional IPPs (which do not have the prefix-final /t/, cf. Table 3 above). The Online Passamaquoddy-Maliseet Dictionary (retrieved from http://www.pmportal.org) contains thirty-one such forms. All of these exceptional cases involve one of the following factors: (a) A noun has been misclassified by the authors of the dictionary as a dependent when in fact it is independent. (b) A noun is deverbal. Since verbs in Passamaquoddy-Maliseet use the Alienable paradigm prefixes for marking person agreement (see below), we find these used with dependent nouns, which are formed from verbs. (c) Both variants exist in the language—the regular Inalienable prefixation and the exceptional prefixation with the Alienable paradigm, suggesting, perhaps, language change in progress. (d) Relatedly, a number of dependent noun stems, which exceptionally take the /t/-final prefixes, also take the possessive theme marker *-Vm*, which is generally restricted to independent nouns across the family (see also note 9 above). This, according to Robert M. Leavitt (personal communication), appears to be a recent innovation. Such a 'borrowing' from the Alienable Possessive paradigm may be suggesting that these nouns are unstable in their dependent status as a result of a relatively recent language change.

12. Note that the epenthetic /i/ conditions assibilation of the prefix-final /t/ in (20a). The /i/-epenthesis in consonant clusters and the assibilation/spirantization exemplified in (20a) are regular phonological processes in Blackfoot (see, for example, Elfner 2004).

13. I have assumed that the /t, d/ consonants in the APP paradigm are part of the possessive prefixes. An anonymous reviewer mentions that, in addition to the evidence presented in this paper, speakers systematically classify possessive prefixes into two distinct paradigms, although I have not been able to confirm this. It should be noted, however, that an alternative analysis is possible where the /t, d/ consonants are not part of the possessive prefixes proper but are a separate morpheme by themselves. Postulating that the /t, d/ consonants are (or were historically) a morpheme separate from the possessive prefixes would mean that Algonquian possessive marking aligns more closely with a cross-linguistically robust behavior of the alienable vs. inalienable marking. In languages that have both, alienable possession is virtually universally marked in a similar way to inalienable possession, but the marking for alienable is longer and more morphologically complex than that for inalienable possession. The additional morpheme in the alienable possessive paradigm has been described as an invariable 'passive', 'possessive', or 'pertensive' affix for a wide variety of languages (for a summary see Dixon 2009:277–297). Whether /t, d/ are analyzed as part of the APPs or as a separate possessive morpheme,

the main claim of this paper remains the same, namely that these consonants must be underlying rather than epenthetic across Algonquian in the alienable possession environment.

14. I focus here specifically on the account proposed in Newell and Piggott (2014) as this is the only existing detailed formal account of the presence/absence of the /t, d/ consonants in APPs vs. IPPs.

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