Dative Pronoun Alternation across Turkic: Emergence of the Unmarked & Faithfulness Hierarchies

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1 Introduction

A multitude of Turkic languages have a stem alternation in singular pronouns triggered by dative case. This alternation involves backing of front vowels /e/ to /a/, velarization of stem final /n/ into /ŋ/ or /ɣ/ depending on the language, and a /nɣ/ cluster simplication at the morpheme boundary in the groups of languages with /-ɣa/ a dative suffix form.

language	non-dative stem	dative suffix	dative form	source
Standard Turkish	ben-	-a	b**an**a	author
Gaziantep Turkish	ben-	-a	b**aŋ**a	Günşen 2009
Cyprus Turkish	ben-	-a	b**aŋ**a	Kabataş 2006
Ardahan Turkish	ben-	-a	b**aŋ**a	**demirci2014g**
Ottoman Turkish	ben-	-a	b**aŋ**a	Bugday 1999; Kerslake 2015
Turkmen	men-	-a	m**aŋ**a	Clark 1998; Schönig 2015
Uyghur	men-	-ɣa	m**aŋ**a	Tömür 2003; Hahn 2015
Chaghatay	men-/min-	-ɣa	m**aŋ**a	Akalın 1979; Thackston Jr. 1993; Bodrogligeti 2001; Boeschoten and Vandamme 2015
Orkhon Turkic	ben-/men-	-ɣa	b**aŋ**a / m**aŋ**a	Akalın 1979; Erdal 2004; Öztürk 2015
Khwarezmian Turkic	män-	-ɣa	m**aŋ**a	Akalın 1979
Codex Cumanicus	men-	-ɣa	m**aŋ**a∼m**aɣ**a∼m**a.**a	Akalın 1979
Karakhanid Turkic	män-	-ɣa	m**aŋ**a	Akalın 1979; Coşkun 2019
Kirgiz	men-	-ɣa	m**aɣ**a	Kara 2003; Kirchner 2015b
Nogay	men-	-ɣa	m**aɣ**a	Csató and Karakoç 2015
Kazakh	men-	-ɣan	m**aɣ**an	Krippes 1997; Muhamedowa 2015

Table 1: Singular Pronoun Alternations: 1.SG

What is interesting about this alternation is that: (i) this alternation affects the stem instead of the suffix even though Turkic languages generally have suffix forms conditioned by stem forms through mechanisms like vowel harmony, and voicing and place of articulation assimilation, (ii) the stem alternation is restricted to singular pronouns and triggered by only the dative suffix.

This paper argues that this phenomenon is a shared morpho-phonological phenomenon in the Turkic language family, and argue while at face value appears to be easily explained by stem suppletion, it is a phonological phenomenon instead. I argue that a suppletive allomorphy analysis not only goes against cross-linguistic patterns of case-based syncretism and allomorphy (Caha, 2009), but also fails to make sense of the systematic phonological correspondences of the alternant stem forms. Instead, I propose that this alternation is a case of *emergence of the unmarked* due to three independent phonological processes interacting with a general hierarchy of morphology-sensitive form *faithfulness* constraints shared across most Turkic languages; namely vowel harmony, cluster simplification, and autosegmental float of hostless phonological features target singular pronoun roots, which are *D* heads, and result in phonological changes to them, while failing to enact the same changes to plural pronominal structures or nouns due to the specific ranking of faithfulness constraints to different morphosyntactic categories in Turkic languages. I propose a common category-sensitive phonological faithfulness hierarchy for the Turkic language family that constrains common phonological mechanisms, and therefore derives the dative alternation. I also argue that the differences in the realization and distribution of the dative alternation is nevertheless slightly different

realizations of the same mechanisms with small different originating from historical changes in phonology and the form of the dative suffix resulting in the different realizations of the dative stem alternation across various groups within the language family.

1.1 Data Collection

The pronoun forms are taken from published reference grammars, grammar sketches, and grammatical description sections of philological books. The Standard Turkish forms are from the variety of the author. Additionally, some specific forms of the 3rd person pronouns for other modern Turkish varieties were searched on the `trTenTen` corpus hosted on *SketchEngine.eu*. This corpus contains data "crawled by the SpiderLing web spider in December 2011 and January 2012 and comprised of more than 3.3 billion words in 12 million documents", as stated in the *SketchEngine.eu* website, and the relevant corpus findings are discussed in section §2.2.

2 Alternation Patterns

The dative stem alternation is widespread in the Turkic language family, and I believe the various nuances in its expression can be grouped into a typological grouping. In Table 2, the *group* column separates the languages under investigation into proposed classes. These classes are determined by criteria: (i) whether they have a stem alternation at all (group A/B/C/D vs. E), (ii) the distribution of the stem alternation (group A vs. B/C/D), and (iii) whether the synchronic form of dative suffix in the language descending from the Proto-Turkic **-ga* has preserves initial velar consonant (group A/B vs. C/D).r

group	language	vowel alt.	/n/ alt.	distribution	dative suf.	sources
A	Standard Turkish	✓	✗	1.sg & 2.sg	-a	author
A	Gaziantep Turkish	✓	[ŋ]	1.sg & 2.sg	-a	Günşen 2009
B	Turkmen	✓	[ŋ]	all sg.	-a	Clark 1998; Schönig 2015
B	Ottoman Turkish (14-20 c.)	✓	[ŋ]	all sg.	-a	Bugday 1999; Kerslake 2015
C	Uyghur	✓	[ŋ]	all sg.	-ɣa	Tömür 2003; Hahn 2015
C	Chaghatay (14-19 c.)	✓	[ŋ]	all sg.	-ɣa	Thackston Jr. 1993; Boeschoten and Vandamme 2015
C	Orhon Turkic (9th c.)	✓	[ŋ]	all sg.	-ɣa	Erdal 2004; Öztürk 2015
D	Kazakh	✓	[ɣ]	all sg.	-ɣa/-ɣan	Krippes 1997; Kirchner 2015a; Muhamedowa 2015
D	Kirgiz	✓	[ɣ]	all sg.	-ɣa	Kara 2003; Kirchner 2015b
D	Nogai	✓	[ɣ]	all sg.	-ɣa	Csató and Karakoç 2015
E	Azerbaijani	✗	✗	none	-a	*Azerbaijani Web Corpus* 2012; Siegel unpublished
E	Uzbek	✗	✗	none	-ɣa	Sjoberg 1963

Table 2: Typology of Dative Stem Alternation in the Turkic language family

2.1 Vowel Harmony

Turkic languages overwhelmingly have progressive vowel harmony, where the vowel features such as *backness* and *roundness* of a stem affects the realization of these features in each suffix that attaches to the stem. While there is variation with regards to which classes of vowels harmonize for which features, harmony blocking morphemes, etc., progressive vowel harmony is a characteristic feature of the family, which crucially also applies to the dative case suffixes under scrutiny.

For example, in (1), we see vowel harmony affecting the form of the dative suffix in Standard İstanbul

Turkish.[1] The dative suffix vowel extends the [+back] feature of the stem vowel, and a glide is inserted if suffixation will result in hiatus.[2]

(1) a. /tavʃan/ -/a/ → [tavʃan**a**]
rabbit -DAT

b. /gyl^{j}/ -/a/ → [gyl^{j}**e**]
rose -DAT

c. /tabela/ -/a/ → [tabela**ja**]
sign -DAT

d. /iscele/ -/a/ → [iscele**je**]
dock -DAT

Vowel harmony works left-to-right, i.e. stem-to-suffix, in these suffixing languages across virtually all nouns, verbs, and other categories. Later in section §4.4, I will argue that this directionality generalization actually breaks down in the dative stem alternation, and that *reverse* vowel harmony can apply due to *faithfulness* constraints; but in the general case, the suffixing nature of these languages ensures *progressive* vowel harmony in most cases.

2.2 Group A: Only 1st & 2nd person singular pronouns, Non-velar Suffix

Group A languages are languages with a non-velar dative suffix, which means that the dative suffix does not have a velar initial consonant. This is relevant to the analysis of velarization of stem-final /n/ in pronoun stems, because while the surface form /ŋ/ can potentially be explained by the merger of the nasal and a velar consonant in other languages, Turkish varieties such as Standard Istanbul Turkish and Gaziantep Turkish do not possess a velar initial consonant in the dative suffix: *-a*.

What sets apart group A languages from group B languages is that the stem alternation seems to be constrained by person features in group A languages. The most clear example in this group is Gaziantep Turkish. In this variety, the dative suffix is *-a*, it does not have a velar, but this affix triggers the velarization of the stem-final of 1st & 2nd person singular pronouns, and the backing of the stem vowel, as highlighted in red in Table 3. Crucially, however, what sets this variety apart from the group B languages that will be discussed later is that the 3rd person singular pronoun stem *on-* does **not** undergo velarization, which is highlighted with yellow. Thus, the alternation makes a distinction between 1st & 2nd persons vs. 3rd persons.

	1	2	3.dist	3.prox	1.pl	2.pl	3.dist-pl	3.prox-pl
nom	ben	sen	o	bu	biz	siz	on-lar	bun-nar ∼ bun-dar
dat	ba**ŋ**a ∼ b**a.**a	sa**ŋ**a ∼ s**a.**a	ona	buna	biz-e	siz-e	–	–
obl	ben-	sen-	on-	bun-	biz-	siz-	on-lar-	bun-nar- ∼ bun-dar-

Table 3: Gaziantep Turkish Pronoun Paradigm (Günşen, 2009)

This observation is based on all 3rd person pronouns in Günşen (2009) having coronal /n/, and a corpus search of the web-scraped `trTenTen` corpus for all the possible transcribed forms of velarized variants. For example, the corpus had 1st & 2nd person dative pronouns written as <baa> and <saa> in non-formal social media text contexts, but possible velarized variants of /on-a/ and /bun-a/, such as <oa>, <aa>, <oğa>, <ağa>, <anga>, <onga>, <bua>, <buğa>, <bunga> with pronoun uses were not found. Since this observation is based on corpora and attested forms, it is possible that velarized 3rd person forms are still possible, but speakers of such varieties are unknown to the author. If there are speakers of this variety that

[1] This is an oversimplification, but enough for the relevant discussion. In reality, vowel harmony is slightly more complicated. Back and front variants of the lateral, [l] and [l^{j}] can serve as the source of a [±back] feature in Turkish in loanwords, so that in [gol^{j}-y] 'goal-ACC' the closer palatalized lateral [l^{j}] extends [-back] harmony to the suffix, and not the farther [+back] vowel [o].

[2] I give the form /-a/ for the dative suffix, while various previous vowel harmony work has also considered a front /-e/ or an underspecified archiphonemic form /-A/ depending of commitments and proposed mechanisms. I use a back vowel form foreshadowing my proposal, where I argue for a fully specified [+back] form of the dative.

produce forms like [oŋa ∼ o.a] and [buŋa ∼ bu.a], then this variety can be grouped with group B languages, but for now I will assume that the forms in Table 3 are representative, and analyze them as such.

A shared property across group A, B, and C languages is that the stem alternation only applies to singular pronoun forms. Note that 1.PL and 2.PL dative forms in Table 3 do not have a form alternation. The affix does not trigger the backing of the stem vowel to unattested forms like *[bɯza] or *[sɯza].

Moving onto a slightly peculiar group A variety, Standard Istanbul Turkish, with the paradigm in Table 4, we run into difficulties: *Does the 3rd person pronoun have the alternation or not?* Diagnosing the stem alternation is not easy in Standard Istanbul Turkish because this variety lacks the velar nasal [ŋ] in general, with even underlying /ŋ/ phonemes in cognates in other varieties all merging with /n/ and being realized as [n]. So, possible alternations in stems with underlying back vowels like the 3rd person /on-/ and /bun-/ would not be diagnosable by the final /n/ turning into a velar [ŋ]. Thus, we do not have any direct way of testing if Standard Istanbul Turkish truly restricts the dative alternation to 1st and 2nd person singular pronouns, and belongs in Group A, or whether the alternation could in principle be applying for 3rd person singular pronouns as well, only to be hidden by the general loss of [ŋ].

However, by the null hypothesis, if we look at the paradigm in Table 4, we find that there is no overt evidence of any stem change for 3rd person forms, and this variety is another variety of modern Turkish, and therefore closely related to other varieties that do show evidence of no alternation in 3rd person pronouns such as Gaziantep, Cyprus, and Ardahan Turkish (Kabataş, 2006; Günşen, 2009; Demirci, 2014). So, I will be assuming that the stem alternation is restricted just to 1st & 2nd person singular pronouns just like Gaziantep Turkish, and this variety also belongs in Group A, just with independent phonological properties making direct testing more difficult.

	1	2	3.dist	3.prox	3.med	1.pl	2.pl	3.dist-pl	3.prox-pl	3.med-pl
nom	ben	sen	o	bu	şu	biz	siz	on-lar	bun-lar	şun-lar
dat	bana	sana	ona	buna	şuna	biz-e	siz-e	on-lar-a	bun-lar-a	şun-lar-a
obl	ben-	sen-	on-	bun-	şun-	biz-	siz-	on-lar-	bun-lar-	şun-lar-

Table 4: Standard Istanbul Turkish Pronoun Paradigm

If we find any evidence to suggest stem alternation also targets 3rd pronouns, but it does not very transparently show up in the output, we could move Standard Istanbul Turkish to group B and analyze the stem alternation as simply targeting singular pronouns instead.

2.3 Group B: All singular pronouns, Non-velar Suffix

For this typological group, I will use the example of Ottoman Turkish, which also has a non-velar and harmonizing dative suffix /-a/ that is virtually identical to the Modern Turkish suffix in form, but nevertheless the dative suffix triggers stem alternation on all singular pronouns, as in Table 5.

	1	2	3.dist	3.prox	3.med	1.pl	2.pl	3.dist-pl	3.prox-pl	3.med-pl
nom	ben	sen	ol	bu	şu	biz	siz	an-lar	bun-lar	şun-lar
dat	baŋa	saŋa	aŋa	buŋa	şuŋa	biz-e	siz-e	an-lar-a	bun-lar-a	şun-lar-a
obl	ben-	sen-	an-	bun-	şun-	biz-	siz-	an-lar-	bun-lar	şun-lar

Table 5: Ottoman Turkish Pronoun Paradigm (Bugday, 1999; Kerslake, 2015)

Since this variety has overt velarization of /n/ in the stem, we can clearly see that the stem alternation takes place for all singular pronouns, including the 3rd person ones, therefore the morphosyntactic conditioning piece of an analysis need not make reference to person features.

2.4 Group C & D: All singular pronouns, Velar Suffix

This typological group of languages has a velar suffix /-ɣa/, and velarization of all singular pronouns, as shown in the Chaghatay paradigm in Table 6 belonging to group C, and the Kirgiz paradigm in Table 7 belonging to group D. As the forms show, the attachment of the dative suffix /-ɣa/ to a /n/-final stem results in the merger /nɣ/ → [ŋ] in Chaghatay, representing group C; and /nɣ/ → [ɣ] in Kirgiz, representing group D.

	1	2	3.dist	3.dist.emph	3.prox	3.prox.emph	1.pl	2.pl	3.dist-pl	3.prox-pl
nom	men	sen	ol	uš-ol	bu	uš-bu	biz	siz	bu-lar	a-lar
dat	maŋa	saŋa	aŋa	–	muŋa	uš-muŋa	biz-ge	siz-ge	a-lar-ɣa	bu-lar-ɣa
obl	men-	sen-	an-	uš-an-	mun-	uš-mun-	biz-	siz-	a-lar-	bu-lar

Table 6: Chaghatay Pronoun Paradigm (Thackston Jr., 1993; Bodrogligeti, 2001; Boeschoten and Vandamme, 2015)

	1	2	3.dist	3.prox	3.med	1.pl	2.pl	3.dist-pl	3.prox-pl	3.med-pl
nom	men	sen	al	bu	ošo	biz	siz	a-lar	bu-lar	ošo-lar
dat	maɣa	saɣa	aɣa	buɣa	ošoɣa	biz-ge	siz-ge	a-lar-ɣa	bu-lar-ɣa	ošo-lar-ɣa
obl	men-	sen-	an-	mun-	ošon-	biz-	siz-	a-lar-	bu-lar	ošo-lar

Table 7: Kirgiz Pronoun Paradigm (Kirchner, 2015b)

The /b/ ∼ /m/ alternation in the 3rd person pronouns is a puzzle I will put to the side for the purposes of this paper, but it is possibly also a phonological process rather than a suppletive one, as the two segments are closely phonologically related, and some other varieties in the Turkic family have a /b/ ∼ /m/ alternation in the pronouns. Regardless, the onset of the pronoun stem is likely not relevant for the dative stem alternation which affects the the syllable nucleus and coda.

2.5 Type E: No Alternation

And finally, there are languages within the Turkic family that do not have the dative stem alternation at all. For example, in Azerbaijani the dative suffix /-a/ just harmonizes with all noun and pronoun stems, and does not trigger velarization anywhere in the pronominal paradigm, yielding the forms in Table 8 (*Azerbaijani Web Corpus* 2012; Siegel, unpublished). This group is heterogeneous, and contains varieties from different branches of the Turkic family, so the reasons for the lack of alternation are likely varied. For analyzing this group of languages, there are many open paths, so I leave it to later work. A brief discussion of these possibile explanations to these patterns is located in section §5.5.

pronoun	stem	dative form
1.sg	mæn-	mæn-æ
2.sg	sæn-	sæn-æ
3.sg	on-	on-a

Table 8: Azerbaijani dative pronouns don't have stem alternation

3 Not Suppletion: Allomorphy misses the mark

A suppletion analysis of the stem alternation proposes that a different phonological form is inserted for the stem in certain morphosyntactic contexts, i.e. it is contextually triggered allomorphy. In this investigation, it

is almost trivial to state the stem and context: the stem in question is a singular pronoun stem, and the triggering context is a dative suffix attaching to the pronoun. However, such an analysis runs into two problems: cross-linguistic patterns of morphological case features predict that such an allomorphy pattern should *not* be possible, and suppletion does not make any principled explanation of the sound correspondence between the stem's elsewhere and alternate form.

Firstly, assuming a distributed the *Distributed Morphology* framework and it's extension to contextual allomorphy by Bobaljik (2012), a suppletion analysis predicts that the stem alternation will occur in not only *dative* case, but superordinate cases such as *instrumental* and *comitative*. This is because in contextual allomorphy, a more contextually more specific vocabulary entry will block the insertion of less specific forms to a structure fitting the contextual description, i.e. in a pronoun form (2-b) will block (2-b) because it is more contextually specified; /biz/ is a vocabulary insertion rule that is specific to pronoun head with [Person:1] features that is a sister to a # head that bears the [PL] feature, so it will block the contextually unspecified /ben/ form.

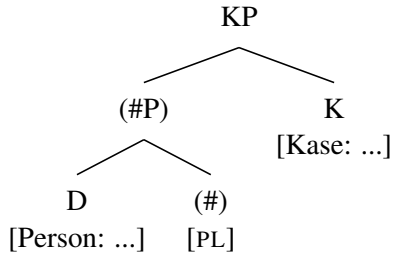
(2) *Vocabulary Insertion Rules: Turkish 1st person pronouns*

a. [D, Person:1] ⇒ /ben/

b. [D, Person:1] ⇒ /biz/ / [_ [#, PL]]

So, let us assume a decomposed pronoun structure as in (3), where D determines the category of the pronoun, and also houses the person features, # houses the number features, and K(ase) houses the case features (Moskal, 2015), we will be able to construct vocabulary insertion entries that realize terminal nodes.

(3) *Pronoun Structure*



Coming to the theoretical problem, the allomorphy under question is predicted to be impossible. Importantly, previous work on cross-linguistically attested syncretisms in case and prepositions has argued for a hierarchy of morphological case features. Blake (1994) and Caha (2009) argue for a *case hierarchy* based on crosslinguistic case syncretism typologies, which states that case features form a chain of subset relations, as schematized in (4). While Caha (2009) formalizes this in a nanosyntax framework, the analysis has also been ported to a DM framework which cashes the feature sets out feature bundles hosted on a case head K (Moskal, 2015; Smith et al., 2019).

(4) *Case Hierarchy (Caha, 2009, reformulated)*

[Kase:NOM] ⊂ [Kase:ACC] ⊂ [Kase:GEN] ⊂ [Kase:DAT] ⊂ [Kase:INSTR]] ⊂ [Kase:COM]

For presentational purposes, it is not necessary to decompose each case into subfeatures, so I will be using a shorthand [DAT] to represent the specific set of features that corresponds to the *dative*, and so forth, but underlyingly each of the case features presented in (4) is internally complex.

Crucially, contextual allomorphy, which is built on the concept of featurally more specified forms blocking less specified forms, predicts that certain patterns are impossible if the relevant morphological features form such a hierarchy. If a form A is a more general form, and if form B is a more contextually specific form for a certain structural description, any structure containing the same structural description *will* fulfil

the insertion criteria of form B, and therefore block the insertion of form A. This is sometimes called a *ABA pattern, which states an unattested and hypothetically impossible paradigm with a structure with an elsewhere form A in a small structure, a more specific form B in a larger structure built on this structure, and the elsewhere form A again in an even larger structure which still contains the trigger for form B. The explanation for this type of paradigm is explained by the way vocabulary insertion rules are triggered, and competition of less specific and more specific rules (Bobaljik, 2012).

Since the *dative* case is subordinate to *instrumental* and *comitative* case according to the case hierarchy, *instrumental* and *comitative* cases should trigger the same stem alternation as *dative* if the stem alternation is allomorphically derived. We have seen that this is not the case for any of the languages under investigation, and that the *dative* and only the *dative* triggers the stem change; hence, this alternation cannot be contextual allomorphy without refuting either the case hierarchy on independent grounds, or refuting the mechanisms of contextual allomorphy.

However, more importantly, even if we were able to rework our assumptions to allow for allomorphy rules deriving the distribution of the dative stem alternation, an allomorphy analysis would not make any principled explanation of the form correspondances between dative pronoun forms and their elsewhere forms. Allomorphy, and especially suppletion, are insensitive to phonological material. Famously, suppletive forms of stems are remarkably phonologically unrelated to their general forms: English *good/better* for comparative suppletion, *go/went* for tense suppletion; Russian *xorošo/lučše* 'good/better' for comparative suppletion; Ket *kɛˀt/dɛ-ŋ* 'man/man-PL' for number suppletion. However, the dative stem alternation in Turkic languages has a very consistent and close phonological correspondence between the alternant and elsewhere form: there is backing of the stem vowel + a consonant alternation involving either a cluster simplification or velarization of a nasal.

If we were to propose that, for example, the *ben-/baŋa* '1/1-DAT' alternation in Ottoman Turkish was derived via allomorphy of the pronoun stem in the context of a dative suffix, it would be a total coincidence that the forms start with [b], that both have low vowels that differ only in [±back], and that the third segment is a nasal that differs in velarization. Furthermore, even if we swallow such extensive coincidental homophony, the same range of accidental homophony would also apply to the 2nd and 3rd person pronoun forms *sen-/saŋa* and *an-/aŋa* respectively. Going even further, each language in the family with this alternation would have the same types of coincidental sound correspondences in their pronominal paradigms between singular and plural forms, and it would be also be a coincidence that the the phonological features underlying these form alternations are the same across each different variety within this large linguistic group.

Thus, I believe that a stem suppletion analysis of this phenomenon is not viable. Such an analysis would not only have to justify going against general properties argued for morphological allomorphy and the features underlying morphological case, but also lose all principled phonological correspondences between forms and the shared phonological character of the alternations across the language family. Thus, I move for a phonological analysis instead which interacts with the morphological structure through phonological constraints that are sensitive to morpho-syntactic features such as category and lexical identity.

4 Proposal

I propose that the dative stem alternation comprises of two different phenomena: reverse vowel harmony, and cluster simplification. What conditions the intersection of these mechanisms is *faithfulness* to different morpho-syntactic categories and lexical items: the hierarchy of faithfulness to phonological material containing pronoun roots (*D* heads), noun structures (*nP*), plural nominals (*#P*), cased nominals (*KP*), and the dative suffix results in these three mechanisms resulting in segment deletion, assimilation, and vowel harmony to different morphemes in different nominal structures. I formalize this category sensitivity as categorically indecexed constraints in a single-cycle optimality theory framework (Benua, 1997; Alderete,

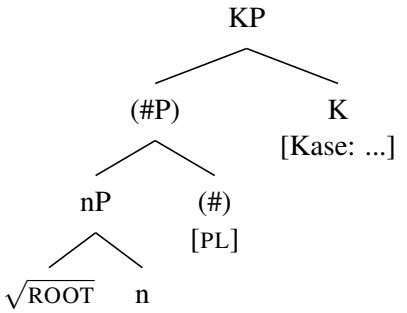
2001; Coetzee, 2009).[3]

In essence, I propose that Turkic languages do not give as much priority to faithfulness to pronominal roots, i.e. *D* heads, compared to larger nominal structures, which contain noun-making *n* heads or number-bearing *#* heads, and the *dative* suffix; thus, general phonological processes result in changes in singular pronoun stems rather than the affixes. In this analysis, the dative suffix is a special lexical item that resists phonological change more than singular pronoun stems (*D* heads) and other suffixes, but is not a disharmonic morpheme; it still harmonizes with noun or plural nominal stems (*#P* and *nP*). This distribution is derived by its specific position within the faithfulness hierarchy proposed in section §4.2 above faithfulness to pronoun roots (*D*), but below nouns (*nP*) and plural nominals (*#P*).

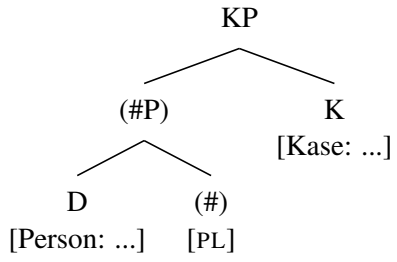
4.1 Pronoun & Noun Structure

I assume the decomposed noun and pronoun structures in (5) and (6). Pronouns are built up from a *D* head bearing person features, and nouns are built up from a root $\sqrt{\text{ROOT}}$ and a noun-building categorical head *n* (Harley, 2014; Moskal, 2015, a.o.). If these nominal structures are plural, then there is an additional #P projection headed by # which bears the plural feature [PL], and finally the outermost projection is KP headed by a *K(ase)* head bearing morphological case features that get realized as case suffixes.

(5) *Noun Structure*



(6) *Pronoun Structure*



In these morpho-syntactic structures, terminal nodes are realized by phonological forms through *vocabulary insertion*, where the most featurally specific vocabulary entry that fits the structure blocks other forms and realizes that node. For number features, I assume that the *plural* is featurally marked and the *singular* the default. In Turkic languages, only the plural is morphologically realized, and there is no straightforward overt realization of singular number in nominals with morphological material. So, I assume that the structure of singular pronouns does not have a # head, and the absence of a # head bearing a [PL] feature is interpreted as singular.[4]

(7) *Number Features*: [PL] is hosted on a head #, singular is the default interpretation of a pronoun without a # node.

For person features, I assume the binary features [±speaker] and [±participant] (CITE).

(8) a. 1st person = [+speaker, +participant]
b. 2nd person = [–speaker, +participant]
c. 3rd person = [–speaker, –participant]

[3]For further discussion and bibliography of category-sensitive phonology and different approaches, see chapter §2 of Inkelas, 2014.

[4]It is also possible to posit a # head that is realized with a null morpheme. Vocabulary insertion rules and faithfulness constraints that are conditioned by the number and person features on the *#* head and *D* head instead of category labels like '*D*' and '*#P*' would derive the same effects according to these alternative assumptions.

4.2 Faithfulness Hierarchy

I assume an Optimality Theory (OT) framework of phonology, which derives output forms by a ranking of violable *markedness* and *faithfulness* constraints (McCarthy and Prince, 1999). While markedness constraints penalize certain marked configurations in the output, faithfulness constraints penalize deviations from certain relations in the output.

The relevant faithfulness constraints for the dative stem alternation are listed in (9): MAX, MAX(F), UNIF, and IDENT(F); these are relevant because the three phonological mechanisms proposed – vowel harmony, assimilation, and cluster simplification – can result in *deletion* of segments, *deletion* of features, *coalescensce* of segments, and *feature changes*, and therefore all of these constraints should be evaluated for the robustness of the analysis.

(9) *Relevant Faithfulness Constraint Families* (McCarthy and Prince, 1999; Wheeler, 2005)

a. MAX: penalizes each segment in the input that is not in the output.
b. MAX(F): penalizes each instance of feature F in the input that is not associated with a segment in the output.
c. UNIFORMITY or UNIF: penalizes each pair of separate segments α and β that merge into one segment γ in the output.
d. IDENTIO(F) or IDENT(F): penalizes each segment that is associated with an instance of feature [F], and is not associated with an instance of [F], or is associated with the opposite value of [F] in the output.

I propose that these faithfulness constraints are not only general constraints, but also have various instances that are related to certain morpho-syntactic structures in the languages under question. For the phenomenon in question, only nominal structure is enough, so I propose the following relevant categories for faithfulness constraints: *nP* for nouns, *#P* for (plural) number projections inside nouns and pronouns, *K* for case suffixes, *D* for pronoun roots, and *KP* for a general projection about all cased pronoun and noun structures, and a lexical item label *dative* for the dative suffix, which sets itself apart from other case suffixes in this phenomenon.

The dative stem alternation is quite homogeneous across the family phonologically and distributionally; it results in a vowel alternation via backing of a stem vowel, and a consonant alternation of /n/ to a velar consonant [ŋ] or [ɣ] in singular pronouns inflected for dative. The nuanced differences such as the result of the consonant alternation and the distribution of the consonant alternation to 1.SG & 2.SG pronouns vs. all singular pronouns can be derived by small number of language specific featural tweaks to mostly shared Turkic constraint hierarchy across the languages under discussion.

The general trends in the family are the following: these languages prefer to allow phonological change to non-*dative case suffixes* rather than *pronouns* or *nouns*, but prefers changes to singular *pronouns* rather than the *dative* case suffix; but if the stem is a *plural nominal* or a *noun*, then they prefer changes to the *dative* suffix over these stems. This marks a general hierarchy of which deviations from the input are possible for nominal structures. Thus, I propose that Turkic languages have a shared *faithfulness hierarchy*, where each faithfulness constraint family obeys the general hierarchy in (10), and therefore the various phonological mechanisms deriving the vowel and consonant alternations under investigation are constrained and naturally brought together by the same hierarchy. The dative stem alternation shows that if a phonological phenomenon has to enact a change, then singular pronoun roots are the preferred target over nouns or plural pronoun stems across the languages under question. If different families of faithfulness constraints behaved fully independently, we would have no explanation for why both *vowel harmony* and *cluster simplification* would have the same preferences with regard to targets not in only one, but many languages in the Turkic language family. If there was no hierarchy, the dative stem alternation would be a coincidental

confluence of vowel and consonant alternation causing mechanisms coinciding on singular pronouns across each language's pronominal paradigms.

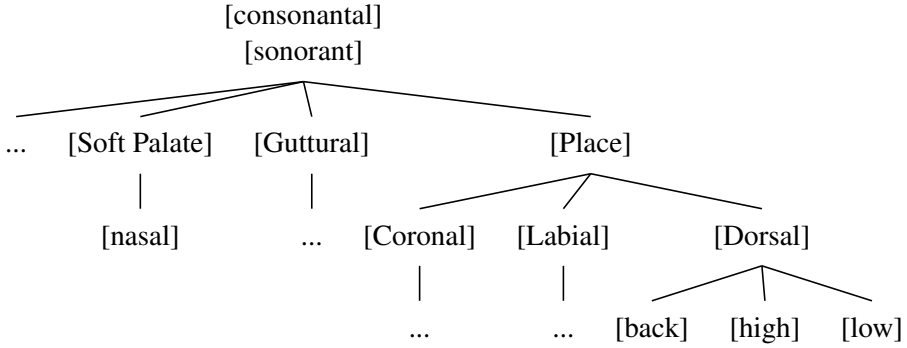
(10) *Faithfulness Hierarchy (*FAITH = *placeholder for any specific faithfulness constraint)*
$\left\{\begin{matrix}\text{FAITH(nP)}\\ \text{FAITH(\#P)}\end{matrix}\right\} \gg \text{FAITH(dative)} \gg \text{FAITH(D)} \gg \text{FAITH(KP)}$

The trigger to all the alternations we see here, the *dative* suffix, allows us to probe the general categorically-conditioned phonology of these languages in this way. While other suffixes that attach to pronouns do not show any evidence of phonological effects on the stem, the lexically marked *dative* suffix proves a very welcome tool of clearly showing that if there is a phonological trigger, then pronoun roots are susceptible to change.

4.3 Phonological Assumptions

I follow Clements (1985)'s proposal that phonological features form a hierarchy, and Halle (1995)'s more explicit formulation of the consonantal feature hierarchy in (11).

(11) *Relevant Phonological Features from Halle (1995)*



As a shorthand notation, I will be omitting intermediate projections in this hierarchy when unnecessary, and combine them with the subordinate features with colons when necessary; such that [Nasal] stands in for the hierarchic structure of [[Soft Palate]–[Nasal]] features since [Soft Palate] is not a necessary feature for this discussion, while [Dorsal:[+back]] stands in for[[Place]–[Dorsal]–[+back]] features since [Dorsal] and its subfeatures are the relevant labels for the phenomena under discussion.

I build my proposal on the claim that the coronal nasal /n/ and velar nasal /ŋ/ differ in dorsal features, specifically in the sub-feature [Dorsal:[±back]]. I propose that the consonant alternation on stem-final nasals is driven by the [Dorsal:[+back]] feature, which when combined with [Nasal] derives [ŋ] and with [–nasal] derives velar obstruents such as the [ɣ] in Type D languages.

(12) *Nasals*
   a. /n/ = [+consonantal, +sonorant, Nasal]
   b. /ŋ/ = [+consonantal, +sonorant, Nasal, Dorsal:[+back]]

One important piece of background is that dorsal obstruents in Turkic languages have allophones that strongly correlate with the *backness* of nearby vowels. While some languages make this split across palato-velar vs. velar allophones like Standard Turkish, others such as Kazakh make it along the velar vs. uvular line.

(13) a. *Turkish: [c, ɟ] vs. [k, g]*

(i) /kabak/ [**ka**b**ak**] ‘squash’
(ii) /kepek/ [**c**e**c**] ‘butterfly’

b. *Kazakh: [k, g] vs. [q, ʁ] (Yawney, 2022)*
(i) /kagaz/ [**qaʁa**z] ‘paper’
(ii) /kyrek/ [**ky**r**ek**] ‘shovel’

For the languages with palato-velar vs. velar allomorphy, the dorsal feature variant that underlies the consonant alternation is specifically [Dorsal:[±back]]. A positive valued [Dorsal:[+back]] feature on a stop derives the velar forms, while a negative valued [Dorsal:[–back]] feature derives the palato-velar ones:

(14) *Turkish Velars – Palato-velar vs. Velar*
a. /c, ɟ/ = [+consonantal, –sonorant, –continuant, Dorsal:[-back, +high]]
b. /k, g/ = [+consonantal, –sonorant, –continuant, Dorsal:[+back, +high]]

For languages with a velar vs. uvular allophony in dorsal stops, such as Kazakh, the relevant sub-feature of *Dorsal* is [Dorsal:[±high]], which derives velars vs. uvulars (Halle, 1995):

(15) *Kazakh Velars – Velar vs. Uvular*
a. /k, g/ = [+consonantal, –sonorant, Dorsal:[+back, +high]]
b. /q, ʁ/ = [+consonantal, –sonorant, Dorsal:[+back, –high]]

In group A & B languages, I propose that a floating [Dorsal:[+back]] feature comes on the dative suffix, and attaches to the /n/ phoneme in singular pronoun stems. The attachment of this dorsal feature to /n/ results in a phone with the following features: [Nasal, +sonorant, Dorsal:[+back]]. This featural combination gets realized as [ŋ]. In group C & D languages, I propose that there are no floating [Dorsal] features, but that the dative suffix has a velar consonant /ɣ/, which is associated with a [Dorsal:[+back, –high]] feature. I propose that in group C languages, the deletion of a pronoun stem /n/ results in its [Nasal] feature surviving and reassociating with this velar phoneme /ɣ/, and the resulting feature bundle getting realized as [ŋ]. Thus, the [Dorsal] feature lies at the heart of the consonant alternation.

4.4 Reverse Harmony

Harmony has been approached in a myriad ways, but most relevant to our discussion in directionality. Previous work has proposed both direction-agnostic mechanisms of harmony (Kaun, 1995; Walker, 1998; Polgardi, 1999; Padgett, 2002), and direction-specific ones (Kirchner, 1993; McCarthy and Prince, 1993; Archangeli and Pulleyblank, 2002). Here, I argue that Turkic languages, despite having a seemingly left-to-right progressive vowel harmony, have a direction agnostic mechanism, based on the vowel alternation patterns discussed in section §2.

Firstly, 1.SG and 2.SG pronoun stems surface with a front vowel in the remainder of the paradigm in these languages, as /ben- ∼ men-/ and /sen-/ respectively, while 3.SG.DIST and 3.SG.PROX pronouns surface with a back vowel, as /on- ∼ an-/ and /bun- ∼ mun-/ respectively. The back-vowel dative form of the 1.SG and 2.SG pronouns is the exceptional case, rather than the general form. Since noun and verb roots also show phonemic front vs. back vowel distinctions, I straightforwardly interpret this vowel distribution as Turkic pronouns allowing an underlying phonemic [±back] distinction, and therefore, that 1st and second persons have an underlying [–back] vowel /e/, while 3rd persons have underlying [+back] vowels /a, o, u/. Indeed, in all but dative case, we see that case suffixes harmonize with the backness of this stem vowel, as seen in the different paradigms in section §2.

If so, then what drives /e/ → /a/ backing in dative singular pronouns? Given the front vowels in 1st and 2nd person singular pronoun stems, we would predict that the dative suffix would harmonize with the

front stem vowel and produce forms like *[ben-e ∼ men-(g)e] and *[sen-(g)e], despite all all but the few languages in group E, which are the languages that do not have the dative stem alternation at all, such forms are unattested.

My answer is the following: since the stems are underlyingly front-vowel stems, and the languages are vowel harmonizing languages, the *backness* of the alternant stem vowel form originates from the dative suffix. In fact, if harmony was not hard-coded to be left-to-right, then it would be possible that a stem vowel changes [±back] to fulfill harmony requirements in cases where the suffix cannot, yielding *reverse harmony*, which is exactly what I propose derives the vowel alternation.

I propose that the vowel alternation is *reverse vowel harmony*, triggered by the dative suffix having an underlying [+back] vowel, and being a phonologically change-resistant suffix with a higher faithfulness ranking compared to other suffixes, and crucially singular pronoun roots. Thus, when a front vowel in a singular pronoun and a back vowel in a dative suffix are contained within the same phonological word, the pronoun stem changes backness to accommodate for the change-resistant nature of the dative suffix and fulfills harmony. I assume the SPREAD(F) family of harmony constraints, which is a direction agnostic constraint that attempts to derive spreading of a feature to all vowels in the applicable domain, as stated in (16). Padgett (2002) also proposes that a Color family of features, which encodes backness and roundness to the exclusion of height, accounts for vowel harmony in Turkish, and would straightforwardly extend to vowel harmony in the other Turkic varieties under discussion, so I will be assuming Color features for this analysis as well.

(16) *Padgett's (2002) Vowel Color Harmony Constraints*

a. Color: The class of phonological features [±round] and [±back]

b. SPREAD(Color): penalize each Color feature [F] that is linked to one syllable nucleus, but not all syllable nuclei in the prosodic word. (Walker, 1998; Padgett, 2002, modified)

Note that *backness* is also a *dorsal place of articulation* feature of consonants in Halle (1995)'s feature hierarchy previously discussed. This is not necessarily a problem, and the color feature [±back] and the dorsal place of articulation feature [±back] could be one and the same. This double nature is not a problem for vowel harmony, because the vowel harmony constraint SPREAD(Color) propagates this [±back] feature, but it affects vowels, and therefore will not interact with the forms of consonants that are relevant for the consonant alternation for this phenomenon.

While Padgett (2002) uses these constraints to derive Turkish vowel harmony patterns, he does not deal with the intricate reverse harmony patterns under discussion, so breaking faithfulness constraints into ones specific to the *root* vs. non-specific ones is sufficient, and thus he proposes the constraint ranking in (17).

(17) *Padgett's (2002) analysis of Turkish Vowel Harmony*
IDENT$_{\text{Rt}}$ ≫ *[+round,–high] ≫ SPREAD(Color) ≫ IDENT

In (17), *[+round, –high] is a markedness constraint which stops rounding harmony for non-high vowels, since it is an exception to vowel harmony in Turkish, and it is not relevant for all of the other languages; however, this slot is potentially where other markedness constraints deriving restrictions for vowel harmony within each language would fit into, so I will be keeping it with the placeholder constraint HARMONYEXCEPTIONS (short HARMEXCP), and propose a generalized *reverse harmony* consonant ranking in (18), which derives the vowel alternation in all class A, B, and C languages.

(18) *Proposed Generalized Reverse Harmony Ranking*
IDENT(nP, back) ≫ HARMEXCP ≫ SPREAD(Color) ≫ IDENT(#P, back) ≫ IDENT(dative, back) ≫ IDENT(D, back) ≫ IDENT(KP, back)

This constraint ranking derives the generally left-to-right nature of vowel harmony, as well as the exceptional reverse harmony that happens in singular pronouns with a dative suffix. [5]

Most important in this ranking is

The ranking {IDENT(nP), IDENT(#P), SPREAD(Color)} ≫ IDENT(KP) derives the overall left-to-right nature of vowel harmony - affixes added to plural nominals or nouns undergo feature changes to preserve the form of the stem and not violate harmony.

However, crucially, the faithfulness constraint specific to the *dative* suffix outranks IDENT(D), which derives the exceptional reverse harmony that happens in dative singular pronouns. Since featural faithfulness to the *dative* suffix is ranked higher the featural faithfulness to pronoun roots (D), the singular pronoun root undergoes vowel harmony instead to preserve the form of the higher-ranked dative suffix. The vital difference between the *dative* suffix and other case suffixes is that IDENT(dative) outranks IDENT(D) and thus can trigger reverse harmony, but other case suffixes cannot because IDENT(KP) ranks below IDENT(D), which means all case suffixes but dative just extend typical left-to-right vowel harmony from the pronoun stem, but the dative suffix triggers reverse harmony on singular pronouns. This crucial ranking of dative vs. non-dative case suffixes vs. pronoun roots derives the puzzling paradigmatic distribution of the vowel alternation. This breakdown of faithfulness, albeit appearing stipulative, is not specific to vowel harmony, and derives the other phenomena associated with the dative stem alternation, which we will discuss next.

(19) a. *Singular Pronoun + Dative ⇒ Vowel alternation*

...e(C)]$_D$-(C)a	ID(nP,bk)	SPR(Color)	ID(#P,bk)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. ...e(C)]$_D$-(C)a		∗!∗				
☞ b. ...**a**(C)]$_D$-(C)a					∗	∗
c. ...e(C)]$_D$-(C)**e**				∗!		∗

b. *Singular Pronoun + Case Suffix ⇒ Vowel harmony*

...e(C)]$_D$-(C)a	ID(nP,bk)	SPR(Color)	ID(#P,bk)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. ...e(C)]$_D$-(C)a		∗!∗				
b. ...**a**(C)]$_D$-(C)a					∗!	∗
☞ c. ...e(C)]$_D$-(C)**e**						∗

c. *Noun + Dative ⇒ Vowel harmony*

...e(C)]$_{nP}$-(C)a	ID(nP,bk)	SPR(Color)	ID(#P,bk)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. ...e(C)]$_{nP}$-(C)a		∗!∗				
b. ...**a**(C)]$_{nP}$-(C)a	∗!					∗
☞ c. ...e(C)]$_{nP}$-(C)**e**				∗		∗

d. *Plural Pronoun + Dative ⇒ Vowel harmony*

...e(C)]$_D$]$_{\#P}$-(C)a	ID(nP,bk)	SPR(Color)	ID(#P,bk)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. ...e(C)]$_D$]$_{\#P}$-(C)a		∗!∗				
b. ...**a**(C)]$_D$]$_{\#P}$-(C)a			∗!		∗	∗
☞ c. ...e(C)]$_D$]$_{\#P}$-(C)**e**				∗		∗

4.5 Feature Floating & Survival

In group A and B languages, the dative suffix is realized in a -V form, where there is no velar stop that is a part of the suffix, in in all nouns and plural pronoun paradigms. When the stem ends in a vowel, an epenthetic glide /j/ is added between the stem and the affix.

[5] Firstly, the ranking IDENT(nP) ≫ SPREAD(Color) derives the fact that disharmonic noun stem are possible and attested in the language; the ranking HARMEXCP ≫ SPREAD(Color) derives the fact that there are some exceptions and restrictions to vowel harmony within each language

(20) *Istanbul Turkish*

a. /kitab**-a**/ 'book-DAT'
b. /defter**-e**/ 'notebook-DAT'
c. /dynjaː**-ja**/ 'world-DAT'
d. /sajfa**-ja**/ 'page-DAT'
e. /biz**-e**/ '1.PL-DAT'
f. /on-lar**-a**/ '3-PL-DAT'

However, crucially, the dative suffix does not show any evidence of a velar consonant independently, but still triggers velarization of stem final /n/ → [ŋ] in singular pronoun alternation – with the exception of the Standard Istanbul variety, which independently does not realize [ŋ] except for place assimilation in consonant clusters.

I argue that it is true that these varieties do not have an underlying velar consonant in the dative suffix synchronically, but the fact that the dative stem alternation results in a velar nasal [ŋ], and the fact that most other related languages outside of the most closely related *Oghuz* branch languages of Turkic, including the oldest attested relatives like 9th century Old Turkic, has a velar suffix of the form /-ɣa/ supports a story where a historical Proto-Turkic dative suffix form */-ɣa/ lost the velar consonant in the group A and B languages.

I propose that this loss of the velar was incomplete, and the residual evidence of this historical velar consonant show up in the dative stem alternation due to the aforementioned faithfulness hierarchy: the dorsal sub-feature [Dorsal:[+back]] of the historical velar consonant survives into these varieties, and gets realized on a pronoun root consonant in singular pronouns because faithfulness to the features of the pronoun root are low in the constraint ranking.

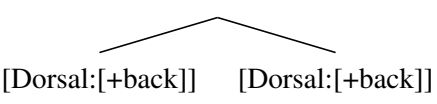
The active constraints in this alternation are faithfulness constraints, MAX(F) and IDENT(XP, F), and a general inviolable well-formedness constraint condition concerning the well-formedness associating multiple identical features with segments.

(21) a. MAX(F): penalizes each instance of feature F in the input that is not associated with a segment in the output.
b. IDENT(XP, F): penalizes each segment in XP that is associated with an instance of feature [F], and is not associated with an instance of [F] or associated with the opposite value of [F] in the output.
c. *MULTIPLEASSOCIATION(F) or *MULTASSOC(F): undominated constraint that penalizes more than feature [F] associating with a single host. (Zimmermann, 2017, adapted from $*^{U}\mu^{U}$)

The well-formedness constraint *MULTASSOC(F) is derived from autosegmental theories of feature association, specifically Zimmermann (2017)'s $*^{U}\mu^{U}$ constraint which penalizes the association of multiple tone features with a single host, thereby deriving tone floating to other syllables. Following the same mechanism, I propose that the [Dorsal:[+back]] feature is a floating feature on the dative suffix originating from the historical velar consonant that was lost in group A & B, which contain Turkish varieties and Turkmen. This feature is a remnant of the past, and survives without it's original host, and it's floating behavior originates from the well-formedness constraint discussed above.

(22) *Turkish Dative Suffix Vocabulary Entry*

[Kase: DAT] ⇒ /-a/



The reason that it floats and associates with the pronoun stem in vowel alternation examples is that the dative suffix does not have any viable hosts to house this feature: the suffix has only a single vowel /a/ which is

proposed to be underlyingly a [+back] vowel, and therefore is already associated with a dorsal feature [Dorsal:[+back]].[6] Since that is the case, and another [Dorsal:[+back]] feature is proposed to come on the dative suffix, associating this second instance of a dorsal feature would violate the *MULTASSOC(Dorsal:[+back]) constraint, so this feature either has to move onto another host or be deleted. The dative alternation in singular pronouns is caused by this floating feature being associated with the pronoun root; in contrast, in non-alternating dative forms such plural pronouns or nouns, this feature is deleted because the higher ranking of faithfulness rankings to plural nominals and nouns blocks this feature from changing the form of the nominal by associating with a segment.

The constraint ranking deriving the floating behavior is a combination of the undominated well-formedness constraint *MULTASSOC(F), and the faithfulness hierarchy IDENT(nP, Dorsal), IDENT(#P, Dorsal) ≫ MAX(Dorsal) ≫ IDENT(D, Dorsal), shown in (23). The well-formedness constraint requires that one of the [Dorsal] features on /-a/ either detaches from it's host or is fully deleted. The faithfulness hierarchy results in a categorically-conditioned deletion or floating of this [Dorsal] feature. In a nominal or plural pronoun structure, featural identity outranks MAX(Dorsal), so the feature is deleted to preserve the featural realization of the stem, however, MAX(Dorsal) outranks the featural identity to pronoun roots, IDENT(D, Dorsal), and therefore associating the [Dorsal] feature with the final consonant /n/ of the pronoun root and thereby turning it into [ŋ] is more optimal than deleting the [Dorsal] feature.

(23) *Constraint Ranking for Dorsal Feature Float*

$$\text{*MULTASSOC(F)} \gg \left\{\begin{matrix}\text{IDENT(nP, Dorsal)}\\ \text{IDENT(\#P, Dorsal)}\end{matrix}\right\} \gg \text{MAX(Dorsal)} \gg \text{IDENT(D, Dorsal)}$$

Thus, this [Dorsal] feature, which is a remnant of a historical velar consonant in group A and B varieties, only survives to the output in singular pronouns due to the faithfulness hierarchy of Turkic languages. The echoes of this lost consonant only show up in one corner of the pronominal paradigm through the *emergence of the unmarked*.

(24) a. *Singular Pronoun + Dative ⇒ [Dorsal] associates with stem*

/...n]$_{D}$-a$^{[Dors,Dors]}$/	*MULTA(Dors)	ID(nP,Dors)	ID(#P,Dors)	MAX(Dors)	ID(D,Dors)
a. [na$^{[Dors,Dors]}$]	∗!				
☞ b. [ŋ$^{[Dors]}$a$^{[Dors]}$]					∗
c. [na$^{[Dors]}$]				∗!	

b. *Plural Pronoun + Dative ⇒ [Dorsal] deletes*

/...n]$_{D}$]...]$_{\#P}$-a$^{[Dors,Dors]}$/	*MULTA(Dors)	ID(nP,Dors)	ID(#P,Dors)	MAX(Dors)	ID(D,Dors)
a. [n...a$^{[Dors,Dors]}$]	∗!				
b. [ŋ$^{[Dors]}$...a$^{[Dors]}$]			∗!		∗
☞ c. [n...a$^{[Dors]}$]				∗	

c. *Noun + Dative ⇒ [Dorsal] deletes*

/...n]$_{nP}$]-a$^{[Dors,Dors]}$/	*MULTA(Dors)	ID(nP,Dors)	ID(#P,Dors)	MAX(Dors)	ID(D,Dors)
a. [na$^{[Dors,Dors]}$]	∗!				
b. [ŋ$^{[Dors]}$a$^{[Dors]}$]		∗!			
☞ c. [na$^{[Dors]}$]				∗	

In group C & D languages, the dative suffix still preserves velar consonant in the historical dative suffix, and this consonant is not deleted within the dative stem alternation, so [Dorsal] feature float does not explain the consonant alternation in Group C & D varieties. The consonant alternation in such varieties is driven by Cluster Simplification, which also derives the distribution of the alternation straightforwardly by the

[6] I follow Halle (1995), who argues that the backness of vowels is determined by the same phonological features as consonants.

faithfulness hierarchy.

4.6 Cluster Simplification

In group C languages, the dative suffix is realized in a -CV form, where C is a velar stop, in all nouns and plural pronoun paradigms. The only corner of the paradigm that a consonant-final stem + dative suffix does not result in a consonant cluster is the dative alternation in singular pronouns: /CVn/ + /ɣa/ forms are realized either as [CVŋa] or [CVɣa] depending on the language. Thus, I posit that the dative suffix underlyingly has a velar consonant, and is of the form /-ɣa/, and the dative alternant form is derived by cluster simplification when /n+ɣ/ clusters are generated in singular pronoun structures.

The cluster simplification only obtains in singular pronoun structures due to the Turkic *faithfulness hierarchy* which preserves the form of dative suffixes (FAITH(dative)), nouns (FAITH(nP)), and plural nominal structures (FAITH(#P)) more than pronoun roots (FAITH(D)). The high faithfulness to both noun/plural stems and dative suffixes blocks the deletion of either /n/ or /ɣ/, and results in the cluster surviving in noun and plural nominal structures; but in singular pronoun structures, the markedness constraint against such clusters successfully deletes the /n/ due to the low ranking of faithfulness to pronoun roots. Whether the single velar consonant in the output is [ŋ] or [ɣ] is determined by the language-specific ranking of MAX(nasal). In Type C languages it is ranked high, so the [Nasal] feature survives the deletion of its host /n/, and attaches to the adjacent consonant to generate [ŋ] in the output; but in group D languages, MAX(nasal) is ranked lower, so deletion of the [Nasal] feature alongside its host /n/ is more optimal, so the dative suffix surfaces without changes to the consonant [ɣ].

The constraints underlying this interaction are in (25) and (26) below. The markedness constraint *NG motivates the resolution of clusters, but it is blocked by faithfulness constraints according to the faithfulness hierarchy, and this interaction derives the distribution of the consonant alternation to only singular dative pronouns.

(25) *Markedness Constraint*
*NG: a markedness constraint that penalizes each nasal stop and dorsal stop cluster in the output.

(26) *Relevant Faithfulness Constraints (McCarthy and Prince, 1999; Wheeler, 2005)*
   a. MAX(XP): penalizes each segment in XP in the input that is not in the output.
   b. MAX(nasal): penalizes each instance of feature [Nasal] in the input that is not associated with a segment in the output.
   c. IDENT(XP, nasal): penalizes each segment in XP that is associated with an instance of feature [Nasal], and is not associated with an instance of [Nasal], or vice versa.

Logically, there are two main ways of obeying the markedness constraint *NG: deletion or coalescense. In the former, one of the segments comprising the consonant cluster would be deleted to resolve the cluster markedness constraint, and in the latter the two segments comprising the cluster would coalesce into one single segment in the output to likewise get rid of the marked cluster. I propose that the cluster simplification at issue in Turkic dative alternation is the former: deletion of a root-final consonant on pronoun roots.

On this choice between mechanisms, Wheeler (2005) argues that segment coalescense and splitting always have the chance to be a viable alternative for deletion and insertion analyses, and should be considered before deciding on analysis, lest they prove fatal to deletion analyses. The relevant faithfulness constraint deriving a hypothetical coalescense analysis of the cluster simplification in group C & D varieties is UNIFORMITY, which penalizes coalescense of segments in the output. More concretely, we would posit the coalescense of the stem-final /n_1/ and suffix-initial /$ɣ_2$/ into [$ŋ_{1,2} \sim ɣ_{1,2}$] in the output.

However, in this case, it turns out that UNIFORMITY cannot derive the attested patterns: the availability of cluster simplification is determined by the categorical identity of the first segment /n/. Assuming coa-

lescense, in a /n]$_{D}$- ɣ/ cluster, the two segments should coalesce, but if the /n/ is part of a different category, such as a noun /n]$_{nP}$- ɣ/ should not coalesce. This is a problem, because UNIFORMITY is a faithfulness constraint, so a violation of a modified category-specific UNIF(D) would always entail a violation for the general constraint UNIF; meaning that we would be able to posit a ranking UNIF(D) ≫ *NG ≫ UNIF to get a distribution where coalescence is *banned* for pronoun segments but allowed elsewhere, but the actual attested distribution where coalescense is allowed for D categories but disallowed elsewhere is impossible with such faithfulness constraints. And if we change tack, and attempt to derive this category dependency by creating category-specific markedness constraint *NG, then we would be making some new and non-trivial claims about certain consonant clusters being marked only for pronouns.

Since I am already proposing a hierarchy for faithfulness hierarchies which would also extend to a deletion account, and the fact that arguing for a category hierarchy for consonant cluster simplification in Turkic languages would require investigation of a very different set of phonological data, I move to put a coalescense analysis aside as unlikely and not presently workable with the current assumptions. Thus, the proposed constraint ranking has UNIF ranked high to block coalescense across the board, so that any cluster simplification is only mediated by active constraints deriving deletion and resistance to deletion.

Thus, I propose that /nɣ/ clusters are simplified in singular pronouns by deletion of the pronoun root-final /n/, while other /nɣ/ clusters surface as is without deletion due to the general faithfulness hierarchy ranking MAX constraints for plural nominal and noun structures above pronouns, derived by the constraint ranking in (27). This follows the general Turkic faithfulness hierarchy in that a change to pronoun stems – in this case, deletion of a segment – is preferred over change to the dative suffix through MAX(dative) *gg* *NG ≫ MAX(D), hence the deletion of root-final /n/ instead of the dative suffix-initial /ɣ/. Furthermore, the faithfulness to nouns and plural nominals outranks the markedness constraint deriving deletion, *NG, and thus deletion is blocked in such structures through the ranking of {MAX(nP), MAX(#P)} ≫ *NG; here, we see another case where a general phonological mechanism surfacing only in the singular pronoun domain due to a general hierarchy of faithfulness.

(27) *Cluster Simplification Ranking*

$$\left\{\begin{array}{c}\text{MAX(nP)}\\ \text{MAX(\#P)}\\ \text{MAX(dative)}\\ \text{UNIF}\end{array}\right\} \gg \text{*NG} \gg \left\{\begin{array}{c}\text{MAX(D)}\\ \text{MAX}\end{array}\right\}$$

Thus, the faithfulness hierarchy derives the distribution of cluster simplification: /nɣ/ clusters result in a simplex [ŋ] or [ɣ] only when a /ɣ/ from a dative suffix attaches to singular pronouns, but not elsewhere. Unfortunately, we cannot check all logical possibilities in these paradigms, because there are no case suffixes other than the dative that starts with /ɣ/, and plural pronoun forms do not end in /n/ for these languages, however, the (27) derived from the general faithfulness hierarchy derives the attested patterns. It also predicts that if there were any plural pronoun forms and other case suffixes that would result in /nɣ/ cluster, it would not result in cluster simplification since the simplification is structurally conditioned and lexically conditioned by the dative suffix.

(28) a. *Singular Pronoun + Dative ⇒ /n/ deletion from stem*

/...n$_1$]$_{D}$-ɣ$_2$.../	MAX(nP)	MAX(#P)	MAX(dat)	UNIF	*NG	MAX(D)	MAX
a. [n$_1$ɣ$_2$]					*!		
b. [ŋ$_{1,2}$] or [ɣ$_{1,2}$]				*!			
☞ c. [ŋ$_2$] or [ɣ$_2$]						*	*
d. [ŋ$_1$] or [ɣ$_1$]			*!				*

b. *Noun + Dative ⇒ no deletion*

/...n_1]$_{nP}$-ɣ$_2$.../	MAX(nP)	MAX(#P)	MAX(dat)	UNIF	*NG	MAX(D)	MAX
☞ a. [n_1ɣ$_2$]					*		
b. [ŋ$_{1,2}$] or [ɣ$_{1,2}$]				*!			
c. [ŋ$_2$] or [ɣ$_2$]	*!						*
d. [ŋ$_1$] or [ɣ$_1$]			*!				*

5 Deriving the Typology

5.1 Group A

Group A varieties comprise of modern Turkish varieties, which set themselves apart from group B and C in their restricted distribution of stem alternation – only 1.SG and 2.SG pronouns alternate, 3rd person or demonstrative pronouns do not – and the dative suffix not appearing to have a velar consonant despite the velarization of /n/ → [ŋ] within the alternation. The vowel alternation is directly derived straightforwardly from the proposed vowel harmony constraint ranking, and the consonant alternation can be derived by the interaction of MAX(F) and IDENT constraints. The restricted distribution of alternation to only 1st and 2nd person singular pronouns can be derived if we add a [±participant] breakdown to IDENT(D) for this language group: IDENT(D[+part],F) and IDENT(D[–part],F). Since category features of the morphemes can determine breakdowns in the faithfulness hierarchy, adding person features to the pool of relevant features does not require any change to formal machinery.

Also, this mirrors another independent distinction in Turkish pronouns, where 1st and 2nd person pronouns are used to refer to people or other animate referents, while the 3rd person pronouns also have a demonstrative usage. If we consider the latter as more noun-like than pronoun roots, then this split would totally mirror the noun vs. pronoun root split we observe. Thus, a conceptual pronoun root vs. noun-like split for faithfulness constraints can derive the restricted distribution of consonant alternation.

5.1.1 Vowel Alternation

The vowel alternation can be derived just by IDENT constraints and a vowel harmony enforcing constraint SPREAD(Color). This vowel harmony crucially ranks below IDENT(nP, back), so that vowel harmony does not change the many attested disharmonic roots in these languages (Padgett, 2002). My contribution to Padgett, 2002's proposed ranking is IDENT(#P, back) ≫ SPREAD(Color) ≫ IDENT(dative, back) ≫ IDENT(D, back), which derives the observed hierarchy of trying to preserve the features of plural nominals over the dative suffix, and the dative suffix over pronoun roots. For vowel harmony, the [±back] feature of vowels is the only feature that will interact with these constraints, so I omit other features – such as the proposed [Dorsal] feature on the dative suffix – for this discussion. The proposed constraint ranking is (29) below.

(29) *Vowel Harmony Ranking*
IDENT(nP, back) ≫ HARMEXCP ≫ SPREAD(Color) ≫ IDENT(#P, back) ≫ IDENT(dative, back) ≫ IDENT(D, back) ≫ IDENT(KP, back)

I will be using the Standard Turkish paradigm, but the same mechanism also derives the Gaziantep Turkish vowels, modulo the velarization of the nasal /n/ → [ŋ], which will be discussed in section §**??**, and is not affected by the vowel-specific constraints under discussion since vowel harmony only targets vowels in these languages. In (30) below, we get the usual vowel harmony extending from a noun stem to the suffix. In this case, none of the new proposed faithfulness constraints come into play, so we get left-to-right backness harmony.

(30) *Standard Turkish: Noun + suffix: locative suffix harmonizes with stem*

/tʃimen-da/ 'grass-LOC'	ID(nP,bk)	SPR(Color)	ID(KP,bk)
a. tʃimen-da		∗!∗	
☞ b. tʃimen-d**e**			∗
c. tʃim**a**n-da	∗!	∗∗	∗
d. tʃ**ɯ**m**a**n-da	∗!∗		∗∗

Now, if we turn to the dative suffix, which sets itself apart from other case suffixes by having a higher ranked faithfulness constraint IDENT(dative, back) ≫ IDENT(D, back) ≫ IDENT(KP, back), we find see in (31) that this lexically specified breakdown of faithfulness does not disrupt vowel harmony in nouns; dative suffixes extend stem harmony as usual since IDENT(nP, back) still ranks higher than IDENT(dative, back).

(31) *Standard Turkish: Noun + dative*

/tʃimen-a/ 'grass-DAT'	ID(nP,bk)	SPR(Color)	ID(dat,bk)	ID(KP,bk)
a. tʃimen-a		∗!∗		
☞ b. tʃimen-**e**			∗	∗
c. tʃim**a**n-a	∗!	∗∗		∗
d. tʃ**ɯ**m**a**n-a	∗!∗			∗∗

However, pronouns are a different case; plural pronouns behave like the noun cases discussed above – all suffixes including the dative extend stem vowel harmony – but singular pronouns have the vowel harmony direction switched when inflected for dative case. (32) below shows a derivation of a non-dative cased form of the 1.SG pronoun. Since IDENT(D, back) ≫ IDENT(KP, back), vowel harmony proceeds as usual from stem to suffix, and the dative stem alternation does not happen for these non-dative case inflections.

(32) *Standard Turkish: Singular pronoun + affix*

/ben-da/ '1-LOC'	SPR(Color)	ID(D,bk)	ID(KP,bk)
a. benda	∗!∗		
☞ b. bend**e**			∗
c. b**a**nda		∗!	∗

However, crucially when a singular pronoun has a dative suffix attached to it, the constraint ranking IDENT(dative, back) ≫ IDENT(D, back) ≫ IDENT(KP, back) results in a vowel harmony direction reversal. The dative suffix /-a/ is [+back], while the 1.SG pronoun root has a [–back] vowel, so backing of the pronoun root vowel is more optimal for this constraint ranking, as in the derivation in (33). Thus, the comparative faithfulness of dative and pronoun roots (D heads) creates a situation where the underlying vowel harmony process surfaces in an unexpected way, via an instance of an *emergence of the unmarked*.

(33) *Standard Turkish: Singular pronoun + dative*

/ben-a/ '1-DAT'	SPR(Color)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. bena	∗!∗			
b. ben**e**		∗!		∗
☞ c. b**a**na			∗	∗

Of course, since the dative stem alternation is restricted to singular pronouns, the constraint ranking must block the situation just presented above from happening for plural pronouns, which also house a pronoun root, i.e. D head. This pattern is derived by the ranking IDENT(#P, back) ≫ IDENT(dative, back) ≫ IDENT(KP), which prioritizes faithfulness to the features of plural nominal structures above dative or other case suffixes. (34) and (35) detail respectively, how both a non-dative and a dative case suffix cannot result

in reverse harmony on plural pronouns. The higher ranked IDENT(#P, back) ensures that the ranking of *dative*-specific faithfulness is not relevant for the optimal output.

(34) *Standard Turkish: Plural pronoun + affix*

/biz-da/ '1.PL-LOC'	SPR(Color)	ID(#P,bk)	ID(D,bk)	ID(KP,bk)
a. bizda	∗!∗			
☞ b. bizd**e**				∗
c. b**ɯ**zda		∗!	∗	∗

(35) *Standard Turkish: Plural pronoun + dative*

/biz-a/ '1.PL-DAT'	SPR(Color)	ID(#P,bk)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. biza	∗!∗				
☞ b. biz**e**			∗		∗
c. b**ɯ**za		∗!		∗	∗

5.1.2 Consonant Alternation

The consonant alternation is derived by a floating [Dorsal:[+back]] feature on the dative suffix. This [Dorsal:[+back]] feature comes from a historical velar consonant that was lost in these varieties, i.e. a residuum of the change: Proto-Turkic */-ga/ → Turkish /-a/. This residual [Dorsal] feature floats because that back vowel in this suffix is already associated by a [Dorsal:[+back]] feature on account of being a [+back] vowel (Halle, 1995). I propose this floating behavior is mediated through the constraint *MULTIPLEASSOCIATION(F), which is a generalized featural variant of Zimmermann (2017)'s $*^{U}\mu^{U}$ constraint which penalizes association of multiple tones with a single host and pushes them to float to other hosts. According to this constraint, since the dative suffix consists of a vowel, it cannot host both the residual [Dorsal:[+back]] and it's inherent [Dorsal:[+back]] specification, so one has to detach and either move to another host or be deleted. This feature derives the consonant alternation /n/ → [ŋ] is a result of this [Dorsal:[+back]] floating and attaching to the pronoun root consonant /n/.

As discussed above, group A varieties make a slightly modified split of structures than the general faithfulness hierarchy, so the restricted distribution of the consonant alternation to only [+participant] singular pronouns is derived by the relative ranking of IDENT(D[–part], Dorsal) above MAX(dorsal) alongside *nP* and *#P* specific constraints, while IDENT(D[+part], Dorsal) is ranked below MAX(dorsal). Thus, the constraint ranking in (36) results in this floating [Dorsal] feature being able to attach to pronoun roots and cause the /n/ → [ŋ] alternation, but get deleted in nouns and plural or [–participant] pronouns.

(36) *Consonant Alternation Ranking*

$$*\text{MULTA(Dorsal)} \gg \left\{ \begin{array}{c} \text{IDENT(nP, Dorsal)} \\ \text{IDENT(\#P, Dorsal)} \\ \text{IDENT(D[–part], Dorsal)} \end{array} \right\} \gg \text{MAX(Dorsal)} \gg \text{IDENT(D[+part], Dorsal)}$$

Thus, we get consonant alternation in [–participant] dative singular pronouns, but do not have such stem changes in non-singular pronouns.

(37) a. *Gaziantep/Cyprus/Ardahan Turkish: Singular [+part] Pronoun + Dative ⇒ /n/ → [ŋ]*

/ben-a$^{[Dors,Dors]}$ '1-DAT'/	*MULTA(Dors)	ID(D[–part],Dors)	MAX(Dors)	ID(D[+part],Dors)
a. bana$^{[Dors,Dors]}$	∗!			
☞ b. baŋ$^{[Dors]}$a$^{[Dors]}$				∗
c. bana$^{[Dors]}$			∗!	

b. *Gaziantep/Cyprus/Ardahan Turkish: Singular [–part] Pronoun + Dative ⇒ no alternation*

/on-a[Dors,Dors]/ '3-DAT'	*MULTA(Dors)	ID(D[–part],Dors)	MAX(Dors)	ID(D[+part],Dors)
a. ona[Dors,Dors]	∗!			
b. oŋ[Dors]a[Dors]		∗!		
☞ c. ona[Dors]			∗	

c. *Gaziantep/Cyprus/Ardahan Turkish: Plural Pronoun + Dative ⇒ no alternation*

/on-lar-a[Dors,Dors]/ '3-PL-DAT'	*MULTA(Dors)	ID(#P,Dors)	ID(D[–part],Dors)	MAX(Dors)
a. onlara[Dors,Dors]	∗!			
b. oŋ[Dors]lara[Dors]		∗!	∗	
☞ c. onlara[Dors]				∗

d. *Gaziantep/Cyprus/Ardahan Turkish: Noun + Dative ⇒ no alternation*

/insan-a[Dors,Dors]/ 'person-DAT'	*MULTA(Dors)	ID(nP,Dors)	MAX(Dors)
a. insana[Dors,Dors]	∗!		
b. insaŋ[Dors]a[Dors]		∗!	
☞ c. insana[Dors]			∗

Standard Turkish, which does not show velarization of the /n/ in the alternation is not incompatible with this analysis, since it independently does not have a surface [ŋ] with the exception of assimilation in /nC[dorsal]/ clusters, even for for underlying phonemic /ŋ/ in roots and affixes which are robustly shown to have /ŋ/ in other Turkish varieties and cognates in other Turkic languages. In the standardized Istanbul variety, the mechanism of stem alternation is just as described above, but a higher ranked *ŋ constraint gets rid of [ŋ] in most outputs through the assimilation and faithfulness ranking in (38).

(38) *Standard Turkish Ranking that obfuscates [ŋ]*
*NG-CONTR(Dorsal) ≫ *ŋ ≫ MAX(dorsal)
*NG-CONTR(Dorsal) ≫ IDENT(Dorsal)

While roots with underlying /ŋ/ in other Turkish dialects and cognates in related languages like /deŋiz/ 'sea', /øŋ/ 'front', /soŋ/ 'end' surface as [deniz], [øn], [son] in Standard Turkish due to the variety-specific markedness of [ŋ],[7] the phone [ŋ] can still surface in consonant place-of-articulation assimilation contexts, as in (39). The ranking in (38) derives both the fact that underlying /ŋ/ surface as [n], but also that local pre-velar assimilation can create [ŋ] outputs regardless of underlying velarness of a nasal.

(39) *Standard Turkish: [ŋ] via assimilation*

a.	sen-in-ki	[seniŋki]	'2.SG-GEN-one'
b.	başlangıç	[baʃlaŋgɯtʃ]	'beginning'
c.	marangoz	[maraŋgo̯z]	'carpenter'
d.	reng-i	[reŋʄi]	'color-3.POSS'
e.	cihan-gir	[dʒihaŋʄiɾ̥]	'world-conqueror'
f.	denge	[deŋʄɛ]	'balance'
g.	ön-görü	[øŋʄøry]	'foresight'
h.	ingiliz-ce	[iŋʄilizdʒɛ]	'English'
i.	dün-kü	[dyŋcy]	'yesterday-one'

[7] cf. *Ottoman* /deŋiz/, /øŋ/, /soŋ/.

5.2 Group B

5.2.1 Vowel Alternation

The vowel alternation in Group B works the same way in group A varieties: SPREAD(Color) tries to spread Color features, which are [±back] and [±round] to all vowels in a phonological word, but this spread is modulated by IDENT(back) constraints specific to nominal categorical labels and the lexical item realizing the *dative* suffix, via the ranking in (40). The OT tableaux in (41) below show the derivation of some singular pronoun, plural pronoun, and a noun form.

(40) *Vowel Harmony Ranking*
IDENT(nP, back) ≫ HARMEXCP ≫ SPREAD(Color) ≫ IDENT(#P, back) ≫ IDENT(dative, back) ≫ IDENT(D, back) ≫ IDENT(KP, back)

(41) a. *Ottoman Turkish: Singular pronoun + dative ⇒ stem vowel backing*

/ben-a/ '1-DAT'	SPR(Color)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. [beŋa]	∗!∗			
b. [ben**e**] or [beŋ**e**]		∗!		∗
☞ c. [b**a**ŋa]			∗	∗

b. *Ottoman Turkish: Singular pronoun + non-dative suffix ⇒ typical vowel harmony*

/ben-da/ '1-LOC'	SPR(Color)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. [benda]	∗!∗			
☞ b. [bend**e**]				∗
c. [b**a**nda]			∗!	∗

c. *Ottoman Turkish: Plural pronoun + dative ⇒ typical vowel harmony*

/ben-a/ '1-DAT'	SPR(Color)	ID(#P,bk)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. [biza]	∗!∗				
☞ b. [biz**e**]			∗		∗
c. [b**ɯ**za]		∗!		∗	∗

d. *Ottoman Turkish: Noun + dative ⇒ typical vowel harmony*

/ev-a/ 'home-DAT'	ID(nP,bk)	SPR(Color)	ID(dat,bk)	ID(KP,bk)
a. [eva]		∗!∗		
☞ b. [ev**e**]			∗	
c. [**a**va]	∗!			∗

5.2.2 Consonant Alternation

The consonant alternation in group B varieties is derived by the same floating [Dorsal] feature mechanism as in group A varieties. The only distinction being that while group A varieties split IDENT(D, Dorsal) into two person-feature sensitive constraints IDENT(D[+participant], Dorsal) and IDENT(D[–participant], Dorsal) which derives a [±participant] pronoun split in the consonant alternation, group B does not have such a split, and follows the proposed general faithfulness hierarchy fully. So, the floating [Dorsal] feature originating from the dative suffix attaches to all singular pronouns in group B, and derives the consonant alternation /n/ → [ŋ], via the constraint ranking in (42). *MULTASSOC(Dorsal) forces the floating [Dorsal] feature to detach from the dative suffix /-a/ which is already associated with an inherent [Dorsal:[+back]] feature, and whether this floating feature can attach to the stem and result in consonant alternation or is deleted is modulated by the ranking of faithfulness constraints: {IDENT(nP, Dorsal), IDENT(#P, Dorsal)} ≫ MAX(Dorsal) ≫ IDENT(D, Dorsal).

(42) *Consonant Alternation Ranking*

$$*\textsc{MultAssoc}(\text{Dorsal}) \gg \left\{ \begin{array}{l} \textsc{Ident}(\text{nP, Dorsal}) \\ \textsc{Ident}(\#\text{P, Dorsal}) \end{array} \right\} \gg \textsc{Max}(\text{dors}) \gg \textsc{Ident}(\text{D, Dorsal})$$

The floating [Dorsal] feature from the dative suffix is deleted in nouns and plural nominals due to {IDENT(nP, Dorsal), IDENT(#P, Dorsal)} ≫ MAX(Dorsal), but in singular nouns, the [Dorsal] feature survives and results in a change in the pronoun root due to the ranking MAX(dors) ≫ IDENT(D, Dorsal).

(43) a. *Ottoman Turkish: Singular pronoun + dative ⇒ [Dorsal] associates with stem*

/ben-a[Dors,Dors] '1-DAT'/	*MULTA(Dors)	MAX(Dors)	ID(D,Dors)
a. bana[Dors,Dors]	∗!		
☞ b. baŋ[Dors]a[Dors]			∗
c. bana[Dors]		∗!	

b. *Ottoman Turkish: Plural pronoun + dative ⇒ [Dorsal] deletes*

/an-lar-a[Dors,Dors]/ '3-PL-DAT'	*MULTA(Dors)	ID(#P,Dors)	ID(D,Dors)	MAX(Dors)
a. anlara[Dors,Dors]	∗!			
b. aŋ[Dors]lara[Dors]		∗!	∗	
☞ c. anlara[Dors]				∗

c. *Ottoman Turkish: Noun + dative ⇒ [Dorsal] deletes*

/zamaːn-a[Dors,Dors]/ 'time-DAT'	*MULTA(Dors)	ID(nP,Dors)	MAX(Dors)
a. zamaːn[Dors,Dors]	∗!		
b. zamaːŋ[Dors]a[Dors]		∗!	
☞ c. zamaːna[Dors]			∗

5.3 Group C

5.3.1 Vowel Alternation

The vowel alternation in group C is derived in the same way as group A and B. The constraint SPREAD(Color) tries to spread vowel features across a phonological word, but the direction of the spread is determined by category-sensitive IDENT(back) constraints via the ranking in (44). The OT tableaux in (45) below show the derivation of some singular pronoun, plural pronoun, and a noun form.

(44) *Vowel Harmony Ranking*
IDENT(nP, back) ≫ HARMEXCP ≫ SPREAD(Color) ≫ IDENT(#P, back) ≫ IDENT(dative, back) ≫ IDENT(D, back) ≫ IDENT(KP, back)

(45) a. *Uyghur: Singular pronoun + dative ⇒ stem vowel backing*

/men-ɣa/ '1-DAT'	SPR(Color)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. [meŋa]	∗!∗			
b. [meŋ**e**]		∗!		∗
☞ c. [m**a**ŋa]			∗	∗

b. *Uyghur: Singular pronoun + non-dative suffix ⇒ typical vowel harmony*

/men-da/ '1-LOC'	SPR(Color)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. [menda]	∗!∗			
☞ b. [mend**e**]				∗
c. [m**a**nda]			∗!	∗

c. *Uyghur: Plural pronoun + dative ⇒ typical vowel harmony*

/silær-ɣa/ '2.PL-DAT'	SPR(Color)	ID(#P,bk)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. [silærɣa]	∗!∗				
☞ b. [silærg**e**]			∗		∗
c. [sil**a**rɣa]		∗!		∗	∗

d. *Uyghur: Noun + dative ⇒ typical vowel harmony*

/øj-ɣa/ 'home-DAT'	ID(nP,bk)	SPR(Color)	ID(dat,bk)	ID(KP,bk)
a. [øjɣa]		∗!∗		
☞ b. [øjg**e**]			∗	
c. [**u**jɣa]	∗!			∗

5.3.2 Consonant Alternation

In group C & D, the consonant alternation is a result of cluster simplification via deletion. The singular person pronouns end in a stem-final /n/ and the dative suffix starts with a /ɣ/ in these varieties, so the suffixation of dative case results in /nɣ/ clusters. I have argued that the lower ranking of MAX(D) compared to the MAX(dative) according to the proposed faithfulness hierarchy, and the cluster markedness constraint *NG which motivates simplification of nasal-velar obstruent clusters, result in deletion of /n/ from pronoun roots due to the ranking of MAX(D), as opposed to deletion of /ɣ/ from the dative suffix. The constraint ranking that derives this distribution is in (46).

(46) *Cluster Simplification Constraint Ranking*

$$\left\{\begin{array}{c}\text{MAX(nP)}\\ \text{MAX(\#P)}\\ \text{MAX(dative)}\\ \text{UNIF}\\ \text{MAX(nasal)}\end{array}\right\} \gg \text{*NG} \gg \left\{\begin{array}{c}\text{MAX(D)}\\ \text{MAX}\\ \text{IDENT(nasal)}\end{array}\right\}$$

Crucially, MAX constraints specific to *nP*, *#P*, and *dative*-internal phonological material is ranked above *NG, so /nɣ/ clusters are not reduced in nouns or plural nominals, but *NG ≫ MAX(D) derives /n/ deletion in dative singular pronouns. What sets group C apart from group D is that the form of the consonant alternation is /nɣ/ → [ŋ] in group C varieties. This is derived by the ranking of MAX(nasal) and IDENT(nasal) in (46): MAX(nasal) ≫ *NG causes a [nasal] feature to remain after the deletion of /n/, and MAX(nasal) ≫ IDENT(nasal) allows this remaining [nasal] feature to attach to the /ɣ/ phoneme on the dative suffix and turn it into [ŋ].

(47) *Uyghur: Singular pronoun + dative ⇒ /nɣ/ → [ŋ]*

/men$_1$-ɣ$_2$a/ '1.sg-DAT'	UNIF	MAX(nas)	*NG	MAX(D)	MAX	IDENT(nas)
a. man$_1$ɣ$_2$a			∗!			
b. maŋ$_{1,2}$a	∗!					∗
c. maɣ$_2$a		∗!		∗	∗	
☞ d. maŋ$_2$a				∗	∗	∗

In these languages, the plural pronouns do not have a stem-final /n/, so no /nɣ/ cluster simplification happens, but this analysis predicts that if there was such a form, it would not undergo cluster simplification. However, we can see /nɣ/ clusters survive in /n/-final nouns; as in (48), nouns ending in /n/ do not result in cluster simplification due to the higher ranking of MAX(nP) ≫ *NG, which blocks deletion of noun-internal material, and the cluster markedness constraint is unable to enact a change.

(48) *Chaghatay: Noun pronoun + dative ⇒ No deletion* (Thackston Jr., 1993)

/qorɣan$_1$-ɣ$_2$a/ ‘fortress-DAT’	MAX(nP)	UNIF	MAX(nas)	*NG	MAX	IDENT(nas)
☞ a. qorɣaŋ$_1$ɣ$_2$a				*		
b. qorɣaŋ$_{1,2}$a		*!				*
c. qorɣaɣ$_2$a	*!		*		*	
d. qorɣaŋ$_2$a	*!				*	*

5.4 Group D

5.4.1 Vowel Alternation

The vowel alternation in group D is derived in the same way as group A, B, and C. The constraint SPREAD(Color) tries to spread vowel features across a phonological word, but the direction of the spread is determined by category-sensitive IDENT(back) constraints via the ranking in (49). The OT tableaux in (50) below show the derivation of some singular pronoun, plural pronoun, and a noun form.

(49) *Vowel Harmony Ranking*
IDENT(nP, back) ≫ HARMEXCP ≫ SPREAD(Color) ≫ IDENT(#P, back) ≫ IDENT(dative, back) ≫ IDENT(D, back) ≫ IDENT(KP, back)

(50) a. *Kazakh: Singular pronoun + dative ⇒ stem vowel backing*

/men-ɣan/ ‘1-DAT’	SPR(Color)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. [meŋan]	*!*			
b. [meŋ**e**n]		*!		*
☞ c. [m**a**ɣan]			*	*

b. *Kazakh: Singular pronoun + non-dative suffix ⇒ typical vowel harmony*

/men-da/ ‘1-LOC’	SPR(Color)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. [menda]	*!*			
☞ b. [mend**e**]				*
c. [m**a**nda]			*!	*

c. *Kazakh: Plural pronoun + dative ⇒ typical vowel harmony*

/sen-der-ɣa/ ‘2.PL-DAT’	SPR(Color)	ID(#P,bk)	ID(dat,bk)	ID(D,bk)	ID(KP,bk)
a. [senderɣa]	*!*				
☞ b. [senderg**e**]			*		*
c. [s**a**nd**a**rɣa]		*!		*	*

d. *Uyghur: Noun + dative ⇒ typical vowel harmony*

/yj-ɣa/ ‘home-DAT’	ID(nP,bk)	SPR(Color)	ID(dat,bk)	ID(KP,bk)
a. [yjɣa]		*!*		
☞ b. [yjg**e**]			*	
c. [**u**jɣa]	*!			*

5.4.2 Consonant Alternation

(51) (52) *Cluster Simplification Constraint Ranking*

$$\left\{\begin{array}{c}\text{MAX(nP)}\\ \text{MAX(\#P)}\\ \text{MAX(dative)}\\ \text{UNIF}\\ \text{IDENT(nasal)}\end{array}\right\} \gg \text{*NG} \gg \left\{\begin{array}{c}\text{MAX(D)}\\ \text{MAX}\\ \text{MAX(nasal)}\end{array}\right\}$$

Again, just like group D, MAX constraints specific to *nP*, *#P*, and *dative*-internal phonological material is ranked above *NG, so /nɣ/ clusters are not reduced in nouns or plural nominals, but *NG ≫ MAX(D) derives /n/ deletion in dative singular pronouns. Group D realizes the consonant alternation as /nɣ/ → [ɣ], which is derived by the ranking of IDENT(nasal) ≫ *NG ≫ MAX(nasal) in (52). Thus, when *NG deletes pronoun root /n/, the [nasal] feature originally associated with that segment cannot attach to /ɣ/ due to the high ranking IDENT(nasal) and the low ranking MAX(nasal), and thus the dative suffix consonant surfaces as [ɣ].

(53) *Kazakh: Singular pronoun + dative ⇒ /nɣ/ → [ŋ]*

/men$_1$-ɣ$_2$an/ '1.sg-DAT'	UNIF	IDENT(nas)	*NG	MAX(D)	MAX	MAX(nas)
a. man$_1$ɣ$_2$an			*!			
b. maŋ$_{1,2}$an	*!	*				
c. maɣ$_{1,2}$an	*!					*
☞ d. maɣ$_2$an				*	*	*
e. maŋ$_2$an		*!		*	*	

In these languages, the plural pronouns do not have a stem-final /n/, so no /nɣ/ cluster simplification happens, but this analysis predicts that if there was such a form, it would not undergo cluster simplification. However, we can see /nɣ/ clusters survive in /n/-final nouns; as in (48), nouns ending in /n/ do not result in cluster simplification due to the higher ranking of MAX(nP) ≫ *NG, which blocks deletion of noun-internal material, and the cluster markedness constraint is unable to enact a change.

(54) *Kazakh: Noun pronoun + dative ⇒ No deletion*

/qaɣan$_1$-ɣ$_2$a/ 'khan-DAT'	MAX(nP)	UNIF	MAX(nas)	*NG	MAX	IDENT(nas)
☞ a. qaɣaŋ$_1$ɣ$_2$a				*		
b. qaɣaŋ$_{1,2}$a		*!				*
c. qaɣaɣ$_2$a	*!		*		*	
d. qaɣaŋ$_2$a	*!				*	*

5.5 Group E

Varieties in group E do not have either the vowel alternation or the consonant alternation. For example, Azerbaijani dative singular pronouns extend typical vowel harmony from pronouns, yielding forms like [mænæ] '1.SG-DAT' and [sænæ] '2.SG-DAT'. Another variety in this group is Uzbek, which has forms like [meŋga] '1.SG-DAT', which lacks both the reverse vowel harmony and the cluster simplification. Since the historical varieties preceding these varieties, Old Anatolian Turkish and Chaghatay, have the dative stem alternation, these varieties have innovated by losing the stem alternation.

This loss of the dative stem alternation could result from multiple different mechanisms: lexical change of the underlying form of the dative suffix, or change in faithfulness constraint rankings. In Standard Uzbek, where we get front vowel pronoun stems and back vowel dative suffixes, like [meŋga] '1.SG-DAT', we can see that the dative suffix surfaces with a [+back] vowel (Sjoberg, 1963).[8] In this case, the culprit for the loss of the vowel alternation is likely the loss of vowel harmony in the language (McCollum, 2019). In this analysis, this would be the reshuffling of faithfulness constraints above the harmony constraint SPREAD(Color). The lack of the consonant alternation, evidenced by the [ng] cluster in [meŋga], would also likely be explained by MAX(D) being ranked higher than the *NG constraint in this variety, thereby blocking cluster simplification across the board. This variety likely detracts from the faithfulness hierarchy, since the lack

[8]The phonetic realization of this vowel can actually be quite fronted for some varieties such as [æ], which can even be raised to [ɛ] word-finally. (Darragh Winkelman, personal communication)

of these alternations would most straightforwardly be explained by FAITH(D) being ranked higher in this variety compared to the groups A/B/C/D varieties.

The case of Azerbaijani is less certain, since this variety not only still has vowel harmony, but the dative forms of singular pronouns in fact extend backness of the stem vowel as nouns, as in [mænæ] '1.SG-DAT' and [sænæ]. Additionally, while this variety has a dative suffix /-e ∼ -a/, it does not trigger consonant alternation /n/ → [ŋ]. Thus, the grammar of Azerbaijani could involve both a change in the phonological specification of the dative suffix, and also a different ranking of constraints. It might, for example, be possible that Azerbaijani dative suffixes no longer lexically house the [Dorsal] suffix associated with a lost historical velar consonant, which would preclude any [Dorsal] feature associating with pronoun root-final /n/ to derive [ŋ]. But alternatively, it is also possible that the residual [Dorsal] feature is still encoded for the dative suffix lexical item, but the faithfulness to dative suffixes is lower in this variety, which hides any evidence of this feature. The fact that dative extends vowel harmony could also point to the a reranking of vowel harmony constraints to have IDENT(D, back) ≫ IDENT(dative, back).

In the end, group E is a heterogenous group of varieties that do not have the dative stem alternation, and have historically had this alternation but later lost it. Thus, the innovations that led to this loss can vary between these varieties, and I will leave the investigation of this loss to later work due to lack of relevant data, and the already large scope of this project that proposes a general pattern of phonological alternation constrained to pronominal paradigms in Turkic languages.

5.6 Diachronic Story

I have argued that the dative stem alternation is a shared phenomenon of the Turkic language family, with minor variations. Thus, I propose Proto-Turkic had a dative suffix */-ga/, where the velar and back vowel are each associated with a [Dorsal:[+back]] feature, and Proto-Turkic obeyed the proposed faithfulness hierarchy. Thus, the oldest attested Turkic language, Orkhon Turkic, shows this alternation. Then, some groups innovate different constraint rerankings, and undergo some changes to the form of the dative suffix to derive the micro-variation within the family, as schematized in Figure 1 below.

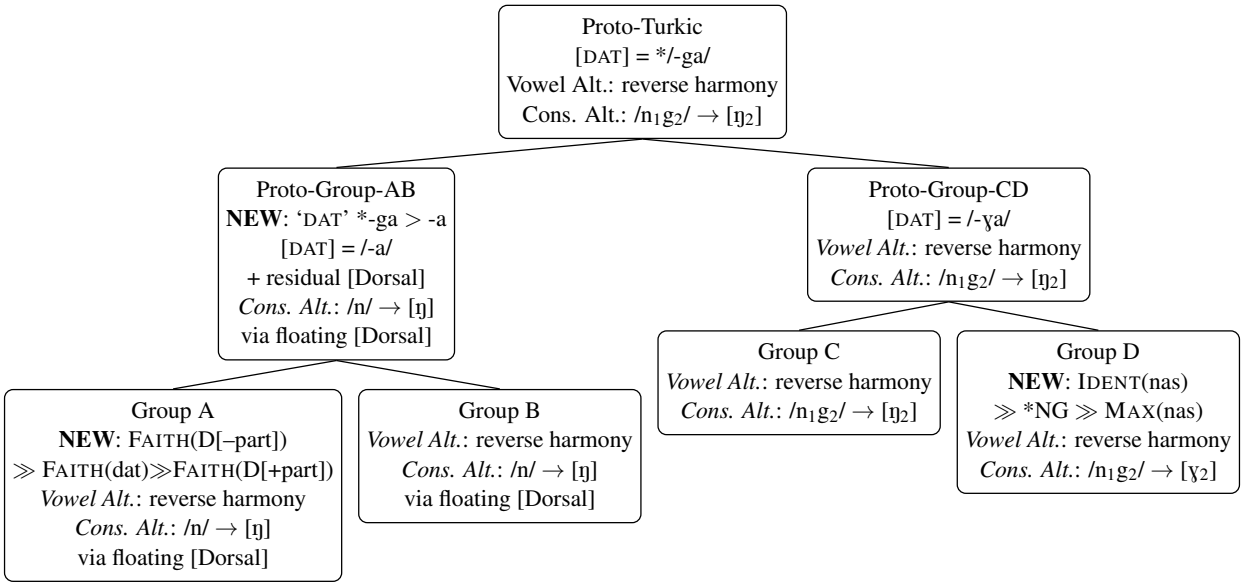


Figure 1: Diachronic Tree of Dative Stem Alternation

The main split that happens within the family is the loss of */g/ in the dative suffix in groups A/B. I have argued that the loss of */g/ was incomplete, and the [Dorsal] feature associated with this segment survived.

This dorsal feature is either deleted in the output, or floats and associates with a valid host, which derives the consonant alternation /n/ → [ŋ] in these varieties. Group A innovates a distinction between [+participant] and [–participant] pronouns, where [–participant] pronouns join nouns and plural nominals as high-ranked in the faithfulness hierarchy, but otherwise group A and B are identical in behaviour. The consonant alternation as this residual [Dorsal] feature floating and attaching to the pronoun root-final /n/ to derive [ŋ].

Groups C and D do not lose */g/, so the consonant alternation remains as a case of cluster simplification. The split between group C and D happens marks a difference in the exponent of the consonant alternation: Group C varieties keep the /nɣ/ → [ŋ] alternation, while Group D has /nɣ/ → [ɣ]. I propose that this is derived by a change of [nasal] faithfulness constraints: Group C preserves the ranking MAX(nasal) ≫ *NG ≫ IDENT(nasal) so that [nasal] survives the deletion of its host during cluster simplification and associates with /ɣ/ to derive [ŋ], while Group D reranks these constraints into IDENT(nasal) ≫ *NG ≫ MAX(nasal), so that [nasal] feature also gets deleted during cluster simplification.

Finally, some varieties such as Azerbaijani and Uzbek completely lose the dative stem alternation. Since this group comes from different proposed historical branches of the Turkic family, this group is a heterogeneous group, which I call Group E, but the reasons and mechanisms for the loss of the dative stem alternation under discussion across these varieties are likely varied and independent, and I leave the discussion of their minutae to later work.

6 Conclusion

I have presented a stem alternation in singular pronouns across multiple Turkic language varieties in the context of a dative suffix, and argued that this is a unified and shared phenomenon of the Turkic language family. I have argued that an allomorphic account of this alternation would not be able to derive the common and well defined phonological characteristics of the form change, and argued that the alternation is indeed phonological: it is derived by general phonological mechanisms like vowel harmony, consonant cluster simplification, and floating features searching for a compatible host that derive the alternant forms. These processes, however, are constrained by structurally indexed faithfulness constraints, which derive its distribution to a very apparently morphosyntactically defined domain: singular pronouns being affixed the dative case suffix. I argue that this distribution is not only derivable by categorically indexed phonological constraints, making this a case of *emergence of the unmarked*, a common and coherent faithfulness hierarchy to different nominal structures can be proposed and consistently derive the relative ranking of different families of faithfulness constraints underlying these three proposed general phonological mechanisms.

This analysis also makes a diachronic claim that the Turkic family, including the earliest attested varieties and current varities from distant branches of the family tree, shares this phenomenon with minor variations, and some individual varieties losing the dative stem alternation due to various innovations. Thus, Proto-Turkic likely had the dative stem alternation and underlying phonological mechanisms and the proposed Turkic faithfulness hierarchy, which got passed onto later varieties, and accumulated small changes in certain branches leading to a typology of micro-variation in its expression. Further work on this phenomenon could look at even more varieties and sharpen the differences in realization and proposed typology, as well as explore which kinds of innovations have led to the loss of this phenomenon in certain varieties.

On a broader context, this proposal argues for a language family specific faithfulness hierarchy that ranks faithfulness to true noun and plural nominal structures above pronoun roots. This raises questions about whether similar structure indexed faithfulness hierarchies can be found more generally crosslinguistically, and if so, whether there are general typological tendencies regarding faithfulness hierarchies of nouns vs. pronouns, large vs. small structures, and feature hierarchies such as person and number.

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