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Plural exponence in the Nez Perce DP: a DM analysis

Amy Rose Deal

Abstract This paper analyzes two patterns of number marking in DP in Nez Perce (Sahaptian) within the framework of Distributed Morphology. The first involves under-realization of plural on nouns. Number has classically been understood as a feature inherent to nouns, rather than to adjectives that modify them. In Nez Perce, however, only a small set of nouns show number morphology, whereas number morphology is highly productive on adjectival modifiers. Adjectives in fact may realize the plural more than once per word – an instance of multiple exponence. I show that the puzzle of under-realization for nouns can be solved through conditioned allomorphy, providing new evidence for the presence of gender features on *n* (Lowenstamm 2007, Kramer 2014). The puzzle of multiple exponence (over-realization) for adjectives can be solved through Local Dislocation (Embick and Noyer, 2001) combined with very late insertion of reduplicative content (Haugen 2008, 2011), demonstrating one way the DM architecture may produce multiple exponence without recourse to dedicated mechanisms.

1 Introduction

One of the major ways that adjectives pattern with nouns morphologically concerns the form in which they expone DP-related features like number. In many languages, adjectives draw from the same inflectional paradigms as nouns do, with the result that the same set of affixes appears across multiple constituents of the DP. In Nez Perce (Sahaptian), nouns and adjectives alike draw on the plural affixes exemplified in (1)-(3) below. Phonological conditioning of allomorphy behaves the same way across

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both word classes: *he-* is used for words beginning with glottal segments /ʔ/ or /h/, and partially reduplicative *Ci-* is used for non-glottal-initial words.[1] A third, rarer, allomorph, *-me*, is conditioned non-phonologically across both classes. We see this set of markers in use across both adjectives and nouns in the DPs shown in (4).[2]

(1) *he-* plural marking

	Singular	Plural	Gloss	Ref.	Category
a.	ʔelwít'et	he-ʔélwit'et	orphan(s)	[A988]	N
b.	háacwal	ha-háacwal*	boy(s)	[A89]	N
c.	ʔéhew	he-ʔéhew	wounded, grieving	[A985]	A
e.	ʔayyí'c	ha-ʔáyyi'c*	dangerous	[A982]	A

(* *he-* > *ha-* by vowel harmony[3])

(2) *Ci-* plural marking (partial reduplication)

	Singular	Plural	Gloss	Ref.	Category
a.	pit'íin'	pi-pít'in'	girl(s)	[A550]	N
b.	qiiwn	qi-qíiwn	old man/men	[A590]	N
c.	taʔc	ti-táʔc	good	[A700]	A
d.	kuhét	ki-kúhet	tall, long	[A250]	A

(3) *-me* plural marking

	Singular	Plural	Gloss	Ref.	Category
a.	píke	piké-me	mother(s)	[A1071]	N
b.	yuʔc	yúʔc-me	poor, pitiful	[A958]	A

(4) Examples

a. ti-táʔc   ha-háacwal
    PL-good PL-boy
    (the) good boys

b. yúʔc-me he-ʔélwit'et
    pitiful-PL PL-orphan
    (the) pitiful orphans

These parallels in noun and adjective inflection stand in contrast to several significant differences. One involves gender (or noun class), which in Nez Perce reflects a semantically determined three-way contrast between humans, other animates, and inanimates. Nez Perce does not expone gender across the DP as part of the same concord system involved in exponing number, in contrast to the pattern in many familiar languages. Instead, the primary role for gender features in number concord lies in conditioning the realization of overt plural affixes. This behavior is restricted

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[1] Nez Perce lacks vowel-initial words, so words in this class always begin with a non-glottal consonant.

[2] Lexical data in this paper draws primarily from the extensive Nez Perce dictionary, Aoki (1994); references to this work are given as [A*n*], where *n* is a page number. All data not credited to a published source comes from fieldwork conducted on the Nez Perce reservation in Lapwai, ID, 2006-2015, with four native speaker consultants. In some cases, data from fieldnotes is given the tag [fn]. Transcriptions are based on the Aoki 1994 system. Note that *e* = IPA *æ*, *y* = IPA *j*, *x̂* = IPA *χ*, *c* = IPA *ts*, and that main stress is indicated with an acute accent. Transcriptions here depart from Aoki in marking vowel length with digraphs, and glottalization with an apostrophe just after the glottalized consonant. They depart from transcriptions used in Deal (2010a,b) and following work in marking the glottal stop with ʔ instead of an apostrophe.

[3] For discussion and references, see section 2.

to nouns: in [-HUMAN] plural DPs, nouns never show overt plural affixes, but adjectives do:

(5) ki-kúhet   ha-ʔáayat   [+HUMAN, +ANIMATE]
     PL-tall   PL-woman
     (the) tall women

(6) ti-táʔc   ciq'áamqal   [-HUMAN,+ANIMATE]
     PL-good dog
     (the) good dogs

(7) ki-kúhet   ti-tíyaw'ic   wix̂si'likéecet'es   [-HUMAN,-ANIMATE]
     PL-tall   PL-sturdy   chair
     (the) tall, sturdy chairs

The surest sign of the plurality of a DP in Nez Perce is therefore not the inflection of the noun itself, but that of its adjectival modifiers. This pattern makes for a contrast with the classical view of number as a feature more closely connected morphologically with nouns than with adjectives.[4] Through this lens, the pattern in (6)-(7) is an instance of under-realization of plural, concerning the noun.

A second difference between noun and adjective plural marking builds on the same fundamentals, but pulls in the opposite direction. Number features are canonically realized only once per word, as of course is true of featural exponence much more generally. Considerable attention has been paid in recent years to patterns of multiple or 'extended' exponence, wherein a single feature is exponed more than once in a given word (Anderson 2001, Müller 2007, Harris 2009, Caballero and Harris 2012). Multiple exponence of plural may be seen in Nez Perce for certain adjectives which are fully reduplicative. In the singular form, these adjectives show a distinctive shape, strictly consisting of one reduplicated foot or (minimal) prosodic word. (I will propose that a single foot constitutes the minimal word in Nez Perce.) In the plural form, the appropriate phonologically-conditioned plural affix, *he-* or *Ci-*, appears twice, once for each half of the reduplicative singular form.

(8)

	Singular	Plural	Gloss	Ref.	Category
a.	qeps-qéps	qi-qeps-qí-qeps	strong, vigorous	[A579]	A
b.	kinán-kinan	ki-kinán-ki-kinan	tough (of wood)	[A227]	A
c.	qiyées-qiyes	qi-qiyés-qi-qiyes	sober-faced	[A591]	A
d.	ʔilp-ʔílp	he-ʔílp-e-ʔilp* (*medial /h/ deletion)[5]	red	[A1022]	A

There is no corresponding pattern for nouns. It turns out that this interaction with lexical category may be expected based on the pattern in (5)-(7) above: while there are numerous fully reduplicative nouns in the language, some of which reduplicate a foot / minimal word, all such nouns are external to the [+HUMAN] noun class, and thus are expected to under-realize the plural.

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[4] See for instance Corbett's (2000, p. 2) fifth "reasonable but incorrect assumption" about number: "Number is a nominal category." The Nez Perce pattern in (6)-(7) is also relevant to the second reasonable but incorrect assumption Corbett discusses: "all relevant items (nouns, for instance) will mark number."

[5] Note that Nez Perce generally does not tolerate post-consonantal glottal consonants. Singular form *ʔilpʔilp* 'red' (8d) is exceptional in this regard.

(9)

		Word	Gloss	Ref.	Category	Gender
	a.	qápt-qapt	thigh bone(s)	[A572]	N	[-HUM,-ANIM]
	b.	k'olál-k'olal	bell(s)	[A284]	N	[-HUM,-ANIM]
	c.	quyées-quyes	bluejay(s)	[A599]	N	[-HUM,+ANIM]
	d.	ʔalwa-ʔálwa	bison calf robe(s)	[A963]	N	[-HUM,-ANIM]

As a consequence of gender-number interactions, the over-realization of plural via double reduplication is a pattern strictly for adjectives in Nez Perce.

My goal in this paper is to document these patterns and show how they may be analyzed within the framework of Distributed Morphology (DM). Two aspects of the framework will play an important role. One concerns the makeup of DP and the origin of nominal features. In DM, the input to morphological realization is a syntactic structure, wherein morphosyntactic features are located on terminal nodes. Number features, following Ritter (1991, 1993), originate not on nouns themselves, but on a functional head within the DP, Num^0. Number is thus no more inherently connected to nouns than to other elements of the DP. This is different from the situation for gender, following Lowenstamm (2007) and Kramer (2014). These authors argue that gender features originate on n heads and are thus inhently connected with nouns. I will show that this pair of assumptions about number and gender allows for a straightforward explanation of under-realization of plural on the noun, and the contrast between nouns and adjectives in (6)-(7).

The analysis of over-realization of the plural on reduplicative adjectives draws from a different part of the DM architecture: morphological operations. Two major proposals for handling multiple exponence within DM come from Noyer (1992) and from Müller (2007). For Noyer, multiple exponence in Tamazight Berber is to be handled by means of *secondary exponence*: if two morphemes both appear to expone feature F, one is analyzed as exponing F and the other as being applicable only when F is exponed by another element. This requires a new type of contextual feature for purposes of Vocabulary Insertion, the core operation responsible for inserting phonological content. For Müller (2007), the key tool in capturing the Berber paradigm is instead a new operation called *enrichment*, which duplicates a feature bundle. Both proposals extend the theory's basic set of tools in significant ways. Building on Haugen (2008, 2011), I will argue that the phenomenon in Nez Perce (8) instead involves the interaction of reduplication with the standard morphological operation of Local Dislocation (Embick and Noyer, 2001). This is an instance of multiple exponence for which neither a primary/secondary exponence distinction nor an enrichment operation is required.

This paper has the following structure. In the next section, I provide background information on the Nez Perce language and certain of its phonological and grammatical properties. I pay particular attention to gender, as this category has not previously been described in this language. Section 3 is then devoted to under-realization of plural on nouns. I present in more depth the patterns of plural inflection on nouns and (non-reduplicative) adjectives, and propose that under-realization arises as a consequence of how allomorphy of plural affixes is conditioned by features of n. I conclude this part of the discussion by arguing that under-realization should be understood in terms of zero exponence, rather than in terms of failure of concord. Concord moves

ϕ- and case-features as a block throughout the Nez Perce DP, but different features are exponed in different loci.

Section 4 is devoted to over-realization of plural on adjectives. I show how full reduplication fits into a larger picture of adjectival derivation in the language, and distinguish the type of full reduplication that triggers multiple exponence of plural from a separate type that does not. Over-realization of plural arises in the context of a bracketing paradox involving roots, *a*, and the Agr nodes attached to adjectives by concord. The resolution of the paradox involves an operation of Local Dislocation linked to an *a* head which is realized in the phonological grammar by full reduplication. I conclude the section with a discussion of the role of reduplicative morphemes in a DM grammar and the nature of late insertion. Finally, section 5 offers some general concluding remarks.

2 Background

Nez Perce is a Sahaptian language spoken in Idaho, Washington, and Oregon, USA. The Sahaptian family is typically treated as part of the broader Penutian stock. The language is currently highly endangered, with only about 30 elderly native speakers.

While no detailed study has been conducted on number morphology, gender-number interactions, or multiple exponence in the language, there are several previous works that relate to the patterns of central interest here. These include Aoki's (1963) study of Nez Perce reduplication (augmented and corrected in various ways by dictionary entries in Aoki 1994) and Crook's (1999) more general study of Nez Perce morphophonology. There is in addition a large body of work on the language's pattern of vowel harmony. Following Aoki (1970), Nez Perce is typically described as showing a five-vowel system. Recessive vowels /e/ (IPA æ) and /u/ harmonize to /a/ and /o/ in the presence of a dominant vowel /a/ or /o/. The fifth vowel in the system, /i/, is transparent. Harmony is bidirectional. Empirical discussion of this system may be found in Aoki (1970) and Crook (1999); theoretical discussions may be found in Zimmer (1967), Chomsky and Halle (1968), Jacobsen (1968), Rigsby and Silverstein (1969), Zwicky (1971), Hall and Hall (1977), Crook (1999), Bakovic (2000), and Mackenzie and Dresher (2004).

Nez Perce has not previously been described as showing a gender system. (A genderless characterization is explicit in Deal 2010b.) Independent of the noun-adjective asymmetries studied in section 3, there are two patterns in the language which suggest that gender features are nevertheless active. The active features are [$\pm$HUMAN] and [$\pm$ANIMATE], which together define three natural genders: humans ([+HUMAN, +ANIMATE]), non-human animates ([-HUMAN,+ANIMATE]), and inanimates ([-HUMAN, -ANIMATE]).

A first pattern demonstrates the importance of [$\pm$ANIMATE] for verbal agreement. Nez Perce shows both head- and dependent-marking at the clausal level, together with considerable word order freedom. Transitive verbs agree with both the subject and the direct object, and intransitive verbs agree with the subject.[6] Verbal agreement

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[6] See Deal (2015) for paradigms and discussion.

has typically been described as reflecting only person and number (Aoki 1970, 1994; Rude 1985; Crook 1999; Deal 2010a,b). Yet gender plays an important role as well: only [+ANIMATE] arguments may control plural agreement on the verb. Compare the plural animate subjects in (10)-(11), which control plural subject agreement suffix *iix*, with the inanimate plural subject in (12), which does not. (Word order permutation does not affect agreement patterns.) Verbs are bolded in these examples.

(10) Ɂémti **hi-w-s-íix**   píilep-t há-ham.
      outside 3SUBJ-be-PRES-S.PL four-SUF PL-man
      Four men are outside.

(11) Lep-ít   pícpic **hi-w-s-íix**   Ɂiníit-pe.
      two-SUF cat   3SUBJ-be-PRES-S.PL house-LOC
      Two cats are in the house.

(12) Lep-ít   cepéepyʼux̂tinʼ **híi-we-s**   Ɂiníit-pe.
      two-SUF pie   3SUBJ-be-PRES house-LOC
      Two pies are in the house.

The same pattern appears in object agreement: compare the plural animate objects in (13)-(14), which control plural object agreement prefix *naas/naacʼ*, with the inanimate plural objects in (15), which cannot.

(13) Jím-nim **hi-náacʼ-yax̂-n-a**   Bill kaa Jíll-ne.
      Jim-ERG 3SUBJ-O.PL-find-P-REM.PAST Bill and Jill-ACC
      Jim found Bill and Jill.

(14) Kii kaa **hi-náas-qaɁan-tato**   picpíc-ne.
      now   3SUBJ-O.PL-respect-HAB.SG cat-ACC
      Now he respects cats.

(15) a. **Páa-Ɂyax̂-n-a**   (Ɂilx̂níi-ne) tamʼáam-na.
          3/3-find-P-REM.PAST (a.lot-ACC) egg-ACC
          He found the (many) eggs.

      b. * **Hi-náacʼ-yaaqi-n-∅**   tamʼáam-na.
          3SUBJ-O.PL-find-P-PRES egg-OBJ
          Intended: He found (the) eggs.
          Speaker comment: "That's more to people or animals."

These examples show that what matters is not whether the argument itself expones plural overtly, but what value it bears for the feature [+ANIMATE]. DPs in Nez Perce must therefore bear gender features, in addition to person and number features, to account for verbal agreement.

A second pattern demonstrates the importance of the [±HUMAN] gender feature for the inflection of numerals. Numerals may take a distinct form when humans are counted, as we see in (16a). They also occur in a general form, which may be used for counting humans as well as nonhumans, (16b). Human and general forms of the basic numerals are listed in (17) and (18).

(16) a. mitáa-w'   pi-pít'in' / *ciq'áamqal / *píswe
          three-HUM PL-girl   / *dog   / *rock
          three girls / *dogs / *rocks

      b. mitáa-t   pi-pít'in' / ciq'áamqal / píswe
          three-SUFF PL-girl   / dog   / rock
          three girls / dogs / rocks

(17) Human forms of basic numerals

Form	Gloss	Ref.	Form	Gloss	Ref.
naaqc-wa	one	[fn[7]]	ʔoyláaqs-wa	six	[A1101]
lep-úʔ	two	[A342]	ʔuynéep-we	seven	[A1106]
mitáa-w'	three	[A451]	ʔoymát-oo[8]	eight	[A1101]
piilep-úʔ[9]	four	[A538]	k'uʔíc-we	nine	[A294]
páax̂-loo	five	[A508]	puutim-we	ten	[A561]

(18) General forms of basic numerals

Form	Gloss	Ref.	Form	Gloss	Ref.
naaqc	one	[A465]	ʔoyláaqc	six	[A1101]
lep-ít	two	[A342]	ʔuynéep-t	seven	[A1106]
mitáa-t	three	[A450]	ʔoymáta-t	eight	[A1101]
píilep-t	four	[A538]	k'uyc	nine	[A294]
páax̂-at	five	[A508]	púutim-t	ten	[A560]

Human forms involve a suffix with allomorphs *we, uʔ, w',* and *loo*. General forms involve a suffix *Vt*, which occurs on all numerals except those that end in the affricate /c/.

   Numeral suffixes are described in Aoki (1994) as classifiers, rather than gender markers. It is quite plausible that these affixes arose historically out of a numeral classifier system; in the data set recorded by Aoki (1994), they contrast with several semantically rich numeral-classifier-type elements:

(19)

√LEP 'two'		√PAAQ 'five'		Gloss
lepít	[A342]	páax̂at	[A508]	*n* (general)
lepúʔ	[A342]	páax̂loo	[A508]	*n* people
lepéelet	[A342]	páaqaalat	[A80]	*n* layers
lepeʔéle	[A342]	páaqaʔala[10]	[A86]	*n* pairs
lepéeluy	[A80]	páqooloy[11]	[A80]	*n* strands

Yet it does not appear that this system survives in any significant way into contemporary Nez Perce. Native speaker consultants were not comfortable counting with

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[7] This form is used in pedagogical materials circulated by the Nez Perce tribe. Aoki (1994) reports that there is no specialized human form for this numeral.

[8] The derivation of this form is presumably *ʔoymata + wa > ʔoymatoo*. Coalescence of *awa* to *oo* is frequent in Nez Perce; see Crook (1999, ch 3).

[9] Aoki records both this form and initial-stress variant *píilepuʔ*.

[10] Aoki attributes this form to one consultant and alternative form *paqaʔála* to another.

[11] Aoki also lists alternative form *páaqaaloy*.

forms from the bottom three rows of (19), suggesting that the numeral classifier system has fallen out of use. Meanwhile, the current system shows three features which suggest that a major reanalysis of the surviving forms has taken place. The erstwhile human classifiers have been reanalyzed as concordial gender markers; the erstwhile general classifiers have been reanalyzed as morphological defaults, appearing with all non-/c/-final roots in the absence of other local inflection.

First, in contrast to classifiers in canonical numeral classifier languages such as Mandarin Chinese (Jiang, 2012), numeral suffixes in Nez Perce are not in complementary distribution with measure words. This is not surprising if general numeral suffixes are morphological defaults, rather than semantically active elements.

(20) mitáa*(-t) temíinewit   nicka?níicka?
      three-SUF   weight.measure strawberry
      three pounds of strawberries

(21) lep*(-ít) ?ipselípt nicka?níicka?
      2-SUF   handful   strawberry
      two handfuls of strawberries

Second, numeral suffixes in Nez Perce are not in complementary distribution with plural marking in the DP. Numeral classifiers and number marking are typically in complementary distribution both within and across languages, as T'sou (1976), Chierchia (1998) and Borer (2005) have discussed.[12]

(22) yox̂-mé   lep-ú?   ki-kúhet ha-?áayat
      DEM.NOM-PL   two-HUM   PL-tall   PL-woman
      those two tall women

These facts, too, are unsurprising on the gender marker analysis of human numeral forms. There is no reason why a DP which expones a number feature should not also expone a gender feature.

Third, as (16) shows, the use of the human numeral form is optional in a [+HUMAN] DP. On the gender marker analysis, this conforms to a broader pattern in Nez Perce (which we will return to in section 3.5): concord is optional for noun modifiers. We see this optionality for case concord and number concord in examples (23)-(25), drawn from the Aoki and Walker (1989) corpus. In (23), the demonstrative and noun in the bracketed DP show concord both for (plural) number and for (accusative) case. In (24), by contrast, accusative appears on the noun, while the demonstrative remains in the (nominative) citation form. Likewise, in (25), plural appears on the noun, while the demonstrative remains in the (singular) citation form.

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[12] This generalization may not be fully universal; see Vázquez Rojas Maldonado (2012) and Dalrymple and Mofu (2012) for discussion.

(23) Meywii-níx   ’eetx   ’e-pe-’péew’-yu’   [kon-ma-ná
morning-EMPH 2.PL.CLITIC 3OBJ-S.PL-look.for-PROSP [DEM-PL-ACC
ti-tm’áayi-na   ].
PL-maiden-ACC]
Early in the morning you will look for those maidens. (Aoki and Walker, 1989, 545)

(24) Kaa koná pé-’wy-∅-e   [yox̂   tuyée-ne   ].
and there 3/3-shoot-P-REM.PAST [DEM.NOM.SG grouse-ACC]
And there he shot that grouse. (Aoki and Walker, 1989, 444)

(25) Hi-pa-wáax̂-n-a   [kii   ha-hácwal   ].
3SUBJ-S.PL-wake.up-P-REM.PAST [DEM.NOM.SG PL-boy.NOM]
These boys woke up. (Aoki and Walker, 1989, 31)

These examples are of a piece with (16), if human numeral forms can be treated as resulting from concord. When the DP is [+HUMAN], gender concord with the numeral results in the human form, (16a); when concord does not occur, the numeral remains in its (general) citation form, (16b). Concord proves optional for noun modifiers in gender as well as number and case. I conclude overall that the feature systems involved in agreement and concord in Nez Perce have access to gender features [±HUMAN] and [±ANIMATE].

3 Under-realization of plural on nouns

Gender effects on verbal agreement show that arguments bear [±ANIMATE] features at the DP level. Gender effects on numeral marking show that DPs bear [±HUMAN] features internally, as a result of concord. We now ask how gender features within the DP contribute to the pattern of under-realization of plural on nouns. Why does gender matter for plural exponence on nouns? Why does it not matter for plural exponence on adjectives? To answer these questions, we begin with a closer look at the basic patterns of noun and adjective inflection.

3.1 Plural on adjectives

The basic paradigm of number exponence for adjectives is repeated in (26)-(28) below, contrasting plural DPs with their singular counterparts. These examples show that plural adjectives appear without regard for the gender feature associated to the DP.

(26)   Gender: [+HUMAN,+ANIMATE]

a. ki-kúhet ha-ʔáayat   b. kuhét ʔáayat
PL-tall   PL-woman   tall   woman
(the) tall women   (the) tall woman

(27) Gender: [-HUMAN,+ANIMATE]

    a. ti-taʔc ciq'áamqal
       PL-good dog
       (the) good dogs

    b. taʔc ciq'áamqal
       good dog
       (the) good dog

(28) Gender: [-HUMAN,-ANIMATE]

    a. ki-kúhet ti-tíyaw'ic wix̂si'likéecet'es
       PL-tall   PL-sturdy chair
       (the) tall, sturdy chairs

    b. kuhét tiyáaw'ic wix̂si'likéecet'es
       tall   sturdy   chair
       (the) tall, sturdy chair

The primary forms of number inflection on the adjective are as shown in (1c-d) and (2c-d), repeated and expanded on below: glottal-initial adjectives take prefix *he-*, and other adjectives take partially reduplicative prefix *Ci-*. (I defer discussion of fully reduplicative adjectives until section 4.)

(29) Adjectives taking the *he-* plural

	Singular	*Plural*	*Gloss*	*Ref.*
a.	háamtiʔc	ha-hámtiʔc	quick	[A95]
b.	hawál'is	ha-háw'lis	mean	[A100]
c.	heey'c	he-héy'c	tender, easy to cut	[A125]
d.	ʔayyí'c	ha-ʔáyyi'c	dangerous	[A982]
e.	ʔéhew	he-ʔéhew	wounded, grieving	[A985]
f.	ʔípsex̂	he-ʔípsex̂	miserly	[A1063]

(30) Adjectives taking the *Ci-* plural

	Singular	*Plural*	*Gloss*	*Ref.*
a.	kuhét	ki-kúhet	tall, long	[A250]
b.	loxc	li-lóxc	diligent	[A401]
c.	páq'ic	pi-páq'ic	shallow, superficial	[A509]
d.	quuy's	qi-qúuy's	rich	[A599]
e.	taʔc	ti-táʔc	good	[A700]
f.	x̂áw'ic	x̂i-x̂áw'ic	sharp	[A918]

    A small number of adjectives deviate from this system. The majority of these do not inflect for number at all, (31).[13] The remainder show unusual plural forms – in one instance, the plural suffix *-me* (as seen in (3b) above); in another, a suppletive form for the plural.

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[13] This list is drawn from unpublished work by Harold Crook.

(31) Adjectives that never take plural affixes

	Adjective	Gloss	Ref.
a.	ʔicwéey's	cold	[A1009]
b.	láwwit	true	[A316]
c.	ʔiyéq'is	hot	[A1094]
d.	hatók'ic	difficult	[A100]
e.	ʔéelew'ic	easy/cheap	[A987]

(32) Unusual plural adjectives

	Singular	Plural	Gloss	Reference	Note
a.	yuʔc	yúʔc-me	poor, pitiful	[A958]	(-*me* suffix)
b.	himéeq'is	titílu	large	[A143,A761]	(suppletive)

3.2 Plural on nouns

Plural inflection for nouns draws on the same set of affixes, with three differences of distribution. First, as discussed above, gender plays an important role: only [+HUMAN] nouns have plural forms.[14] We see this in (33), where all plural forms appear in row (i) or lower; nouns above this line have a single form which is used in singular and in plural contexts. Second, while phonological conditioning of prefixes *he-* and *Ci-* works as for adjectives, suffix *-me* is conditioned for a broad semantic class with nouns; it forms the plural of kinship terms (rows (i)-(l)). Third, two subclasses of nouns behave exceptionally. Nouns of ethnicity, despite belonging to the [+HUMAN] class, lack plural forms (rows (u)-(x)). Occupational nouns derived by the deverbal suffix *(n)ew'eet* lack plural forms as well (rows (y)-(bb)).

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[14] Aoki (1994) records a small number of exceptions to this pattern: *(mi)méex̂sem* 'mountain(s)' [A437], *(pi)póhol* 'ravine(s)' [A555], *(si)sáqan* 'canyon(s)' [A623], *(he)ʔískit* 'road(s)' [A1078]. My consultants report a varying degree of familiarity with the plurals of these words, but are not comfortable using them in sentences. They are comfortable with plural forms only for human-class nouns.

(33)   Nouns and plural

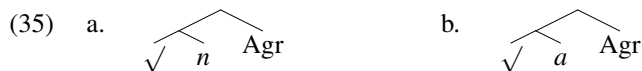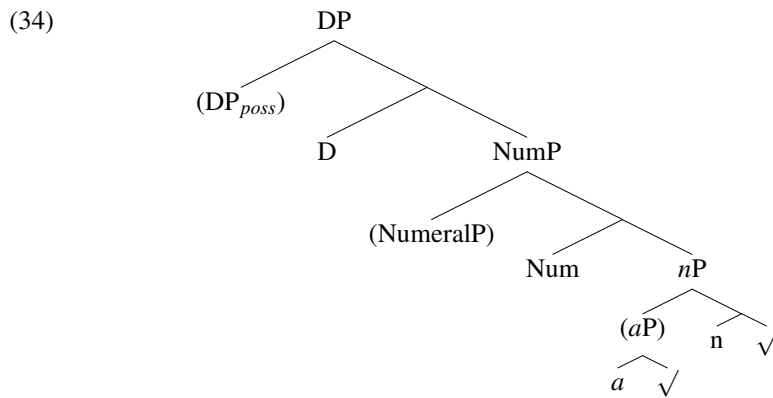|	*Singular*	*Plural*	*Gloss*	*Ref.*	*Animacy (note)*
a.	ʔiníit		house(s)	[A1052]	
b.	píswe		rock(s)	[A549]	[-HUM,-ANIM]
c.	ʔáatooc		car(s)	[fn]	
d.	samx̂		shirt(s)	[A620]	
e.	sík'em		horse(s)	[A639]	
f.	łépłep		butterfly/butterflies	[A418]	[-HUM,+ANIM]
g.	pícpic		cat(s)	[A535]	
h.	ʔiceyéeye		coyote(s)	[A1007]	
i.	píke	pikée-me	mother(s)	[A1071]	
j.	himíyu	himiyúu-me	ancestor(s)	[A146]	[+HUM,+ANIM]
k.	háama	háama-ma	husband(s)	[A92]	(kinship)
l.	láwtiwaa	láwtiwaa-ma	friend(s)	[A314]	
m.	ʔelwít'et	he-ʔélwit'et	orphan(s)	[A988]	
n.	ʔiluutíin	he-ʔluutíin	big-bellied person(s)	[A1023]	[+HUM,+ANIM]
o.	háama	há-ham	man/men	[A92]	(glottal-initial)
p.	háacwal	ha-hácwal	boy(s)	[A89]	
q.	laymíwt	li-láymiwt	young one(s)	[A317]	
r.	miyóox̂at	mi-míyoox̂at	chief(s)	[A455,fn]	[+HUM,+ANIM]
s.	qiiwn	qi-qíiwn	old man/men	[A590]	
t.	tamtaynáat	ti-tamtaynáat	preacher(s)	[A684]	
u.	titóoqan		native person(s)	[A763]	
v.	niimíipuu		Nez Perce person(s)	[A489]	[+HUM,+ANIM]
w.	soyáapoo		white person(s)	[A658]	(ethnicity)
x.	ʔisequúlkt		Sioux person(s)	[A597]	
y.	ʔinpew'éet		police officer(s)	[fn]	
z.	saykiptaw'áat		doctor(s)	[A629]	[+HUM,+ANIM]
aa.	hitemenew'éet		student(s)	[fn]	(occupation)
bb.	ʔipew'iyew'éet		detective(s)	[fn]	

This sets the stage for the basic analysis.

3.3 Capturing under-realization

What we need is a system that captures the shared paradigm for nouns and adjectives while recognizing the existence of extra conditions on plural exponence in the case of nouns. For ethnicity and deverbal occupation nouns, it is clear why the decisive factor should be applicable to nouns but not to adjectives; status as an ethnicity noun (for instance) is a fundamental feature of the noun itself, rather than its modifiers. Something similar can be said for gender, building on ideas from Lowenstamm (2007) and Kramer (2014). In a DM model, roots are typically taken to serve as complements to a head – *v*, *n*, or *a* – which establishes the category of the resulting constituent along with certain of its other syntactic properties. Lowenstamm and Kramer propose that

n, in addition to categorizing a root as nominal, contributes a gender feature. Gender may be shared through the DP, along with number, as part of the concord system, but its origin at the *n*P level nevertheless distinguishes its connection with nouns in particular. This is the key to the analysis I propose.

I assume the basic structure in (34) as a syntactic representation of the overall DP. Optional specifiers are parenthesized. Nouns and adjectives consist of *n* or *a* heads combined with roots; I assume the root undergoes head movement to the categorizing head. Concord at the DP level attaches the DP's gender, number, and case features to the root+categorizer unit as an Agr node (Norris, 2012).[15] This produces the basic word-level structures in (35). (Note that these structures represent only constituency, not linear order.)

(34)

```
              DP
            /    \
       (DP_poss)  \
                /    \
               D     NumP
                    /    \
             (NumeralP)   \
                       /      \
                     Num       nP
                             /    \
                          (aP)     \
                         /    \    n   √
                        a      √
```

(35) a.

```
        /  \
       /\   Agr
      √  n
```

b.

```
        /  \
       /\   Agr
      √  a
```

Structure (35a) is clear for occupation nouns, which consist of a root together with a nominalizing suffix *-(n)ew'eet* (or, by vowel harmony, *-(n)aw'aat*).[16] I take this suffix to realize *n*. While number and gender are not realized overtly on nouns of this class, Agr is nevertheless visible as the insertion site of case suffixes. As expected, these suffixes surface outside of *n*.[17]

(36)

	'police officer'	'doctor'
NOMINATIVE	ʔinp-e'weet	saykipt-aw'aat
ERGATIVE/GENITIVE	ʔinp-e'wet-uum	saykipt-aw'at-oom
ACCUSATIVE	ʔinp-e'wet-uune	saykipt-aw'at-oona

Likewise, certain ethnicity nouns show evidence of a special nominalizing morpheme *puu* (or, by vowel harmony, *poo*) between the root and case suffixes.

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[15] The concord process itself may be understand in a variety of ways; I leave this question open here. See Baker (2008), Carstens (2001), and Toosarvandani and van Urk (2014) for discussion of Agree-based concord, and Norris (2012, 2014) for discussion of concord via morphological feature copying.

[16] The appearance of /n/ is conditioned by the class of the root. Root class is syntactically determined in Nez Perce (Deal and Wolf, In press).

[17] On the case system of Nez Perce, see Deal (2010a,b).

	'Nez Perce person'	'white person'
NOMINATIVE	niimii-puu	sooya-poo
ERGATIVE/GENITIVE	niimii-puu-m	sooya-poo-m
ACCUSATIVE	niimii-puu-ne	sooya-poo-na

(37)

In both instances we see morphological reason to posit a specialized n head – henceforth n_{OCC} (for occupation nouns) and n_{ETH} (for ethnicity nouns). If, for some ethnicity nouns, n_{ETH} has a null allomorph (see rows (u) and (x) in (33)), we can understand the 'ethnicity' and 'occupation' blocks in (33) strictly in terms of the presence of these n heads. Parallel reasoning suggests a third specialized (null) form of n, n_{KIN}, for kinship terms. Assuming the n_{KIN}, n_{ETH} and n_{OCC} heads contribute a [+HUMAN] gender feature, the structures in (38) can be posited for three specialized blocks of (33). (For space reasons, gender, number, and case features at Agr are represented here simply with $\mathscr{F}$; [+ANIMATE] on n is omitted whenever [+HUMAN] is present.)
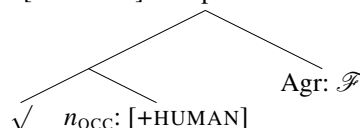
(38) a. [+HUMAN] kinship nouns

$\sqrt{}$ n_{KIN}: [+HUMAN]   Agr: $\mathscr{F}$
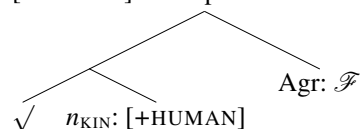
b. [+HUMAN] ethnicity nouns

$\sqrt{}$ n_{ETH}: [+HUMAN]   Agr: $\mathscr{F}$
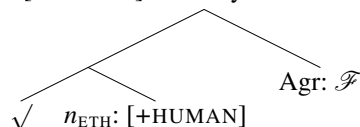
c. [+HUMAN] occupation nouns

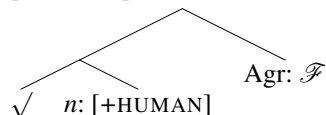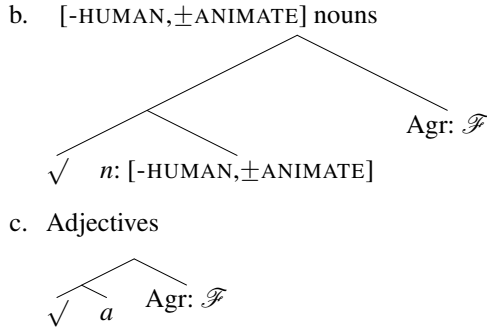$\sqrt{}$ n_{OCC}: [+HUMAN]   Agr: $\mathscr{F}$

For nouns in the [+HUMAN] class outside of these special cases, I assume a general null n head bearing a [+HUMAN] gender feature. All other nouns include an n head bearing a [-HUMAN] gender feature (as well as a specification for [±ANIMATE]). Adjectives, by contrast, bear a gender feature at the Agr node as a result of concord, but not at a.

(39) a. [+HUMAN] nouns, otherwise

$\sqrt{}$ n: [+HUMAN]   Agr: $\mathscr{F}$

b. [-HUMAN,$\pm$ANIMATE] nouns

$\sqrt{}$ *n*: [-HUMAN,$\pm$ANIMATE]   Agr: $\mathscr{F}$

c. Adjectives

$\sqrt{}$ *a*   Agr: $\mathscr{F}$

The absence of gender at the *a* node proves crucial in explaining why the realization of plural is tied to gender for nouns but not for adjectives. While gender features are borne by Agr as part of $\mathscr{F}$, I claim that the Vocabulary Items competing for realization at that node do not provide for the exponence of gender directly. Rather, gender plays a role as one of the contextual features that adjudicate the competition between Vocabulary Items realizing plural number. As is canonical, allomorphy at Agr looks inward for contextual resolution. The features on *n* or *a* form the context. (Crucially, features on Agr do *not* form the context for insertion of other features on Agr.) Inward from Agr in adjectival structure (39c), a [$\pm$HUMAN] feature is always absent (given that *a* does not bear gender); plural is nevertheless overtly exponed. I conclude that overt exponence of plural is the general case. Inward from Agr in nominal structure (39b), by contrast, a [-HUMAN] feature is present on *n*; in this case, I propose that plural is exponed by a conditioned zero.

The core analysis is stated in (40). Zero plural is lexically listed among adjectives (it is conditioned by particular $\sqrt{}+a$ combinations); it is associated with [-HUMAN] gender in the conditioning environment; and it is associated with the particular *n* heads n_{OCC} and n_{ETH} in the conditioning environment. For the suffixal plural *-me*, allomorphy is conditioned either lexically or by the presence of n_{KIN}. These first two plural forms will occur for adjectives only by lexical listing. The *he-* and partially reduplicative plurals are more general. The *he-* form is conditioned purely phonologically. Reduplication is an elsewhere case. It is indicated by RED, an abstract vocabulary entry for the *Ci-* reduplicant, to be given phonological content in the phonological component; this is discussed in section 4 below.

(40)   a.   [PL] $\leftrightarrow$ $\emptyset$ / __ $\begin{cases} \textit{Ɂicweey's, lammat'ic, Ɂiyeq'is} \ldots \\ [\text{-HUMAN}] \\ n_{\text{OCC}} \\ n_{\text{ETH}} \end{cases}$

     b.   [PL] $\leftrightarrow$ -me / __ $\begin{cases} \textit{yuɁc} \\ n_{\text{KIN}} \end{cases}$

     c.   [PL] $\leftrightarrow$ he- / __ [+GLOTTAL]

     d.   [PL] $\leftrightarrow$ RED

This system allows the *he-* and partially reduplicative *Ci-* prefixes to be given very general vocabulary entries, which apply equally well to nouns and adjectives. Extra

conditions on plural exponence for nouns are captured by reference to the specific *n* heads n_{KIN}, n_{OCC}, and n_{ETH}, as well as by reference to gender features (in particular, [-HUMAN]) borne by *n*.

3.4 Theoretical consequences

A typological prediction of this system concerns interactions of gender, number and lexical category. There should be no stable systems where nouns and adjectives share the same plural morphemes, but the interaction with gender is the opposite of the Nez Perce pattern: plural allomorphy is sensitive to gender-based conditions for adjectives, but not for nouns. This prediction follows from the fact that gender features are present on adjectives only as part of the Agr node, where they coexist with number features.

To see this, consider for instance a fictional language PerceNez, where *he-* and *Ci-* allomorphs are conditioned phonologically as in Nez Perce but are possible for adjectives only in [+HUMAN] DPs. For the realization of adjectival Agr, a [+HUMAN] feature is not present in the conditioning environment (i.e. on *a*) and must therefore be part of the feature bundle being exponed, as in (41).

(41)　PerceNez vocabulary entries for adjectival Agr (fictional)

    a.　[PL,+HUMAN] ↔ he- / __ [+GLOTTAL]

    b.　[PL,+HUMAN] ↔ RED

For nouns in PerceNez, by contrast, gender plays no role in determining the allomorphy of plural. (PerceNez is fully the inverse of Nez Perce, then, in how its nominal and adjectival plurals respond to gender information.) PerceNez nouns therefore require an entirely separate set of Vocabulary Entries:

(42)　PerceNez vocabulary entries for nominal Agr (fictional)

    a.　[PL] ↔ he- / __ [+GLOTTAL]

    b.　[PL] ↔ RED

This system does not capture the generalization that nouns and adjectives share the same plural paradigm. The similarities are merely accidental. This fact presumably plays a significant role in explaining why the interaction of plural marking and lexical category in real languages, such as Nez Perce, comes out as it does.

Further consequences of the present proposal concern the nature of Vocabulary Insertion. The conditioning of allomorphy in (40) involves both phonological and non-phonological features; it looks inward for features of both types. The resolution of allomorphy at Agr therefore requires that, as a precondition to insertion, both phonological and non-phonological features (such as gender) be determined for the complement of Agr. Part of this condition is automatically ensured by "inside-out" models of lexical insertion, which require that phonological material be inserted first at the root and *a/n*, before at Agr. What is required on top of this is that insertion be

monotonic: it simply adds phonological information on top of existing morphosyntactic features (Adger et al. 2003, Gribanova and Harizanov In press, Deal and Wolf In press, *pace* Noyer 1992, Bobaljik 2000).

The relevance of both types of features for allomorphy of Agr allows us to ask whether non-phonological factors have precedence over phonological ones in the conditioning of allomorphy (Bye and Svenonius, 2012), or vice versa (Harizanov and Gribanova, 2011). Test cases are glottal-initial words in the [-HUMAN] gender or the n_{KIN}, n_{OCC}, or n_{ETH} classes. In line with Bye and Svenonius's prediction, non-phonological conditioning factors are decisive in these circumstances. Kinship terms that are glottal-initial take suffix *-me*:

(43)

	Singular	Plural	Gloss	Reference
a.	háama	háama-ma	husband(s)	[A92]
b.	ʔiwéepne	ʔiwéepne-me	wife/wives	[A1089]
c.	ʔeeks	ʔéeks-me	man's sister(s)	[A986]

[-HUMAN], occupation, and ethnicity nouns that are glottal-initial take the zero plural:

(44)

	Singular	Plural	Gloss	Reference
a.	ʔiceyéeye	ʔiceyéeye	coyote(s)	[A1007]
b.	ʔipewiy-e'wéet	ʔipewiy-e'wéet	detective(s)	[fn]
c.	ʔiseqúulkt	ʔiseqúulkt	Sioux person(s)	[A597]

Vocabulary entry (40c) fails to apply in these cases, suggesting phonological conditioning factors hold sway only once non-phonological factors have been taken into consideration.

A final group of implications concerns the features involved in allomorphy and the status of zero. This system requires that negative features be possible conditioners of allomorphy (*pace* Harley 1994). In making a distinction between the lack of a [±HUMAN] feature on *a* versus the presence of a [-HUMAN] feature on certain instances of *n*, it requires more generally that gender features be equipollent rather than privative (*pace* Harley and Ritter 2002). And in capturing the special status of [-HUMAN], occupation, and ethnicity nouns with a conditioned zero, it requires that the absence of phonological content not be taken purely as reflective of the failure to insert (*pace* Deal and Wolf In press).

3.5 Zero exponence, or failure of concord?

The concord system of Nez Perce is somewhat unusual in that not every element showing concord bears the same inflectional features. (This contrasts with what Norris (2014) calls *simple concord*.) Numerals, for instance, expone gender overtly, but not number; adjectives show the opposite behavior; many nouns expone neither gender nor number overtly. On the analysis just sketched, this pattern is essentially morphological: it follows from how features are exponed. Concord itself can be understood as moving gender, number and case features together, as a bundle, even in languages where this bundling is not directly reflected morphologically.

I conclude this section with an argument that this understanding is the correct one. Under-realization of plural on nouns is about zero exponence, not failure to participate in concord. The argument draws on patterns of optionality in case and number concord of the type we saw in (23)-(25) above. The DPs of interest are repeated below. Example (45a) shows that demonstratives may show both case and number concord; (45b) and (45c) show that case and number concord, respectively, are optional.

(45)   a. kon-ma-ná   ti-tm'áayi-na
             DEM-PL-ACC PL-maiden-ACC
             those maidens

       b. yox̂   tuyée-ne
             DEM.NOM.SG grouse-ACC(SG)
             that grouse

       c. kii   ha-hácwal
             DEM.NOM.SG PL-boy(NOM)
             these boys

Note that in (45b) and (45c) there is a potential question as to whether number and case concord, respectively, have taken place. Singular on the demonstrative in (45b) could be a result of concord, but it could also simply be the default form. Likewise for nominative on the demonstrative in (45c).

What is crucial is that unambiguously mixed patterns of concord do not occur: whenever it is clear morphologically that the demonstrative has participated in concord for any one feature, its form is consistent with both number and case features associated to the DP. Notably ill-formed are examples like (46): in (46a), the demonstrative expones plural but fails to expone accusative case, and in (46b), it does the opposite.[18] Compare the well-formed example in (47), showing both number and gender concord on the demonstrative.

(46)   a. * kon-má   ha-ʔáayato-na
              DEM-PL(NOM) PL-woman-ACC

       b. * kon-yá   ha-ʔáayato-na
              DEM-ACC(SG) PL-woman-ACC

(47) kon-ma-ná   ha-ʔáayato-na
     DEM-PL-ACC PL-woman-ACC

Gaps like (46) suggest that concord is optional not on a feature-by-feature basis, but for the entire feature set as a block. If a demonstrative participates in concord, it obtains an Agr node containing both number and case features.[19] If it does not participate in concord, it obtains neither. This type of behavior indicates that concord

---

[18] No examples of this type have been located in Aoki and Walker (1989), the source of examples (45) above, and speakers generally reject these forms in elicitation.

[19] In view of the separate exponence of number and case in examples like (47), I assume that these features are fissioned at the point of Vocabulary Insertion. On fission, see Noyer (1992), Halle (2000).

in Nez Perce is not radically different from its counterparts in simple concord languages. Features move through the DP together, as a bundle; what is special in Nez Perce is lexical sensitivity in which features of the bundle are overtly exponed.

This conclusion makes it possible to probe whether under-realization of plural on certain nouns could be due to the generalized inability of these nouns to participate in concord. Crucially, nouns that do not mark plural overtly nevertheless participate normally in case concord. In the following examples, the form of an adjective indicates a plural feature within DP. The noun nevertheless does not mark plural, even though it marks accusative case.

(48) ti-taʔás-na   tamsaswakóos-na   [-HUMAN,-ANIMATE]
      PL-good-ACC   tomato-ACC
      good tomatoes

(49) yóq-oʔ   ti-tísqaʔaw-na   qoq'áalx-na   [-HUMAN,+ANIMATE]
      that-EMPH PL-fat-ACC   buffalo-ACC
      those fat buffalo (Aoki and Walker, 1989, 86)

If concord transfers both case and number features together, as a block, then the presence of case on the noun in these examples indicates the underlying presence of plural number at the nominal Agr node. The difference between the two types of features is strictly morphological: case but not number is overtly exponed.

4 Reduplication and multiple exponence

The core analysis of under-realization of plural for nouns centers around special properties of *n* heads – in particular, gender features – which are absent for their *a* counterparts. We now turn to the pattern of over-realization of plural for adjectives, where it is special properties of *a* that take on the starring role. These properties are both morphological and phonological. To identify them, we begin by considering the range of *a* heads available in Nez Perce.

4.1 Varieties of *a*

Almost all Nez Perce adjectives are transparently morphologically complex. Full reduplication, exemplified in (50), is one of several means of adjectivalization. In (50a-e), the root undergoing adjectivalization alternatively may form a verb, noun, or adverb. In (50f-j), the root appears only in reduplicative adjectivalization.

(50)   Full reduplication: adjectivalization

	Adjective	Gloss	Ref.	Related element
a.	kaʔáw'kaʔaw'	flashy, flickery	[A199]	kaʔáw 'to flash, flicker' (V)
b.	sik'éem-sik'em	mean, selfish	[A639]	sík'em 'horse' (N)
c.	qaʔánqaʔan	respected	[A575]	qaʔán 'to respect' (V)
d.	qepsqéps	strong, vigorous	[A579]	qepís 'strongly, loudly' (Adv)
e.	sit'xsít'x	slow, sluggish	[A653]	sit'úx 'to give up' (V)
f.	kaʔáwkaʔaw	empty, unoccupied	[A197]	–
g.	kewxkéewx	buckskin colored	[A206]	–
h.	lokóylokoy	slender	[A399]	–
i.	qeesqées	spotted, multicolored	[A582]	–
j.	wiʔxwíʔx	heavy	[A907]	–

In a corpus of 76 fully reduplicated adjectives of this type gathered from Aoki 1994, 31 involve roots also used in verbs; seven involve roots also used in adverbs; four involve roots also used in nouns; and 34 involve roots appearing in no other contexts.

In addition to full reduplication, Nez Perce forms adjectives by the addition of the suffixes *ʔis/ʔic* and *ʔew*, and a few adjectives show no overt adjectivalizing morphology. Samples of these adjective types are given below.

(51)   Adjectives derived by *ʔis/ʔic*

	Adjective	Gloss	Ref.	Related element
a.	páq'ic	shallow	[A509]	–
b.	sayáq'ic	beautiful	[A628]	sayaqí 'to like, admire' (V)
c.	cik'éet'is	dark	[A29]	cik'éet 'to be dark, be night' (V)

(52)   Adjectives derived by *ʔew*

	Adjective	Gloss	Ref.	Related element
a.	hetéʔew	lovely	[A997]	héetewi 'to love' (V)
b.	tisqáʔaw	fat	[A759]	tasx̂ 'fat' (N)
c.	siy'áaw'aw	wild, untamed	[A997]	siy'áaw 'to be suspicious' (V)

(53)   Zero-derived adjectives

	Adjective	Gloss	Ref.
a.	kímti	new	[A226]
b.	tax̂áam	elusive	[A695]
c.	qacanó	capable, fearless	[A569]

There are some roots that appear in more than one adjectival form, with differences in meaning.

(54)   *cikaaw* 'to fear, be afraid' [A24]

       cikáaw'is   mean, frightening
       cikáaw'aw cowardly, timid

(55)   *qaʔan* 'to respect' [A575]

       qaʔán'is   modest, respectable
       qaʔánqaʔan respected

(56) *tiyaaw*, bound root [A775]

        tiyáaw'ic   secure

        tiyawtiyáaw   tight

I therefore take the choice of adjectivalizing morphology to reflect distinct choices of *a* heads. Various such heads are realized as *ʔis/ʔic*, *ʔew*, and full reduplication. I will refer to the morpheme involved in full reduplication in (50) as a_{FR}.

4.2 Morphophonology of a_{FR}

The major distinctive morphological property of a_{FR} adjectives is their double exponence of the plural. We saw this in (8), repeated below.

(57)

	Singular	*Plural*	*Gloss*	*Ref.*
a.	qeps-qéps	qi-qeps-qí-qeps	strong, vigorous	[A579]
b.	kinán-kinan	ki-kinán-ki-kinan	tough (of wood)	[A227]
c.	qiyées-qiyes	qi-qiyés-qi-qiyes	sober-faced	[A591]
d.	ʔilp-ʔílp	he-ʔílp-e-ʔilp	red	[A1022]

The major distinctive phonological property of these adjectives is, of course, reduplication. Several types of full reduplication are active in Nez Perce, however, and so it is helpful to identify an additional phonological property that distinguishes a_{FR} adjectives. The most notable candidate is the particular templatic shape associated with this case of full reduplication. The Prosodic Morphology Hypothesis of McCarthy and Prince (1993) requires that templates be defined in terms of prosodic units such as moras, syllables, feet, and prosodic words. The a_{FR} reduplicative template cannot be a single mora or syllable, given that both monosyllables (57a,d [singular]) and bisyllables (57b,c [singular]) may be reduplicated. Notably, the reduplication of monosyllables is tightly restricted: only CVCC, CVVC, or CVN (where N is any nasal) syllables are found. This suggests that a full foot must be reduplicated; only syllables of these shapes qualify as heavy and may form (bimoraic) feet. CV and CVC syllables (where the final C is non-nasal) qualify as light and cannot serve as feet.

(58) Reduplicated monosyllables

	Word	*Gloss*	*Ref.*	*Shape (segmental)*	*Shape (metrical)*
a.	cilp-cílp	round	[A34]	CVCC	H
b.	yoos-yóos	blue	[A956]	CVVC	H
c.	cam-cám	quick to step around	[A5]	CVN	H

It is relevant to observe that Nez Perce permits monosyllabic content words, and that they are largely confined to this same range of shapes:[20]

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[20] CVC words *sis* 'navel', *pis* 'drizzle' and *tit* 'tooth' are potential exceptions. Harold Crook (p.c.) reports final consonant lengthening in these forms, however, in keeping with the hypothesis that true CVC words are sub-minimal. I am not aware of any potential CV content words.

(59) Minimal words

	Word	Gloss	Ref.	Shape (segmental)	Shape (metrical)
a.	hipt	food	[A158]	CVCC	H
b.	siis	soup	[A647]	CVVC	H
c.	mam	nephew/niece	[A427]	CVN	H

This suggests that the minimal word and the foot are coextensive in Nez Perce and thus that the a_{FR} template may be defined in terms of either.

The particular templatic effect we see in a_{FR} reduplication makes it possible to phonologically distinguish this class of adjectives from an apparently similar class also involving full reduplication. For these adjectives, shown in (60), both distinctive properties of a_{FR} adjectives are absent: the plural is not doubly exponed, and only a single light syllable (CVC) is reduplicated.

(60)

	Singular	Plural	Gloss	Ref.
a.	c'élc'el	ci-c'élc'el	awkward	[A67]
b.	kúckuc	ki-kúckuc	small	[A249]
c.	q'ocq'óc	q'i-q'ócq'oc	naked, treeless	[A611]

This suggests that these adjectives are formed by a separate a head with a slightly different morphophonological profile; the reduplicative template in this case is perhaps the mora (μ). Let us call the head associated with this template a_μ. The importance of a_μ adjectives lies in showing that multiple exponence of the plural in examples like (57) should be connected not to full reduplication *per se*, but to the a_{FR} morpheme – one of several morphemes in the language which happen to be realized via full reduplication.

### 4.3 Capturing multiple exponence

When we now ask why it is that the plural is exponed twice in examples like (57), note that the question is akin to asking what determines the base of reduplication. Such questions may be answered on the basis of prosodic properties or (morphosyntactic) structural ones. I will provide an analysis of the latter type: a_{FR} reduplicates its sister constituent. At the point in the derivation where phonological content is inserted for a_{FR}, its sister is not merely the root, but the root along with its Agr morpheme:

(61)

$$\text{Agr} \quad \sqrt{} \qquad a_{FR}$$

This, notably, is the opposite of the bracketing assumed in section 3. There, the position of Agr outside of categorizing heads, particularly n, played an important role in the conditioning of plural allomorphy. That discussion leads us to expect that structure of a_{FR} adjectives should instead be as in (62).[21]

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[21] Recall that this structure represents only constituency, not linear order; it is fully equivalent to the structures discussed in section 3, where Agr was displayed to the right of its sister.

(62)

$$\text{Agr} \quad \sqrt{} \quad a_{FR}$$
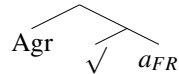
If (62) is required for Vocabulary Insertion, but (61) is required for reduplication, we are faced with a bracketing paradox. The way out is to recognize that each structure corresponds to a distinct step in the overall selection of phonological content. Structure (62) is relevant in the choice of a prefixal plural, rather than suffixal or zero. Structure (61) is relevant in the choice of the particular phonological content that is fully reduplicated. These choices belong to two separate steps of a morphological derivation.

This claim should be contextualized in a broader DM theory of reduplication. Following Haugen (2008, 2011), I assume that reduplication involves insertion of an abstract structure, RED, which receives phonological content in a post-morphological phonological component. If this component is modelled with an OT grammar, as Haugen and others propose (Gribanova 2010, Bye and Svenonius 2012, i.a.), we may port over McCarthy and Prince 1993's tools for dealing with violable templatic constraints on reduplicant size.[22] The phonological component is responsible for assigning segmental content to a RED morpheme, and is expected to do so in a way that is sensitive to phonological constraints and representations. While all lexical insertion is "late" in a DM model, insertion of reduplicative phonological content is thus particularly late: it occurs subsequent not just to the syntactic component, but also to the morphological one.

The very late insertion of reduplicative content comes with consequences for the interaction of reduplication with morphological operations that alter constituent structure–what Embick and Noyer (2001) call *movement operations after syntax*. Embick and Noyer propose two operations of this type, distinguished by their occurrence before or after Vocabulary Insertion. Their Late Linearization Hypothesis treats Vocabulary Insertion as happening concurrent with the determination of linear order among terminal nodes.

(63)   *The Late Linearization Hypothesis*
        The elements of a phrase marker are linearized at Vocabulary Insertion.

Movement operations that happen prior to Vocabulary Insertion may therefore not reference linear order. The pre-Vocabulary Insertion movement operation, Lowering, accordingly is stated in strictly syntactic terms: a head may lower to the head of its complement.

(64)   Lowering of X to Y
        $[_{XP} X^0 \ldots [_{YP} \ldots Y^0 \ldots]] \rightarrow [_{XP} \ldots [_{YP} \ldots [_{Y^0} Y^0 + X^0] \ldots]]$

Intervention effects for Lowering are expected only when an additional head intervenes along the line of projection. An adjunct or complement in YP will not block Lowering, even when positioned linearly between Y^0 and the original location of X^0.

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[22] This view may be contrasted with rule-based phonological approaches advocated by Embick 2010 and (with particular emphasis on reduplication) by Raimy 2000a,b and Frampton 2009.
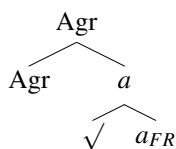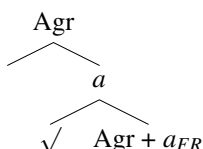
The post-Vocabulary Insertion counterpart to Lowering is Local Dislocation. In keeping with the Late Linearization Hypothesis, this operation will apply to structures like (65b), where syntactic terminals have been replaced with Vocabulary Items (schematized with lowercase letters) and linear ordering relationships have been established (indicated by *). The output of Local Dislocation may be either of the structures in (65c).

(65)   a. Base structure
        $[_{XP}$ X^0 $[_{YP}$ $[_{ZP} Z^0$] Y^0]]

      b. Vocabulary Insertion / Linearization
        [$[_{X^o}$ x] * [$[_{Z^o}$ z] * $[_{Y^o}$ y]]]

      c. Local Dislocation

          i. String Vacuous
              [[$[_{Z^o}$ x * z] * $[_{Y^o}$ y]]]

         ii. Non-String Vacuous
              [[$[_{Z^o}$ z * x] * $[_{Y^o}$ y]]]

The effect of non-string-vacuous Local Dislocation in (65c-ii) is linear inversion of x and z; string vacuous Local Dislocation in (65c-i) merely results in rebracketing of x with z.

For the case at hand, the advantage of Local Dislocation over Lowering is clear on the basis of the structures in (61) and (62). Let us suppose that the output of the syntactic component is hierarchically structured as in (62), as in section 3, and (for the sake of argument) that Agr instantiates a projecting head.[23] The input to morphological operations is therefore as in (66a). Applied to such a structure, a Lowering analysis could produce only (66b), where Agr and *a* form the most deeply embedded constituent. Lowering does not produce the desired structure in (61).

(66) a.   Agr   b.   Agr
           Agr   *a*   – *Lowering* →   *a*
               √ a_{FR} √   Agr + a_{FR}

String-vacuous Local Dislocation, on the other hand, may apply to the structure in (62)/(66a) after Vocabulary Insertion, and rebracket Agr together with its right linear neighbor, the root. This produces (67), where *p, r* and α stand in for material inserted at Agr, √, and *a*.

(67) $[_{PL}$ $[_a$ $[_{\sqrt{}}$ p * r] * α]]

This structure instantiates the bracketing needed for reduplication, (61).

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[23] The major alternative is to treat Agr as an adjunct to the complex *a* head. If this is so, then Lowering *ipso facto* cannot bring Agr into the desired configuration (61), as Agr has no complement that it may be lowered to.

Let us see how this analysis applies to the case of *qiqaʔanqiqaʔan* 'respected (PL)'. The output of Vocabulary Insertion for this example contains ordinary phonological content for the root (*qaʔan*), but merely abstract exponents RED_1 and RED_2 for Agr and a_{FR}, respectively. These are ordered linearly as shown in (68).

(68)   Output of Vocabulary Insertion: [RED_1 * [qaʔan * RED_2]]

Local Dislocation subsequently applies. While linear relationships do not change, RED_1 (inserted at Agr) is rebracketed to form a complex constituent with the root.

(69)   Output of Local Dislocation: [[RED_1 * qaʔan] * RED_2]]

This produces the input to the phonological computations which assign content to each reduplicative affix. Constraints enforcing a *Ci-* template for RED_1 result in the selection of *qi* as the optimal output. Constraints enforcing full reduplication for RED_2 result in selection of *qiqaʔan* as the optimal output. The optimal form overall is therefore *qiqaʔanqiqaʔan*:

(70)   Output of phonology: [[qi qaʔan] qiqaʔan]]

There is one final analytical step to be taken: if Local Dislocation is triggered by the particular morpheme a_{FR}, which is linked in the phonological grammar to constraints enforcing a foot / minimal word template, then we can capture the fact that plural is multiply exponed for the a_{FR} adjectives in (57) but not their a_μ reduplicative brethren in (60). For a_μ adjectives, local dislocation is not triggered, and only the root is reduplicated.

In this system the special properties of a_{FR} emerge from the particular combination of its morphology and its reduplicative phonology. Reduplication by itself will lead to multiple exponence of a feature F only when the base of reduplication includes a morpheme exponing F and the reduplicant is forced to copy this material. For a_{FR} adjectives, this is so only in virtue of Local Dislocation. If a_{FR} did not trigger this operation, there would be no multiple exponence of the plural. There would also be no multiple exponence of the plural if a_{FR} triggered Local Dislocation but was realized as an ordinary segmental affix.

4.4 Theoretical consequences

This part of the system has consequences for our understanding of how and when phonological content is inserted in a derivation. We have made a derivational distinction between reduplicative morphemes and morphemes with fixed segmental content. Non-reduplicative morphemes have phonological material inserted all at once, at Vocabulary Insertion. Reduplicative morphemes have abstract phonological material inserted at Vocabulary Insertion, but receive concrete material only within the phonological component.

A grammar containing both types of morphemes must then make use of two apparently separate types of "late insertion" – one the standard DM type (insertion in the morphological component), and the other closer to the type advocated by Mester

(1994), Mascaró (1996) and others in the OT literature (insertion in the phonological component). The latter, phonological type cannot be eliminated in view of the fact that phonological content for reduplicative morphemes may be affected by Local Dislocation. Could the former, morphological type be eliminated? The theory that results would be distinct from a standard DM model in terms of phonologically conditioned allomorphy. The choice among abstract exponents could be made in the morphological component, but the choice of particular phonological content for each morpheme would be made in the phonology. Much of the theory of allomorphy would then rest on the shape of the phonological component – whether it is strictly global or at least partially local; whether it is rule-based or constraint-based; whether it is optimizing or purely arbitrary.

The analysis also has implications for the treatment of multiple exponence within DM. No mechanism specific to multiple exponence must be posited for this case; the key tool is simply Local Dislocation, along with very late insertion of reduplicative content. Various other instances of multiple exponence discussed in the literature do not involve reduplication and thus presumably may not be so analyzed. This is so, for instance, for the Tamazight Berber paradigms that Noyer (1992) and Müller (2007) discuss. These paradigms lead Noyer to a theory of secondary exponence, and Müller to a theory of enrichment – tools that allow multiple vocabulary items to be inserted for what is ostensibly a single inflectional feature. If these tools instead of Local Dislocation were to be invoked in the Nez Perce case, however, note that one of the vocabulary items realizing plural would need to be infixed in the reduplicated adjective, whereas the other is prefixed:

(71) *prefix*   *infix*

⁀qi- qaʔan ⁀-qi- qaʔan

reduplicated stem

The Local Dislocation account avoids the need for this extra complication; it accounts both for the doubling of the plural affix and the placement of each affix. I conclude that multiple exponence should be treated within DM as a heterogeneous phenomenon, arising in some cases from Local Dislocation and reduplication but in other cases from other mechanisms.

5 General conclusions

Plural exponence in Nez Perce brings together several of the factors that make inflectional paradigms richly diverse across languages: concord, which enriches the set of words that expone plural within the DP; interactions between gender, number, and lexical category; combinations of reduplication and simple concatenation; and multiple exponence. In several of these respects, the patterns in this language underline major findings in the morphological typology of number (Corbett, 2000). Number is not simply a property of nouns, need not be marked on all nouns, and need not be marked only once per word.

I have shown that plural patterns in the Nez Perce DP can be explained in a DM model with two uncontroversial mechanisms: conditioned allomorphy and Local Dislocation. Crucial for the first part of the analysis is the presence of gender features on *n*, but not *a* (Lowenstamm 2007, Kramer 2014). Crucial for the second part is the treatment of reduplication as involving an abstract RED morpheme which is given phonological content very late in the derivation (Haugen 2008, 2011). Insofar as the analysis is successful, it provides support for these specific assumptions along with the overarching theoretical model. In so doing it casts light on many other questions of current interest among DM practitioners. The conditioning of allomorphy must favor non-phonological conditioning factors over phonological ones. Gender features must be equipollent, rather than privative. Reduplicative morphemes must receive their phonological content in a step separate from Vocabulary Insertion. And multiple exponence must be understood as arising from more than one basic mechanism of the theory.

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