Multiple exponence in Finno-Ugric personal pronouns

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Abstract

This paper presents a study of personal pronouns in Finno-Ugric languages. Personal pronouns in these languages show a curious phenomenon of possessive exponents that duplicate ϕ-features of the pronominal root. While such duplication is attested in a vast majority of Uralic languages, it does not apply to all pronominal forms. The paper investigates the distribution of possessive marking within the paradigms and shows that it is governed by the case hierarchy (Blake 1994, Caha 2009). I suggest that the pattern instantiates partially superfluous extended exponence and requires a morphological analysis. I show that the data are straightforwardly derived under the harmonic serialist approach to inflectional morphology by employing the MINSAT constraint proposed in Müller (2020) and the observable variation within Uralic can be accounted for by invoking harmonic alignment of scales and subsequent constraint conjunction, as proposed by Aissen (1999, 2003).

1. Introduction

In a number of Finno-Ugric languages personal pronouns bear possessive markers that express the same ϕ-features as the pronominal stem. This is illustrated in (1) from Hill Mari. The form in (1a) presents the dative first person plural pronoun and shows that it contains a possessive marker that also realizes the first person plural features. Example (1b) presents the second person plural pronoun and the possessive marker realizes second person plural features correspondingly. The presence of the possessive markers is obligatory in both forms; cf. (2).

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(1) a. mä-län-**nä**
we-DAT-1PL
'to us'
b. tä-län-**dä**
you-DAT-2PL
'to you (plural)'

(2) a. *mä-län
we-DAT
'to us'
b. *tä-län
you-DAT
'to you (plural)'

In this paper, I present a survey on possessive marking in Finno-Ugric pronominal paradigms and show that such possessive inflection is ubiquitous in Finno-Ugric languages. It is attested in Hungarian, Khanty, Mansi, Mordvin, Mari, Udmurt, and Komi. At the same time, possessive marking does not appear in all cells of a paradigm. I will explore the distribution of possessive marking across the paradigms and show that in all languages it is not accidental, but follows clear principles. In particular, I will focus on case and show that the independently established case hierarchy in (3) determines the distribution of possessivity. First, possessive marking tends to be absent in less marked cases and tends to be present in more marked, oblique ones. Second, and more importantly, if possessive marking is present in some case, it will also appear in all more marked cases within a given language. For instance, there are no languages displaying possessive marking in accusative and dative with the exclusion of the genitive that appears between ACC and DAT on the case hierarchy.

(3) Case Hierarchy (Blake 1994, Caha 2009)
NOM < ACC < GEN < DAT < others

I would like to propose that possessive marking in Finno-Ugric languages is an instance of multiple (or extended) exponence, i.e., double morphological realization of the same features. I suggest that possessive markers do not introduce any possessive meaning, but only realize ϕ-features, superfluously in the case of pronouns as the features are already independently realized by a pronominal stem.

Multiple exponence is attested for various grammatical categories cross-linguistically (see Matthews 1972, 1974, Caballero and Harris 2012), so most morphological theories are capable of accounting for such data. In Distributed Morphology (Halle and Marantz 1993), some cases of multiple exponence are subsumed under contextual allomorphy (Bobaljik 2000) and formalized by secondary (or contextual) features on vocabulary items. Other cases were

argued to require copying of features from one node to the other in morphology (Grofulović and Müller 2023). Crucially, under this approach morphology only realizes previously built syntactic structure, so both these analyses necessitate the presence of the two distinct projections in the syntactic structure, one for the pronominal stem and the other for the possessive marking. In the absence of a possessive semantics associated with forms as in (1), there is only morphological, but no syntactic motivation for postulating two distinct projections hosting ϕ-features. The account would thus require syntactic structure building to take morphology into consideration.

Instead, I would like to suggest that the data are more naturally derived if morphological component does not interpret structures constructed in syntax but builds up the structure, relying on morphological principles. In this paper I will pursue the Harmonic Serialist approach to inflectional morphology developed in Müller (2020). Under this approach, all structure, morphological and syntactic, is constructed by Merge, but the two may differ in the set of further constraints regulating structure building. In particular, multiple exponence is derived by the MINSAT constraint. This constraint ensures gradual improvement of the constraint profile, so that the possessive marker that as I suggest realizes only the ϕ-features needs to be merged before the pronominal stem that realizes ϕ-features as well as the feature [pronominal].

This analysis derives the presence of possessive marking without the need to postulate and motivate a possessive head and word-internal possessive agreement in the absence of a clear possessive meaning. The observed variation within Finno-Ugric languages can be further accounted for by invoking harmonic alignment of scales and subsequent constraint conjunction (see Aissen 1999, 2003).

The current analysis differs from most existing analyses, which pursue a syntactic approach to possessive marking. They take the possessive inflection at face value and postulate an actual possessive structure (see Asbury 2008, Dékány 2018, and Burukina 2023). I will show that these accounts encounter difficulties in deriving the presence of possessive marking in structural cases and the correct position of possessive markers in pronominal forms. Spencer and Stump (2013) develop a morphological analysis of data that are very similar but not completely parallel to the ones presented in (1). This approach deems at least some of the forms with duplication of the ϕ-features by a possessive marker idiosyncratic and indivisable. As a result, the generalization

on the role of case hierarchy for the distribution of possessive marking is not captured.

I will proceed as follows. In section 2, I will present the data and make generalizations. I will present the analysis in section 3. The final section 4 discusses alternative analysis and implications of the current proposal.

2. Data

2.1. Overview

This paper investigates personal pronouns in Finno-Ugric langauges. The term *Finno-Ugric* is commonly used to indicate the larger branch of Uralic languages. Samoyedic languages present the other branch of this family. They are substantially different from Finno-Ugric languages and are not considered in this paper. Internal divisions within Finno-Ugric languages remain debated, but there is a consensus in that the following subgroups can be identified: Saami, Finnic, Mordvin, Mari, Permic, Mansi, Khanty, and Hungarian (Collinder 1965, Michalove 2002, Salminen 2002, and Janhunen 2009).

Possessive marking in personal pronouns is attested in Mordvin, Mari, Permic, Mansi, Khanty, and Hungarian subgroups. This does not mean that all languages in these subgroups show possessivity in pronouns, but that at least one language from each subgroup has it. Possessive marking seems to be completely absent in Saami languages (Kert 1971, Tereshkin 2002, Feist 2010, Wolbur 2014) and in Finnic languages (Agranat 1990, Zaikov 1999, Karlsson 2015).

In what follows, I will go through the data on possessive marking in Finno-Ugric languages and show that the languages differ with respect to the distribution of the possessive marking across the paradigms. I will focus on case and demonstrate that the split between the forms with a possessive marker and without it can occur in different places in the paradigm, but always follows the case hierarchy. Possessivity appears in the continuous segment of the hierarchy and gravitates towards more marked cases. Less marked cases tend to show no possessive marking. For each division on the case hierarchy, there will be at least one, but usually several languages displaying the split between forms with possessive marking and without it.

The data will be arranged in accordance with the patterns they display.

All the data come from existing grammars and language descriptions. I will not undertake the task of unifying the phonological representations of the languages, but will follow the notation systems used in the corresponding sources.

2.2. NOM < ACC ...

In this section, I will discuss paradigms where the split between forms with and without possessive marking takes place between nominative and accusative, the first two cases in the hierarchy. One of the Finno-Ugric languages showing such a distribution of possessivity is Northern Khanty (Nikolaeva 1999). The data in (4) show regular possessive inflection on a noun:

(4) Possessive inflection in Northern Khanty (Nikolaeva 1999)

xo:t-e:m	xo:t-l	xo:t-e:w	xo:t-e:mən
house-1SG	house-3SG	house-1PL	house-1DU
'my house'	'his house'	'their house'	'their (dual) house'

The table in (5) illustrates that these exponents are used in personal pronouns. They realize the same ϕ-features as the pronominal stem. The part of the paradigm not presented here is organized in the same manner.

(5) Personal pronouns in Northern Khanty (Nikolaeva 1999)

NOM	ma	luw	muŋ	min
	PRON.1SG	PRON.3SG	PRON.1PL	PRON.1DU
ACC	ma:n-**e:m**	luw-**e:l**	muŋ-**e:w**	min-**e:mən**
	PRON.1SG-1SG	PRON.3SG-3SG	PRON.1PL-1PL	PRON.1DU-1DU
LOC	ma:n-**e:m**-na	luw-**e:l**-na	mu-**e:w**-na	min-**e:mən**-na
	PRON.1SG-1SG-LOC	PRON.3SG-3SG-LOC	PRON.1PL-1PL-LOC	PRON.1DU-1DU-LOC

Northern Khanty has a small number of cases: Pronouns in the table above distinguish between nominative, accusative, and locative. The accusative form has no overt case marker; nominative and accusative are not distinguished on nouns. In pronouns, accusative form differs from the nominative only in the presence of the possessive marker. Finally, note that in the locative case, the possessive exponent appears closer to the pronominal stem than the case marker. Such an order of affixes is typical for the language and is attested in regular nominal forms as well:

(6) xo:tə-l-na
house-3SG-LOC
'in this house'

Another language with the nominative-accusative split is Northern Mansi (Riese 2001). The data in (7) show regular possessive inflection on nouns.

(7) Possessive agreement in Nothern Mansi (Riese 2001)

āmp-əm	āmp-ən	āmp-e	āmp-men
dog-1SG	dog-2SG	dog-3SG	dog-1DU
'my dog'	'your (sg) dog'	'her dog'	'our (dual) dog'

A relevant part of the paradigm of personal pronouns is given in (8). All forms but the nominative contain possessive markers that realize the same ϕ-features as the pronominal stem. The forms not presented here follow the same pattern.

(8) Personal pronouns in Northern Mansi (Riese 2001)

NOM	am	naŋ	taw	mēn
	PRON.1SG	PRON.2SG	PRON.3SG	PRON.1DU
ACC	ān-**əm**	naŋ-**ən**	taw-**e**	mēn-**men**
	PRON.1SG-1SG	PRON.2SG-2SG	PRON.3SG-3SG	PRON.1DU-1DU
DAT	ān-**əm**-n	naŋ-**ən**-n	taw-**e**-n	mēn-**men**-n
	PRON.1SG-1SG-DAT	PRON.2SG-2SG-DAT	PRON.3SG-3SG-DAT	PRON.1DU-1DU-DAT
ABL	ān-**əm**-nəl	naŋ-**ən**-nəl	taw-**e**-nəl	mēn-**men**-nəl
	PRON.1SG-1SG-ABL	PRON.2SG-2SG-ABL	PRON.3SG-3SG-ABL	PRON.1DU-1DU-ABL
COM	ān-**əm**-təl	naŋ-**ən**-təl	taw-**e**-təl	mēn-**men**-təl
	PRON.1SG-1SG-COM	PRON.2SG-2SG-COM	PRON.3SG-3SG-COM	PRON.1DU-1DU-COM

The Northern Mansi data are also analogous to the Northern Khanty data presented above in that there is no dedicated accusative marker, so that nominative and accusative forms differ only in the presence of the possessive exponent. In forms with a case marker, possessivity always precedes case.

The last language that I will discuss in this section and that I suggest also has the nominative-accusative split is Hungarian (Kenesei et al. 1998, Rounds 2009). As shown in (9), Hungarian has possessive marking on nouns.

(9) Possessive marking in Hungarian (Rounds 2009)

táská-m	táská-d	táská-ja	táská-nk	táská-tok	táská-juk
bag-1SG	bag-2SG	bag-3SG	bag-1PL	bag-2PL	bag-3PL
'my bag'	'your (sg) bag'	'his/her bag'	'our bag'	'your (pl) bag'	'their bag'

Paradigms of Hungarian pronouns are given below. The table in (10) shows forms of the third person pronouns. They do not include a possessive marker:

(10) 3rd person pronouns in Hungarian (Rounds 2009)

NOM	ő	ő-k
	PRON.3	PRON.3-PL
ACC	ő-t	ő-k-et
	PRON.3-ACC	PRON.3-PL-ACC

First and second person pronouns are given in (11). They contain exponents that realize corresponding possessive marking on nouns. The stems of the singular pronouns also augment a *g* consonant before the possessive marker. The presence of this additional consonant as well as the optionality of the accusative case exponent has been used to argue that singular as well as plural accusative forms are idiosyncratic and indivisible, i.e., the possessive marker cannot be separated (Spencer and Stump 2013). As the regular possessive marker can be clearly identified in the form and omission of the accusative case marking is attested for nouns as well, I will continue separating possessive and case markers and assume a case-conditioned *en~eng* and *te ~ tég* allomorphy.

(11) 1st and 2nd person pronouns in Hungarian (Rounds 2009)

NOM	én	te	mi	ti
	PRON.1SG	PRON.2SG	PRON.1PL	PRON.2PL
ACC	eng-**em**(-et)	tég-**ed**(-et)	mi-**nk**-et	ti-**tek**-et
	PRON.1SG-1SG-ACC	PRON.2SG-2SG-ACC	PRON.1PL-1PL-ACC	PRON.2PL-2PL-ACC

Besides nominative and accusative, Hungarian has a large inventory of oblique forms. The postpositional or affixal status of these forms remains subject to discussion (cf. Spencer and Stump 2013). These forms obligatorily contain a possessive marker, but differ from the patterns above in two regards. First, the pronominal stem may be omitted, leaving only a case/postposition marker followed by the possessive affix.

(12) Some oblique forms – case or postpositions (Rounds 2009, Dékány 2018)

ADE	(én-)nál-**am**	(te-)nál-**ad**	(mi-)nál-**unk**	(ti-)nál-**atok**
	PRON.1SG-ADE-1SG	PRON.2SG-ADE-2SG	PRON.1PL-ADE-1PL	PRON.2PL-ADE-2PL
SUBL	(én-)rá-**m**	(te-)rá-**d**	(mi-)rá-**nk**	(ti-)rá-**tok**
	PRON.1SG-SUBL-1SG	PRON.2SG-SUBL-2SG	PRON.1PL-SUBL-1PL	PRON.2PL-SUBL-2PL

Second, the order of the possessive and the oblique marker is not the same as on nouns:

(13) a sál-am-nál
the scarf-POSS.1SG-ADE

‘at my scarf’ (Dékány 2018)

In what follows, I will focus on the pattern with both the pronominal stem and the ϕ-marker attested robustly across Finno-Ugric languages (see though section 3.4), but I tentatively suggest that the proposed account has a potential to be extended to forms without a pronominal stem: They occur when the feature [pronominal] is realized by a case marker. The shape of such case markers is often somewhat different from the affixal use.

2.3. ... ACC < GEN ...

In this section, I will present paradigms with an accusative-genitive split. The first language with such a split is Udmurt (see Alatyrev 1983, Winkler 2001, 2011). Possessive morphology in Udmurt is more complex in that the shape of the possessive marker depends on case as well as on the number of the possessee. The table in (14) displays a part of the paradigm.

(14) Possessive agreement (based on Winkler 2011)

	Singular possessee					
	1SG	2SG	3SG	1PL	2PL	3PL
NOM	-e	-ed	ez	-m-i̯	-d-i̯	-z-i̯
ACC	-m-e	-d-e	-z-e	-m-es	-d-es	-z-es
GEN	-e-len	-ed-len	-ez-len	-m-i̯-len	-d-i̯-len	-z-i̯-len
DAT	-e-li̯	-ed-li̯	-ez-li̯	-m-i̯-li̯	-d-i̯-li̯	-z-i̯-li̯
IN	-a-m	-a-d	-a-z	-a-m-i̯	-a-d-i̯	-a-z-i̯
EL	-i̯šti̯-m	-i̯šti̯-d	-i̯šti̯-z	-i̯šti̯-m-i̯	-i̯šti̯-d-i̯	-i̯šti̯-z-i̯
	Plural possessee					
	1SG	2SG	3SG	1PL	2PL	3PL
NOM	-jos-i̯	-jos-i̯-d	-jos-i̯-z	-jos-m-i̯	-jos-t-i̯	-jos-s-i̯
ACC	-jos-m-e	-jos-t-e	-jos-s-e	-jos-m-es	-jos-t-es	-jos-s-es
GEN	-jos-i̯-len	-jos-i̯-d-len	-jos-i̯-z-len	-jos-m-i̯-len	-jos-t-i̯-len	-jos-s-i̯-len
DAT	jos-i̯-li̯	-jos-i̯-d-li̯	-jos-i̯-z-li̯	-jos-m-i̯-li̯	-jos-t-i̯-li̯	-jos-s-i̯-li̯
IN	-jos-a-m	-jos-a-d	-jos-a-z	-jos-a-m-i̯	-jos-a-d-i̯	-jos-a-z-i̯
EL	-jos-i̯šti̯-m	-jos-i̯šti̯-d	-jos-i̯šti̯-z	-jos-i̯šti̯-m-i̯	-jos-i̯šti̯-d-i̯	-jos-i̯šti̯-z-i̯

I suggest that /m/, /d/, and /z/ mark first, second, and third person features correspondingly, /jos/ realizes the plural feature of a possessee, /i̯/ realizes plural of a possessor or a possessee, and /e/ is present if neither a possessor nor a possessee is plural. A difficulty for this approach comes from the fact that whereas it is consistently present with plural possessors, /m/ is not present in several forms with a first person singular possessor. With the exception of the accusative form, /m/ is absent if possessive marking precedes case, and present

in forms where possessivity follows case. I tentatively suggest that this is a result of a contextual allomorphy (/m/ ~ /Ø/) and take a consistent presence of /m/ in first person plural contexts as an evidence that the marker realizes the first person feature.

I will now turn to personal pronouns in Udmurt. The paradigm is given in (15).

(15) Personal pronouns in Udmurt (Winkler 2011)

	Singular		
NOM	mon PRON.1SG	ton PRON.2SG	so PRON.3
ACC	mon-e PRON.1SG-ACC	ton-e PRON.2SG-ACC	so-je PRON.3-ACC
GEN	mi̯n-a-**m** PRON.1SG.OBL-GEN-1	ti̯n-a-**d** PRON.2SG.OBL-GEN-2	so-len PRON.3-GEN
DAT	mi̯n-i̯-**m** PRON.1SG.OBL-DAT-1	ti̯n-i̯-**d** PRON.2SG.OBL-DAT-2	so-li̯ PRON.3-DAT
ABL	mi̯n-ešti̯-**m** PRON.1SG.OBL-ABL-1	ti̯n-ešti̯-**d** PRON.2SG.OBL-ABL-2	so-leš PRON.3-ABL
INSTR	mon-en PRON.1SG-INSTR mon-eni̯-**m** PRON.1SG-INSTR-1	ton-en PRON.2SG-INSTR ton-eni̯-**d** PRON.2SG-INSTR-2	so-in PRON.3-INSTR
CAR	mon-tek PRON.1SG-CAR	ton-tek PRON.2SG-CAR	so-tek PRON.3-CAR
ADVL	mon-ja PRON.1SG-ADVL	ton-ja PRON.2SG-ADVL	so-ja PRON.3-ADVL
APPR	mon-lań PRON.1SG-APPR	ton-lań PRON.2SG-APPR	so-lań PRON.3-APPR
	Plural		
NOM	mi PRON.1PL	ti PRON.2PL	so-os PRON.3-PL
ACC	mil’-**em**-i̯z mil’-**em**-di̯ PRON.1PL.OBL-1-ACC	til’-**ed**-i̯z til’-**ed**-di̯ PRON.2PL.OBL-2-ACC	so-os-i̯z so-os-ti̯ PRON.3-PL-ACC
GEN	mil’-a-**m** PRON.1PL.OBL-GEN-1	til’-a-**d** PRON.2PL.OBL-GEN-2	so-os-len PRON.3-PL-GEN
DAT	mil’-**em**-li̯ PRON.1PL.OBL-1-DAT mil’-**em** PRON.1PL.OBL-1	til’-**ed**-li̯ PRON.2PL.OBL-2-DAT til’-**ed** PRON.2PL.OBL-2	so-os-li̯ PRON.3-PL-DAT
ABL	mi̯l’-ešti̯-**m** PRON.1PL.OBL-ABL-1	ti̯l’-ešti̯-**d** PRON.2PL.OBL-ABL-2	so-os-leš PRON.3-PL-ABL
INSTR	mil’-**em**-i̯n PRON.1PL.OBL-1-INSTR mil’-eni̯-**m-i̯** PRON.1PL.OBL-INSTR-1-PL	til’-**ed**-i̯n PRON.2PL.OBL-2-INSTR til’-eni̯-**d-i̯** PRON.2PL.OBL-INSTR-2-PL	so-os-i̯n PRON.3-PL-INSTR
CAR	mi-tek PRON.1PL-CAR	ti-tek PRON.2PL-CAR	so-os-tek PRON.3-PL-CAR
ADVL	mi-ja PRON.1PL-ADVL	ti-ja PRON.2PL-ADVL	so-os-ja PRON.3-PL-ADVL
APPR	mi-lań PRON.1PL-APPR	ti-lań PRON.2PL-APPR	so-os-lań PRON.3-PL-APPR

The data show that first and second person pronouns contain possessive

markers. These possessive markers realize person features; the number exponent is absent in all forms, except for the instrumental plural form where the number suffix is present as well. Plural pronouns in Udmurt show the already familiar nominative-accusative split, while singular pronouns show the split between the accusative and the genitive; i.e., possessive exponents are absent in the nominative and in the accusative case, they are present in the genitive and in more oblique cases (dative, ablative, instrumental). There are however three oblique forms where possessivity is consistently absent: caritive, adverbial case, and approximative.

The behavior of the radically oblique forms that seemingly do not comply with the case hierarchy has been discussed with respect to other languages and phenomena (see Smith et al. 2019) and there are two views on how such data may be treated in a way compatible with the predictions of the case hierarchy. First, while all cases are in principle hierarchically organized, oblique cases do not always linearly continue the case hierarchy, but may branch off from different positions in the hierarchy. Second, the difference between case and other types of oblique forms such as semantically loaded adverbial and attributive markers is not always straightforward, i.e., some of the oblique forms traditionally considered to be case may be in fact outside of the case system of a given language.

As I will show later, other Finno-Ugric languages in my sample show an analogous pattern: The behavior of cases explicitly present in the hierarchy complies with the predictions of the hierarchy, but there are also some oblique forms that seem to deviate from the predicted pattern and show no possessive marking. While I will not be able to consider each such form in detail, I assume that they are in fact not cases (see, e.g., Georgieva 2023 on the adverbial, Usačëva 2012 on the approximative form). Hence, the absence of possessive exponence in these forms does not violate case hierarchy.

Komi (Udor dialect) is another language showing the accusative-genitive split. For the sake of space and as Komi nominal morphology shows numerous irregularities, the discussion here will be restricted to a selected set of forms. The data in (16) illustrate first, second, and third person singular possessive markers. In Komi, /d/ consistently realizes first person features and /s/ realizes third person features. First person singular is realized by /ö/ in some forms and by /(i/y)m/ in the others. A similar variation in the shape of the first person marker is attested in Udmurt, but the corresponding Udmurt markers are /e/ and /em/; i.e., one of the exponents is a substring of the other and /e/

is associated with the singular feature in the rest of the paradigm. In Komi, possessive markers may be also segmented into an exponent realizing number and an exponent realizing person: /i/ or /y/ in the possessive markers can be also viewed as a realization of the singular, and /m/ as a marker for the first person feature. The other first person marker /ö/ is however segmentally distinct from both, so I assume that it cumulatively realizes number and person.

(16) Some possessive forms in Udor Komi (Sorvachova and Beznosikova 1990)

	1SG	2SG	3SG
NOM	-ö	-y-d	-y-s
	völ-ö	ruč-y-d	bat'-y-s
	horse-1SG	fox-SG-2	father-SG-3
EL	-s'-i-m / -s'-y-m	-s'-i-d / -s'-y-d	-s'-i-s / -s'-y-s
	jur-s'-i-m	tšutšku-s'-i-d	pon-s'-i-s
	head-EL-SG-1	stomach-EL-SG-2	dog-EL-SG-3

The table in (17) illustrates singular personal pronouns in Komi.[1] These data show that several first and second person pronouns contain possessive exponents (while third person pronouns do not). For the first and second person pronouns, nominative and accusative forms have no possessive marking, while genitive, dative, ablative, instrumental, and approximative cases obligatorily contain possessive exponents, more oblique forms show possessive exponents only optionally.

[1] Plural pronouns show even more variation, but seem to lack possessive marking for person in at least some dialects. Should this pattern indeed be attested, it seems to suggest that while the generalization that being present in some form, possessive marking will be present in all more marked forms holds for case, it might be violated for number. At the same time, all cases of first and second person plural pronouns except for nominative contain the /n/ formant that also marks plural possessor feature on nouns. I would like to suggest that plural pronouns show a consistent duplication of features, but do so with respect to number, not person.

(17) Pronouns in Udor Komi (Sorvachova and Beznosikova 1990)

NOM	mə PRON.1SG	tə PRON.2SG
ACC	mən-ö PRON.1SG-ACC	tən-ö PRON.2SG-ACC
GEN	məja-**m** PRON.1SG.GEN-1	təja-**d** PRON.2SG.GEN-2
DAT	məj-**m** PRON.1SG.DAT-1	təj-**d** PRON.2SG.DAT-2
ABL	mə-s'-**i-m** PRON.1SG-ABL-SG-1	tə-s'-**i-d** PRON.2SG-ABL-SG-2
INSTR	mə-na-**m** PRON.1SG-INSTR-1	tə-na-**d** PRON.2SG-INSTR-2
APPR	mə-lan'-**ö** PRON.1SG-APPR-1SG	tə-lan'-**y-d** PRON.2SG-APPR-SG-2
COM	mə-köt PRON.1SG-COM mə-köt-**ö** PRON.1SG-COM-1SG	tə-köt PRON.2SG-COM tə-köti-**y-d** PRON.2SG-COM-SG-2
CAR	tə-tög PRON.1SG-CAR mə-tögi-**ö** PRON.1SG-CAR-1SG	tə-tög PRON.2SG-CAR tə-tögi-**y-d** PRON.1SG-CAR-SG-2
CNS	mə-la PRON.1SG-CNS mə-la-**ö** PRON.1SG-CNS-1SG	tə-la PRON.2SG-CNS tə-la-**y-d** PRON.2SG-CNS-SG-2
EL	mə-is' PRON.1SG-EL mə-s'-**i-m** PRON.1SG-EL-SG-1	tə-is' PRON.2SG-EL tə-s'-**i-d** PRON.2SG-EL-SG-2
EGR	mə-s'an' PRON.1SG-EGR mə-s'an'-**ö** PRON.1SG-EGR-1SG	tə-s'an'-**y-d** PRON.2SG-EGR-SG-2
TERM	mə-ədz PRON.1SG-TERM mə-ədz-**ö** PRON.1SG-TERM-1SG	tə-ədz-**y-d** PRON.2SG-TERM-SG-2

To sum up, despite a larger variation in the shape of exponents, Komi demonstrates the accusative-genitive split in the pronouns of the first and second person, and I assume that oblique forms where possessive marking is optional are not cases.

2.4. ... GEN < DAT ...

In this section, I will turn to paradigms showing the genitive-dative split. Hill Mari is one of the languages with such a pattern. Possessive marking in Hill Mari is regular and agglutinative; see (18). The language has an active vowel harmony: The first and second plural affixes show a front vowel in this example, because the nominal stem contains a front vowel.

(18) Possessive inflection in Hill Mari (Pleshak and Kashkin 2023)

rekä-em	rekä-et	rekä-nä	rekä-dä
river-1SG	river-2SG	river-1PL	river-2PL
‘my river’	‘your (sg) river’	‘our river’	‘your (pl) river’

The paradigm of personal pronouns in Hill Mari is given in (19). It shows only first and second person pronouns, because Hill Mari has no dedicated third person pronouns and uses demonstratives in this function. Demonstratives do not include possessive markers.

(19) Personal pronouns in Hill Mari (Pleshak and Kashkin 2023)

NOM	mön’(ӧ) PRON.1SG	tön’(ӧ) PRON.2SG	mä PRON.1PL	tä PRON.2PL
ACC	mön’-ӧm PRON.1SG-ACC	tön’-ӧm PRON.2SG-ACC	mäm-**nä**-m PRON.1PL-1PL-ACC	täm-**dä**-m PRON.2PL-2PL-ACC
GEN	mön’-ӧn’ PRON.1SG-GEN	tön’-ӧn’ PRON.2SG-GEN	mäm-**nä**-n PRON.1PL-1PL-GEN	täm-**dä**-n PRON.2PL-2PL-GEN
DAT	mӧ-län-**em** PRON.1SG-DAT-1SG mӧ-lä**m** PRON.1SG-DAT.1SG	tӧ-län-**et** PRON.2SG-DAT-2SG tӧ-lä**t** PRON.2SG-DAT.2SG	mä-län-**nä** PRON.1PL-DAT-1PL	tä-län-**dä** PRON.2PL-DAT-2PL
SIM	mön’-lä-**em** PRON.1SG-SIM-1SG	tön’-lä-**et** PRON.2SG-SIM-2SG	mä-lä-**nä** PRON.1PL-SIM-1PL	tä-lä-**dä** PRON.2PL-SIM-2PL
COM	mön’-ge-**em** PRON.1SG-COM-1SG	tön’-ge-**et** PRON.2SG-COM-2SG	mä-ge-**nä** PRON.1PL-COM-1PL mä-**vlä**-ge PRON.1PL-PL-COM	tä-ge-**dä** PRON.2PL-COM-2PL tä-**vlä**-ge PRON.2PL-PL-COM

Singular and plural pronouns in Hill Mari show different distributions of possessive marking. Singular pronouns do not have possessive markers in the nominative, accusative, and genitive forms. Doubling of the ϕ-features by

a possessive marker occurs in the dative, similative, and comitative. In the plural, Hill Mari shows the nominative-accusative split. There is an irregularity in the plural comitative forms: In addition to the expected forms with the case and the possessive marker, the forms consisting of the plural pronominal stem, plural affix, and case are possible. The plural suffix thus duplicates the plural feature that is already present in the pronominal stem. Note that this is a regular nominal plural suffix that is not related to realizing possessivity.[2]

Another language that I suggest shows the genitive-dative split is Moksha Mordvin. Moksha however has no morphological difference between accusative and genitive. Nouns in the direct object position and in the possessor position show the same exponents; see (20). This case is traditionally called genitive and I will follow this tradition here. However, the label is not relevant. What is important is that pronouns marked for the case that has all the typical genitive functions have no possessive marking, while pronouns in the dative case show possessivity. I therefore treat Moksha as having the genitive-dative split.

(20) a. t'ɛ ava-t' kud-əc
this woman-DEF.SG.GEN house-3SG.POSS.SG
'the house of this woman'

b. Mon n'ɛj-in'ə t'ɛ ava-t'.
I see-PST.3.O.1SG.S this woman-DEF.SG.GEN
'I saw this woman.'

The shape of possessive marking in Moksha depends on the case of the noun phrase in that one set of affixes is used in the nominative, the genitive, and the dative, and the other one in oblique cases. It is the second set of exponents that appears in personal pronouns and is illustrated in (21).

[2] I suggest that these data reinforce the account developed later in the paper according to which possessive suffixes appearing in pronominal forms in fact realize no possessive meaning, but simply duplicate the ϕ-features of a pronoun. At the same time, addressing the question why plural comitative forms in Hill Mari also allow forms where only number, but not person is duplicated is beyond the scope of the present paper.

(21) Possessive inflection in Moksha (Kholodilova 2018)

vir'-sə-n	vir'-sə-t	vir'-sə-nzə
forest-IN-1SG	forest-IN-2SG	forest-IN-3SG
'in my forest'	'in your(sg) forest'	'in his forest'
vir'-sə-nək	vir'-sə-nt	vir'-sə-st
forest-IN-1PL	forest-IN-2PL	forest-IN-3PL
'in our forest'	'in your(pl) forest'	'in their forest'

The table in (22) presents personal pronouns in Moksha. Possessive marking is not present in the nominative and genitive forms. It appears in dative, ablative, inessive, elative, caritive, and equative forms.

There is another pecularity in the Moksha paradigm: In addition to the expected forms with pronominal stem, case, and possessive marking, the dative may be formed by a morpheme *t'ejə* used across all persons and numbers. It is combined with a possessive marker that realizes the ϕ-features of a pronoun. Notably, *t'ejə* bears some similarity but is not completely identical to the run-off-the-mill dative that appears on nouns. Similarly to the Hungarian case in 2.2, I suggest that *t'ejə* in Moksha cumulatively realizes the features [pronominal] and case, while pronominal ϕ-features are realized solely by the possessive exponent.[3]

[3]Glosses in the table below suggest that in the singular all forms except for the nominative and genitive use the oblique stem. In fact, the shape of the oblique stem is identical to the genitive form, but there is no segmentable genitive exponent. Nevertheless, this can be viewed as an instance of morphological containment, where more marked cases properly include feature specifications of the less marked cases and this is represented in their morphological realization (see, e.g., Stump (2001) on such 'Priscianic' formations).

(22) Personal pronouns in Moksha (Kholodilova 2018)

	Singular		
NOM	mon PRON.1SG	ton PRON.2SG	son PRON.3SG
GEN	mon' PRON.1SG.GEN	ton' PRON.2SG.GEN	son' PRON.3SG.GEN
DAT	mon'-d'əjə-**n** PRON.1SG.OBL-PRON.DAT-1SG t'ejə-**n** PRON.DAT.1SG	ton'-d'əjə-**t** PRON.2SG.OBL-PRON.DAT-2SG t'ejə-**t** PRON.DAT-2SG	son'-d'əjə-**nzə** PRON.3SG.OBL-PRON.DAT-3SG t'ejə-**nzə** PRON.DAT-3SG
ABL	mon'-d'ədə-**n** PRON.1SG.OBL-ABL-1SG	ton'-d'ədə-**t** PRON.2SG.OBL-ABL-2SG	son'-d'ədə-**nzə** PRON.3SG.OBL-ABL-3SG
IN	ʔmon'-cə-**n** PRON.1SG.OBL-IN-1SG	ʔton'-cə-**t** PRON.2SG.OBL-IN-2SG	ʔson'-cə-**nzə** PRON.3SG.OBL-IN-3SG
EL	ʔmon'-ctə-**n** PRON.1SG.OBL-EL-1SG	ʔton'-ctə-**t** PRON.2SG.OBL-EL-2SG	ʔson'-ctə-**nzə** PRON.3SG.OBL-EL-3SG
CAR	mon'-ftəmə-**n** PRON.1SG.OBL-CAR-1SG	ton'-ftəmə-**t** PRON.2SG.OBL-CAR-2SG	son'-ftəmə-**nzə** PRON.3SG.OBL-CAR-3SG
EQU	mon'-ška-**n** PRON.1SG.OBL-EQU-1SG	ton'-ška-**t** PRON.2SG.OBL-EQU-2SG	son'-ška-**nzə** PRON.3SG.OBL-EQU-3SG
	Plural		
NOM	min' PRON.1PL	t'in' PRON.2PL	s'in' PRON.3PL
GEN	min' PRON.1PL	t'in' PRON.2PL	s'in' PRON.3PL
DAT	min'-d'əjə-**nək** PRON.1PL-PRON.DAT-1PL t'ej-**nək** PRON.DAT-1PL	t'in'-d'əjə-**nt** PRON.2PL-PRON.DAT-2PL t'ejə-**nt** PRON.DAT-2PL	s'in'-d'əjə-**st** PRON.3PL-PRON.DAT-3PL t'ejə-**st** PRON.DAT-3PL
ABL	min'-d'ədə-**nək** PRON.1PL-ABL-1PL	t'in'-d'ədə-**nt** PRON.2PL-ABL-2PL	s'in'-d'ədə-**st** PRON.3PL-ABL-3PL
IN	ʔmin'-cə-**nək** PRON.1PL-IN-1PL	ʔt'in'-cə-**nt** PRON.2PL-IN-2PL	ʔs'in'-cə-**st** PRON.3PL-IN-3PL
EL	ʔmin'-ctə-**nək** PRON.1PL-EL-1PL	ʔt'in'-ctə-**nt** PRON.2PL-EL-2PL	ʔs'in'-ctə-**st** PRON.3PL-EL-3PL
CAR	min'-ftəm(ə)-**nək** PRON.1PL-CAR-1PL	t'in'-təmə-**nt** PRON.2PL-CAR-2PL	s'in'-ftəmə-**st** PRON.3PL.GEN-CAR-3PL
EQU	min'-ška-**nək** PRON.1PL-EQU-1PL	t'in'-ška-**nt** PRON.2PL-EQU-2PL	s'in'-ška-**st** PRON.3PL-EQU-3PL

2.5. ... DAT < others

The remaining split on the case hierarchy is the one between dative and more oblique cases. For the phenomenon at hand, this means that possessive marking must be absent in all cases in the left part of the hierarchy including dative and it must be present in more oblique cases. Eastern Khanty (Surgut dialect) presents such pattern.

Eastern Khanty has three numbers (singular, dual, and plural), but I will only focus on the singular forms here. The data in (23) show markers for a singular possessor and a singular possessee.

(23) Singular possessive morphology (Csepregi 2017)

kut-əm	kut-ən	kut-əɬ
house-1SG	house-2SG	house-3SG

The table in (24) presents a paradigm of singular personal pronouns. Second and third person pronouns have no possessive marking in the nominative, accusative, and dative. Possessive marking appears in the lative, i n the ablative, and in other oblique cases. The first person pronoun has a different pattern and demonstrates possessive marking in the dative case as well.

Eastern Khanty pronouns show a number of further properties. First, the vast majority of oblique cases properly include the accusative form. Such cases are often viewed as morphological containment, i.e., the features representing more marked cases contain less marked cases and this is mirrored in their morphological realization (see Caha 2009). Second, possessive marking is absent in some oblique forms, most consistently in the locative case. The special status of this form is confirmed by the lack of the accusative marker.

(24) Singular personal pronouns in Eastern Khanty (Csepregi 2017)

NOM	ma PRON.1SG	nüŋ PRON.2SG	ɬüw PRON.3SG
ACC	man-t PRON.1SG-ACC	nüŋ-at PRON.2SG-ACC	ɬüw-at PRON.3SG-ACC
DAT	man-t-**em** PRON.1SG-ACC-1SG	nüŋ-at-y PRON.2SG-ACC-DAT	ɬüv-at-y PRON.3SG-ACC-DAT
LAT	man-t-**em**-a PRON.1SG-ACC-1SG-LAT	nüŋ-at-**en**-a PRON.2SG-ACC-2SG-LAT	ɬüw-at-**yɬ**-a PRON.3SG-ACC-3SG-LAT ɬüv-at-a PRON.3SG-ACC-LAT
ABL	man-t-**em**-i PRON.1SG-ACC-1SG-ABL	nüŋ-at-**en**-i PRON.2SG-ACC-2SG-ABL	ɬüw-at-**iɬ**-i PRON.3SG-ACC-3SG-ABL ʎüv-aty-ji PRON.3SG-ACC-ABL
APPR	man-t-**em**-nam PRON.1SG-ACC-1SG-APPR	nüŋ-at-**en**-nam PRON.2SG-ACC-2SG-APPR	ɬüw-at-**yɬ**-nam PRON.3SG-ACC-3SG-APPR
INSTR	man-t-**em**-at PRON.1SG-ACC-1SG-INSTR	nüŋ-at-**yn**-at PRON.2SG-ACC-2SG-INSTR	ɬüw-aty-xat PRON.3SG-ACC-INSTR
COM	man-t-**em**-nat PRON.1SG-ACC-1SG-COM	nüŋ-at-**en**-at PRON.2SG-ACC-2SG-COM	ɬüw-aty-nat PRON.3SG-ACC-COM
CAR	man-t-**em**-ʎəx PRON.1SG-ACC-1SG-CAR	nüŋ-at-**yn**-ɬəx PRON.2SG-ACC-2SG-CAR	ɬüw-aty-ɬəx PRON.3SG-ACC-CAR
TRANSL	man-t-**em**-xə PRON.1SG-ACC-1SG-TRANSL	nüŋ-at-**en**-xə PRON.2SG-ACC-2SG-TRANSL nüŋ-aty-xə PRON.2SG-OBL-TRANSL	ɬüw-aty-xə PRON.3SG-ACC-TRANSL
LOC	ma-nə PRON.1SG-LOC	nüŋ-nə PRON.2SG-LOC	ɬüw-nə PRON.3SG-LOC

2.6. Generalization

In this section I have presented paradigms of personal pronouns in the following Finno-Ugric languages: Eastern Khanty, Hungarian, Hill Mari, Moksha Mordvin, Northern Khanty, Northern Mansi, Udmurt, and Udor Komi. Personal pronouns in all these languages show possessive marking that realizes the same features as the ones already realized by the pronominal stem. Languages differ in the distribution of possessive marking within the paradigm. I claim that the split between forms with possessive marking and forms without aligns with the case hierarchy repeated in (25).[4]

(25) Case Hierarchy
NOM < ACC < GEN < DAT < others

The attested patterns are summarized in (26):

(26) Summary of attested patterns

		NOM	ACC	GEN	DAT	others
1.	Northern Khanty, Hungarian, Northern Mansi, Udmurt (1PL, 2PL), Hill Mari (1PL, 2PL)		ϕ-feature doubling by a possessive marker			
2.	Udmurt (1SG, 2SG), Udor Komi (1SG, 2SG)					
3.	Moksha Mordvin, Hill Mari (1SG, 2SG), Eastern Khanty (1SG)	no doubling				
4.	Eastern Khanty (2SG, 3SG)					

The table shows that the duplication of ϕ-features by a possessive marker tends to be present in more marked forms in the right part of the hierarchy and tends to be absent in less marked forms in the left part of the hierarchy. Possessivity always appears within a continuous section on the case hierarchy, so cases that use possessive marking are never intertwined with cases where possessive marking is absent.

While in this paper I focus on case, similar tendencies can be observed for other categories. For person, possessivity is typically present in more marked local persons, but is sometimes absent in less marked third person forms. For instance, in Hungarian, possessive marking is present in first and second person pronouns, but absent in third person pronouns. Crucially, none of the languages considered here show a reverse pattern where doubling would be

[4] Several researches have proposed an additional case on the hierarchy, viz., instrumental. I put this further split aside, because several of the languages under consideration either have no instrumental case or combine standard instrumental functions with other cases.

present in the third person, but absent in the first or second person. Similarly for number: possessive marking is more wide-spread in the plural forms than in the singular forms. For instance, in Hill Mari, doubling is attested in both numbers, but appears in more paradigm cells in the plural.[5]

3. Analysis

3.1. Proposal

I would like to suggest that possessive inflection in Finno-Ugric personal pronouns and its restrictions are best accounted for in morphology. I propose that possessive inflection in Finno-Ugric personal pronouns is an instance of multiple exponence. Exponents typically called possessive markers do not express any possessive meaning and do not indicate a presence of a possessive structure in syntax. They simply realize ϕ-features in the nominal domain. These markers are often identified as possessive, because ϕ-features typically appear on a noun due to agreement with its possessor. However, on pronouns they superfluously duplicate features already realized by a pronominal stem.

The phenomenon of multiple exponence is not rare, it is attested in different languages, and several types are distinguished (see Caballero and Harris 2012). Multiple exponence in Finno-Ugric pronouns aligns with the partially superfluous type: Features of one marker are a proper subset of features of the other one. A common example of partially superfluous multiple exponence comes from German nominal morphology. As shown in (27), the regular dative plural form of a noun 'child' includes two markers. The first one realizes the plural feature. The second one realizes the dative feature, but it also duplicates the plural feature. The evidence that the second affix indeed realizes plural comes from the fact that it cannot appear on nouns in the singular. The form *Kind-er-n* thus realizes the plural feature twice.

(27)	stem-affix1-affix2	Kind-er-n	*Kind-n
	-[**y**]-[**y**,z]	child-PL-DAT.PL	child-DAT.PL

Similarly, person and number are realized twice in Finno-Ugric personal pronouns, once by a pronominal stem and then again by a ϕ-marker. I assume

[5] Eastern Khanty presents a potential exception. If in this language possessive marking is indeed present in the singular, but absent in the plural, this might indicate that the markedness relation for number is reversed in this language.

that besides ϕ-features, the pronominal stem realizes the feature [pronominal]. Abstracting away from possible feature decompositions, features realized by individual exponents in pronouns with duplication are illustrated for the Hill Mari first person accusative plural pronoun in (28a); compare also the nominative form without duplication in (28b) .

(28) a. mäm -nä -m
[PRON,1PL] [1PL] [ACC]
b. mäm -Ø
[PRON,1PL] [NOM]

I suggest that multiple exponence in Finno-Ugric languages is best derived if morphology does not simply interpret structure built in syntax, but building of morphological structure proceeds in morphology and follows morphological principles.

One such approach has been developed by Müller (2020). It employs a harmonic serialist version of the Optimality Theory (see McCarthy 2010, 2016 as well as Heck and Müller 2013, 2016), under which the application of the generator GEN is restricted so that maximally one operation can apply to the input, but the winning candidate is fed as an input to a new optimization cycle until the constraint profile cannot be improved anymore. Under this approach, a root and a set of features that need to be realized are in the input to the morphological derivation, and they are realized by a series of optimality-theoretic evaluations.

Similarly to syntax, morphological structure is built by Merge of exponents and Merge is driven by features. I will indicate these features as [•X•] following the notation by Heck and Müller (2007). Discharge of merge features is ensured by the constraint in (29).

(29) Merge Condition (•X•) (Heck and Müller 2013, Müller 2020):
Structure-building features ([•X•]) participate in Merge.

Crucially, structure building in morphology is further restricted by morphological constraints that may be different from those employed in syntax. This makes it possible to account for purely morphological effects such as multiple exponence. Müller (2020) suggests that multiple exponence is derived by a requirement to improve the constraint profile only gradually, which can be formalized as the following constraint:

(30) MINSAT (Minimize Satisfaction) (Müller 2020: 192):
Assign * to an output O_i iff (a) and (b) hold.

a. O_i has x new constraint satisfactions ($0 \leq x \leq n$).
b. There is an output O_j ($j \neq i$) in the same candidate set such that
   (i) O_j has y new constraint satisfactions ($0 \leq y \leq n$);
   (ii) $0 < y < x$; and
   (iii) O_j improves the constraint profile of the input.

This constraint ensures that in the scenario where several exponents can be merged, the exponent realizing fewer features will be merged first. The exponent realizing more features is merged second, giving rise to multiple exponence. Applied to personal pronouns in Finno-Ugric languages and given the input [PRON, ϕ], this means that the exponent realizing only ϕ-features (commonly called the possessive marker) is merged first, and the more specific marker also realizing the feature [PRON] is merged next. The derivation of a form with multiple exponence in Hill Mari is sketched in (31):

(31) Forms with extended exponence
Input: [PRON, 1PL, ACC], [•D•], [•K•]

step 1:	nä		
	1PL		
step 2:	mäm	-nä	
	PRON.1PL	-1PL	
step 3:	mäm	-nä	-m
	PRON.1PL	1PL	ACC

Without further additions, this analysis predicts multiple exponence to appear throughout the paradigm. I suggest that the scope of MINSAT is restricted if it is outranked by a constraint that forces realization of some feature in a given context, e.g., feature [PRON] in the nominative context. The derivation of a form without multiple exponence then proceeds as follows:

(32) Forms without extended exponence
Input: [PRON, 1PL, NOM], [•D•], [•K•]

step 1:	mä	
	PRON.1PL	
step 2:	mä	-ø
	PRON.1PL	NOM

In the next section, I will provide a detailed derivation of forms with and without multiple exponence and then demonstrate how multiple exponence can be restricted in a systematic way deriving the effects of the case hierarchy.

3.2. Derivations

Let us first consider the derivation of a pronoun with multiple exponence and look at the Hill Mari form *mäm-nä-m* 'PRON.1PL-1PL-ACC' for this. Typically, in the first step of the derivation, a lexical root is merged with the categorizing head. However, since personal pronouns essentially just realize ϕ-features, I assume that personal pronouns have no lexical component. All features that need to be realized are hosted by a functional head. Pronouns are nominal element, so such a functional head may be conceived as *n*, but here I will follow Müller (2020) and assume that such head has no categorial identity itself (see also the super-categories by Zeijlstra 2020). I will indicate this head as *x*. It hosts different merge features and their identity determines the category of a derived form. In case of personal pronouns, *x* hosts features [ϕ, PRON] as well as two merge features, [•D•] that participates in merging the pronominal stem and [•K•] that ensures the presence of the case marker. For each of the merge features there is a corresponding Merge Condition constraint that is violated if the feature is not checked.

Besides the two merge constraints and MINSAT discussed earlier the derivation includes IDENT-F and MAX constraints. IDENT-F blocks the outputs that realize features different from those present in the input and MAX constraints force the realization of features present in the input.

(33) IDENT-F (IDF):
Morpho-syntactic features of input and output cannot have different values.

(34) MAX(F):
[F] of the input is realized by an exponent in the output.

The first step of the derivation is given in (35). The output O_1 is identical

to the input and it violates the merge constraints and all MAX constraints. In the output O_2, the second person singular pronominal stem is merged. This satisfies the merge condition for the [•D•] feature, but as the features realized by the exponent are different from the features in the input, the higher ranked IDENT constraint is violated. The output O_3 shows the merge of the pronominal stem and O_4 shows the merge of the ϕ-marker. Both outputs have an exponent satisfying the [•D•] feature and realizing the ϕ-features present in the input. The two outputs differ in that O_3 also realizes feature [PRON] and thereby satisfies both MAX(ϕ) and MAX(PRON), while O_4 realizes only ϕ features and still violates MAX(PRON). The merge of pronominal stem in O_3 eliminates violations of two MAX constraints. This improves the constraint profile too rapidly and causes the violation of MINSAT that favors O_4 and ensures that the exponent realizing only the subset of the features is merged first.

(35) Step 1: mäm-nä-m 'PRON.1PL-1PL-ACC'

I: *x*:[PRON.1PL, ACC] [•D•], [•K•]	IDF	MIN SAT	MC (•D•)	MC (•K•)	MAX (ϕ)	MAX (PRON)	MAX (CASE)
O_1: *x*:[PRON.1PL, ACC] [•D•], [•K•]			*!	*	*	*	*
O_2: *x*:[PRON.1PL, ACC]-tən':[2SG] [•K•]	*!			*			*
O_3: *x*:[PRON.1PL, ACC]-mäm:[PRON.1PL]' [•K•]		*!		*			*
☞ O_4: *x*:[PRON.1PL, ACC]-nä:[1PL] [•K•]				*		*	*

The output with the best constraint profile in (35) constitutes the input to the next optimization cycle in (36). O_{43} contains a stem with mismatching features and violates the high ranked IDENT-F constraint. The relevant outputs are O_{41} and O_{42}. In the output O_{41}, the case marker is merged. This eliminates the violation of Merge Condition for the [•K•] feature and MAX(CASE). Output O_{42} has merged the pronominal stem. This does not create new satisfactions of the Merge Conditions and improves the constraint profile only with respect to one MAX constraint, MAX(PRON). Similarly to the previous optimization cycle, the merge of the case exponent in O_{41} improves the constraint profile

more radically than O_{42}. This incurs a violation of MINSAT, so that O_{42} has a better constraint profile.[6]

(36) Step 2: mäm-nä-m 'PRON.1PL-1PL-ACC'

I_4: *x*:[PRON.1PL, ACC]-nä:[1PL] [•K•]	IDF	MIN SAT	MC (•D•)	MC (•K•)	MAX (ϕ)	MAX (PRON)	MAX (CASE)
O_{41}: *x*:[PRON.1PL, ACC]-nä:[1PL]-m:[ACC]		*!				*	
☞ O_{42}: mäm:[PRON.1PL]-*x*:[PRON.1PL, ACC]-nä:[1PL] [•K•]				*			*
O_{43}: tən':[PRON.2SG]-*x*:[PRON.1PL, ACC]-mä:[1PL] [•K•]	*!			*			*

In the final step of the derivation, the accusative case marker is merged; see (37).

(37) Step 3: mäm-nä-m 'PRON.1PL-1PL-ACC'

I_{42}: mäm:[PRON.1PL]-*x*:[PRON.1PL, ACC]-nä:[1PL] [•K•]	IDF	MIN SAT	MC (•D•)	MC (•K•)	MAX (ϕ)	MAX (PRON)	MAX (CASE)
O_{421}: mäm:[PRON.1PL]-*x*:[PRON.1PL, ACC]-nä:[1PL] [•K•]				*!			*
☞ O_{422}: mäm:[PRON.1PL]-*x*:[PRON.1PL, ACC]-nä:[1PL]-m:[ACC]							
O_{423}: mäm:[PRON.1PL]-*x*:[PRON.1PL, ACC]-nä:[1PL]-län:[DAT]	*!						*

To sum up, the derivation starts with the ϕ-features, the feature [PRON], the case feature, and the two merge features. In the first step of the derivation, the less specific exponent that realizes only the ϕ-features is merged, and the more specific exponent realizing feature [PRON] as well is merged in the second step. The initial choice of the exponent realizing fewer features is due to MINSAT.

[6] As in the previous step of the derivation, MINSAT plays a crucial role in determining the optimal output. However, in this case the two relevant outputs, O_{41} and O_{42}, also differ in that the two merged exponents realize different grammatical categories (case and ϕ). As a result, it might be that in some language the merge of the case marker violates some lower ranked constraint not represented in (36). Then, O_{41} would have the better constraint profile. On one hand, the derivation might indeed follow this path, i.e., the case marker might be merged first and the marked realizing feature [PRON] after it. This does not alter the final derived form. On the other hand, constraint EXHAUST MORPHOLOGICAL ARRAY introduced by Müller (2020) requires that once an exponent satisfying some Merge Condition is merged, the derivation must continue with merging affixes of this category before turning to a new category.

This constraint delays the insertion of the exponent realizing more features until the next step and thus derives multiple exponence.[7]

As it stands, this approach predicts multiple exponence in all cells of a pronominal paradigm, contrary to the facts. I suggest that multiple exponence is blocked if MINSAT is outranked by a constraint that forces realization of a feature in a given context. In particular, the lack of the ϕ-exponent in the nominative form in Hill Mari form *mä-ϕ* 'PRON.1PL-NOM' can be ensured by a constraint *NOM/PRON&MAX(PRON). This is a local conjunction of two simpler constraints (Smolensky 1995, 2006). The two constraints are *NOM/PRON, which is violated by all nominative pronouns, and MAX(PRON), which requires realization of the feature [PRON]. The conjoint constraint forces the realization of the feature [PRON] for pronouns in the nominative case. Note that this constraint must be generally present in the language, but has no effect on the derivation of the accusative pronoun above, because the first part of the conjunction *NOM/PRON is not violated then. I will now go through the derivation of the nominative pronoun and show that multiple exponence is successfully blocked. After this I will elaborate on the exact shape of this constraint and show how the account extends to the case hierarchy effects.

The ϕ-features, [PRON], [NOM], and the two merge features on x constitute the input to the derivation. Unlike in the previous derivation, O_4, which is formed by merge of the pronominal stem, has the best constraint profile. Output O_3, which shows merge of the ϕ-marker, violates the *NOM/PRON&MAX(PRON) constraint because the input contains both [PRON] and [NOM] features and there is no realization of the feature [PRON]. This constraint is not violated by the corresponding output in the previous derivation, because the feature [NOM] is not present there and the first part of the constraint will always be satisfied.[8]

[7] Note that the Standard Parallel Optimality Theory does not allow to account for the multiple exponence: Since all affixes need to be merged in one fell-swoop, the output containing a more specific exponent will be always preferred over the output with a less specific exponent as well as the output with both markers.

[8] Müller (2020) presents a different analysis of forms without multiple exponence. He proposes that the less specific exponent is still merged first, but the more specific exponent that is merged next is endowed with a removal feature that deletes the earlier merged marker. Such an account cannot be straightforwardly extended to the current data because the presence of the removal feature cannot be determined for an exponent in general, but depends on a case value. For instance, in Hill Mari, marker mä [PRON.1PL] must have the removal feature only if it is used in the form with the nominative case.

(38) Step 1: mä-ø 'PRON.1PL-NOM'

I: *x*:[PRON, 1PL, NOM] [•D•], [•K•]	IDF	*NOM/PRON& MAX(PRON)	MIN SAT	MC (•D•)	MC (•K•)	MAX (ϕ)	MAX (PRON)	MAX (CASE)
O_1: *x*:[PRON, 1PL, NOM] [•D•], [•K•]		*!		*	*	*	*	*
O_2: *x*:[PRON, 1PL, NOM]-ø:[NOM] [•D•]		*!		*		*	*	
☞ O_3: mä:[PRON.1PL]-*x*:[PRON, 1PL, NOM] [•K•]			*		*			*
O_4: *x*:[PRON, 1PL, NOM]-nä:[1PL] [•K•]		*!			*		*	*

In the second step of the derivation given in (39), the case feature is merged. The merge of the ϕ-marker in O_{31} does not improve the constraint profile because it realizes only a subset of features already realized by the pronominal stem. Under this account of multiple exponence, a less specific exponent must be merged first; it cannot successfully be merged after the more specific exponent, because it does not lead to new constraint satisfactions.

(39) Step 2: mä-ø 'PRON.1PL-NOM'

I3: mä:[PRON.1PL]-*x*:[PRON, 1PL, NOM] [•K•]	IDF	*NOM/PRON& MAX(PRON)	MIN SAT	MC (•D•)	MC (•K•)	MAX (ϕ)	MAX (PRON)	MAX (CASE)
O_{31}: mä:[PRON.1PL]-*x*:[PRON, 1PL, NOM]-nä:[1PL] [•K•]					*			*
☞ O_{32}: mä:[PRON.1PL]–*x*:[PRON, 1PL, NOM]-ø:[NOM]								

Thus, multiple exponence does not appear in Hill Mari nominative pronouns because the constraint *NOM/PRON & MAX(PRON) ensures that the more specific exponent realizing the feature [PRON] is merged in the first step. In the next section, I will discuss this constraint and other constraints blocking multiple exponence in more detail.

3.3. Restrictions on multiple exponence in Finno-Ugric languages

Recall that the main empirical generalization of this paper (see section 2.6) states that the distribution of globally superfluous ϕ-marking in pronominal paradigms obeys the case hierarchy, so that multiple exponence tends to appear in more marked, but not in less marked forms. If multiple exponence appears in some form, it also appears in all more marked forms. The summary of attested patterns is repeated in (40).

(40) Summary of attested patterns

		NOM	ACC	GEN	DAT	others
1.	Northern Khanty, Hungarian, Northern Mansi, Udmurt (1PL, 2PL), Hill Mari (1PL, 2PL)		ϕ-feature doubling			
2.	Udmurt (1SG, 2SG), Udor Komi (1SG, 2SG)			by a possessive marker		
3.	Moksha Mordvin, Hill Mari (1SG, 2SG), Eastern Khanty (1SG)	no doubling				
4.	Eastern Khanty (2SG, 3SG)					

I would like to suggest the analysis of multiple exponence in personal pronouns developed in this paper makes it possible to account for the generalization in a straightforward way by invoking harmonic alignment of scales and subsequent constraint conjunction, as proposed by Prince and Smolensky (2004) and Aissen (1999, 2003). The formal technique of harmonic alignment is given in (41). It takes two scales such as those given in (41a), where one of the scales is obligatorily binary, and produces their harmonic alignment as in (41b). Harmonically aligned scales use $\succ$, which means 'more harmonic than'. The scales are then turned into constraints which are ordered in such a way that the constraints banning less harmonic feature combinations are ranked higher.

(41) General procedure

a. Scales H_1 and H_2
   (i) H_1: a > b > c > ... > z
   (ii) H_2: X > Y

b. Harmonic Alignment
   (i) H_X: a/X $\succ$ b/X $\succ$ ... $\succ$ z/X
   (ii) H_Y: z/Y $\succ$ ... $\succ$ b/Y $\succ$ a/Y

c. Constraints
   (i) *z/X $\gg$ ... $\gg$ *b/X $\gg$ *a/X
   (ii) *a/Y $\gg$ *b/X $\gg$ ... $\gg$ *z/Y

The two scales required for the account of the restrictions on multiple exponence in Finno-Ugric personal pronouns are given in (42a). The first scale is the familiar case hierarchy. The second scale is binary and states that pronouns are more marked than nouns. Harmonic alignment of the these two scales is shown in (42b). The first one that deals with pronouns will be relevant for the account.

(42) a. Scales
   (i) OBL > DAT > GEN > ACC > NOM

(ii) pronoun > noun

b. Harmonic Alignment

(i) OBL/PRON > DAT/PRON > GEN/PRON > ACC/PRON > NOM/PRON

(ii) NOM/NOUN > ACC/NOUN > GEN/NOUN > DAT/NOUN > OBL/NOUN

The harmonically aligned scale in (42bi) is subsequently mapped to constraints in (43). These constraints do not ban combinations of features as such, but require realization of the pronominal stem in marked contexts. This is implemented via local conjunction with MAX(PRON). I also assume that the first part of this conjoint constraint can be violated only by the most marked case value present in a form. This condition is relevant if the case hierarchy implies case containment, i.e., if more marked cases structurally include less marked ones; so that, for instance, feature [NOM] is included DAT. In that case, the dative pronouns still do not incur the violation of *NOM/PRON&MAX(PRON), because while [NOM] is present on a pronoun due to case containment, it is not the top case value and the constraint does not apply to it.

The constraints are ranked so that the requirement for overt realization is stronger in more marked contexts. Since the ranking is determined by general markedness principles, constraints are not rerankable. The ranking below is universal and it underlies the hierarchy effects in pronominal paradigms.

(43) Ranking plus local conjunction with MAX(PRON)
*NOM/PRON&MAX(PRON) ≫ *ACC/PRON&MAX(PRON) ≫ *GEN/PRON&MAX(PRON) ≫ *DAT/PRON&MAX(PRON) ≫ *OBL/PRON&MAX(PRON)

Constraint *NOM/PRON&MAX(PRON), the highest ranked constraint in (43), was used in the Hill Mari derivation in section 3.2. Since it is ranked higher than MINSAT, it ensures that the pronominal stem is merged in the first step of the derivation and blocks multiple exponence. I suggest that variation across Finno-Ugric languages follows from different rankings of MINSAT with respect to the constraints in (43). If a constraint referring to some case outranks MINSAT, multiple exponence is absent in this case form. For instance, if *NOM/PRON&MAX(PRON) is the only constraint outranking MINSAT, nominative is the only case form without multiple exponence. If

both nominative and accusative are ranked above MINSAT, a duplication of features is absent in these two case forms. The possible constraint rankings and the patterns derived by them are summarized in (44).

(44) a. Northern Khanty, Hungarian, Northern Mansi, Udmurt (1PL, 2PL), Hill Mari (1PL, 2PL):
*NOM/PRON&MAX(PRON) ≫ MINSAT ≫ ...

b. Udmurt (1SG, 2SG), Udor Komi (1SG, 2SG):
*NOM/PRON&MAX(PRON) ≫ *ACC/PRON&MAX(PRON) ≫ MINSAT ≫ ...

c. Moksha Mordvin, Hill Mari (1SG, 2SG), Eastern Khanty (1SG):
*NOM/PRON&MAX(PRON) ≫ *ACC/PRON&MAX(PRON) ≫ *GEN/PRON&MAX(PRON) ≫ MINSAT ≫ ...

d. Eastern Khanty (2SG, 3SG):
*NOM/PRON&MAX(PRON) ≫ *ACC/PRON&MAX(PRON) ≫ *GEN/PRON&MAX(PRON) ≫ *DAT/PRON&MAX(PRON) ≫ MINSAT ≫ ...

Note, finally, that in some forms the presence of the ϕ-marker is determined not only by case, but also by person and number of a pronoun. The simplest way to capture this is by including the corresponding feature in the first part of the locally conjoint constraints above. It is however not yet clear whether generalizations concerning person and number similar to those made for case can be made. While some data presented in this paper (cf. the Hill Mari paradigm) suggest that multiple exponents gravitates to more marked forms for number and person as well, and consequently these features must be also incorporated in a systematic way by a repeated application of harmonic alignment, the exact empirical generalization and account remain for further research.

3.4. Affix order

In the derivations presented in section 3.2, some markers are merged as prefixes and others as suffixes. In this section, I will sketch the account of this. All pronominal forms considered in this paper include pronominal stem and case, some of the forms also include a ϕ-marker. In all languages, pronominal stem is always the left-most exponent, but depending on the placement of the other two exponents, three patterns can be identified. First, ϕ-affix may be before

case in pronouns and the same affix order is attested for nouns. Second, case may precede the ϕ-marker in pronouns and this matches the affix order on nouns. Third, the affix order is ϕ-marker before case, but this differs from the affix order on nouns.

The vast majority of pronouns display one of the first two patterns.[9] The first pattern can be illustrated by Northern Khanty. As shown in (45) (repeated from above), the ϕ-exponent precedes case both on pronouns and nouns.

(45) a. luw-e:l-na
PRON.3SG-3SG-LOC
b. xo:tə-l-na
house-3SG-LOC

The second pattern is attested, for instance, in Moksha, where ϕ-marker follows oblique cases; see the pronoun in (46a) and the noun in (46b).

(46) a. min'-cə-nək
PRON.1PL-IN-1PL
b. vir'-sə-nək
forest-IN-1PL

I assume that affix order is derived by alignment constraints (Trommer 2001, 2008). These constraints refer to features realized by exponents and require alignment with a right or with a left edge of the word. The account will rely on three alignment constraints provided in (47)-(49). I am also assuming that similarly to Merge in syntax, Merge in morphology is regulated by the Strict Cycle Condition (Chomsky 1973, Chomsky 2019), which ensures that exponents are always merged to the root of the tree structure.

(47) L⇐PRON
A morphological exponent realizing [PRON] is aligned with the left edge of a word.

(48) CASE⇒R

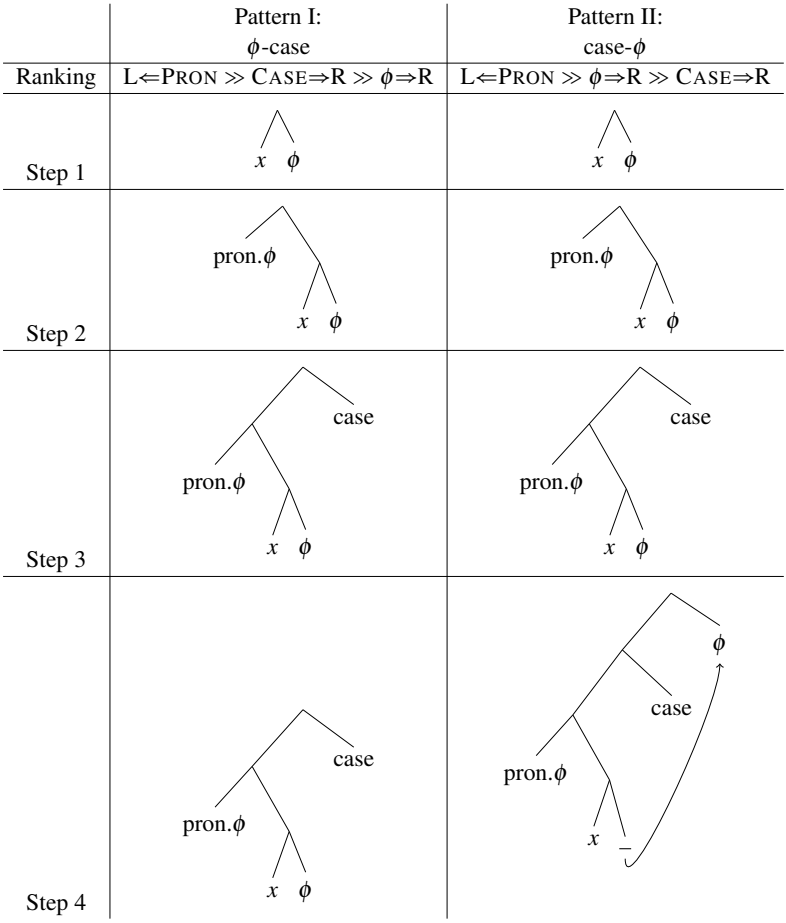
[9]The two patterns may also co-exist in one language if it allows variable placement of a case and a ϕ-affix on nouns. For instance, Hill Mari is such a language. In Hill Mari, case follows ϕ-exponent in structural cases and precedes it in semantic cases. This pattern in preserved in personal pronouns.

A morphological exponent realizing [CASE] is aligned with the right edge of a word.

(49) ϕ⇒R
A morphological exponent realizing [ϕ] is aligned with the right edge of a word.

Constraint L⇐PRON outranks other alignment constraints and this ensures that pronominal stem is always the leftmost marker. Different placements of ϕ-marker and case follow from from different rankings of CASE⇒R and ϕ⇒R. If the alignment constraint for case is ranked higher, case follows ϕ. If the alignment constraint for ϕ is ranked higher, than ϕ follows case. The derivations of the first two patterns are schematized in (50). Note that since ϕ-marked is merged before case and the derivation is restricted by the Strict Cycle Condition, case is first merged to the right of the ϕ-marker in both derivation, but ϕ is then moved across case in the derivation of the second pattern; see Gleim et al. (2023) for the independent argumentation in favor of movement in morphology.

(50) Affix order in pronouns



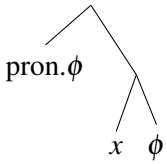
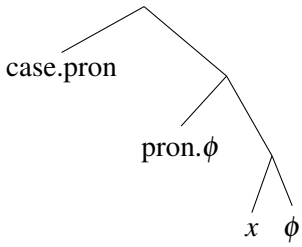
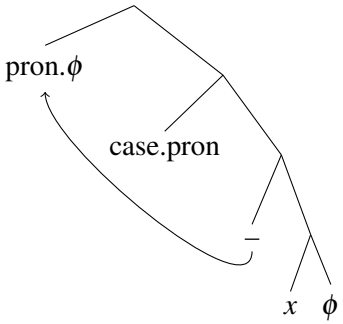
Under the third, considerably more rare, pattern the affix order on pronouns does not match the affix order on nouns in that a case marker precedes a ϕ-exponent in pronominal forms, but not on nouns. Such a pattern is widely discussed on the basis of oblique forms in Hungarian; see (51).

(51) a. (én-)nál-am
PRON.1SG-ADE-1SG

b. a sál-am-nál
the scarf-POSS.1SG-ADE
'at my scarf'

Hungarian forms displaying the thirds pattern also differ from other data discussed in this paper in other regards. First, they allow to omit the pronominal stem altogether. Second, as noted by Spencer and Stump (2013), the shape of case markers in such forms is not always identical to the corresponding affix on a noun. I would like to suggest that the pattern is derived if case affix that appears on pronouns realizes feature [PRON], in addition to its case feature. This means that constraint L⇐PRON applies to the case exponent. Crucially, the case markers used on nouns do not have feature [PRON], so this constraint does not apply to them. The derivation of a pronominal form is sketched below.

(52) Affix order in pronouns, the third pattern

	Pattern III: case-ϕ on pronoun, but ϕ-case on nouns
Ranking	L⇐PRON ≫ CASE⇒R ≫ ϕ⇒R
Step 1	
Step 2	
Step 3	
Step 4	

To sum up, the analysis of extended exponence in personal pronouns developed in this paper accounts for affix order in personal pronouns and its correspondence to affix order on nouns by employing standard optimality-theoretic alignment constraints.

4. Alternative analyses

In this section, I will review alternative approaches to possessive marking in pronominal paradigms. I will start with two existing approaches: the morphological account developed by Spencer and Stump (2013) and a more widely pursued syntactic account (see Asbury 2008, Dékány 2018, and Burukina 2023).

The morphological analysis was developed by Spencer and Stump (2013) and is based on Hungarian data. Besides the presence of the possessive marker, these data are peculiar in that the pronominal stem is present only optionally and the paper focuses on the forms without the stem; see (53).

(53) a. mögött-em
behind-1SG
'behind me'
b. benn-ünk
IN-1PL
'in us'

The account of the data is couched in the theory of Paradigm Function Morphology (PFM). The core idea of the analysis is formalized in (54)-(55). It builds on the assumption that oblique cases have abstract and conjoint forms that may but do not need to be phonologically different. The conjoint form is an affix and it is used with nouns. The abstract form is a root morpheme and it is used with pronouns. The ϕ-features of a pronoun are then turned into inflection of the case morpheme.

(54) a. If (i) the case postposition associated with the case specification γ has the absolute stem P_a and the conjunct stem P_c, and
(ii) σ is a morphosyntactic property set such that CASE:$\gamma \in \sigma$,
then by definition, *abst*(σ) = P_a and *cjst*(σ) = P_c.
b. otherwise *abst* and *cjst* are undefined.

(55) Rule of paradigm linkage for personal pronouns in Hungarian
Where L is a pronoun lexeme and γ is an oblique case,
PF($\langle$L, σ:{CASE:γ}$\rangle$) = PF($\langle$abst(σ), {INFL:σ}$\rangle$)

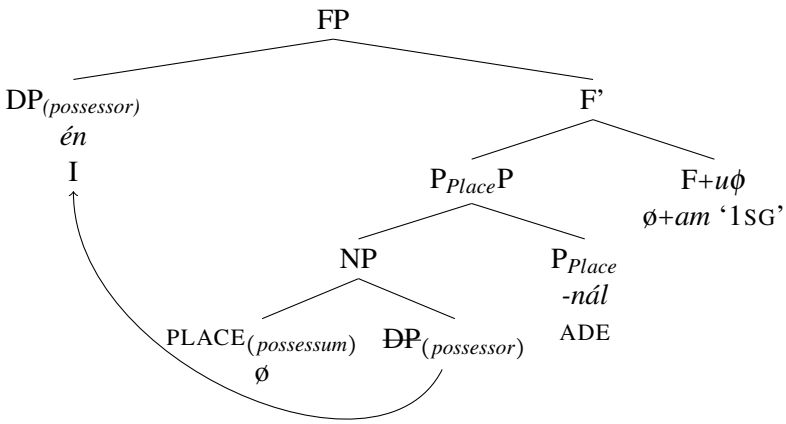
This analysis successfully derives Hungarian forms in (53), where the pronominal stem is absent, but does not account for the more common pattern where

the ϕ-features are realized twice, by a pronominal stem and by the ϕ-marker. It thus still remains to be shown that this approach can be extended to the data with duplication that are the main focus of the paper.

The existing syntactic approach takes the presence of the possessive marker in pronominal forms at face value and postulates possessive structure for pronouns showing ϕ exponence. Dékány (2018) suggests the structure in (57) for the Hungarian pronoun in (56). The pronoun occupies the possessor position in the noun phrase projected from the null place noun. As a regular possessor, the pronoun is assumed to move up the structure to the specifier of the functional projection that hosts possessive agreement.

(56) (én)-nál-am
I-ADE-POSS.1SG
'at me'

(57) Possessive structure for personal pronouns



While successfully deriving a part of the data, such an approach encounters some problems once other Finno-Ugric languages are considered. First, this analysis connects the presence of the possessive structure to the oblique, semantically loaded case forms, which have independently been argued to have a more elaborate structure (Terzi 2008, Pantcheva 2011). In Finno-Ugric languages, possessive marking is also attested in structural cases, accusative and genitive; see Hungarian data in (58a) or Udmurt in (58b).

(58) a. mi-**nk**-et
we-1PL-ACC
b. mi̯n-a-**m**
I.OBL-GEN-1

If possessive marking in structural and oblique cases is to be accounted for uniformally, then the analogous possessive structure needs to be postulated in structural cases, where there is even less motivation for possessive structure and it is unclear what could be the possessum.

Second, the syntactic approach predicts for the case marker to linearly precede the possessive marker: The case marker is a realization of a functional projection that together with the null noun yields the correct locative meaning, while possessivity appears higher in the structure. In fact, however, forms where the case marker follows possessivity are attested in different languages; see (59a) from Northern Mansi or (59b) from Hill Mari, in addition to (58a), (58b).

(59) a. ān-**əm**-nəl
I-1SG-ABL
b. mäm-**nä**-n
we-1PL-GEN

Third, the syntactic analysis does not seem to offer an insightful approach to the cross-lingustic distribution of possessive marking governed by the case hierarchy.

Abstracting away from this particular implementation, I would like to suggest that the data are problematic for accounts where morphology only realizes the structure built by syntax. For forms with multiple exponence, such an approach requires postulating two separate projections in syntax. One of the two projections is the original host of ϕ-features, while the second projection has no syntactic function. Furthermore, its presence or absence must be further conditioned by case feature. This sets multiple exponence in Finno-Ugric pronouns aside from most known cases of multiple exponence, where presence of two projections in syntax is independently motivated; compare, for instance, the German example *Kind-er-n* ‘child-PL-PL.DAT’ discussed earlier where number feature is duplicated on an independently postulated projection hosting a case feature (the D head). For pronouns, the presence of two projections has no syntactic, but only a morphological motivation and thus requires syntactic

structure building to be determined by morphological principles. This violates modularity. The data thus favor an approach where building morphological structure is handled in the morphology.

5. Summary

The empirical basis of this paper is the curious phenomenon of possessive marking in personal pronouns attested in Finno-Ugric languages. A detailed investigation of the personal pronouns has shown that the pattern is present in all branches of Finno-Ugric languages and that the distribution of additional ϕ-marking in pronominal paradigms is not random. It can be described by two generalizations. First, possessive marking gravitates towards more marked forms. Second, if possessive marking appears in some case form, it is also present in all more marked cases.

I have suggested that possessive marking in pronominal paradigms is a case of multiple exponence where ϕ-features of a pronoun are realized twice, by a pronominal stem and by a ϕ-marker that is commonly called a possessive inflection, but in fact realizes only ϕ features. In the harmonic serialist approach to morphology developed in (Müller 2020), multiple exponence is accounted for by MINSAT. This constraint forces merge of an exponent realizing fewer features before the more specific exponent. Such an account of multiple exponence is possible because morphological structure is built in morphology and multiple exponence can be derived without postulating projections in syntax or Agree operations that lack syntactic motivation. The approach also offers a principled account of case hierarchy effects: Harmonic alignment derives both the tendency for multiple exponence in oblique cases and the absence of gaps on the case hierarchy.

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