Systemic polyfunctionality and morphology-syntax interdependencies

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1 Introduction

The notion of polyfunctionality is essentially an empirical generalization based on the observed behavior of grammatical markers in a particular language:[1]

(1) The same class of grammatical markers can assume related but different functions in different grammatical contexts.

The pervasive recurrence of such form-meaning correspondences, of course, calls for an explanation concerning why this distribution of correspondences is so common. This is especially important given variants of the Transparency assumption adopted in many morphological traditions. This assumption concerning an organizational preference within inflectional systems for bi-unique form-meaning correspondences is cogently stated in Wurzel (1984, 168).

> ...transparency means the non-occurrence of polyfunctional inflections in the paradigm and the morphosemantic transparency in its forms...

Two particular questions arise with respect to this phenomenon: (i) why do so many languages display polyfunctionality, especially, since it evidently violates transparency and (ii) why do particular patterns of meaning-form mapping recur cross-linguistically? From an intuitive perspective, an obvious answer to question (i) is that polyfunctionality minimizes the number of distinct forms required to subserve different functions, permitting a language to have a smaller inventory of markers than would be necessary, if there were bi-unique form-function mappings. Question (ii) is intriguing and likely instructive about constraints on grammar organization: it motivates the particular alignments of form-function mappings which occur and why these recur,

[1]This work was presented at the Conference on Defaults in Morphological Theory at the University of Kentucky in May 2012. We thank the organizers and the audience for stimulating discussion. Primary reseach on Tundra Nenets by the first alphabetic author was generously supported by a Hans Rausing Language Documentation Grant 2003-2006 with Irina Nikolaeva and Tapani Salminen. Nikolaeva (2014) provides a comprehensive, descriptive morphosyntax of the language. Elicitation was primarily in Russian and sometimes Nenets, since our consultants were bi-lingual. We thank our primary consultants Galina Koreneva and Amda Lambdo, also Maria Barmič. Special thanks are due to Irina Nikolaeva for her guidance through the thickets of Tundra Nenets morphosyntax, even though she may not agree with aspects of the analyses defended here. This work was partially supported by the French Investissements d'Avenir - Labex EFL program (ANR-10-LABX-0083).

rather than possible alternatives. There is reason to believe that the economy in the inventory of forms, associated with answer (i), is particularly efficient, when the associated functions are largely predictable on the basis of their categorial distributions. This, in effect, is a possible answer to question (ii).

Both of these questions, however, are only peripherally addressed here. Rather, our goal is to examine and analyze the spectacular deployment of this phenomenon in the grammar system of the Samoyedic language Tundra Nenets. We will refer to this as systemic polyfunctionality in the sense that the phenomenon becomes explicable only by consideration of the nature of organization observed in the Tundra Nenets grammar system: it cannot be understood by simply analyzing each different use on its own. Instead, clues to the observed distributions arise when the variations comprising the distribution are looked at together. It is our belief that a careful systemic exploration of this phenomenon within a single language provides insight into the nature of the eventual theory that can motivate answers to the previous two consequential questions.

While there are many domains in languages where polyfunctionality obtains, one is of particular relevance here. Cross-linguistically person/number markers (PNMs) in verbal paradigms often exhibit similarities (up to identity) with PNMs in nominal possessive constructions (see among others Allen, 1964; Radics, 1980; Siewierska, 1998, 2004). When a language has distinct PNM paradigms for verbal subject (S/A) and object (O) indexing, a question arises: Which paradigm does the possessive paradigm align with? As Siewierska (1998) shows, both conceivable situations arise.

(2) Retuarã (Tucanoan): S/A alignment

bĩre **yi**-hãã-a?si **yi**-behoa-pi
2SG 1SG-kill-NEG.IMP 1SG-spear-INSTR

'(Be careful), lest I kill you with my spear' (Strom, 1992, 63)

(3) Kilivila (Central-Eastern Malayo-Polynesian): O alignment

lube-**gu** ku-sake-**gu** buva
friend-1SG 2SG-give-1SG betel_nut

'My friend, do you give me betel nuts?' (Senft, 1986, 53)

Among the 130 relevant languages in Sierwieska's (1998) sample she observes that,

> We see that [...], among the languages in the sample the affinities in form between the possessor affixes and the verbal person markers of the O (41%) are just marginally more common than those with the S/A (39%). (Siewierska, 1998, 2)

There are, by hypothesis, systemic properties of specific (classes of) grammars,rather than language independent universals, that explain the alignments observed. The languages compared by Siewierska appear to have distinct markers for S/A and O, and the question that is posed concerns which paradigm exhibits identity (or strong similarity) to the possessive marking strategy in a given language.

The empirical, descriptive question for Tundra Nenets is a variant of what occurs in languages where SUBJs and OBJs are distinguished by distinct markers: given (as shown below) that it has

a verbal paradigm which indexes only SUBJ person/number properties and another that indexes the person/number of the SUBJ and the number of the OBJ, which paradigm does the Possessive paradigm align?

Anticipating somewhat, we will demonstrate that the same PNM formatives are deployed in different parts of the inflectional system of Tundra Nenets. They serve different functions depending on the lexical category of the word construction or syntactic construction in which they appear. In particular, they exhibit variation with respect to what they index:

- both arguments in a two-place relation, i.e., verbal object agreement, possessive marking, prenominal relative;
- one argument in a two place relation, i.e., postpositions, predestinatives; or
- one argument in a one place relation, i.e., subject agreement in nonfinite verbs.

These markers display variation with respect to the type associated with the PNM, i.e., pronominal versus agreement, while each form invariantly specifies person/number properties across all uses. Such behaviors raise a theoretical challenge:

(4) How does one account for similarities and differences, i.e., variation, among (classes of) words with shared formatives displaying a diverse set of functions?

The distributions attested in Tundra Nenets provide a fertile ground for exploration because they combine polyfunctionality with cumulative exponence, where a single paradigm indexes two sets of features. There are, of course, many different ways to address this question. The analysis we propose here, which is guided by insights from Paradigm Function Morphology and Sign Based Construction Grammar, treats polyfunctionality as the realization of a unifying morphomic feature that abstracts away what is common between different morphosyntactic configurations.

We begin with a presentation of Tundra Nenets polyfunctionality in order to provide an empirical basis for subsequent analysis. This is followed by an introduction to the essential representational assumptions for a realization-based abstractive perspective on morphology. This will guide our analysis of an instructive subset of Tundra Nenets polyfunctional patterns in the following section. We conclude with a summary of our results.

2 The problem exemplified: Tundra Nenets

Along with Forest Nenets, Tundra Nenets belongs to the Nenets sub-branch of the Samoyedic branch of the Uralic language family. The language is spoken in the Arctic part of European Russia and northwestern Siberia between the Kanin Peninsula in the west and the Yenisei river delta in the east. There are currently about 25,000 speakers.

There are several morphological and syntactic properties of the Tundra Nenets grammar system that are important to consider for the description and analysis of polyfuntionality. From a morphological perspective the language shows the following profile:

- It is largely agglutinative with some cumulative markers
- There are 3 nominal declension types: ABSOLUTE, POSSESSED and PREDESTINATIVE

- There are 3 nominal stem types ending in **V**, **C**, or a glottal stop, either **-q** or **-h**.
- Polyfunctional person markers consistently realize combinations of person and number independent of function.
- There are 3 persons: 1, 2, 3
- There are 3 numbers: SINGULAR, DUAL, PLURAL
- There are 7 nominal cases: grammatical (NOMINATIVE, ACCUSATIVE, GENITIVE, local (DATIVE, LOCATIVE, ABLATIVE, PROSECUTIVE)
- There are 3 verbal conjugations: SUBJECTIVE, OBJECTIVE and REFLEXIVE
- There is a large inventory of non-finite forms, many of which inflect for pronominal subject
- Postpositions inflect for pronominal object

From the perspective of syntax there are several relevant properties:

1. The basic clause has the default order of Subject Object Predicate, where P = V, N, A
2. There are many types of nonfinite clauses
3. Modifiers precede modified elements
4. Prenominal externally headed relative clauses

2.1 Absolute and possessed nouns

Nominal paradigms are partitioned in several subparadigms, corresponding to different syntactic constructions. In the present section we examine the specific subparadigms of absolute and possessed nominals. Absolute forms are used when there is no possessor or when the possessor is a lexical NP; these nominals index case and number. This condition is illustrated below in (5a). In contrast, the possessed form is used when there is a pronominal possessor; the relevant markers index case, number as well as the person and number of the pronominal possessor. This set of information is associated with the possessed nominal in (5b).

(5) a. Werah-h ti
wera-GEN.SG reindeer[NOM.SG]
'Wera's reindeer'

b. te-da
reindeer[NOM.SG]-3SG
'his/her reindeer'

The absolute and possessed subparadigms of the noun *ti* are shown in Table 1, with minimal segmentation isolating stem alternants from (sequences of) affixal exponents. Dual forms in locative cases are periphrastic, and not shown in this table. The reader may notice that, although the nominative, accusative and genitive dual are syncretic in the absolute subparadigm, there is a contrast between genitive and nongenitive forms in the possessed subparadigm.

		ABSOLUTE	POSSESSED								
			SINGULAR			DUAL			PLURAL		
			1	2	3	1	2	3	1	2	3
SG	NOM	ti	te-m°	te-r°	te-da	te-m′ih	te-r′ih	te-d′ih	te-maq	te-raq	te-doh
	ACC	ti-m	te-m°	te-mt	te-mta	te-m′ih	te-mt′ih	te-mt′ih	te-maq	te-mtaq	te-mtoh
	GEN	ti-h	te-n°	te-nt°	te-nta	te-n′ih	te-nt′ih	te-nt′ih	te-naq	te-ntaq	te-ntoh
	DAT	te-n°h	te-xən°	te-xənt°	te-x°nta	te-x°n′ih	te-x°nt′ih	te-x°nt′ih	te-x°naq	te-x°ntaq	te-x°ntoh
	LOC	te-x°na	te-x°nan°	te-x°nant°	te-x°nanta	te-x°nan′ih	te-x°nant′ih	te-x°nant′ih	te-x°nanaq	te-x°nantaq	te-x°nantoh
	ABL	te-xəd°	te-x°dən°	te-x°dənt°	te-x°dənta	te-x°dən′ih	te-x°dənt′ih	te-x°dənt′ih	te-x°dənaq	te-x°dəntaq	te-x°dəntoh
	PROS	te-w°na	te-w°nan°	te-w°nant°	te-w°nanta	te-w°nan′ih	te-w°nant′ih	te-w°nant′ih	te-w°nanaq	te-w°nantaq	te-w°nantoh
DU	NOM	te-x°h	te-x°yun°	te-x°yud°	te-x°yuda	te-x°yun′ih	te-x°yud′ih	te-x°yud′ih	te-x°yunaq	te-x°yudaq	te-x°yudoh
	ACC	te-x°h	te-x°yun°	te-x°yud°	te-x°yuda	te-x°yun′ih	te-x°yud′ih	te-x°yud′ih	te-x°yunaq	te-x°yudaq	te-x°yudoh
	GEN	te-x°h	te-x°yun°	te-x°yut°	te-x°yuta	te-x°yun′ih	te-x°yut′ih	te-x°yut′ih	te-x°yunaq	te-x°yutaq	te-x°yutoh
PL	NOM	ti-q	te-n°	te-d°	te-da	te-n′ih	te-d′ih	te-d′ih	te-naq	te-daq	te-doh
	ACC	tí	te-n°	te-d°	te-da	te-n′ih	te-d′ih	te-d′ih	te-naq	te-daq	te-doh
	GEN	tí-q	te-qn°	te-t°	te-ta	te-qn′ih	te-t′ih	te-t′ih	te-qnaq	te-taq	te-toh
	DAT	te-x°q	te-xəqn°	te-xət°	t-ex°ta	te-x°qn′ih	te-x°t′ih	te-x°t′ih	te-x°qnaq	te-x°taq	te-x°toh
	LOC	te-x°qna	te-x°qnan°	te-x°qnat°	te-x°qnata	te-x°qnan′ih	te-x°qnat′ih	te-x°qnat′ih	te-x°qnanaq	te-x°qnataq	te-x°qnatoh
	ABL	te-xət°	te-x°tən°	te-x°tət°	te-x°təta	te-x°tən′ih	te-x°tət′ih	te-x°tət′ih	te-x°tənaq	te-x°tətaq	te-x°tətoh
	PROS	te-qm°na	te-qm°nan°	te-qm°nat°	te-qm°nata	te-qm°nan′ih	te-qm°nat′ih	te-qm°nat′ih	te-qm°nanaq	te-qm°nataq	te-qm°natoh

Table 1: The absolute and possessed subparadigms of *ti* ‘reindeer’

2.2 Predestinative nouns

In addition to absolute and possessed forms of nouns, Tundra Nenets has another nominal subparadigm referred to as PREDESTINATIVE FORMS. In these nominals the PNM indexes the person and number features of a pronominal beneficiary or future possessor.[2] The construction requires that the noun be marked by the suffix *-də* and then marked by formatives from the possessor paradigm when the future beneficiary or possessor is pronominal. This is illustrated in (6) where the direct object BOOK is suffixed by the predestinative marker *-də*, which is in turn followed by the accusative form of the possessor marker for a 2nd person singular future possessor.

(6) Masha-n° (pidər°) kniga-da-mt° m'iŋa-d°m
Masha-DAT (you) book-PRED-ACC.2SG give-1SG
'I gave Masha a book for you.'

Predestinative nouns inflect for grammatical case, i.e., NOM, ACC, GEN as well as the person and number of the prenominal beneficiary, but not for number. This can be seen for both lexical NP and pronominal beneficiaries in (7), where the presence of the predestinative marker leave the number specification of the base noun indeterminate.

(7) a. Wata-h ŋəno-d°
Wata-GEN boat-PRED
'boat/boats for Wata'

b. ŋəno-də-r°
boat-PRED-NOM.2SG
'your boat/boats'

As can be seen in Table 2, there is strict formal identify between the joint exponents of case, singular number, and possessor person and number on possessed nounts, and the joint exponents of case and beneficiary person and number on predestinatives. We schematize this correspondence in (8).

(8) possessed nouns: ⟨ case/number of possessed, possessor ⟩
predestinative nouns: ⟨ case of noun , beneficiary ⟩

2.3 Finite verbs

Finite verbs have three conjugations: subjective, objective and reflexive. The subjective and reflexive conjugations index just one argument, while the objective conjugation is used for transitive verbs with topical third person objects and indexes the person and number of the subject as well as the number of the object.

The uses of the subjective and objective paradigms are typified by the examples in (9), where in response to simple inquiry concerning the nature of unknown event, the subjective paradigm is employed, as in (9a). In contrast, when the inquiry concerns an unknown action in relation

[2] cite Irina on predestinatives in TN, Siegel on Forest Enets and the Tungusic literature on DESIGNATIVE constructions.

	1	2	3
SG	te-m°	te-r°	te-da
DU	te-m′ih	te-r′ih	te-d′ih
PL	te-maq	te-raq	te-doh

NOMINATIVE

	1	2	3
SG	te-də-m°	te-də-r°	te-d°-da
DU	te-d°-m′ih	te-d°-r′ih	te-d°-d′ih
PL	te-d°-maq	te-d°-raq	te-d°-doh

NOMINATIVE

	1	2	3
SG	te-m°	te-mt	te-mta
DU	te-m′ih	te-mt′ih	te-mt′ih
PL	te-maq	te-mtaq	te-mtoh

ACCUSATIVE

	1	2	3
SG	te-də-m°	te-də-mt	te-d°-mta
DU	te-d°-m′ih	te-d°-mt′ih	te-d°-mt′ih
PL	te-d°-maq	te-d°-mtaq	te-d°-mtoh

ACCUSATIVE

	1	2	3
SG	te-n°	te-nt°	te-nta
DU	te-n′ih	te-nt′ih	te-nt′ih
PL	te-naq	te-ntaq	te-ntoh

GENITIVE

	1	2	3
SG	te-də-n°	te-də-nt°	te-d°-nta
DU	te-d°-n′ih	te-d°-nt′ih	te-d°-nt′ih
PL	te-d°-naq	te-d°-ntaq	te-d°-ntoh

GENITIVE

SG possessed noun

predestinative noun

Table 2: Comparison between singular possessed and predestinative nouns

to a known object referent, the objective paradigm is used. Either a marker appears in conjunction with a lexical NP functioning as a secondary topic[3] or it appears alone, functioning as a pronominal object.

(9) a. 'What happened?'
xasawa ti-m xada°
man reindeer-ACC kill[SUBJ.3SG]
'A man killed a reindeer.'

b. 'What did the man do to the reindeer?'

i. xasawa ti-m xada°-da
man reindeer-ACC kill-OBJ.SG.3SG
'The man killed the reindeer.'

ii. xasawa xada°-da
man kill-OBJ.SG.3SG
'The man killed it.' (Dalrymple & Nikolaeva 2011: 128)

Table 3 exemplifies the subjective and reflexive conjugations, while Table 4 gives the objective conjugation in parallel with relevant forms from the possessed noun paradigm. As the reader can

[3]See Dalrymple and Nikolaeva (2011) for detailed discussion.

	1	2	3
SG	mənc°raə-d°m	mənc°raə-n°	mənc°ra°
DU	mənc°ra°-n′ih	mənc°ra°-d′ih	mənc°raə-x°h
PL	mənc°raə-waq	mənc°raə-daq	mənc°ra°-q

Subjective conjugation
MƏNC°RA ‘to work’

	1	2	3
SG	teyə-w°q	teyə-n°	tey°-q
DU	tey°-n′ih	tey°-d′ih	teyə-x°h
PL	tey°-naq	tey°-daq	teyə-d°q

Reflexive conjugation
TE ‘to flow’

Table 3: Subjective and reflexive conjugations

	1	2	3
SG	te-m°	te-r°	te-da
DU	te-m′ih	te-r′ih	te-d′ih
PL	te-maq	te-raq	te-doh

SG possessed

	1	2	3
SG	meə-m°	meə-r°	me°-da
DU	me°-m′ih	me°-r′ih	me°-d′ih
PL	me°-maq	me°-daq	me°-doh

SG object

	1	2	3
SG	te-x°yun°	te-x°yud°	te-x°yuda
DU	te-x°yun′ih	te-x°yud′ih	te-x°yud′ih
PL	te-x°yunaq	te-x°yudaq	te-x°yudoh

DU possessed

	1	2	3
SG	meŋa-x°yun°	meŋa-x°yud°	meŋa-x°yuda
DU	meŋa-x°yun′ih	meŋa-x°yud′ih	meŋa-x°yud′ih
PL	meŋa-x°yunaq	meŋa-x°yudaq	meŋa-x°yudoh

DU object

	1	2	3
SG	te-n°	te-d°	te-da
DU	te-n′ih	te-d′ih	te-d′ih
PL	te-naq	te-daq	te-doh

PL possessed

	1	2	3
SG	meyə-n°	meyə-d°	meyə-da
DU	meyə-n′ih	meyə-d′ih	meyə-d′ih
PL	meyə-naq	meyə-daq	meyə-doh

PL object

NOM possessed noun
TI ‘reindeer’

objective verb
ME ‘take’

Table 4: Comparison between nominative possessed nouns and objective verbs

check, there is some overlap between the three conjugations, but that overlap is not very organized. The same markers are used for 1DU (*-n′ih*), 2DU (*-d′ih*) and 2PL (*-daq*) in the subjective and reflexive conjugations as well as in the DU and PL object subparadigms of the objective conjugation, but not in the SG object subparadigm of the objective conjugation, which uses *-m′ih*, *-r′ih* and *-raq*. By contrast, for 1PL subjects, the SG object subparadigm of the objective conjugation patterns with the subjective conjugation (*-waq*), while the DU and PL object subparadigms of the objective conjugation pattern with the reflexive conjugation (*-naq*). For 2SG subjects, the subjective and reflexive conjugations use the same marker *-n°*, while the objective conjugation contrasts two markers *-r°* and *-d°* depending on object number. For 3SG and 3PL subjects it is the other way

around, with a single, syncretic marker in the objective conjugation, and contrasting markers for the subjective and reflexive conjugations. For 3DU subjects there is a single marker for the subjective and reflexive conjugations, and another single, syncretic marker across the objective conjugation.

These scattered similarities between the conjugations contrast with the exceptionless parallelism between the marking of subjects and objects in the objective conjugation and the marking of possessor and possessed on nominative possessed nouns.[4]

(10) possessed nouns: ⟨ case/number of possessed, possessor ⟩
finite verbs: ⟨ object number , subject ⟩

In sum, we have seen so far that a subset of the markers from the full possessive paradigm is redeployed in both predestinative nouns and finite verbs. In all instances the person-number features associated with each marker remains invariant, while the function differs according to nominal and verbal subtypes: the objective conjugation occurs solely with transitive verbs. A similar pattern of invariant person-number designation and difference in function occurs with the lexical category of postpositions.

2.4 Simple and pronominal local postpositions

Various postpositions denoting spatial senses can inflect with local case markers. This is illustrated in Table 5 with inflected forms of the postposition *n´a* 'at' to indicate 'to the direction of', 'at the location of', 'from the direction of' and 'through the place in the direction of'. Notice that while there is some clear historical connection with the corresponding singular forms of absolute nouns, the marker paradigms are clearly distinct.

	SG absolute noun *ti* 'reindeer'		local postposition *na* 'at'
DAT	te-n°h	DAT	n´a-h
LOC	te-x°na	LOC	n´a-na
ABL	te-xəd°	ABL	n´a-d°
PROS	te-w°na	PROS	n´a-mna

Table 5: Comparison of absolute nouns and nonpronominal inflected forms of pospositions.

Pronominal objects of such postpositions are expressed morphologically as suffixes:

(11) a. Wera-h nya-h wəsadey°q
Wera-GEN at-DAT turn-REFL.3SG
'He turned to Wera.'

[4]The segmentation indicated in Table 4 follows Salminen (1997) in assuming that *meyə* is a stem alternant of *me*. An alternative (see Nikolaeva, 2014) is to treat *-yə* as an affixal exponent of plural. Under such an analysis the parallelism between the possessed paradigm of nouns and the objective conjugation is not full, but it remains that most exponents are shared between the two subsystems.

b. nya-ən° wəsadey°q
at-DAT.1SG turn-REFL.3SG
'He turned to me.'

Once again there is a striking overlap between the exponence of pronominal objects of postpositions and the exponents for singular possessed nouns. As Table 6 shows, for each combination of case, possessor person and possessor number, the two forms share a final substring, which is arguably the main exponent of person and number.

	1	2	3
SG	te-xən°	te-xənt°	te-x°nta
DU	te-x°n'ih	te-x°nt'ih	te-x°nt'ih
PL	te-x°naq	te-x°ntaq	te-x°ntoh

DATIVE

	1	2	3
SG	n'a-ən°	n'a-ənt°	n'a-°nta
DU	n'a-°n'ih	n'a-°nt'ih	n'a-°nt'ih
PL	n'a-°naq	n'a-°ntaq	n'a-°ntoh

DATIVE

	1	2	3
SG	te-x°nan°	te-x°nant°	te-x°nanta
DU	te-x°nan'ih	te-x°nant'ih	te-x°nant'ih
PL	te-x°nanaq	te-x°nantaq	te-x°nantoh

LOCATIVE

	1	2	3
SG	n'a-nan°	n'a-nant°	n'a-nanta
DU	n'a-nan'ih	n'a-nant'ih	n'a-nant'ih
PL	n'a-nanaq	n'a-nantaq	n'a-nantoh

LOCATIVE

	1	2	3
SG	te-x°dən°	te-x°dənt°	te-x°dənta
DU	te-x°dən'ih	te-x°dənt'ih	te-x°dənt'ih
PL	te-x°dənaq	te-x°dəntaq	te-x°dəntoh

ABLATIVE

	1	2	3
SG	n'a-dən°	n'a-dənt°	n'a-dənta
DU	n'a-dən'ih	n'a-dənt'ih	n'a-dənt'ih
PL	n'a-dənaq	n'a-dəntaq	n'a-dəntoh

ABLATIVE

	1	2	3
SG	te-w°nan°	te-w°nant°	te-w°nanta
DU	te-w°nan'ih	te-w°nant'ih	te-w°nant'ih
PL	te-w°nanaq	te-w°nantaq	te-w°nantoh

PROSECUTIVE

	1	2	3
SG	n'a-mnan°	n'a-mnant°	n'a-mnanta
DU	n'a-mnan'ih	n'a-mnant'ih	n'a-mnant'ih
PL	n'a-mnanaq	n'a-mnantaq	n'a-mnantoh

PROSECUTIVE

SG possessed noun
TI 'reindeer'

local postposition
with pronominal object
N'A 'at'

Table 6: Comparison between singular possessed nouns and local postpositions

As in the other uses we have seen, the particular function associated with PNMs is relativized predictably to the lexical category with which it occurs: it designates the object of the postposition in the present instance.

(12) possessed nouns: ⟨ case/number of possessed, possessor ⟩
local postpositions: ⟨ case , object ⟩

2.5 Nonfinite forms of verbs

As mentioned, Tundra Nenets conjugation contains many types of nonfinite verb forms which head various sorts of embedded or non-finite clauses (including relative clauses). These nonfinite forms co-occur with lexically selected subjects and for many of these verbal forms, if the subject is pronominal, it is realized affixally on the nonfinite head verb with a PNM. Thus, in these instances, the familiar markers specify the person-number features associated with the subject of either intransitive or transitive verbs.

(13) a. [xad°-nta wəyarəy°bt'e-b°q] ŋædalaŋku-naq
snowstorm-GEN.3SG stop-SUBORD travel-FUT-REFL.1PL
'We will travel when the snowstorm stops.'

b. [yəxa-m mədabə-b°qna-ntoh] pane-n-ta wæs°-q səqn'e-wi°-q
river-ACC cross-SUBORD-3PL cloth-GEN-3SG edge-PL become_wet-NARR-3PL
'When they cross the river, her clothe's edges became wet.'

With subordinatives, the exponents for pronominal subjects coincide with the genitive singular exponents for pronominal possessors on possessed nouns. This is shown in Table 7.

	1	2	3
SG	te-n°	te-nt°	te-nta
DU	te-n′ih	te-nt′ih	te-nt′ih
PL	te-naq	te-ntaq	te-ntoh

GEN.SG possessed noun
TI 'reindeer'

	1	2	3
SG	me-b°qna-n°	me-b°qna-nt°	me-b°qna-nta
DU	me-b°qna-n′ih	me-b°qna-nt′ih	me-b°qna-nt′ih
PL	me-b°qna-naq	me-b°qna-ntaq	me-b°qna-ntoh

SUBORDINATIVE verb
ME 'take'

Table 7: Comparison between singular possessed and subordinative verbs

In (14) we schematize this alignment. It is remarkable that, while subordinatives resemble subjective and reflexive finite verbs in realizing agreement with the subject only, they do so using forms from the possessed noun paradigm which is better suited for the indexing of two arguments;

(14) possessed nouns: ⟨ case/number of possessed, possessor ⟩
participles: ⟨ — , subject ⟩

2.6 Predicative forms of nouns

Copular sentences in the present and past are expressed by inflecting a noun or adjective. Other TAM combinations are expressed using an explicit copula *ŋæ* 'be'.

(15) a. pidər° xam′ena-nə-s′°
you hunter-2SG-PST
'You were a hunter.' (Nikolaeva, 2014, 254)

b. səwa xam′ena ŋæ-ŋku-d°m
good hunter be-FUT-1SG
'I will be a good hunter.' (Nikolaeva, 2014, 254)

c.

As table 8 illustrates, the exponents of subject agreement coincide with those of the subjective conjugation.

	1	2	3
SG	mənc°raə-d°m	mənc°raə-n°	mənc°ra°
DU	mənc°ra°-n′ih	mənc°ra°-d′ih	mənc°raə-x°h
PL	mənc°raə-waq	mənc°raə-daq	mənc°ra°-q

Subjective conjugation
MƏNC°RA 'to work'

	1	2	3
SG	xasawa-d°m	xasawa-n°	xasawa
DU	xasawa-n′ih	xasawa-d′ih	xasawa-x°h
PL	xasawa-waq	xasawa-daq	xasawa-q

Predicative noun
XASAWA 'man'

Table 8: Comparison between subjective verbs and predicative nouns

There is an interesting twist however when a possessed noun is used in the predicative function. Where one could expect cumulation of exponents from the possessed noun paradigm and the subjective conjugation, the language in fact uses forms of possessed nouns for this purpose, expressing subject number agreement with forms normally used for the realization of inherent number. Subject person is unexpressed. (17) schematizes the situation.

(16) n′a-x°yu-də-s′°
companion-DU-3SG-PST
'We/you/they two were his friends.' (Nikolaeva, 2014, 77)

(17) possessed nouns: ⟨ case/number of possessed, possessor ⟩
possessed predicative: ⟨ number of subject , possessor ⟩

2.7 Possessive relative constructions

Perhaps the most arresting variant of non-finite verb uses concerns their behavior in what Ackerman and Nikolaeva (2013) refer to as the POSSESSIVE RELATIVE CONSTRUCTION. These constructions are surface identical to nominal possessive constructions, but function as externally headed non-subject prenominal relative clauses.

(18) a. [Wera-h ta-wi°] ti
Wera-GEN ta-PART.PERF reindeer
'the reindeer Wera gave'

b. [(pida) ta-wi°] te-da
he/she.NOM ta-PART.PERF reindeer-3SG
'the reindeer Wera gave'

As indicated in the gloss, the PNM marker on the modified noun expresses the pronominal subject of the embedded verb. In this construction, the PNM has the pronominal status associated with other verbal forms heading nonfinite constructions, but it is non-locally construed as bearing this relation, since it appears on the modified noun, rather than on the verb itself. These relatives display the same distribution of marking strategies already presented for nominal possessive constructions. In particular, as indicated in (9), the modified nominal is uninflected when it co-occurs with a lexical NP subject, but is inflected when the subject is pronominal.

2.8 Reusable exponents: summary

In the preceding sections we have provided brief synopses of the diverse morphological and syntactic constructions in which PNMs exhibit polyfunctionality. We have seen that sets of person-number markers get systemically redeployed to serve functions that are characteristic of the word class or syntactic phrase in which they appear. The relevant distributions and functions are summarized in tabular form in Table 9, which includes a few other uses of polyfunctional exponents that we did not discuss.

possessed nouns:	⟨ case/number of self	, possessor	⟩
predestinative nouns: case of self	⟨ beneficiary	,	
possessed predicative noun:	⟨ number of subject	, possessor	⟩
adjectives:	⟨ case/number concord	, possessor concord	⟩
finite verbs:	⟨ object number	, subject	⟩
action nominals:	⟨ self (singular)	, subject	⟩
subordinative verbs:	⟨ —	, subject	⟩
local postpositions:	⟨ case	, pron. object	⟩
head of a possessive relative clause:	⟨ case/number of self	, subject of embedded verb	⟩

Table 9: Polyfunctionality of person-number markers

It is evident from this comparison that there are systematic analogies between exponents occurring with different categories. It is also evident that there are systemic differences within Tundra Nenets concerning the syntactic features that are expressed by these exponents. For example, the diverse class of functions associated with exponents from PNM paradigms is presented in the right column in Table 9. As can be seen from the categories within angled brackets, in all instances, except for participles, there are two relations being indexed by the markers: these categories and their values vary according to the lexical category of the host word or syntactic construction. The empirical evidence for the systemic polyfunctionality Tundra Nenets PNMs is evident in the right column with the angled brackets and clearly constitutes a rich domain for theoretical analysis. It is to the issue of analysis that we now turn.

3 An abstractive analysis

In this section we present what, following Blevins (2006, To appear), we call an ABSTRACTIVE analysis of systematic polyfunctionality for Tundra Nenets inflection. The basic analytic strategy that characterizes this approach is the identification of generalizations across the particularities of particular word and syntactic patterns that permit a statement of systemic relatedness among distinct constructions. A common way to conceptualize this is via DEFAULT INHERITANCE, whereby one feature template is established as exemplary, with specific values of this canonical encoding over-ridden in other word patterns. This can be exemplified for the Tundra Nenets PNM distributions, as schematized in Figure:1.

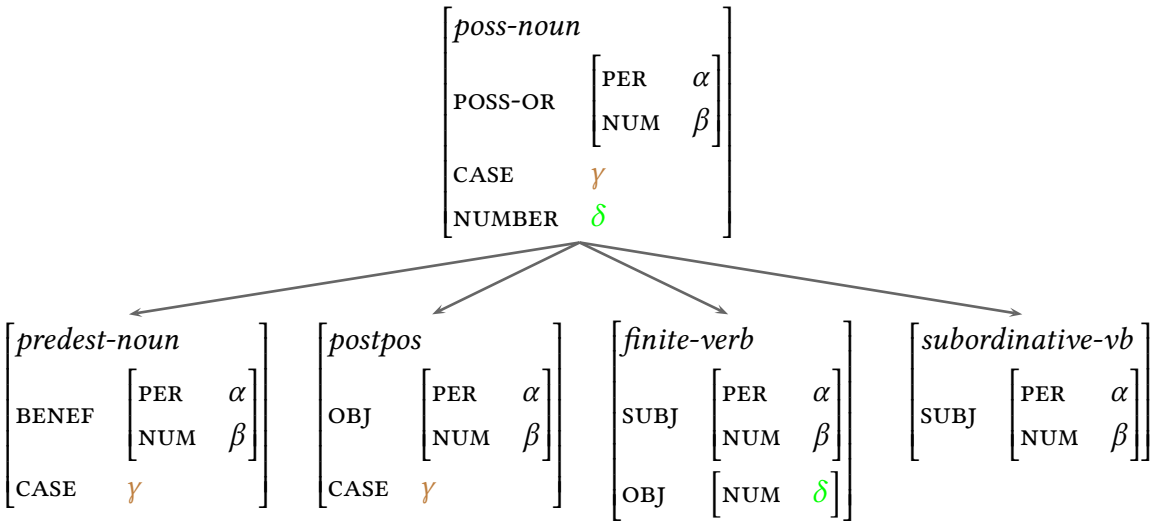


Figure 1: A constructive view of Tundra Nenets polyfunctional morphology

The exemplary type of word pattern at the top i.e., *poss-noun*, serves as a basis for the deviations in feature specification found in all of the word types, as indicated by the arrows directed away from this type and toward all of the others.

With respect to the organization of a synchronic system, the postulation of a specific type as basic or privileged is often questionable. In the present instance, it might be argued that the complete set of distinct PNM forms exists in the possessed-noun constructions and that a subset of these appear in other word types. Though it is true that the possessed-noun paradigm serves as a resource for the patterns of forms in other types, it is not clear, beyond this, that there is some fundamental nonequivalence among the related types. As a consequence, we will conceptualize the relation among the relevant types quite neutrally. This can be represented as in Figure 2.

Though the details will described as we proceed, arrows from each distinct construction type, indicated by italicized labels and containing characteristic properties indicated by small caps, point toward a structure which contains information that less specific than similar information in any specific types. From this perspective, Tundra Nenets PNMs participate in several distinct word types whose systemic relatedness can be defined by positing abstract features that mediate the relationship between content and form. In our case, we will use a feature INDEXED collecting information on linguistic signs whose person-number-case properties are indexed in the morphology of words. The value of the feature INDEXED relates on the one hand to syntactic

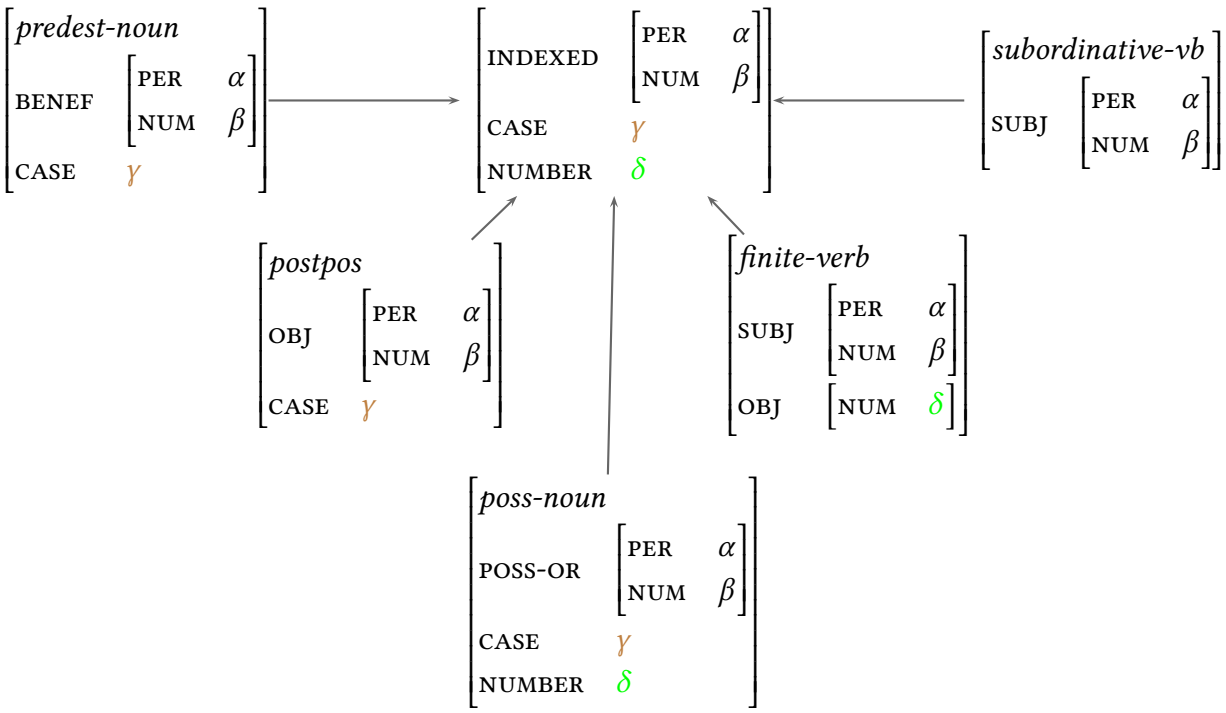


Figure 2: An abstractive view of Tundra Nenets polyfunctional morphology

representations, ensuring that different phrase-structural and/or grammatical function configurations share an indexing strategy. On the other hand, the value of the feature INDEXED is taken as input by inflection rules, ensuring that each exponent only needs to be introduced once. To take a concrete example, consider the two inflected words in (19a) and (19b), which share exponents of dual (*-x˚yu*) and 3SG (*-da*). Although the two words exhibit different configurations of grammatical functions, we assume that they have the same INDEXED value, shown in (20), resulting in the triggering of the same inflection rules and the realization of the same exponents.

(19) a. yemp˚q-ŋa-x˚yu-da
dress-FIN-DU-3SG
'They two dressed her/him.'

b. ngəno-x˚yu-da
boat-DU-3SG
'His/her two boats.'

(20) $\left[\text{INDEXED} \quad \left\langle \left[\text{NUM} \quad du\right], \left[\begin{matrix}\text{PER} & 3\\ \text{NUM} & sg\end{matrix}\right] \right\rangle\right]$

The idea of introducing an abstract feature to generalize over paradigm cells that share exponence while realizing similar but distinct morphosyntactic content is not novel; for precedents see Bonami and Boyé (2008) on the exponence of subject agreement features in Nepali conjugation, Lacroix (2009); Bonami and Lacroix (2010) on exponence in plain and inverse constructions in Laz, and most relevantly Spencer and Stump (2013) on shared exponence of possessors on nouns

and pronominal objects on postpositions in Hungarian.[5]

3.1 Technical preliminaries

In order to provide a falsifiable execution of the idea of a common abstract feature, we sketch a concrete analysis within a lexicalist and constructional approach to grammar coupled with a realisational morphological component. Specifically, we adopt the strategy initially advocated by Bonami and Samvelian (2009) and further developped in Bonami (2011); Bonami and Webelhuth (2013); Bonami and Samvelian (inpress), where a constructional HPSG approach to syntax and semantics (Sag, 1997; Sag et al., 2003; Sag, 2012) is interfaced with a Paradigm Function Morphology analysis of inflection (Stump, 2001; Stewart and Stump, 2007).[6] The use of an explicit syntactic framework, very close to that adopted in Ackerman and Nikolaeva's (2014) detailed investigation of Tundra Nenets syntax, is crucial to the construction of a credible morphology-syntax interface.

Adopting the feature geometry of Sag (2012), we assume that any linguistic sign is primarily described by the attributes PHONOLOGY or PHON, SYNTAX or SYN, and SEMANTICS or SEM. In a phrasal sign, the value of each attribute is explicated by properties of the construction used to build it from smaller signs. To take a trivial (and simplified) example, the sentence *Wera xoni* 'Wera sleeps' is modelled as the sign at the top of Figure 3. This phrasal sign is licensed by the existence of the lexical signs for *Wera* and *xoni* shown at the bottom of Figure 3 and the head-subject construction sketched in Figure 4.

Figure 4 states that in a well-formed head-subject construction, (i) the phrase has the same category as its head; (ii) the head daughter has a single valence requirement, and (iii) the non-head daughter saturates that requirement; (iv) the non-head daughter must be saturated for valence; (v) the head daughter's semantic contribution is a property, and the phrase's semantic contribution is obtained by applying that property to the non-head daughter's contribution; and finally (vi) the head daughter's phonology is the concatenation of the phonologies of the non-head and the head daughter, in that order.[7] The lexical signs at the bottom of Figure 3 provide specific phonological, categorial, argument-structural and semantic information that is then used to instantiate the construction.

Under current assumptions, lexemes are not objects distinct from words; rather, the lexeme is an underspecified representation of a family of words abstracting away information common to

[5]Related but distinct strategies have been proposed to address the same issue over the years in the context of realizational approaches to morphology. See e.g. the use of rules of referral to an abstract rule block Agr in Stump (2001) to account for shared exponence accross Lingala subject and object markers, the use of inwards rules of referrals to account for polyfunctionality of person markers in Sora conjugation in Stump (2005). Crysmann and Bonami (2012); Bonami and Crysmann (2013) propose yet another encoding of polyfunctionality based on type underspecification rather than the postulation of an abstract feature. Each of these strategies corresponds to an attempt to capture the same basic intuitions within a different set of theoretical assumptions; it is not clear that they make starkly different empirical predictions.

[6]See Bonami and Crysmann (2013) for an alternative approach to inflection in HPSG that is close in spirit to PFM but crucially different in its approach to variable morphotactics and multiple exponence. For present purposes however both approaches are equivalent.

[7]Constructions are organized in an inheritance hierarchy, so that some of the properties that the head-subject construction shares with other constructions can be abstracted away as properties of a more general construction type. For instance, (i) is shared with all headed constructions, (iii) with all head-valent constructions, and (vi) with all head-final binary constructions.

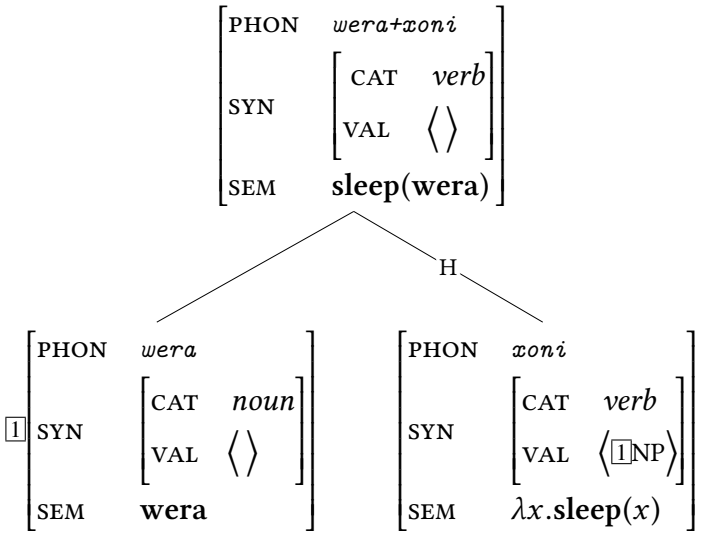


Figure 3: A simplified analysis for the sentence *Wera xoni* 'Wera sleeps'

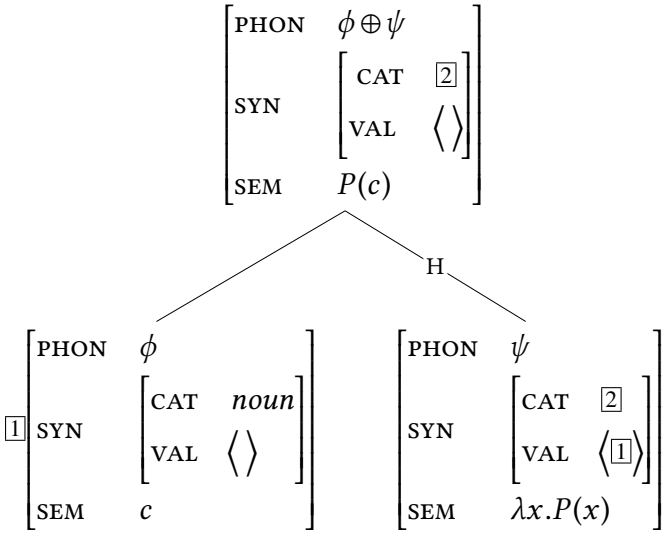


Figure 4: A simplified head-subject construction

all its inflected forms. Lexical entries such as (21) must minimally enumerate all lexeme-level information that is necessary to deduce the full set of inflected forms.[8] This includes a specification of part of speech (CAT), lexical semantics (SEM) and combinatory potential (ARG-ST). In addition the lexeme specifies, through the attribute STEMS, a list of (possibly morphomic) stem alternants (Aronoff, 1994; Brown, 1998; Pirelli and Battista, 2000; Stump, 2001; Blevins, 2003; Bonami and Boyé, 2006, *inter alia*). Finally, we follow Sag (2012); Spencer (2013) in assuming lexemes to come equipped with a unique LEXEME IDENTIFIER or LID; the LID information projects into syntax, along

[8]Note that nothing in the current framework precludes listing of individual inflected words: since (21) is an underspecified representation of a family of words, it could equivalently be replaced by an enumeration of more specific representations, corresponding to subparadigms or even individual words. For simplicity and concreteness we conform to the standard, constructive (Blevins, 2006) view of inflection where lexical entries encode lexemes and redundancy is avoided in the lexical representation of an inflectional paradigm.

the head path, which is crucial to the theory of selection; it also is crucial in allowing for distinguishing lexemes with identical stems but different inflection patterns. The features grouped under MOR are features relevant to morphology but that are invisible to syntax.

(21) The lexical entry for XONI 'sleep'

$$\begin{bmatrix} \text{MOR} & \begin{bmatrix} \text{STEMS} & \langle \text{XONI,XONYO} \rangle \\ \text{ARG-ST} & \langle \text{NP}_x \rangle \end{bmatrix} \\ \text{SYN} & \begin{bmatrix} \text{CAT} & \begin{bmatrix} \textit{verb} & \\ \text{LID} & \textit{xoni-lid} \end{bmatrix} \end{bmatrix} \\ \text{SEM} & \lambda x.\textbf{sleep}(x) \end{bmatrix}$$

Various lexical principles are responsible for deducing fully specified descriptions of words from the partial description of lexemes. For instance, the principle of Argument Realization (22) governs the relationship between argument structure and valence. In the canonical situation, there is a strict correspondence between ARG-ST and VAL, but this correspondance can be disrupted if arguments are extracted, realized affixally, or simply unrealized in situations of null anaphora (see e.g. Miller and Sag, 1997). The simplified principle in (22) simply states that all valents must be arguments, but that some arguments may be realized in other ways. This will be crucial below to deal with the fact that pronominal possessors need not be realized syntactically.

(22) **Argument Realization**

$$\textit{WORD} \rightarrow \begin{bmatrix} \text{MOR} & \begin{bmatrix} \text{ARG-ST} & \boxed{L} \bigcirc \textit{list}(\textit{sign}) \end{bmatrix} \\ \text{SYN} & \begin{bmatrix} \text{VAL} & \boxed{L} \end{bmatrix} \end{bmatrix}$$

More central to our current concerns is the inflection principle (23). We introduce an attribute MORSYN which indicates the morphosyntactic property set to be realized by inflection. Crucially, we do not assume the value of MORSYN to be a definite subpart of the word's syntactic and/or semantic representation. Rather, MORSYN is an essentially parochial representation, which in each language groups together whatever information deduced from syntax and semantics happens to be relevant to inflection. This is executed by assuming that a function **ms** can be defined that deduces a unique morphosyntactic property set for any possible instantiation of the word's SYN and SEM.[9] An inflected word's phonology is then deduced by a paradigm function taking as arguments the lexeme's LID (3),[10] the indexed set of stems (4), and the morphosyntactic property set to be realised (5).

(23) **Inflection principle**

[9] MORSYN closely resembles the set of morphological features, as opposed to syntactic features, assumed by Sadler and Spencer (2001). It also allows for an easy encoding of many morphosyntactic mismatches, thus eschewing the need for a distinction between form and content paradigms (Stump, 2006).

[10] Where appropriate, LID values can be organised in a hierarchy to capture a system of inflection classes. We won't go into this as we will have no use for inflection classes in Nenets.

$$\textit{WORD} \rightarrow \begin{bmatrix} \textsc{phon} & \mathbf{pf}(\boxed{3},\boxed{4},\boxed{5}) \\ \textsc{mor} & \begin{bmatrix} \textsc{lid} & \boxed{3} \\ \textsc{stems} & \boxed{4} \\ \textsc{morsyn} & \boxed{5}\ \mathbf{ms}(\boxed{1},\boxed{2}) \end{bmatrix} \\ \textsc{syn} & \boxed{1} \\ \textsc{sem} & \boxed{2} \end{bmatrix}$$

The paradigm function **pf** itself is then be defined essentially in the same way as it is in current versions of PFM (see Bonami and Stump, forthcoming, for a most current presentation), with minimal adaptation to fit the use of typed feature structures in the place of set-theoretic constructs for the representation of lexeme classes, stem sets and morphosyntactic property sets. For convenience we write rules using attribute-value matrices, but this is a purely presentational decision. A rule of exponence associates a lexeme class and a morphosyntactic representation with a partial function from phonological representations to phonological representations. We illustrate the syntax used for these rules in (24), with the rule form the absolute dual marker *xəh*.

(24) $$X, \begin{bmatrix} \textsc{lid} & \textit{lid} \\ \textsc{morsyn} & \begin{bmatrix} \textsc{indexed} & \left\langle \begin{bmatrix} \textsc{num} & \textit{du} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \longrightarrow X\text{xəh}$$

Rules of exponence are organized into arbitrary rule blocks (Anderson, 1992; Stump, 2001) encoding simultaneously paradigmatic opposition and the order of exponents. Where more than one rule in a block is applicable in a given context, the most specific rule is used, where specificity is assessed by first comparing the size of the lexeme class two rules are respectively applicable to, and then assessing the subsumption relations between their morphosyntactic property set specifications.

A rule of stem selection takes as input a lexeme class, a indexed stem set represented as a list, and morphosyntactic representation, and outputs a stem. The default rule of stem selection is given in (25). Where a system uses stem alternants, further more specific rules will choose a non-initial member of the list of stems.

(25) Default rule of stem selection:
$$\begin{bmatrix} \textsc{lid} & \textit{lid} \\ \textsc{stems} & \langle \boxed{1}, \ldots \rangle \\ \textsc{morsyn} & \textit{ms} \end{bmatrix} \longrightarrow \boxed{1}$$

Finally, the paradigm function of a language defines, for each syntactic class of lexemes, the inventory and the relative order of the rule blocks relevant for that syntactic class.

3.2 Polyfunctionality at the morphology-syntax interface

The central analytic device in the current analysis is the postulation of a morphosyntactic feature INDEXED that abstracts over various categories that rely on the same paradigms of exponents. In this section we define explicitly the interface between the values of that feature and various

syntactic configurations of categories and grammatical relations. We do so by providing a classification of words at the morphology-syntax interface, in the form of a multiple inheritance hierarchy. In the interest of space, we only present partial hierarchies for absolute and possessed nouns, and finite and nonfinite verbs. The analysis extends readily to other categories, notably predestinative nouns, adjectives, and postpositions.

3.2.1 Nouns

First, we assume the partial hierarchy of nouns in Figure 5.

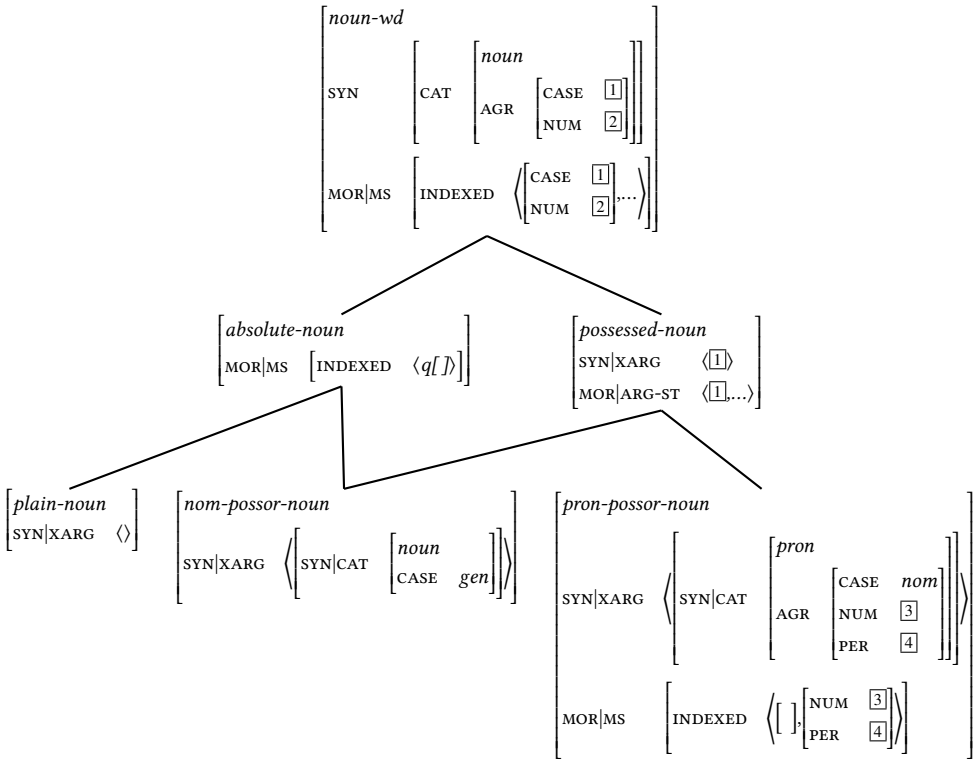


Figure 5: Partial hierarchy of nouns

As indicated by the type at the top of the hierarchy, all nouns share the property of realizing their case and number features through the first element on the INDEXED list. This type is then split: *absolute-noun*s are characterized by the absence of possessive morphology, ensured by stating that the INDEX list is a singleton; whereas *possessed-noun*s are characterized by syntactic selection of a possessor. Possessors are individuated by being the sole element on a noun's argument structure that is also the noun's EXTERNAL ARGUMENT or XARG (Sag, 2012, 133)—that is, both absolute and possessed nouns may have other arguments, but only possessed nouns have a possessor.[11]

One simple subtype of *absolute-noun* is that of a *plain-noun*, which is constrained not to have a possessor in syntax—that is, its XARG list is empty. As a consequence of the presence of this type

[11]The XARG value projects to phrase level. This is crucial to capturing the reuse of possessive morphology on nouns as the realization of pronominal subjects of relative clauses in the possessed relative clause construction (Ackerman and Nikolaeva, 2014).

in the hierarchy, the sign in Figure 6 is a well-formed NP in its own right. Notice how the case and number values are transmitted from the agreement characteristics in the syntactic representation of the noun to the first and only element of the INTEXED list in the morphological representation, as entailed by the constraints inherited by the type *plain-noun* from its supertypes *absolute-noun* and *noun-wd*. This triggers appropriately the use of the absolute nominative singular form *ti* as the phonology of the sign, as will be detailed in section 3.3.

$$\begin{bmatrix} \textsc{phon} & ti \\ \textsc{syn} & \begin{bmatrix} \textsc{cat} & \begin{bmatrix} noun \\ \textsc{agr} & \begin{bmatrix} \textsc{case} & nom \\ \textsc{num} & sg \end{bmatrix} \end{bmatrix} \\ \textsc{val} & \langle\,\rangle \\ \textsc{xarg} & \langle\,\rangle \end{bmatrix} \\ \textsc{mor} & \begin{bmatrix} \textsc{ms}|\textsc{indexed} & \left\langle \begin{bmatrix} \textsc{case} & nom \\ \textsc{num} & sg \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}$$

Figure 6: Syntactic analysis for the noun *ti* used as a full NP

To account for possessed nouns, a more subtle distinction needs to be made. In Tundra Nenets both morphology on the noun and case marking are dependent on whether the possessor is nominal or pronominal: nominal possessors are genitive and do not trigger agreement morphology on the noun (26a), whereas pronominal possessors are always realized in the morphology, and may optionally also be realized as a nominative pronoun (26b).

(26) a. Wera-h ti
Wera-GEN.SG reindeer[NOM.SG]
'Wera's reindeer'

b. (pida) te-da
3sg.nom reindeer-3SG
'his/her reindeer'

To account for this we need a further subdivision of the type *possessed-noun*. The nominal possessor subtype is also a subtype of *absolute-noun*, and hence inherits the property of not exhibiting possessor morphology. This type licenses phrases such as the one in Figure 7.

The pronominal possessor subtype, on the other hand, identifies the person and number features of its nominative possessor with the second element on INDEXED. This is meant to trigger appropriately the realization of possessor marking in the morphology, as will be detailed in the next section. There are two possible ways of instantiating the *pron-possor-noun* type to derive a full NP. On the one hand, the pronominal possessor may be realized syntactically, leading to a complex phrase such as the one shown in Figure 8. On the other hand, it may also be left unrealized in the syntax, thanks to the constraint in (27), a refinement of argument realization which entails that pronominal external arguments may be syntactically unexpressed.[12] Figure 9 exhibits

[12]Implicit in (27) is the fact that XARG contains at most one element. Thus there are possible configurations for the two sublists 1 and 2 listed in the XARG. (i) both 1 and 2 are empty lists, and there is no possessor. (ii) 1 is a singleton

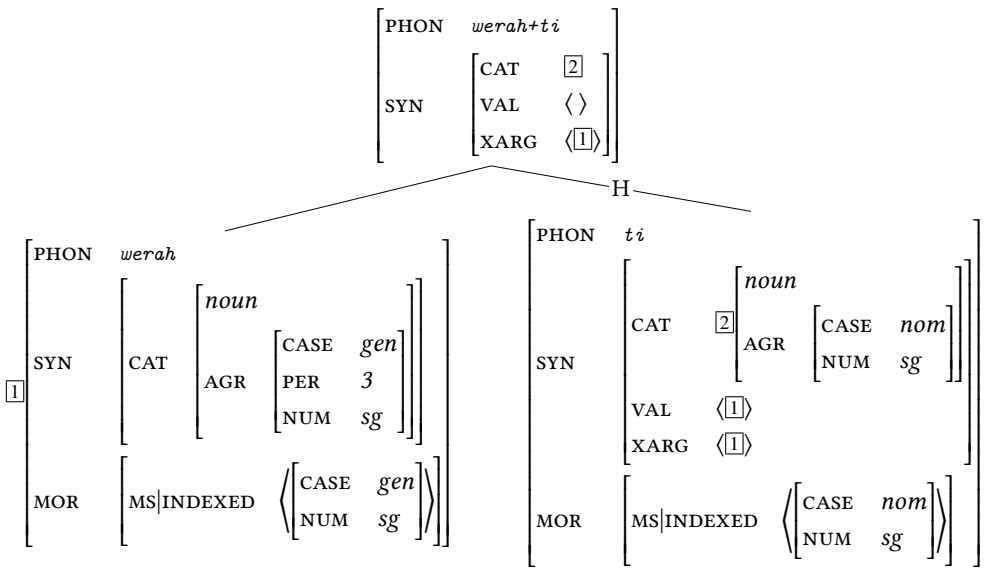


Figure 7: Syntactic analysis for (26a)

this possibility. In both cases however, the same INDEXED value is triggered in the morphological representation, leading to the same form *teda* as the phonology of the word.

(27) **External argument realization**

$$word \rightarrow \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{XARG} & \boxed{1} \oplus \boxed{2}\, list([\text{CAT } pron]) \\ \text{VAL} & \boxed{1} \oplus \boxed{3}\, list(sign) \end{bmatrix} \\ \text{MOR} & \begin{bmatrix} \text{ARG-ST} & \boxed{1} \oplus \boxed{2} \oplus \boxed{3} \end{bmatrix} \end{bmatrix}$$

3.2.2 Finite verbs

Let us now turn to the analysis of further lexical categories that share part of their inflectional exponence with nouns, starting with finite verbs. Remember that finite verbs come in three conjugations that contrast in the encoding of person marking. The subjective and reflexive conjugations index only the subject argument, while the objective conjugation indexes both the subject and object arguments, through the same exponents used on possessed nouns. Verbs come in four classes. Intransitive verbs are split into two subclasses, one of which uses the subjective (28), and the other the reflexive (29) conjugation. As (Ackerman and Nikolaeva, 2014, 100-101) show, the choice of conjugation for intransitives can be predicted neither from syntactic nor from semantic properties of the verb. Ordinary transitive verbs are in the subjective conjugation by default (30a), but use the objective conjugation (30b) when they take a topical third person object (Dalrymple and Nikolaeva, 2011). Finally, there is a class of optionally transitive verbs (called

list, and 2 is empty. The only elemement in 1 is projected in syntax as a valent; that element is unconstrained and may be either an NP or a pronoun. (iii) 1 is empty but 2 contains one element, which is constrained to be a pronoun. In that case however it is not transmitted to VAL and thus will not be projected in syntax. Notice that (27) is stated as a constraint on external arguments generally, rather than more specifically on possessors. Thus the same constraint accounts directly for pro-drop on verbs.

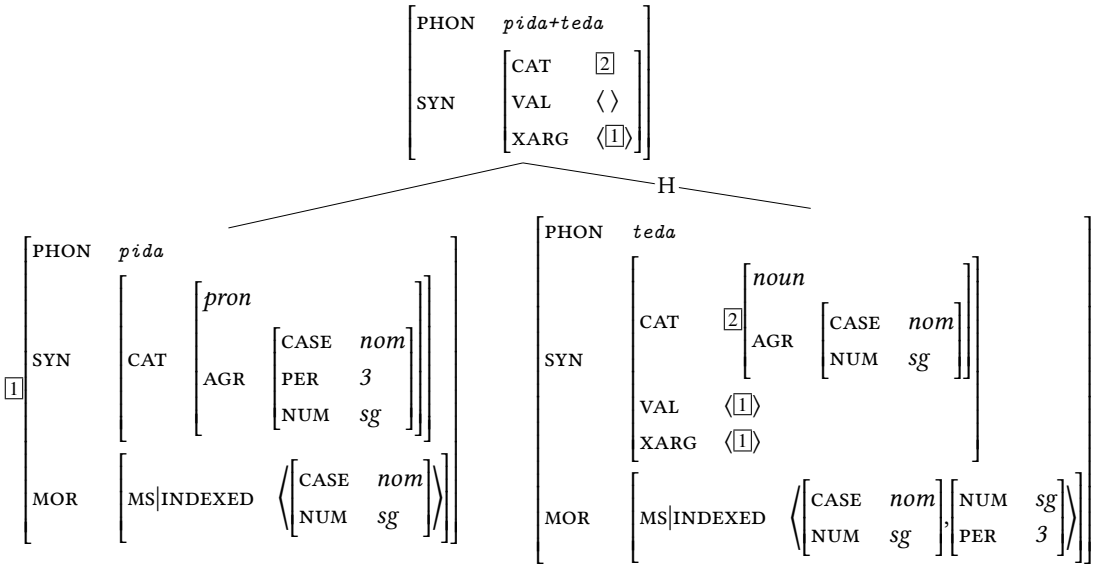


Figure 8: Syntactic analysis for (26b) with syntactically expressed possessor

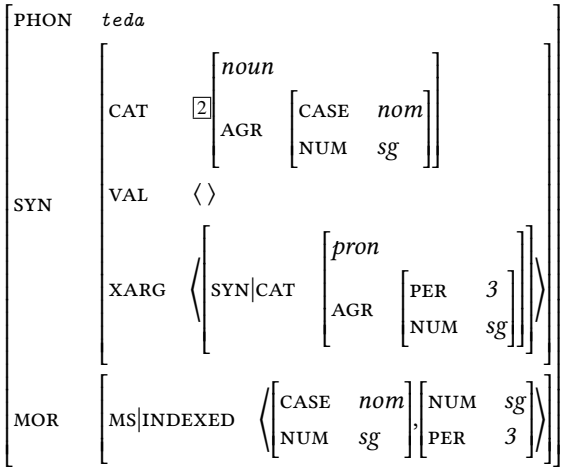


Figure 9: Syntactic analysis for (26b) with syntactically unexpressed possessor

transitive-reflexive by Salminen 1997), which pattern like transitives when they have an object and like reflexives when they don't. We will ignore the technical complications posed by this final class for the sake of brevity. Notice that distinctions of transitivity and conjugation lead to overlapping classifications of verbs, as Figure 10 highlights.

(28) mənc̥raə-d̥m (subjective, intransitive)
work-SUBJ.1SG
'I work'

(29) teyə-w̥q (reflexive, intransitive)
flow-REFL.1SG
'I flow'

(30) a. me˚-d̥m (subjective, transitive)

'I took it'

b. me˚-da (objective, transitive)
take-OBJ.3SG>SG 'I took it'

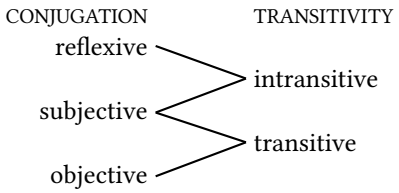


Figure 10: Relation between transitivity and conjugation

To capture this situation, we assume the partial hierarchy of finite verbs in Figure 11. As in the case of nouns, the hierarchy crucially relies on multiple inheritance to capture the overlapping crossclassification of verbs according to transitivity and conjugation. The property shared by all finite verbs is that their subject (XARG and first element of ARG-ST) contributes person and number features to the morphosyntactic property set, more specifically to the last element in INDEXED. If the verb is in the subjective or reflexive conjugation, this last element will also be the only element in INDEXED. This shared property of the two conjugations is captured by the type (*single-idx-vb*). If the verb is in the objective conjugation on the other hand, there is another element on INDEXED, which encodes the expression of object number. This is captured by the type *objective-vb* at the bottom right of the hierarchy. A crucial feature of the hierarchy, however, is that *objective-vb* is not a sister type of *single-idx-vb*. Rather, there is an intermediate type of *transitive-vb* which captures the commonalities between transitive verbs in the subjective (type *subj-trans-vb*) and objective (type *objective-vb*) conjugations, namely that they take an accusative complement. There is a similar overlapping classification among subtypes of *single-idx-vb*. The three leaf types at the bottom of the hierarchy respectively capture verbs in the reflexive conjugation, intransitive verbs in the subjective conjugation, and transitive verbs in the subjective conjugation. The first two types share the property of being intransitive, which is specified on their common supertype *intransitive-vb* by stating that they can't have accusative complements. The last two type share a morphological property, the use of exponents from the subjective set rather than the reflexive set. We capture this through a specification for the binary feature REFL, a purely morphological feature located inside MOR that will trigger different rules of exponence.

Let us now walk through the consequences of the hierarchy in Figure 11, taking into account all the information deducible by inheritance. Intransitive verbs get very similar representations whether they are inflected according to the reflexive or subjective conjugation, the only difference lying in the value of the REFL feature, which in turn will trigger the use of different rules of exponence. Figure 12 shows the two signs that are respectively licensed by types *reflexive-vb* and *subj-intr-vb* as analyses for (29) and (28) respectively. Both are complete clauses on their own, since (by virtue of (27)) pronominal subjects need not be expressed as valents.

Turning to transitive verbs, we contrast the consequences of the two types *subj-trans-vb* and *objective-vb* by showing analyses of in (9a) and (9b) in Figures 13 and 14 respecively.[13] From

[13]Notice that we follow Ackerman and Nikolaeva (2014) in assuming flat structures for Tundra Nenets clauses, with subjects and objects combining at the same level of embedding. Nothing crucial hinges on this choice.

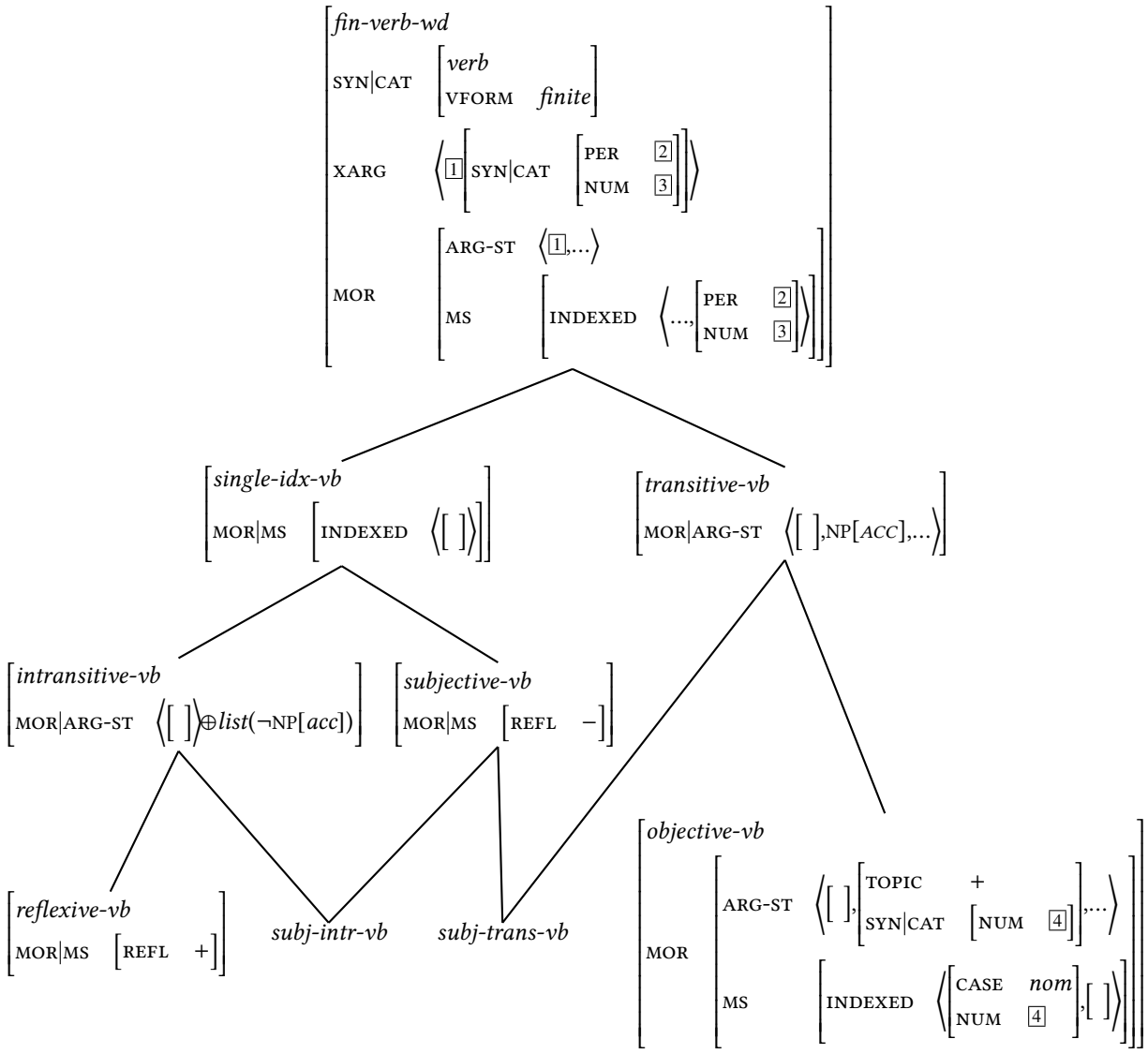
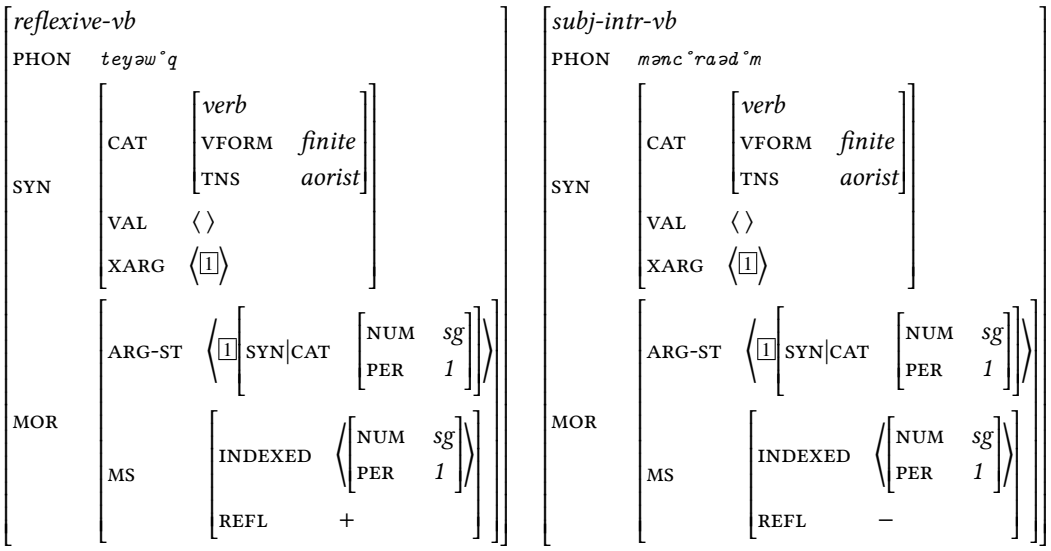


Figure 11: Partial hierarchy of Tundra Nenets verb types

a syntactic point of view the only difference between the two examples is the topicality of the object in (9b). For concreteness we capture this through a specification [TOPIC +] on the relevant sign, although of course a fuller analysis should embed a more elaborate theory of information structure. Thus the two syntactic trees are fully isomorphic. The only difference lies in the morphosyntactic representation. Being of type *subj-trans-vb*, the verb in Figure 13 has an MS value fully congruent with that of the intransitive verb in Figure **??**b, with a single element on INDEXED and a [REFL –] specification. This captures the fact that transitive and intransitive subjective verbs are inflectionally indistinguishable. However, in Figure 14, the topicality of the object licenses the use of the type *objective-vb*. As a consequence, the number specification of the object is passed on to the first element in the INDEXED list. The fact that the INDEXED list contains two elements will trigger the use of exponents from the same set used for possessed nouns. The specification that the first element in *indexed* is [CASE *NOM*] captures the fact that objective verbs take the same person markers as nominative possessed nouns; however, since this specification occurs inside the



(a) Reflexive (29) (b) Subjective (28)

Figure 12: Two uses of intransitive verbs

morphological representation rather than within the syntactic representation, it should be seen as a purely morphological (or morphomic) statement about shared exponence across categories: the object unambiguously carries accusative case from the point of view of syntax.

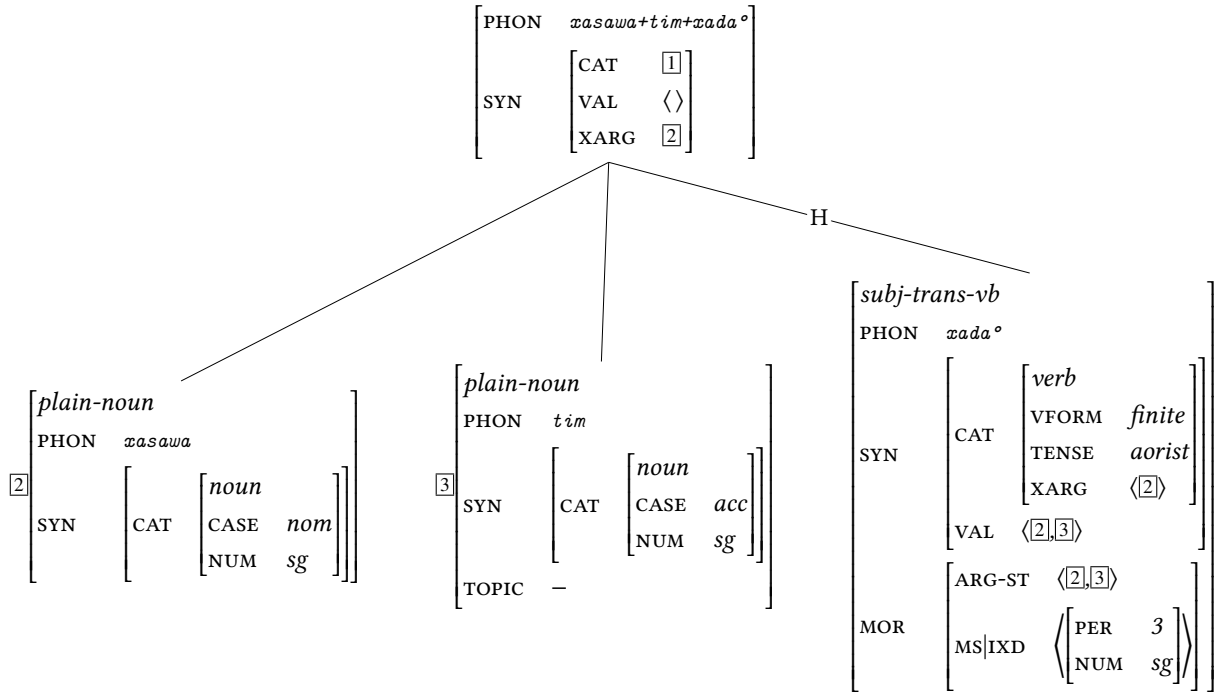


Figure 13: Use of a subjective transitive verb (9a)

Abstracting away from the very different syntax, single-indexing verbs have morphological representations that closely resemble those of absolute nouns, while objective verbs have repre-

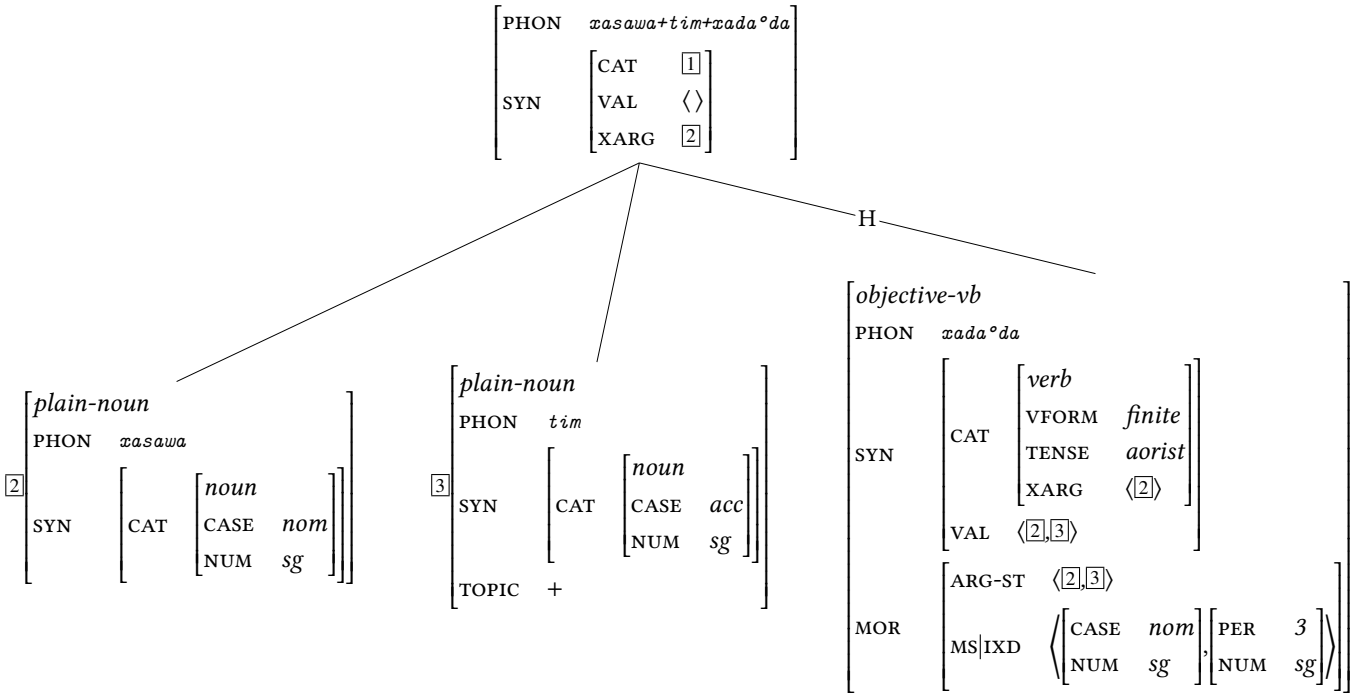


Figure 14: Use of an objective transitive verb (9b)

sentations that closely resemble those of nouns with pronominal possessors. As we will see in section 3.3, this will facilitate the statement of polyfunctionality as the expression of the same features across categories.

3.2.3 Nonfinite verbs

Let us finally turn to nonfinite verbs. As we saw above, nonfinite verbs may take a local subject, normally realized as a genitive NP. When the subject is pronominal however, it is realized as inflection on the verb. Given that nonfinite verbs only ever realize properties of the subject, one would expect the person markers realizing pronominal subjects to belong to correspond to either the subjective or the objective conjugation. This is not what happens however: nonfinite verbs use a separate set of markers, which coincides with the markers used on possessed nouns in the genitive singular.

This behaviour can be easily captured within the analytic frame defined so far. The simple hierarchy in Figure 15 states a bifurcation in the behavior of nonfinite verbs depending on the category of their subjects: with nominal subjects, they exhibit no agreement, which is captured by an empty INDEXED value. With pronominal subjects however, the INDEXED value is a list of two elements, the second of which expresses the person and number features of the subject. The morphomic specification that the first element is genitive singular simply guides the inflectional component towards the use of the right set of person markers in the paradigm of possessed nouns.

The two types of nonfinite verbs in Figure 15 respectively license the uninflected and inflected nonfinite verbs in examples (13a) and (13b), leading to the analyses for the nonfinite clauses in Figures 16 and 17. Note that once again, thanks to the principle in (27), pronominal arguments may be omitted in the syntax, but are expressed in the morphology.

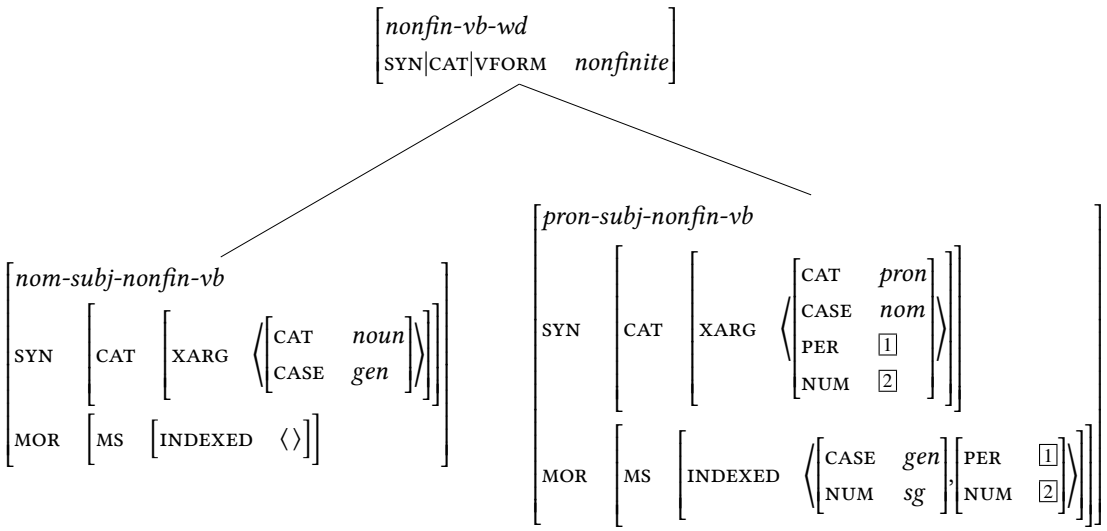


Figure 15: Hierarchy of nonfinite verbs

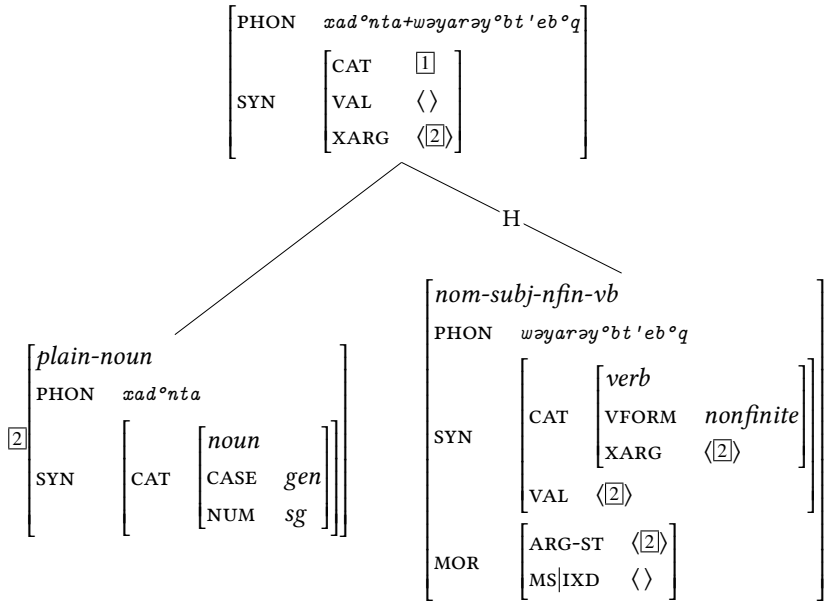


Figure 16: Use of nonfinite verb with nominal subject (13a)

3.3 Exponence accross categories

In the last section we provided the first half of our account of polyfunctionality in Tundra Nenets, in the form of a detailed specification of the morphology-syntax interface. Crucial to the account is the use of the pivotal feature INDEXED, which stands at the interface between true syntax, where different categories of heads relate to different valents via various grammatical relations, and exponence, which collapses some of the distinctions made by syntax. Specifically, we ended up distinguishing three families of words: those with an empty INDEXED list realize no indexed element; those with one element in their INDEXED list realize properties of a single indexed element—the head itself with nouns, the subject with verbs; those with two elements in INDEXED typically re-

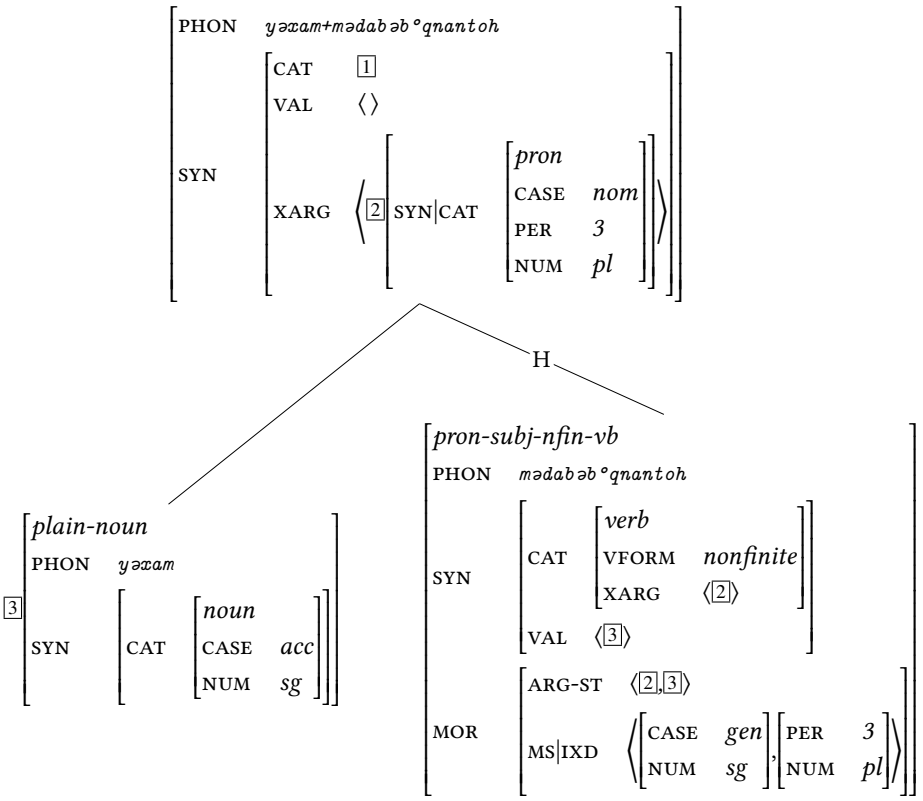


Figure 17: Use of nonfinite verb with pronominal subject (13b)

alize properties of two indexed element: head noun and possessor for possessed nouns, object and subject for objective verbs. With nonfinite verbs however, a subpart of the double indexing paradigm is reused for the indexing of a single element, the subject: exponents for possessed genitive singular nouns are redeployed for that purpose.

The second half of the account then consists in providing a system of exponence for the realization of shared morphology accross categories. Because nominal declension involves the largest set of exponents, we start with this, and will to conjugation in a second step.

3.3.1 Nominal declension

In this subsection we provide a detailed formal analysis of Tundra Nenets nominal declension. The analysis largely follows Salminen (1997).

Although Tundra Nenets declension is mostly agglutinative, the system is characterized by a rather high degree of overlapping exponence. Let us establish this by examining the paradigm in Table 1. First, there is a clear pattern of morphomic stem alternation (Aronoff, 1994), between the basic stem and the so-called accusative plural stem, which is used in the accusative and genitive plural of both absolute and possessed nouns, and in the nominative plural of possessed nouns.The unpredictibility of the alternation clearly calls for lexical listing of stem alternants, but the choice of one of the two stems is a partial indicator of number, case, and absolute or possessed status.[14]

[14]The *e*~*i* alternation is phonologically predictable: *i* occurs in final syllables. What is unpredictable is the *e*~*í* alternation.

Second, the post-stem material can generally be segmented into a sequence of a case-number marker and a possessor marker, but case and number markers are largely fused. Clearest evidence for this comes from comparing accusative and genitive forms: ACC.SG is marked by *-m* (*-w* between two vowels by regular phonology), ACC.PL is unmarked except for the stem alternation, GEN.SG is marked by *-n* (*-h* word-finally by regular phonology), and GEN.PL is marked by *-q* (dropped before obstruents by regular phonology). Possessor markers can then by identified as in Table 10. However, even in this rather well-behaved subparadigm, some aspects are not accounted for by a simple segmentation. First, different dual markers are used in the absolute *-xəh* and possessed *-xəyu* (SG and DU)/ *-xəyuq* (PL) situations. Second, there is a remaining segment *-n* found between the case-number and the possessor marker only when the noun is nonsingular and the possessor first person.

	SG	DU	PL
1	-ə	-'ih	-aq
2	-tə	-t'ih	-taq
3	-ta	-t'ih	-toh

Possessor markers

	SG	PL
ACC	-m	–
GEN	-n	-q

Case-number markers

DU.ABS	-xəh
DU.POSS	-xəyu
DU/PL.1POSS	-n

Fused markers

Table 10: Markers as evidenced in the ACC and GEN

Looking at more subparadigms only brings out more noncanonical exponence. In the nominative, there is a fused exponent *-m* (*-w* between two vowels by regular phonology) marking singular nouns with first person possessors; *-r* marks singular nouns with second person possessors, but also precludes the appearance of the initial *-t-* of second person possessor markers *-tə*, *-t'ih*, *-taq* from Table 10, thus calling into question the perspicuity of that segmentation. Finally, *-q* marks plural absolute nouns.

Turning to local cases, which are historically formed on the genitive, these exhibit the scattered reuse of the typical genitive exponents (SG *-n*, PL *-q*), combined with other elements: the dative possessed uses both following *-xə*; the locative and ablative use only plural *-q*, realized between the form *-xə* and *-na* and *tə* respectively; the prosecutive also uses only *-q*, but this time followed by *məna*.

As this short discussion should make clear, the complexity of the dataset and the extent of reuse of exponents for different situations are such that there is little empirical evidence for any specific segmentation. A coarse segmentation will give rise to a long list of partially redundant exponents, and lots of fused exponence. Table 11 presents the inventory of exponents and positions entailed by one such segmentation, mostly following Nikolaeva (2014). A more fine-grained segmentation will avoid redundancy at the cost of multiplying the number of rule blocks realising the same features, and raising the amount of multiple exponence. Table 12 shows an inventory exponents under a segmentation close to that advocated by Salminen (1997). For concreteness we adopt the latter strategy, although this has little consequence for the issues discussed in this paper. Discussing the full set of rules would be tedious, we only provide an illustrative sample highlighting the main design properties of the analysis.[15]

[15]When interpreting the exponents shown in Tables 11 and 12, the following sandhi rules should be kept in mind. Although these are by no means exhaustive, they are sufficient to correctly derive the forms in Table 1.

1	2	3
NOM.PL;ABS: *-q*	NOM/ACC;1.POSS: *-m*	SG.POSS: *-ə*
ACC.SG;ABS: *-m*	1POSS: *-n*	3SG.POSS: *-a*
GEN.SG;ABS: *-n*	NOM.SG;2.POSS: *-r*	DU.POSS: *-'ih*
DAT.SG;ABS: *-nəh*	NOM.SG;3.POSS: *-t*	PL.POSS: *-aq*
DAT.SG;POSS: *-xə*	ACC;2/3.POSS: *-t*	3PL.POSS: *-oh*
LOC.SG: *-xəna*	NOM/ACC.DU/PLU;2/3.POSS: *-t*	
ABL.SG: *-xətə*	OBL.SG;2/3.POSS: *-ht*	
PROS.SG: *-məna*	OBL.DU/PLU;2/3.POSS: *-qt*	
DU.ABS: *-xəh*		
DU;POSS: *-xəyu*		
GEN.PL: *-q*		
DAT.PL: *-xəq*		
LOC.PL: *-xəqna*		
ABL.PL: *-xəqtə*		
ABL.PL: *-qməna*		

Table 11: Position classes and exponents under a coarse-grained segmentation

1	2	3	4	5	6
DAT/LOC/ABL: *-xə*	NOM.PL;ABS: *-q*	LOC: *-na*	ACC.SG: *-m*	2/3.POSS: *-t*	1/2SG: *-ə*
DAT.SG;ABS: *-nəh*	OBL.PL: *-q*	ABL: *tə*	OBL.SG: *-n*	NOM.SG;1.POSS: *-m*	3SG: *-a*
	DU;POSS: *-xəyu*	PROS: *-məna*	OBL.DU/PL;1/2.POSS: *-q*	NOM.SG;2.POSS: *-r*	DU: *-'ih*
	DU.ABS: *-xəh*			DU/PL;1.POSS: *-n*	1/2PL: *-aq*
					3PL.POSS: *-oh*

Table 12: Position classes and exponents under a fine-grained segmentation

When writing the inflection rules realizing the exponents in Table **??**, we take them to solely realize the value of the feature INDEXED. This corresponds to the fact that most of the exponents in the table are redeployed with other categories, and should thus not be made dependent on a particular category. As detailed in section 3.2.1, in the context of nouns, a single element on INDEXED corresponds to an absolute noun, with no morphological indexing of possessor, while two elements correspond to a noun indexing a pronominal possessor.

Rules of exponence used in declension then come in three categories: some rules are used only with absolute nouns, some rules only with possessed nouns, and some rules with both. Thus rule (31) appropriately applies only to absolute dual nouns. Since it constrains the INDEXED value to have two elements, but it does not constrain the features of the second element, rule (32) applies to any possessed noun, expressing only features of the noun itself. Conversely, a rule expressing only properties of the possessor, on the other hand, will leave underspecified the first

(i) m→w intervocally before a morph boundary

(ii) q→ ∅ before obstruents

(iii) n→h word finally

(iv) t→d postvocally

Stem allomorphy is responsible for the alternation beween *ti* (e.g. NOM.SG.ABS), *tí* (e.g. ACC.PL.ABS) and *te* (e.g. DAT.SG.ABS). For present purposes the modeling of stem allomorphy can be ignored.

element on INDEXED; it is however crucial to mention that underspecified first element, since second position in the list encodes possessor status, as in rule (33). Rules (34) and (35) illustrate the final two possibilities: (34) exemplifies cumulative exponence, while (35) applies to both absolute and possessed nouns since it leaves underspecified the length of the INDEXED list.

(31) $X, \begin{bmatrix} \textsc{lid} & \textit{lid} \\ \textsc{morsyn} & \begin{bmatrix} \textsc{indexed} & \left\langle \begin{bmatrix} \textsc{num} & \textit{du} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \longrightarrow X$xəh (block 2)

(32) $X, \begin{bmatrix} \textsc{lid} & \textit{lid} \\ \textsc{morsyn} & \begin{bmatrix} \textsc{indexed} & \left\langle \begin{bmatrix} \textsc{num} & \textit{du} \end{bmatrix}, \begin{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \longrightarrow X$xəyu (block 2)

(33) $X, \begin{bmatrix} \textsc{lid} & \textit{lid} \\ \textsc{morsyn} & \begin{bmatrix} \textsc{indexed} & \left\langle \begin{bmatrix} \end{bmatrix}, \begin{bmatrix} \textsc{num} & \textit{du} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \longrightarrow X$'ih (block 6)

(34) $X, \begin{bmatrix} \textsc{lid} & \textit{lid} \\ \textsc{morsyn} & \begin{bmatrix} \textsc{indexed} & \left\langle \begin{bmatrix} \textsc{case} & \textit{nom} \\ \textsc{num} & \textit{sg} \end{bmatrix}, \begin{bmatrix} \textsc{per} & 2 \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix} \longrightarrow X$r (block 5)

(35) $X, \begin{bmatrix} \textsc{lid} & \textit{lid} \\ \textsc{morsyn} & \begin{bmatrix} \textsc{indexed} & \left\langle \begin{bmatrix} \textsc{case} & \textit{oblique} \\ \textsc{num} & \textit{pl} \end{bmatrix}, \ldots \right\rangle \end{bmatrix} \end{bmatrix} \longrightarrow X$q (block 2)

3.3.2 Redeployment of exponents

All the exponents shown in Table 12 are reused in some way or another in other parts of the inflection system of Tundra Nenets. Given the way the morphology-syntax interface has been set up in section 3.2, the rules specified above for nouns can automatically be redeployed for other categories, as long as the combinations of features they express are relevant. Thus for instance, rules (32–35) are readily available for redeployment in the objective conjugation; on the other hand, rule (36) will never be used in conjugation, because the paradigm of a verb does not contain cells with a locative first element on INDEXED.[16] However there is no need for the rule of exponence to encode that property, since it follows from the interface with syntax.

(36) $X, \begin{bmatrix} \textsc{lid} & \textit{lid} \\ \textsc{morsyn} & \begin{bmatrix} \textsc{indexed} & \left\langle \begin{bmatrix} \textsc{case} & \textit{locative} \end{bmatrix}, \ldots \right\rangle \end{bmatrix} \end{bmatrix} \longrightarrow X$na (block 2)

Given this observation, one may wonder whether exponence ever needs to be made sensitive to syntactic category in Tundra Nenets. As a matter of fact, this is rarely the case, and the level

[16] However that very rule will be used in the inflection of local postpositions

of cross-categorial versatility of the system is quite impressive. Consider the three single indexing paradigms we have encountered, illustrated again in Table 13. It is notable that the third person markers in the subjective conjugation coincide with nominative markers in the absolute declension. Thus, if one considers, unsurprisingly, that subjective conjugation, third person and nominative case are the unmarked choice in their respective dimensions, one may conclude that polyfunctionality is also found across nouns and verbs in the context of single indexing paradigms; and all rules introducing the exponents in Table 13 may be formulated without mention of syntactic category: the fact that nouns do not have second person forms, or verbs genitive forms, follows from their paradigm structure, and does not need to be stipulated again as part of the system of exponence.

(a) Subjective conjugation

	SG	DU	PL
1	-təm	-n'ih	-maq
2	-nə	-t'ih	-taq
3	∅	-xəh	-q

(b) Subjective conjugation

	SG	DU	PL
1	-məq	-n'ih	-naq
2	-nə	-t'ih	-taq
3	-q	-xəh	-təq

(c) Absolute declension

	SG	DU	PL
NOM	∅	-xəh	-q
ACC	-m	-xəh	∅
GEN	-h	-xəh	-q
…	…	…	…

Table 13: Comparing three person marker paradigms

4 Conclusions

We began by identifying polyfunctionality as a cross-linguistically recurring phenomenon that provides empirical guidance for morphological theory construction. In particular, the prevalent reuse of the same markers for different morphosyntactic purposes departs from common assumptions concerning a proposed principle of morphological organization such as TRANSPARENCY whereby there is a bi-unique relation between a form and function. A natural inquiry that arises from this is whether there are particular domains in grammar in which such recurrence tends to appear and what strategies grammar systems employ to organize this information. One domain in which it is well-known to occur is the indexing of person/number pronominal distinctions across different lexical categories. The profligacy with which this principle is violated suggests that morphological organization must be responsive to factors that are quite different from e.g., TRANSPARENCY. As suggested at the outset, the identification of relevant factors and how they can be developed into an explanatory morphological theory are dependent upon an understanding of a detailed and complex distribution of data.

Thus, in order to explore this basic issue we have provided a case study of a language which presents a particularly challenging array of polyfunctional uses, namely, the scatter of distributions attested for Tundra Nenets person/number markers. Guided by the observation that all of the Tundra Nenets uses of these markers share some properties, we abstracted a common set of properties that get redeployed in different ways constrained by properties of the parts of speech with which they co-occur. We, then, developed the resources, following sign-based constructional proposals and a variant of PFM, that permitted the formulation of an abstractive analysis of Tundra Nenets polyfunctionality. This, it must be noted, constitutes an analysis of the synchronic system of Tundra Nenets.

We have throughout, and largely implicitly, addressed the relation between cross-linguistic typological observations and linguistic theory that we have mentioned previously. What is the relation between the systematic cross-linguistic recurrence of form-function patterns, the details of their encoding in particular language systems and theoretical analysis? While we have provided some of the theoretical representational constructs required to address the encodings of the targeted pattern in a particular language, we have foregone exploring principles responsible for the cross-linguistic tendencies themselves (probabilistic universals). Why do they occur and how (ultimately, why) are they manifested in the way they occur within particular (classes of) language systems? This limitation of our proposal becomes clear when the polyfunctionality of Tundra Nenets person-number marking is compared with similar paradigms from even related Uralic languages such as Pite Saami (Wilbur, 2014) or Vogul (Kalman, 1965). Each of these languages display somewhat different distributions and alignments of person/number markers with lexical categories. From our perspective, each of the languages exhibits a different systemic organization of this type of polyfunctionality. Moreover, these differences within a single language family both resemble and depart from analogous phenomena within other families. Morphological theory is, then, confronted with the fact that PNM polyfunctionality is a cross-linguistically convergent tendency which exhibits local variability wherever it occurs. As a consequence, the type of abstractive analysis developed here for Tundra Nenets needs to be construed as a necessary step in the formulation of a comprehensive morphological theory that provides systemic motivation for the development, maintenance, and change concerning the patterns of polyfunctionality attested in the languages of the world.

References

Ackerman, F. and Nikolaeva, I. (2014). *Descriptive Typology and Linguistic Theory. A study in the morphosyntax of relative clauses*. Stanford: CSLI Publications.

Allen, W. (1964). 'Transitivity and possession'. *Language*, 40:337–343.

Anderson, S. R. (1992). *A-Morphous Morphology*. Cambridge: Cambridge University Press.

Aronoff, M. (1994). *Morphology by itself*. Cambridge: MIT Press.

Blevins, J. (2003). 'Stems and paradigms'. *Language*, 79:737–767.

Blevins, J. P. (2006). 'Word-based morphology'. *Journal of Linguistics*, 42:531–573.

Bonami, O. (2011). 'Reconstructing HPSG morphology'. In *18th International Conference on HPSG*. Seattle.

Bonami, O. and Boyé, G. (2006). 'Deriving inflectional irregularity'. In *Proceedings of the 13th International Conference on HPSG*. Stanford: CSLI Publications, 39–59.

——— (2008). 'Paradigm shape is morphomic in Nepali'. In *13th International Morphology Meeting*. Vienna.

Bonami, O. and Crysmann, B. (2013). 'Morphotactics in an information-based model of realisational morphology'. In S. Müller (ed.), *Proceedings of HPSG 2013*. Stanford: CSLI Publications, 27–47.

Bonami, O. and Lacroix, R. (2010). 'In how many ways can you be morphomic? person marking in Laz'. In *Perspectives on the morphome*. Coimbra.

Bonami, O. and Samvelian, P. (2009). 'Inflectional periphrasis in Persian'. In S. Müller (ed.), *Proceedings of the HPSG 2009 Conference*. Stanford: CSLI Publications, 26–46.

——— (inpress). 'The diversity of inflectional periphrasis in Persian'. *Journal of Linguistics*, 51.

Bonami, O. and Stump, G. T. (forthcoming). 'Paradigm Function Morphology'. In A. Spencer (ed.), *Handbook of Morphology*. Blackwell, 2^e edn.

Bonami, O. and Webelhuth, G. (2013). 'The phrase-structural diversity of periphrasis: a lexicalist account'. In M. Chumakina and G. G. Corbett (eds.), *Periphrasis: The role of syntax and morphology in paradigms*. Oxford: Oxford University Press, 141–167.

Brown, D. (1998). 'Stem lndexing and morphonological selection in the russian verb: a network morphology account'. In R. Fabri, A. Ortmann, and T. Parodi (eds.), *Models of Inflection*. Niemeyer, 196–224.

Crysmann, B. and Bonami, O. (2012). 'Establishing order in type-based realisational morphology'. In S. Müller (ed.), *Proceedings of HPSG 2012*. Stanford: CSLI publications, 123–143.

Dalrymple, M. and Nikolaeva, I. (2011). *Objects and information structure*. Cambridge: Cambridge University Press.

Kalman, B. (1965). *Vogul Chrestomathy*. Bloomington: Indiana University Linguistics Club.

Lacroix, R. (2009). *Description du dialecte laze d'Arhavi*. Ph.D. thesis, Université Lumière Lyon 2.

Miller, P. and Sag, I. A. (1997). 'French clitic movement without clitics or movement'. *Natural Language and Linguistic Theory*, 15:573–639.

Nikolaeva, I. (2014). *A grammar of Tundra Nenets*. Berlin: Mouton de Gruyter.

Pirelli, V. and Battista, M. (2000). 'The paradigmatic dimension of stem allomorphy in italian verb inflection'. *Rivista di Linguistica*, 12.

Radics, K. (1980). *Tipológia és nylevtõrténet [Typology and language history]*. Budapest: Kandidátusi értékezés.

Sadler, L. and Spencer, A. (2001). 'Syntax as an exponent of morphological features'. In G. Booij and J. van Marle (eds.), *Yearbook of Morphology 2000*. Dordrecht: Kluwer, 71–96.

Sag, I. A. (1997). 'English relative clause constructions'. *Journal of Linguistics*, 33:431–484.

——— (2012). 'Sign-based construction grammar: An informal synopsis'. In H. Boas and I. A. Sag (eds.), *Sign-Based Construction Grammar*. Stanford: CSLI Publications, 69–202.

Sag, I. A., Wasow, T., and Bender, E. (2003). *Syntactic theory. A formal introduction*. Stanford: CSLI Publications, 2nd edn.

Salminen, T. (1997). *Tundra Nenets Inflection*, vol. 227 of *Mémoires de la Société Finno-Ougrienne*. Helsinki: Suomalais-Ugrilainen Seura.

Senft, G. (1986). *Kilivila, the Language of the Trobriand Islanders*. Berlin: Mouton de Gruyter.

Siewierska, A. (1998). 'Nominal and verbal person marking'. *Linguistic Typology*, 2:1–53.

——— (2004). *Person*. Cambridge: Cambridge University Press.

Spencer, A. (2013). *Lexical relatedness: a paradigm-based model*. Oxford: Oxford University Press.

Spencer, A. and Stump, G. T. (2013). 'Hungarian pronominal case and the dichotomy of content and form in inflectional morphology'. *Natural Language and Linguistic Theory*, 31:1207–1248.

Stewart, T. W. and Stump, G. T. (2007). 'Paradigm function morphology and the morphology/syntax interface'. In G. Ramchand and C. Reiss (eds.), *The Oxford handbook of linguistic interfaces*. Oxford: Oxford University Press, 383–421.

Strom, C. (1992). *Retuarã syntax*. Dallas and Arlington: Summer Institute of Linguistics and University of Texas at Arlington.

Stump, G. T. (2001). *Inflectional Morphology. A Theory of Paradigm Structure*. Cambridge: Cambridge University Press.

——— (2005). 'Referrals and morphomes in Sora verb inflection'. In G. Booij and J. van Marle (eds.), *Yearbook of Morphology 2005*. Berlin: Springer, 227–251.

——— (2006). 'Heteroclisis and paradigm linkage'. *Language*, 82:279–322.

Wilbur, J. (2014). *A grammar of Pite Saami*. Berlin: Language Science Press.

Wurzel, W. U. (1984). *Flexionsmorphologie und Natürlichkeit. Ein Beitrag zur morphologischen Theoriebildung*. Berlin: Akademie-Verlag. Translated as Wurzel (1989).

——— (1989). *Inflectional Morphology and Naturalness*. Dordrecht: Kluwer.