Valency-conditioned allomorphy in the verbal agreement of the Takestani dialect of Southern Tati

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Abstract

This paper studies the morphological structure of verbs in Takestani, an endangered Iranian dialect of Southern Tati. We analyze the effects of various morphological conditions on subject agreement allomorphy. The agreement suffix exhibits a large range of allomorphs in the past tense. We show that the primary factor for the agreement allomorphy is the valency of the root, and secondary factors are the presence of auxiliaries or perfective aspect. We also propose that the agreement allomorphy is a long-distance process. The agreement allomorphy is conditioned by the voice or transitivity of the verb stem even though stem is not directly adjacent to the agreement suffix. Alternative formulations in terms of clitics vs suffixes do not negate the long-distance nature of this allomorphy. We also find morphomic patterns of behavior, such that the verbal agreement suffixes are mobile and can alternatively surface as possessive suffixes on nouns.

1   Introduction

This paper looks at the morphological structure of verbs in Southern Tati (henceforth Tati), an understudied Iranian language. We analyze various morphological conditions on agreement allomorphy. Among Iranian languages, the structure of verbs has been documented in depth in some languages, especially Persian and Kurdish. But for Tati, the structure of verbs is relatively under-described in terms of all possible inflections, and Tati verbs are also under-analyzed in terms of the interaction between verbal morphology and phonology. The variety of Tati investigated in this study is the Takestani dialect (henceforth Takestani).

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As an empirical contribution, we focus on the realization of subject agreement. As previewed in Table 1, the agreement suffix (bold) displays a wide range of allomorphs in the past tense. The choice of allomorph is primarily conditioned by past tense and verb valency, i.e., whether the verb stem or root (bold) is transitive or intransitive. Other conditions are perfective aspect and the presence of auxiliaries. Crucially, the target of allomorphy (the agreement suffix) is not always linearly adjacent to the main triggers of allomorphy (valency on the root or verb stem + past tense suffix). Thus, we propose that agreement allomorph is long-distantly conditioned. Note that we use $\sqrt{}$ to gloss roots in our paradigms.

Table 1: Valency-conditioned subject agreement is non-locally conditioned

	Simple Past 3PL	Subj. Perfect 3PL
Transitive 'to rinse'	o-**kaˈʃ**-ast-**eʃon**	o-**kɛʃ**-ɛsˈt-ɛ-b-**iʃon**
Intransitive 'to return'	ʌ-**gɛrˈd**-ɛst-**indɛ**	ʌ-**gɛrd**-ɛsˈt-ɛ-b-**indɛ**
	PV-$\sqrt{}$-PST-3PL	PV-$\sqrt{}$-PST-PTCP-SBJV-3PL

Typologically, the wide-ranging allomorphy in Tati contrasts with some other Iranian languages which do not have valency-conditioned allomorphy (Persian: Mahootian 2002:227). There are other Iranian languages which on the surface show transitivity-induced agreement allomorphy (Laki: Moradi 2015). But it has been argued that at least for some of these languages, the set of transitive vs. intransitive agreement suffixes are not genuine allomorphs of each other, but that intransitive verbs select for suffixes while the transitive verbs receive clitics via some type of split-ergative system. In contrast for Takestani, we do not find independent evidence for split-ergativity.[1] Therefore, we do not see evidence for treating the transitive set as clitics, while the intransitive set as suffixes. Subject agreement in Takestani is sensitive to the person features of only the grammatical subject, regardless of transitivity; there is no object agreement.

Complicating allomorphy is the role of affix mobility. For the transitive past verbs in Takestani, the agreement suffixes can shift from the verb onto some nominal constituent. When this shift happens, the agreement suffixes take slightly different forms as possessive suffixes. We argue that the agreement and possessive suffixes are the same morphological items at an abstract morphological level, i.e., they're morphomic (Aronoff 1994; Herce 2023).

Our primary goal is to have a robust empirical picture on agreement allomorphy in Takestani. By doing so, we argue that Takestani morphology displays long-distance allomorphy. Long-distance allomorphy is cross-linguistically somewhat rare, and it is a contentious theoretical topic (Božič 2019). We provide realization rules for agreement allomorphy. We adopt an item-and-arrangement model to morphology, specifically piece-based Distributed Morphology (Halle & Marantz 1993; Embick & Noyer 2007; Embick

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[1]The fact that Takestani is arguably not a split-ergative system is an interesting future (syntactic) research question that is beyond the scope of this (morphological) paper.

2015). We do so out of convenience because we want to highlight the role of non-adjacent conditions on agreement allomorphy.

This paper is organized as follows. §2 provides background on Takestani verbal morphology. We go through agreement morphology for the synthetic tenses in §3. Past agreement marking varies by the transitivity of the stem. We discuss the mobility of agreement marking in the transitive past (§4). This mobility suggests that agreement and possessive suffixes are morphologically the same. Periphrastic tenses are covered in §5 where we again find valency-conditioned allomorphy. §6 discusses valency-changing morphology and other voice-changing operations, such that the change of verbal voice transparently causes a change in agreement. We catalog the agreement suffixes in §7 and analyze this distribution. The goal of the analysis is to explicitly show how voice or valency is a long-distance trigger in allomorphy. We briefly discuss whether a clitic analysis is suitable or not for the agreement suffixes. We ultimately argue that the clitic vs. affix distinction does not matter for allomorphy because the allomorphy is still long-distantly triggered. We then conclude in §8. The appendix provides an alternative analysis with a more fine-grained (though arguably less linguistically plausible) segmentation for the agreement suffixes, and additional descriptive data on auxiliaries.

2 Background on Tati and Takestani verbs

Tati is one of the branches of North-Western Iranian languages in the Indo-European language family. Tati is considered under-studied, although there is some valuable descriptive work on the language (Yarshater 1969; Taheri 2009; Rahmani & Rahmani 2021). Tati is spoken in the northern and northwestern parts of Iran, mainly in the Qazvin, Alborz, Markazi, Tehran, Ardabil, Gilan, Zanjan, and Khorasan-e-Shomali provinces. Tati is categorized by UNESCO's Atlas of the World's Languages in Danger as a "definitely endangered" language (Moseley 2010), meaning that its transition from parents to children has been interrupted. The variety of Tati investigated in this study, Takestani, is spoken by the Tat community in the city of Takestan and is known by its speakers as *Siyadiniji*. Siyaden is another name for Takestan used by the local people of the area, and Siyadiniji means 'of Siyaden'.

In Takestani, a verb usually consists of two elements: a preverb and the verb stem. The verb stem includes the root and any valency-changing suffixes such as the causative. The preverb-stem combination comprises the main lexical content of the verb. Some roots can select different preverbs, and the choice of preverb determines the actual lexical meaning of the verb, such as for the root /zan/ below.

(1) a. ˈbe-zan-em
         PV-√-1SG

    'I hit (present).'

  b. ˈʌ-zan-em

    PV-√-1SG

    'I blend.'

The set of preverbs is {a-, ʌ-, o-, u-, be-, de-}. Some irregular verbs lack a preverb such as [vʌt-em] 'say.PST-1SG (I said)'.

For inflection, Takestani uses some prefixes (imperfective and the negative), but inflection is primarily suffixal with suffixes for tense, aspect, and agreement.

In Iranian languages, each verb has at least two stems called the 'present stem' and the 'past stem' (Lazard 1992; Haig 2008). Likewise, Takestani uses present stems and past stems (Yarshater 1969). In terms of conjugation classes, Takestani verbs can be categorized in terms of the shape of their past stems (Table 2). For simple regular verbs like 'to rinse', the past stem is formed by just adding the past suffix *-ast* to the root. For some irregular verbs, the past suffix is *-d* or *-t*, and some suppletive verbs simply use a different root allomorph to mark the past stem.

Table 2: Partial overview of stem formation

	Regular 'to rinse'	Irregular 'to beat'	Suppletive 'to fall'	
Subj. Pres 1PL	ˈo-**kaʃ**-om(ɛ)	ˈʌ-**tʌʃ**-om(ɛ)	ˈbe-**gen**-om(ɛ)	PV-√-1PL
Past 1PL	o-**kaˈʃ-ast**-emon	ʌ-ˈ**tʌʃ-t**-emon	be-ˈ**kɛt**-imon	PV-√-PST-1PL

We do not discuss irregularities in forming the past stem. These irregularities do not affect subject agreement. Both regular and irregular verbs use the same system of subject agreement marking.

Data was collected in 2015-2019 from the first-named author, who is a native speaker of Takestani. She self-reports herself as a bilingual speaker of Takestani and Persian, and had learned Arabic and English since adolescence. She had lived seven years in the U.S. at the time of data collection for this study.[2]

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 [2]Glosses are as follows: ACC (accusative), AGR (agreement suffix), ASP (aspect), AUX (auxiliary), CAUS (causative suffix), CMPR (comparative suffix), DEF (definite suffix), F (feminine), IMP (imperative), IMPF (imperfective prefix), INF (infinitive suffix), INTR (intransitive), EZ (ezafe suffix), LOC (location suffix), MOOD (mood), M (masculine), PASS (pass), PL (plural), PLUP (pluperfect auxiliary), POSS (possessive suffix), PROG (progressive), PERF (perfect), POST (postposition), PRF (perfect), PRS (present), PST (past), PTCP (participle), PV (preverb), SBJV (subjunctive auxiliary), SG (singular), TRNS (transitive).

3 Synthetic present and past tenses

In terms of tense-aspect-agreement, the inflectional paradigms of Takestani verbs can be divided into three categories (Table 3): present-based tense, synthetic past-based tense, and complex tenses. The first two categories are synthetic, while the third is periphrastic. For simple regular verbs, the latter two categories use the past suffix -*ast* (the past stem), even in contexts where the verb is not semantically past. The third category of complex tenses is periphrastic, such that the verb root is in the form of a past participle: stem + past -*ast* + participle suffix -*a*. Tense and agreement are expressed on an encliticized auxiliary.

Table 3: Inflectional cells for the Takestani verb

		Present-based	Past-based	Complex tenses
Cells:	Finite	Present imperfective	Simple past	Present perfect
		Present subjunctive	Past imperfective	Pluperfect
		Imperative	Subjunctive Perfect	
	Non-finite		Infinitive	
			Past participle	
Property:		Synthetic	Synthetic	Periphrastic
		Do not use past -*ast*	Use past -*ast*	Use past -*ast*

We introduce verbal paradigms and the allomorphy of affixes in Takestani using two main examples: the transitive verb 'to rinse' [o-kaʃ-ast-an] and the intransitive verb 'to return' [ʌ-gard-ast-an]. We first delineate the present-based, then the past-based, then the complex tenses. We find that in the non-present tenses, agreement suffixes differ based on the transitivity of the root; we summarize Agreement (AGR) allomorphy in (§7). There are some prosodic differences across these suffixes, which we describe but do not analyze.

3.1 Present-based tenses

Present-based tenses consist of the present imperfective, imperative, and subjunctive present.

3.1.1 Present imperfective

In the present imperfective, the verb is inflected by separating the preverb (PV) and root with the imperfective prefix (IMPF). This prefix surfaces as -*n*- between a vowel-final preverb and a consonant-initial root. The root is then followed by the present agreement

suffix (PʀsAgʀ). These suffixes are the same for both transitive and intransitive verbs. We show the paradigm in Table 4.

Throughout the paradigms, we show the phonological form of inflected verbs before the application of phonological rules (the Underlying Representation; UR) and after the application of such rules (the Surface Representation; SR). These phonological rules are stress assignment, vowel harmony, and optional assimilation processes.

Table 4: Paradigm of present imperfective

	Transitive 'to rinse'		Intransitive 'to return'		Agr suffix
	UR	SR	UR	SR	
1SG	o-n-kaʃ-em(ɛ)	o-n-kaˈʃ-em(ɛ)	ʌ-n-gard-em(ɛ)	ʌ-n-garˈd-em(ɛ)	-em(ɛ)
	'I rinse'		'I return'		
2SG	o-n-kaʃ-i	o-n-kɛˈʃ-i	ʌ-n-gard-i	ʌ-n-gɛrˈd-i	-i
3MSG	o-n-kaʃ-e	o-n-kaˈʃ-e	ʌ-n-gard-e	ʌ-n-garˈd-e	-e
3FSG	o-n-kaʃ-ijɛ	o-n-kɛˈʃ-ijɛ	ʌ-n-gard-ijɛ	ʌ-n-gɛrˈd-ijɛ	-ijɛ
1PL	o-n-kaʃ-om(ɛ)	o-n-kaˈʃ-om(ɛ)	ʌ-n-gard-om(ɛ)	ʌ-n-garˈd-om(ɛ)	-om(ɛ)
2PL	o-n-kaʃ-ʌ	o-n-kaˈʃ-ʌ	ʌ-n-gard-ʌ	ʌ-n-garˈd-ʌ	-ʌ
3PL	o-n-kaʃ-endɛ	o-n-kaˈʃ-endɛ	ʌ-n-gard-endɛ	ʌ-n-garˈd-endɛ	-endɛ
	PV-IMPF-√-PʀsAgʀ		PV-IMPF-√-PʀsAgʀ		

Note that there are some suffixes which end in an optional vowel, like present 1SG *-em(ɛ)*. We mark such optionality with parentheses.

The present imperfective is used for simple present and in simple future tenses. For future tenses, adverbs of time are needed to specify that the verb has a future meaning.

(2) a. anɛ kʌrʌ teron-ɛ   **ʌ-n-garˈd-om(ɛ)**
         now PROG Tehran-LOC PV-IMPF-return-1PL

         'We are returning from Tehran now.'   (present)

     b. sʌbʌ   søb   teron-ɛ   **ʌ-n-garˈd-om(ɛ)**
         tomorrow morning Tehran-LOC PV-IMPF-return-1PL

         'We will return from Tehran tomorrow morning.'   (future)

Note that in the paradigm in Table 4, we provide the underlying and surface forms of the verbs. These differ in that the surface forms show the application of vowel harmony triggered by the /i/. To put it briefly, /a/ becomes [ɛ] before the vowel /i/.[3]

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[3]The full facts of vowel harmony are unclear to us. We set it aside for future work. For the above case with /a/ to /ɛ/, a reviewer notes that a more appropriate description can be calling it vowel raising, whereby a low vowel raises to mid in partial, regressive assimilation to a following high vowel.

Phonological rule 1. High-vowel induced vowel harmony

/a/	→	[ɛ]	/ _ . . . i
e.g., /o-n-kaʃ-ijɛ/	→	[o-n-kɛʲʃ-ijɛ]	'she rinses'

Takestani distinguishes three persons and two numbers (singular and plural). In the 3SG, gender is distinguished between masculine and feminine for the present tense and for intransitive past tense. Gender is unmarked for all other persons and numbers.

Present agreement suffixes uniformly place stress on the first syllable of the agreement suffix. It does not matter whether the suffix is monosyllabic or bisyllabic: 3MSG [o-n-kaˈʃ-e] or 3PL [o-n-kaˈʃ-endɛ] . For this paper, we merely describe this fact with the generalization below.

Stress rule 1. Stress in the present imperfective:
Present agreement suffixes assign stress to the first syllable of the agreement suffix.
E.g., [o-n-kaˈʃ-endɛ] 'they rinse'

3.1.2 Imperative

The imperative is formed by adding imperative agreement suffixes (IMPAGR) to the pre-verb and root (Table 5). The imperative 2SG is a covert agreement suffix or zero suffix, while the 2PL is overt /-ʌ/. The same imperative agreement suffixes are used for both transitive and intransitive verbs.

Table 5: Paradigm of imperative

	Transitive 'to rinse'		Intransitive 'to return'		Agr suffix
	UR	SR	UR	SR	
2SG	o-kaʃ-∅	ˈo-kaʃ	ʌ-gard-∅	ˈʌ-gard	-∅
	'come back!'		'return!'		
2PL	o-kaʃ-ʌ	ˈo-kaʃ-ʌ	ʌ-gard-ʌ	ˈʌ-gard-ʌ	-ʌ
	PV-√-IMPAGR		PV-√-IMPAGR		

Imperative verbs are used to give an order, request, direction, or instruction, to a second person (singular or plural). Examples below each contrast two verbs, one in present imperfective and the other one in imperative mood.

(3) a. az **m-iʃuˈr-em**   ta ˈo-kaʃ-∅
       1SG IMPF-wash-1SG 2SG PV-rinse-IMP-2SG

       'I wash (it), you rinse.'

   b. hami **me-ˈvʌt-em**   **ˈʌ-gard-∅**
      always IMPF-say.PST-1SG PV-return-IMP2SG
      'I always said "come back!".'

In terms of prosody, imperative verbs place stress on the first syllable of the verb (i.e., the preverb in the above examples).

Stress rule 2. Stress in the imperative:
Imperative verbs have stress on the first syllable.
E.g., [ˈʌ-gard-ʌ] 'rinse! (pl)'.

Note how in 2PL, the present and imperative utilize the same agreement suffix /-ʌ/. These two tenses differ in the presence of the imperfective prefix and in the placement of stress: [ʌ-n-garˈd-ʌ] 'you rinse (PL)' vs. [ˈʌ-gard-ʌ] 'rinse! (PL)'.

3.1.3   Subjunctive present

The final construction we discuss is the subjunctive present (Table 6). This construction consists of concatenating the preverb and root, then adding present agreement suffixes. Stress is placed on the initial syllable of the word, as it is in imperative verbs.

Table 6: Paradigm of the subjunctive present

	Transitive 'to rinse'		Intransitive 'to return'		Agr suffix
	UR	SR	UR	SR	
1SG	o-kaʃ-em(ɛ)	ˈo-kaʃ-em(ɛ)	ʌ-gard-em(ɛ)	ˈʌ-gard-em(ɛ)	-em(ɛ)
	'(If) I rinse'		'(If) I return'		
2SG	o-kaʃ-i	ˈo-kɛʃ-i	ʌ-gard-i	ˈʌ-gɛrd-i	-i
3MSG	o-kaʃ-e	ˈo-kaʃ-e	ʌ-gard-e	ˈʌ-gard-e	-e
3FSG	o-kaʃ-ijɛ	ˈo-kɛʃ-ijɛ	ʌ-gard-ijɛ	ˈʌ-gɛrd-ijɛ	-ijɛ
1PL	o-kaʃ-om(ɛ)	ˈo-kaʃ-om(ɛ)	ʌ-gard-om(ɛ)	ˈʌ-gard-om(ɛ)	-om(ɛ)
2PL	o-kaʃ-ʌ	ˈo-kaʃ-ʌ	ʌ-gard-ʌ	ˈʌ-gard-ʌ	-ʌ
3PL	o-kaʃ-endɛ	ˈo-kaʃ-endɛ	ʌ-gard-endɛ	ˈʌ-gard-endɛ	-endɛ
	PV-√-PRSAGR		PV-√-PRSAGR		

Subjunctive verbs are mostly used in the conditional mood, and after Exceptional Case-Marking (ECM) verbs like *think* (4c) or *want* (4b). We write the subjunctive verb in bold in the following examples.

(4)   a. armʌz-on tøn   **ˈo-kɛʃ-i**   me-ˈʃ-om   bar
        cloth-PL   quickly PV-rinse-2SG IMPF-go-1PL out
        'If you rinse the clothes quickly, we will go out.'

  b. мoɢo ˈʌ-**gard-em** sijʌden
    AUX.want PV-return-1SG Sijaden
    'I want to go back to Siyaden (Takestan).'

  c. ˈfek **jar-em** ʌ-n-garˈd-ʌ
    thought do-1SG PV-IMPF-return-2PL
    'I think you will return.'

In terms of prosody, we state the stress generalization below.

  Stress rule 3. Stress in the present subjunctive:
  Present subjunctive verbs have stress on the first syllable.
  E.g., [ˈo-kaʃ-endɛ] '(If) they rinse'.

Note the contrast between the present imperfective and the subjunctive present. These two differ in that they have different stress locations: [o-n-kaˈʃ-endɛ] 'they rinse' vs. [ˈo-kaʃ-endɛ] '(if) they rinse'. Furthermore, only the imperfective uses the imperfective prefix *-n-*.

This completes present-based tense. The next section discusses past-based tenses, where we see different sets of agreement suffixes based on transitivity.

3.2   Synthetic past-based tenses

The synthetic past-based tense consists of different categories of synthetic tenses. These tenses are unified in that they all use the past stem or past suffix *-ast*, which is placed between the root and the subject-verb agreement suffixes.

For presentational purposes, we distinguish finite and non-finite constructions. The finite constructions are the simple past, imperfective past, and present perfect. The non-finite constructions are the infinitive and participle.

3.2.1   Finite constructions

3.2.1.1   Simple past and past imperfective

Consider again the transitive verb 'to rinse' and intransitive verb 'to return'. In the simple past, the suffix *-ast* is added after the root. Different agreement suffixes are then added based on the verb's transitivity (Table 7). For example, the past 1SG marker is /-em(ɛ)/ for transitives but /-im(ɛ)/ for intransitives.

Table 7: Paradigm for simple past

	Transitive 'to rinse'		Intransitive 'to return'	
	UR	SR	UR	SR
1SG	o-kaʃ-ast-em(ɛ) 'I rinsed'	o-kaˈʃ-ast-em(ɛ)	ʌ-gard-ast-im(ɛ) 'I returned'	ʌ-gɛrˈd-ɛst-im(ɛ)
2SG	o-kaʃ-ast-i	o-kɛˈʃ-ɛst-i	ʌ-gard-ast-iʃ(ɛ)	ʌ-gɛrˈd-ɛst-iʃ(ɛ)
3MSG	o-kaʃ-ast-eʃ(ɛ)	o-kaˈʃ-ast-eʃ(ɛ) o-kaˈʃ-a͡tʃ-t͡ʃɛ	ʌ-gard-ast-∅	ʌ-garˈd-ast
3FSG	o-kaʃ-ast-eʃ(ɛ)	o-kaˈʃ-ast-eʃ(ɛ) o-kaˈʃ-a͡tʃ-t͡ʃɛ	ʌ-gard-ast-ɛ	ʌ-garˈd-ast-ɛ
1PL	o-kaʃ-ast-emon	o-kaˈʃ-ast-emon	ʌ-gard-ast-imon	ʌ-gɛrˈd-ɛst-imon
2PL	o-kaʃ-ast-ijon	o-kɛˈʃ-ɛst-ijon	ʌ-gard-ast-ijon	ʌ-gɛrˈd-ɛst-ijon
3PL	o-kaʃ-ast-eʃon	o-kaˈʃ-ast-eʃon o-kaˈʃ-a͡tʃ-t͡ʃon	ʌ-gard-ast-indɛ	ʌ-gɛrˈd-ɛst-indɛ
	PV-√-PST-TRNSPSTAGR		PV-√-PST-INTRPSTAGR	

The simple past is used for verbs whose action has started and ended in the past tense.

(5) a. ɢabl-e   be-oχʌrd-an sozi-m   χor **o-kaˈʃ-ast-em**
   before-EZ PV-eat-INF   vegetable-POSS.1SG well PV-rinse-PST-1SG
   'Before eating, I rinsed my vegetables well.'

  b. tøn   be-ˈʃɛi-mon   **ʌ-gɛrˈd-ɛst-imon**
   quickly PV-go.PST-1PL PV-return-PST-1PL
   'We went (and) came back quickly.'

The past imperfective is formed similarly (Table 8). The imperfective prefix /-n-/ is added between the preverb and root. The same Agr suffixes are used as in the simple past.

Table 8: Paradigm of past imperfective

	Transitive 'to rinse'		Intransitive 'to return'	
	UR	SR	UR	SR
1SG	o-n-kaʃ-ast-em(ɛ) 'I would rinse'	o-n-kaˈʃ-ast-em(ɛ)	ʌ-n-gard-ast-im(ɛ) 'I would return'	ʌ-n-gɛrˈd-ɛst-im(ɛ)
2SG	o-n-kaʃ-ast-i	o-n-kɛˈʃ-ɛst-i	ʌ-n-gard-ast-iʃ(ɛ)	ʌ-n-gɛrˈd-ɛst-iʃ(ɛ)
3MSG	o-n-kaʃ-ast-eʃ(ɛ)	o-n-kaˈʃ-ast-eʃ(ɛ) o-n-kaˈʃ-a͡tʃ-t͡ʃɛ	ʌ-n-gard-ast-∅	ʌ-n-garˈd-ast
3FSG	o-n-kaʃ-ast-eʃ(ɛ)	o-n-kaˈʃ-ast-eʃ(ɛ) o-n-kaˈʃ-a͡tʃ-t͡ʃɛ	ʌ-n-gard-ast-ɛ	ʌ-n-garˈd-ast-ɛ
1PL	o-n-kaʃ-ast-emon	o-n-kaˈʃ-ast-emon	ʌ-n-gard-ast-imon	ʌ-n-gɛrˈd-ɛst-imon
2PL	o-n-kaʃ-ast-ijon	o-n-kɛˈʃ-ɛst-ijon	ʌ-n-gard-ast-ijon	ʌ-n-gɛrˈd-ɛst-ijon
3PL	o-n-kaʃ-ast-eʃon	o-n-kaˈʃ-ast-eʃon o-n-kaˈʃ-a͡tʃ-t͡ʃon	ʌ-n-gard-ast-indɛ	ʌ-n-gɛrˈd-ɛst-indɛ
	PV-IMPF-√-PST-TRNSPSTAGR		PV-IMPF-√-PST-INTRPSTAGR	

The past imperfective is used for expressing repetitive actions in the past or the subjunctive mood in past.

(6) a. kiɛ dɛ hami a ɢʌb-on-i **o-n-kaˈʃ-ast-em**
   home at always 1SG dish-PL-POSS2SG PV-IMPF-rinse-PST-1SG
   'At home, it was always me who rinsed your dishes.'

   b. ɛgɛ søb **ʌ-n-gɛrˈd-ɛst-iʃɛ** anɛ engʌ dɛ vɛj-ʃ(ɛ)
   if morning PV-IMPF-return-PST-2SG now here LOC be.PST-2SG
   'If you returned in the morning, you would be here now.'

In terms of prosody, past agreement suffixes place stress on the preceding syllable, i.e., they are prestressing suffixes that place stress on the past suffix *-ast*.

Stress rule 4. Stress for past agreement suffixes:
Past agreement suffixes place stress on the preceding syllable (i.e., on the past suffix *-ast*).
E.g., [ʌ-garˈd-ast-ɛ] 'she returned'.

In terms of phonological alternations, as before, we find that the /i/ vowel in Agr suffixes triggers the raising of /a/ to [ɛ]. We see this raising in both the root and the past suffix: /ʌ-gard-ast-imon/ → [ʌ-gɛrˈd-ɛst-imon] 'we returned'.

Additionally, in Takestani, the following two-morpheme sequences can optionally assimilate to form a 'reduced' form of the sequence: /-ast-eʃ(ɛ)/ → [ast-eʃ(ɛ), -a͡tʃ-t͡ʃɛ]. The first morpheme is the past suffix /-ast/, and the second is a past transitive Agr suffix with /ʃ/

(3SG or 3PL). This assimilation does not apply in careful speech, but it applies in casual speech. It also varies by speaker. Such an assimilation process is not an automatic phonological rule in Takestani. It is restricted to some transitive Agr suffixes, for example to the transitive past 3SG /-eʃ(ε)/ but not the intransitive 2SG /-iʃ(ε)/. We do not find this process applying outside of verbal paradigms.

3.2.1.2 Present perfect

Finally, consider the present perfect (Table 9).[4] The present perfect is formed slightly differently from the simple past. The past suffix /-ast/ is added after the root and then followed by the present perfect agreement suffix. Again, these agreement suffixes vary by the transitivity of the verb. For example, the present perfect 3PL agreement suffix is /-iʃon/ for transitives but /-indε/ for intransitives. The set of present perfect agreement suffixes differs from that of the past agreement suffixes. For example, the past 3PL marker is /-eʃon/ for transitives instead of /-iʃon/. We call this of suffixes the perfect agreement suffixes (Perf Agr).

Table 9: Paradigm of present perfect

	Transitive 'to rinse'		Intransitive 'to return'	
	UR	SR	UR	SR
1SG	o-kaʃ-ast-im(ε)	o-kεʃ-εsˈt-im(ε)	ʌ-gard-ast-εjm(ε)	ʌ-gεrd-εsˈt-εjm(ε)
	'I have rinsed'		'I have returned'	
2SG	o-kaʃ-ast-i	o-kεʃ-εsˈt-i	ʌ-gard-ast-εjʃ(ε)	ʌ-gεrd-εsˈt-εjʃ(ε)
3MSG	o-kaʃ-ast-iʃ(ε)	o-kεʃ-εst-ˈiʃε	ʌ-gard-ast-i	ʌ-gεrd-εsˈt-i
		o-kεʃ-ε͡tʃ-ˈt͡ʃijε		
3FSG	o-kaʃ-ast-iʃ(ε)	o-kεʃ-εst-ˈiʃε	ʌ-gard-ast-ijʌ	ʌ-gεrd-εst-iˈjʌ
		o-kεʃ-ε͡tʃ-ˈt͡ʃijε		
1PL	o-kaʃ-ast-imon	o-kεʃ-εsˈt-imon	ʌ-gard-ast-εjmon	ʌ-gεrd-εsˈt-εjmon
2PL	o-kaʃ-ast-ijon	o-kεʃ-εsˈt-ijon	ʌ-gard-ast-εjon	ʌ-gεrd-εsˈt-εjon
3PL	o-kaʃ-ast-iʃon	o-kεʃ-εst-ˈiʃon	ʌ-gard-ast-indε	ʌ-gεrd-εsˈt-indε
		o-kεʃ-ε͡tʃ-ˈt͡ʃijo		
	PV-√-PST-TRNSPRFAGR		PV-√-PST-INTRPRFAGR	

The present perfect is used for actions looked at as completed in the time of stating the verbs. Examples are below.

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[4]Morphologically, we classify the present perfect as a synthetic past-based tense because it uses the past marker /-ast/. At first glance, the use of the past suffix here does not look semantically motivated. But it has been argued that past semantics is part of the calculation of perfect semantics (Kiparsky 2005:123; Moradi 2019, 2020, 2021:ch3.1).

(7) a. sar-em   **b-iʃurˈd-im(ɛ)**   **o-keʃ-ɛsˈt-im(ɛ)**
         head-POSS1SG PV-wash.PST-PRF1SG PV-rinse-PST-PRF1SG
         'I have washed (and) rinsed my head.'

     b. dʌnɛ   hatman   **ʌ-gɛrd-ɛsˈt-i**
         till.now definitely PV-return-PST-PRF1MSG
         'He has definitely come back by now.'

In terms of optional phonology, the past suffix and following transitive Agr suffixes can assimilate to a reduced form: 3SG /-ast-iʃɛ/ → [-ɛst-ˈiʃɛ, -ɛt͡ʃ-ˈt͡ʃijɛ] and 3PL /-ast-iʃon/ → [-ɛst-ˈiʃon, -ɛt͡ʃ-ˈt͡ʃijon]. Again, this optional reduction is restricted to this set of past transitive Agr suffixes. Note that the morph /-iʃ(ɛ)/ is reducible when it is the transitive present perfect 3SG suffix but not when it is the intransitive past 2SG suffix (Table 7).

In terms of harmony, the surface [i] triggers the raising of the previous /a/ vowel: /ʌ-gard-ast-ijʌ/ → [ʌ-gɛrd-ɛst-iˈjʌ] 'she has returned'. Furthermore, the harmony trigger can be a surface glide [j]: /ʌ-gard-ast-ɛjmon/ → [ʌ-gɛrd-ɛsˈt-ɛjmon] 'they have returned'. Data is too limited to know whether the glide trigger can be any surface appearance of [j], even if the glide is likely epenthetic. For example, the intransitive 3FSG is a surface [-ijʌ] suffix, but one could argue that it is underlying /-iʌ/ with the surface glide being epenthetic. Furthermore, one could argue that the surface [-ɛjmon] is underlyingly /-ɛimon/, such that the high vowel triggers harmony and then turns into a glide. At this point, data is too limited to convincingly argue for one analysis over another.

In terms of stress, the present perfect Agr suffixes generally place stress on the first syllable of the suffix: [ʌ-gɛrd-ɛsˈt-ɛjon] 'you.PL have returned'. The exception is intransitive 3FSG, where stress is on the second syllable of the suffix: [ʌ-gɛrd-ɛst-iˈjʌ] 'she has returned'.

> **Stress rule 5.** Stress for present perfect agreement suffixes:
> Most of the present perfect agreement suffixes place stress on their first syllable (i.e., on the Agr suffix itself). Intransitive 3FSG are the exception by placing stress on the second syllable of the suffix.
> E.g., [ʌ-gɛrd-ɛsˈt-ɛjm(ɛ)] I have returned' but [ʌ-gɛrd-ɛst-iˈjʌ] 'she has returned'.

It is not obvious why the stress is different for 3FSG [-iˈjʌ]. We cannot blame the difference on vowel hiatus because transitive 1PL has initial stress [-ˈijon]. One could hypothesize that /ʌ/ attracts stress over /i/ because /ʌ/ is more sonorous, but sonority-sensitive stress is not attested elsewhere in the language.

Note how the agreement markers all take stress. This suggests that the present perfect is a synthetic construction and not periphrastic. We do not find any obvious evidence for treating the present perfect as containing a covert auxiliary.

3.2.2   Non-finite constructions

The last subcategory in the past-based tense are non-finite forms. These forms utilize the past suffix /-ast/, even though this suffix does not contribute any past semantics. These forms include the infinitive and the past participle (Table 10).

Infinitives are formed by adding the past suffix onto the root, followed by the infinitive suffix /-an/. The participle is formed by adding the suffix /-ɛ/ after the past suffix. Stress is final.

Table 10: Formation of infinitive and past participle

	'to rinse'	'to return'	
Infinitive	o-kaʃ-asˈt-an	ʌ-gard-asˈt-an	PV-√-PST-INF
Participle	o-kaʃ-asˈt-ɛ	ʌ-gard-asˈt-ɛ	PV-√-PST-PTCP

The infinitive has the past suffix even though it is a non-finite verb. As for the participle, it is likewise non-finite. It can be used as an adjective modifier without any past connotations.

(8) a. o-kaʃ-ast-ɛ   armʌz tamiz = e
         PV-rinse-PST-PTCP cloth   clean = is.PRS3SG

         'the rinsed cloth is clean.'
     b. ʌ-gard-ast-ɛ   asif-on   χarʌb = endɛ
         PV-return-PST-PTCP apple-PL bad = is.PRS3PL

         'the returned apples are bad.'

Thus, infinitives and participles utilize the past suffix but do so meaninglessly, meaning that the past suffix does not compositionally contribute any semantic values like past tense. The past suffix can be considered morphomic in these contexts (Aronoff 1994), meaning that the past stem is acting as a morphomic verbal stem (Haig 2008; Kaye 2013). The analysis of such past stems as morphomic has precedents in the morphological literature on Iranian and areally nearby languages (Talyshi: Kaye 2013; Persian: Bonami & Samvelian 2015; Kurdish: Kalin & Atlamaz 2018; Armenian: Dolatian & Guekguezian 2022; Overviews: Belyaev 2021:607, Herce 2023:96).

4   Mobile past markers and bi-morphemic decompositions

Before analyzing the allomorphy of past agreement, we first discuss the mobility of these markers. For transitive verbs, the past agreement suffixes stay on the verb if no object is

present. But if an object is present, then the agreement suffixes move to the object and surface as possessive suffixes. No such movement is attested for intransitive verbs.

This mobility is tied into how the past agreement suffixes are nearly identical with nominal possessive suffixes. The agreement suffixes compete with possessive suffixes such that a possessive suffix on an object prevents the agreement suffix from jumping to the object.[5] This mobility suggests that two sets of suffixes are morphologically the same items.

4.1 Possessive marking

Nouns can take prestressing possessive suffixes, which mark the person and number of the possessor (Table 11).

Table 11: Paradigm of possessive suffixes

	arˈmʌz	'cloth'
1SG	arˈmʌz-em	'my cloth'
2SG	arˈmʌz-i	'your.SG cloth'
3MSG	arˈmʌz-eʃ	'his cloth'
3FSG	arˈmʌz-eʃ	'her cloth'
1PL	arˈmʌz-emon	'our cloth'
2PL	arˈmʌz-ijon	'your.PL cloth'
3PL	arˈmʌz-eʃon	'their cloth'

The possessive suffixes look nearly identical to the transitive past agreement suffixes. We contrast the two sets in Table 12. Both sets of suffixes are prestressing, which we represent with the asterisk *. The main difference between the two sets is that the 1SG and 3SG past suffixes end in an optional vowel. This final vowel is absent in the possessive set.

Table 12: Similarity of possessive suffixes and transitive past agreement suffixes

	Possessive	Transitive past Agr	Underlying form
1SG	*-em	*-em(ɛ)	*-em<ɛ>
2SG	*-i	*-i	*-i
3MSG	*-eʃ	*-eʃ(ɛ)	*-eʃ<ɛ>
3FSG	*-eʃ	*-eʃ(ɛ)	*-eʃ<ɛ>
1PL	*-emon	*-emon	*-emon
2PL	*-ijon	*-ijon	*-ijon
3PL	*-eʃon	*-eʃon	*-eʃon

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[5]The near-identity of agreement and possessive marking, and the mobility of such agreement markers is also found in some other Iranian languages, such as Laki (Taghipour 2017:51ff).

Because the possessive suffixes and agreement suffixes look almost the same in form, they are likely diachronically connected. Synchronically, we argue that the possessive and transitive past agreement suffixes are the same morphemes. The reason is because of the mobility of these markers and their co-occurence restrictions in the following section.

Before we discuss the evidence for unifying these two sets of suffixes, we first show the analysis.

For slots like 1SG, both possessive [-em] and past [em(ε)] are derived from the same underlying form /-em<ε>/. The final vowel is a floating vowel, represented by brackets. This vowel can optionally dock or surface, but it is banned from docking in nouns. A unified analysis thus requires a complex morphosyntactic phonological rule specific to these morphemes.

> **Phonological rule 2.** Docking final vowel in verbs:
>
> For suffixes with a final floating vowel, this vowel is a floating vowel. It is docked optionally and only in verbs.
>
> <V> → V / in a verb (optional)

Semantically the possessive and agreement suffixes don't form a natural class. Such a unified analysis would necessarily be morphomic (Herce 2023).

4.2 Mobility of past agreement

In the present, the present Agr suffixes stay fixed to the verb. These suffixes are stable in both transitive and intransitive verbs.

(9) a. arˈmʌz **o-n-kaˈʃ-ʌ**
       cloth   PV-IMPF-rinse-2PL
       'You.PL rinse a cloth.'
    b. moˈɢo døkˈtør **ˈgɛrd-ijε**
       want   doctor become-3FSG
       'She wants to become a doctor.'

In contrast, in the past, the Agr suffixes are placed on the object as possessive suffixes, not on the verb, in transitive sentences.

(10) a. arˈmʌz-**ijon**   **o-kaˈʃ-ast**
        cloth-POSS2PL PV-rinse-PST
        'You.PL rinsed a cloth.'

    b. *arˈmʌz **o-kaˈʃ-ast-ijon**
        cloth   PV-rinse-PST-2PL
        'You.PL rinsed a cloth.'

Thus the agreement markers from the verb are replaced with possessive markers on the object. This is evidence that at an abstract morphological level, the agreement and possessive suffixes are the same unit.

The object can be unmarked for definiteness or number, as in the above examples. The object can likewise be singular definite (11a-11b), plural indefinite (11c-11d), or plural definite (11c, 11e). In all these cases, the agreement suffixes are absent from the verb; instead object takes the possessive suffixes in the past. Note that the singular definite suffix is /-e/, but it is absent before possessive suffixes. For plurals, there is no definite suffix. When a plural takes the mobile Agr suffixes from the verb, stress is used to distinguish definites from indefinites.

(11)   a. armʌˈz-e
         cloth-DEF
         'the cloth (non-subject position)'

        b. armʌz-iˈ**jon**   **o-kaˈʃ-ast**
         cloth-POSS2PL PV-rinse-PST
         'You.PL rinsed the cloth.'

        c. armʌˈz-on
         cloth-PL
         'clothes (definite or indefinite)'

        d. armʌˈz-on-**ijon**   **o-kaˈʃ-ast**
         cloth-PL-POSS2PL PV-rinse-PST
         'You.PL rinsed clothes.'

        e. armʌz-on-iˈ**jon**   **o-kaˈʃ-ast**
         cloth-PL-DEF-POSS2PL PV-rinse-PST
         'You.PL rinsed the clothes.'

For transitive verbs in the past tense, Agr suffixes surface on the verb only if either a) the object is removed (12a), or b) the object is possessed and has its own possessive suffix (12b-12d). For these sentences, we perceive stress before the possessive/agreement suffixes, but the prominence is weak.

(12)   a. **o-kaˈʃ-ast-ijon**
         PV-rinse-PST-2PL
         'You.PL rinsed (something).'

    b. arˈmʌz-em   **o-kaˈʃ-ast-ijon**
       cloth-POSS1SG PV-rinse-PST-2PL
       'You.PL rinsed my cloth.'

    c. arˈmʌz-ijon   **o-kaˈʃ-ast-ijon**
       cloth-POSS2PL PV-rinse-PST-2SG
       'You.PL rinsed your.PL cloth.'

    d. armʌˈz-on-ijon   **o-kaˈʃ-ast-ijon**
       cloth-PL-POSS2PL PV-rinse-PST-2SG
       'You.PL rinsed your.PL clothes.'

The above data show that agreement marking can't shift to an object that already has possessive markers. There is thus a co-occurrence restriction against have the two markers together on a noun. This is further evidence that the two sets of morphemes are morphologically the same at an abstract level.

For objects with demonstratives, we see similar behavior. In the present, these nouns do not take the Agr suffixes. In the past, they take the Agr suffixes as possessives. Note that the ezafe marker *-e* is absent before the Agr suffixes.[6]

(13)   a. d͡ʒi armʌˈz-e **o-n-kaˈʃ-ʌ**
        this cloth-EZ PV-IMPF-rinse-2PL
        'You.PL rinse this cloth.'

     b. d͡ʒi armʌz-iˈjon   **o-kaˈʃ-ast**
        this cloth-POSS2PL PV-rinse-PST
        'You rinsed this cloth.'

     c. d͡ʒi armʌˈz-on **o-n-kaˈʃ-ʌ**
        this cloth-PL   PV-IMPF-rinse-2PL
        'You rinse these clothes.'

     d. d͡ʒi armʌz-on-iˈjon   **o-kaˈʃ-ast**
        this cloth-PL-POSS2PL PV-rinse-PST
        'You rinsed these clothes.'

Note that stress distinguishes possessive suffixes that mark true possession vs. possessive suffixes that mark subject agreement. In Table 13, we see that the possessive suffix /-ijon/ is not stressed when it marks possession on the noun [armʌˈz-on-ijon] (12c, 12d),

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[6]Ezafe (often abbreviated as "EZ") is a grammatical particle used in some Iranian languages, including Tati and Persian, to link nouns with their modifiers, such as adjectives, possessors, and prepositional phrases (Kahnemuyipour 2014; Taghipour & Rahmani 2023).

but it can take stress when it marks subject agreement [armʌz-on-**iˈjon**] (11b, 11e).[7] It's unclear to us how to best formalize the stress difference.

Table 13: Stress differences for objects with vs. without agreement-based possessive suffixes (underlining for stress, boldface for agreement)

	Has agreement-based possessive suffix?	
	no	yes
singular indefinite	arˈm<u>ʌ</u>z (9a)	arˈm<u>ʌ</u>z-**ijon** (10a)
singular definite	armʌˈ<u>z-e</u> (11a)	armʌz-i**ˈjon** (11b)
plural indefinite	armʌˈ<u>z-on</u> (11c)	armʌˈ<u>z-on</u>-**ijon** (11d)
plural definite	armʌˈ<u>z-on</u> (11c)	armʌz-on-i**ˈjon** (11e)
singular possessed	arˈm<u>ʌ</u>z-ijon (12c)	NA
plural possessed	armʌˈ<u>z-on</u>-ijon (12d)	NA

By contrast, for intransitives in the past tense, the Agr always surface on the verb, never on the subject or any other constituent.

(14) døktør **garˈd-ast-ɛ**
     doctor become-PST-3FSG
     'She became a doctor.'

The above cases are for the simple past. We likewise find that the past Agr shifts to the transitive object for the past imperfective. For contrast, we provide a sentence without the object.

(15) a. **o-n-kaˈʃ-ast-ijon**
        PV-IMPF-rinse-PST-2PL
        'You.PL were rinsing (something).'
    b. arˈmʌz-**ijon**   **o-n-kaˈʃ-ast**
        cloth-POSS2PL PV-IMPF-rinse-PST
        'You.PL were rinsing cloth.'

4.3 Mobility in complex predicates

Like several other Iranian languages such as Persian, Tati has complex predicates in which the 'verb' is made up of a light verb and a preverbal word (Persian: Dabir-Moghaddam

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[7]The stress judgments are impressionistic. A future phonetic study should verify the prosodic differences for the possessive suffix when it marks subject agreement on a definite noun. We suspect the stress differences are marked by a combination of pitch and duration, and that the actual phonetic cues or signals are weak.

1997; Folli et al. 2005; Megerdoomian 2012; Kurdish: Gündoğdu 2015). Together, these two elements form a semantically non-compositional unit. This unit can be transitive and take an object. We see complicated patterns of agreement mobility for such predicates.

For example, consider the root /-kaʃ-/. With the preverb /-o-/, this preverb + root combination means 'to rinse'. With the preverb /be-/, the preverb + root combinations means 'to drag'. Finally, when used in combination with the word /sar/ 'head' and without a preverb, the construction non-compositionally means 'to guzzle'.

(16) a. o-kaʃ-asˈt-an
          PV-√-PST-INF
          "to rinse'

      b. be-kaʃ-asˈt-an
          PV-√-PST-INF
          'to drag'

      c. sar   kaʃ-asˈt-an
          head root-PST-INF
          'to guzzle' (lit. 'to drag to one's head')

If the complex predicate is transitive and has past agreement, then we see mobility of the agreement suffix. When the object is absent, we see past agreement shifting to the preverbal word. When an object is present, the agreement shifts to the object.

(17) a. ˈsar-**em**   kaˈʃ-**ast**
          head-POSS1SG root-PST
          'I guzzled.'

      b. ʃarˈbat-**em**   sar kaˈʃ-**ast**
          drink-POSS1SG head root-PST
          'I guzzled a drink.'

Across Iranian languages, there is ample work on complex predicates, for example in Persian (Karimi 1997) and Balochi (Korn 2009). One of the most important features of complex predicates in Iranian languages that is agreed upon is their non-compositionality, and their idiomaticity in semantics and event structure. For instance, in the verbal construction in (17b), the meaning of [sar kaʃ-ast] 'to guzzle' is not entirely the sum of the meanings of /sar/ 'head' and the root. For the sake of space, we do not discuss complex predicates in depth.

4.4   Agreement in the present perfect as bi-mophemic

The present perfect likewise shows the mobility of the agreement suffix for transitive verbs. We show such mobility in this section. We likewise discuss a segmentation problem for the relevant agreement markers.

Recall that in past-based tense, transitive verbs show two types of past agreement suffixes. One set is for the simple past, another for the present perfect. We repeat the paradigms for transitive verbs only (Table 14).

Table 14: Paradigm of transitive simple past and present perfect

	Simple past 'to rinse'		Present perfect 'to rinse'	
	UR	SR	UR	SR
1SG	o-kaʃ-ast-em(ɛ) 'I rinsed'	o-kaˈʃ-ast-em(ɛ)	o-kaʃ-ast-im(ɛ) 'I have rinsed'	o-kɛʃ-ɛsˈt-im(ɛ)
2SG	o-kaʃ-ast-i	o-kɛˈʃ-ɛst-i	o-kaʃ-ast-i	o-kɛʃ-ɛsˈt-i
3MSG	o-kaʃ-ast-eʃ(ɛ)	o-kaˈʃ-ast-eʃ(ɛ) o-kaˈʃ-at͡ʃ-t͡ʃɛ	o-kaʃ-ast-iʃ(ɛ)	o-kɛʃ-ɛst-ˈiʃɛ o-kɛʃ-ɛt͡ʃ-ˈt͡ʃijɛ
3FSG	o-kaʃ-ast-eʃ(ɛ)	o-kaˈʃ-ast-eʃ(ɛ) o-kaˈʃ-at͡ʃ-t͡ʃɛ	o-kaʃ-ast-iʃ(ɛ)	o-kɛʃ-ɛst-ˈiʃɛ o-kɛʃ-ɛt͡ʃ-ˈt͡ʃijɛ
1PL	o-kaʃ-ast-emon	o-kaˈʃ-ast-emon	o-kaʃ-ast-imon	o-kɛʃ-ɛsˈt-imon
2PL	o-kaʃ-ast-ijon	o-kɛˈʃ-ɛst-ijon	o-kaʃ-ast-ijon	o-kɛʃ-ɛsˈt-ijon
3PL	o-kaʃ-ast-eʃon	o-kaˈʃ-ast-eʃon o-kaˈʃ-at͡ʃ-t͡ʃon	o-kaʃ-ast-iʃon	o-kɛʃ-ɛst-ˈiʃon o-kɛʃ-ɛt͡ʃ-ˈt͡ʃijon
	PV-√-PST-TRNSPSTAGR		PV-√-PST-TRNSPRFAGR	

As the paradigms make clear, no person-number combination is completely identical in both the simple past and present perfect. For example, in 1SG, the past agreement suffix is /-em(ɛ)/, while the present perfect agreement suffix is /-im(ɛ)/. Some combinations are segmentally identical but prosodically different. For example, 2PL is prestressing /-ijon/ in the simple past but stressed /-ijon/ in the present perfect.

However, we see syncretism across the two sets when the present perfect verb has an object. When a transitive verb lacks an object, the agreement is on the verb. But when an object is present, then the agreement suffix shifts to the object and surfaces as a possessive suffix. On the verb, what remains is a segment /-i/, which we gloss as -PERF.

(18)   a.   **o-kɛʃ-ɛsˈt-im(ɛ)**
             PV-rinse-PST-PRF1SG

             'I have rinsed (something).'

       b.   arˈmʌz-**em**   **o-kɛʃ-ɛsˈt-i**
             cloth-POSS1SG PV-rinse-PST-PERF

'I have rinsed cloth.'

As before, mobility occurs when the object is bare (18b), definite (19a), plural (19b), or plural definite (19c). Mobility is blocked if the object has its own possessive suffix (19d,19e).

(19) a. /armʌz-e-**em**   **o-kaʃ-ast-i**/
          armʌˈz-∅-**em**   **o-kɛʃ-ɛsˈt-i**
          cloth-DEF-POSS1SG PV-rinse-PST-PERF

          'I have rinsed the cloth.'

      b. armɛˈz-on-**em**   **o-kɛʃ-ɛsˈt-i**
          cloth-PL-POSS1SG PV-rinse-PST-PERF

          'I have rinsed clothes.'

      c. /armʌz-on-e-**em**   **o-kaʃ-ast-i**/
          armʌz-oˈn-∅-**em**   **o-kɛʃ-ɛsˈt-i**
          cloth-PL-(DEF)-POSS1SG PV-rinse-PST-PERF

          'I have rinsed the clothes.'

      d. arˈmʌz-**em**   **o-kɛʃ-ɛsˈt-im(ɛ)**
          cloth-POSS1SG PV-rinse-PST-PERFPRF1SG

          'I have rinsed my cloth.'

      e. arˈmʌz-**emon**   **o-kɛʃ-ɛsˈt-im(ɛ)**
          cloth-POSS1SG PV-rinse-PST-PERFPRF1SG

          'I have rinsed our cloth.'

In Table 15, we provide the full paradigm of transitive present perfect verbs with an object versus without an object.

Table 15: Paradigm of the transitive present perfect with agreement shifting, using 'to rinse'

	without object (SR)	with object (SR)	
1SG	o-kɛʃ-ɛsˈt-im(ɛ)	arˈmʌz-em	o-kɛʃ-ɛsˈt-i
	'I have rinsed'	'I have rinsed the cloth'	
2SG	o-kɛʃ-ɛsˈt-i	arˈmʌz-i	o-kɛʃ-ɛsˈt-i
3MSG	o-kɛʃ-ɛst-ˈiʃɛ	arˈmʌz-eʃ	o-kɛʃ-ɛsˈt-i
	o-kɛʃ-ɛt͡ʃ-ˈt͡ʃijɛ		
3FSG	o-kɛʃ-ɛst-ˈiʃɛ	arˈmʌz-eʃ	o-kɛʃ-ɛsˈt-i
	o-kɛʃ-ɛt͡ʃ-ˈt͡ʃijɛ		
1PL	o-kɛʃ-ɛsˈt-imon	arˈmʌz-emon	o-kɛʃ-ɛsˈt-i
2PL	o-kɛʃ-ɛsˈt-ijon	arˈmʌz-ijon	o-kɛʃ-ɛsˈt-i
3PL	o-kɛʃ-ɛst-ˈiʃon	arˈmʌz-eʃon	o-kɛʃ-ɛsˈt-i
	o-kɛʃ-ɛt͡ʃ-ˈt͡ʃijon		
	PV-√-PST-TRNSPRFAGR	cloth-POSSAGR PV-√-PST-PERF	

Based on the data, there are two possible segmentation analyses for the agreement markers. One option is to treat a suffix like 1PL [-imon] as derived faithfully from a monomorphemic /-imon/. This is the analysis we use. An alternative option is to treat [-imon] as bi-morphemic and derived from /-i-emon/, such that /-i/ is the PERF marker, while /-emon/ is agreement. We do not adopt this bi-morphemic analysis for the following reasons.

First, we need a morpheme-specific phonological rule of vowel hiatus repair in the present perfect transitive suffixes, such that the PERF suffix vowel /-i/ triggers the deletion of any subsequent vowel.

Second, a bi-morphemic analysis becomes more complicated for the intransitive markers. The 1PL intransitive marker is surface [-ɛjmon]. Our mono-morphemic analysis uses a straightforward UR /-ɛjmon/. But a bi-morphemic analysis would require a UR /-ɛ-imon/ where /-ɛ/ is an abstract PERF suffix that never surfaces on its own.

As a null hypothesis, we thus treat the present perfect agreement markers as monomorphemic. There is likely a diachronic source or connection between suffix mobility, the perfective marker [-i], and the surface shapes of the agreement markers [-ijon, ɛjmon]. But we don't think there is strong evidence to make this connection be synchronic.

5   Complex tenses

This section discusses periphrastic constructions: subjunctive perfect and pluperfect. Here, the verb is in participle form, with the past suffix /-ast/ and the participle suffix /-a/,

while agreement is on an encliticized auxiliary. As before, we find that the Agr suffixes display allomorphy that is conditioned by the transitivity of the root.

5.1 Agreement system

In the subjunctive perfect, the verb is in past participle form with the past suffix /-ast/ followed by the participle suffix /-a/. An auxiliary /-b/ is encliticized to the verb. This auxiliary is followed by agreement suffixes. The paradigm is shown in Table 16.

Table 16: Paradigm of subjunctive perfect

	Transitive 'to rinse'		Intransitive 'to return'	
	UR	SR	UR	SR
1SG	o-kaʃ-ast-a-b-im(ε) '(If) I have rinsed'	o-kɛʃ-ɛsˈt-ɛ-b-im(ε)	ʌ-gard-ast-a-b-im(ε) '(If) I have returned'	ʌ-gɛrd-ɛsˈt-ɛ-b-im(ε)
2SG	o-kaʃ-ast-a-b-i	o-kɛʃ-ɛsˈt-ɛ-b-i	ʌ-gard-ast-a-b-iʃ(ε)	ʌ-gɛrd-ɛsˈt-ɛ-b-iʃ(ε)
3MSG	o-kaʃ-ast-a-b-iʃ(ε)	o-kɛʃ-ɛsˈt-ɛ-b-iʃ(ε)	ʌ-gard-ast-a-b-e	ʌ-gɛrd-ɛsˈt-a-b-e
3FSG	o-kaʃ-ast-a-b-iʃ(ε)	o-kɛʃ-ɛsˈt-ɛ-b-iʃ(ε)	ʌ-gard-ast-a-b-ijε	ʌ-gɛrd-ɛsˈt-ɛ-b-ijε
1PL	o-kaʃ-ast-a-b-imon	o-kɛʃ-ɛsˈt-ɛ-b-imon	ʌ-gard-ast-a-b-imon	ʌ-gɛrd-ɛsˈt-ɛ-b-imon
2PL	o-kaʃ-ast-a-b-ijon	o-kɛʃ-ɛsˈt-ɛ-b-ijon	ʌ-gard-ast-a-b-ijon	ʌ-gɛrd-ɛsˈt-ɛ-b-ijon
3PL	o-kaʃ-ast-a-b-iʃon	o-kɛʃ-ɛsˈt-ɛ-b-iʃon	ʌ-gard-ast-a-b-indε	ʌ-gɛrd-ɛsˈt-ɛ-b-indε
	PV-√-PST-PTCP-SBJV-TRNSAUXAGR		PV-√-PST-PTCP-SBJV-INTRAUXAGR	

The pluperfect is formed similarly (Table 17). The only difference is that the auxiliary is /-b-/ for the subjunctive perfect and /-v-/ for the pluperfect (also called the past perfect).

Table 17: Paradigm of pluperfect or past perfect

	Transitive 'to rinse'		Intransitive 'to return'	
	UR	SR	UR	SR
1SG	o-kaʃ-ast-a-v-im(ε) 'I had rinsed'	o-kɛʃ-ɛsˈt-ɛ-v-im(ε)	ʌ-gard-ast-a-v-im(ε) ' I had returned'	ʌ-gɛrd-ɛsˈt-ɛ-v-im(ε)
2SG	o-kaʃ-ast-a-v-i	o-kɛʃ-ɛsˈt-ɛ-v-i	ʌ-gard-ast-a-v-iʃ(ε)	ʌ-gɛrd-ɛsˈt-ɛ-v-iʃ(ε)
3MSG	o-kaʃ-ast-a-v-iʃ(ε)	o-kɛʃ-ɛsˈt-ɛ-v-iʃ(ε)	ʌ-gard-ast-a-v-e	ʌ-gard-asˈt-a-v-e
3FSG	o-kaʃ-ast-a-v-iʃ(ε)	o-kɛʃ-ɛsˈt-ɛ-v-iʃ(ε)	ʌ-gard-ast-a-v-ijε	ʌ-gɛrd-ɛsˈt-ɛ-v-ijε
1PL	o-kaʃ-ast-a-v-imon	o-kɛʃ-ɛsˈt-ɛ-v-imon	ʌ-gard-ast-a-v-imon	ʌ-gɛrd-ɛsˈt-ɛ-v-imon
2PL	o-kaʃ-ast-a-v-ijon	o-kɛʃ-ɛsˈt-ɛ-v-ijon	ʌ-gard-ast-a-v-ijon	ʌ-gɛrd-ɛsˈt-ɛ-v-ijon
3PL	o-kaʃ-ast-a-v-iʃon	o-kɛʃ-ɛsˈt-ɛ-v-iʃon	ʌ-gard-ast-a-v-indε	ʌ-gɛrd-ɛsˈt-ɛ-v-indε
	PV-√-PST-PTCP-PLUP-TRNSAUXAGR		PV-√-PST-PTCP-PLUP-INTRAUXAGR	

As before, the choice of agreement suffix depends on the transitivity of the root. We call this set of suffixes the periphrastic agreement or auxiliary-induced agreement suffixes

(Aux Agr). For example, the subjunctive past perfective 3PL is /-iʃon/ for transitives but /-indɛ/ for intransitives. Interestingly, the target of allomorphy (the Agr suffixes) and the trigger of allomorphy (the root's valency) are not linearly adjacent but are interrupted by the past suffix, the participle suffix, and the auxiliary. This appears to be a case of long-distance allomorphy in periphrasis. Typologically, long-distance allomorph is relatively rare but attested (Bobaljik 2000; Bruening 2018; Deal 2018; Lee & Amato 2018; Wu 2018; Božič 2019). See Dolatian & Guekguezian (2023) for other cross-linguistic cases of long-distance allomorphy.

Furthermore, the set of past Agr suffixes on auxiliaries is different from that of the previous synthetic tenses. For example, the intransitive 3FSG is /-ijʌ-/ for the past perfect (attached to the verb) but is /-ijɛ-/ for the subjunctive perfect (attached to the auxiliary). This indicates that the past Agr suffixes display allomorphy that is triggered not only by root valency (which is non-adjacent) but also by the presence of the auxiliary (which is adjacent to Agr).

We call the morphemes /-b-, -v-/ auxiliaries for the following reasons. First, these morphemes are also used as copula verbs in predicate sentences, where they mark tense/agreement. The exact glossing is unclear to us. See Appendix §B for more data on auxiliaries.

(20) a. bʌjes sʌt sø   dɛ engʌ dɛ **b-e**
         should clock three at here at AUX-3SG
         'He should be here at 3 o'clock.'

      b. pʌr-ɛ d͡ʒavon-tar **v-e**
         last   year-POST young-CMPR AUX.PST-3SG
         'Last year he was younger.'

When the /b,v/ morphemes are part of a predicate sentence without a separate verb (20), we argue that these morphemes constituent their own morphological word. In contrast, when the /b,v/ morphemes are part of a periphrastic constructions like the pluperfect, the /b,v/ morphemes form a tight morphophonological constituent with the host verb. Evidence for this comes from vowel harmony which we discuss next.

In terms of phonology, we find different domains for different processes. For vowel harmony, we see that harmony from /i/ spreads from the Agr suffix all the way to the root, affecting 3 morphemes in total: /ʌ-gard-ast-a-v-indɛ/ → [ʌ-gɛrd-ɛsˈt-ɛ-v-indɛ] 'they had returned'. Thus, the entire encliticized verb forms one domain of vowel harmony.

Stress is placed on the participle suffix. In Figure 1, we analyze that the past participle itself forms a single prosodic domain, i.e., a prosodic word, while the auxiliary is encliticized to form a larger prosodic constituent, such as a recursive prosodic word or clitic group (Nespor & Vogel 1986; Selkirk 1996; Booij 1996; Peperkamp 1997; Zec 2005; Ito & Mester 2009; Vogel 2009).[8]

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[8]An alternative descriptively-equivalent analysis is to argue that auxiliary agreement suffixes are pre-

Figure 1: Prosodic structure of periphrastic tenses

PW' = harmony

PW = stress

$\sqrt{}$ -PST -PTCP   AUX-AGR
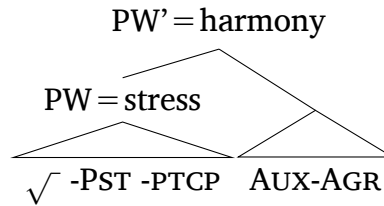
The domain of stress is the minimal or internal prosodic word, while the domain of vowel harmony is the maximal prosodic word. Similar mismatches between the domains of stress and harmony have been analyzed in other languages, such as Turkish (Kabak & Vogel 2001). We illustrate a derivation in Table 18.

Table 18: Derivation for stress and harmony in periphrastic verb

	'we had rinsed'					
	PV	$\sqrt{}$	PST	PTCP	PLUP	1PL
Input:	/ o-	kaʃ	-ast	-a	-v	-imon /
Prosody:	((o-	kaʃ	-ast	-a)$_w$	-v	-imon)$'_w$
Harmony in PW'	((o-	kɛʃ	-ɛst	-ɛ)$_w$	-v	-imon)$'_w$
Stress in PW	((o-	kɛʃ	-ɛsˈt	-ɛ)$_w$	-v	-imon)$'_w$
Output	o-	kɛʃ	-ɛsˈt	-ɛ	-v	-imon

5.2 Mobile agreement

As before, transitive periphrastic forms show mobility of the agreement suffixes. For a transitive verb like 'to rinse', the agreement suffixes surface on the verb when the object is absent. If the object is present, the agreement appears on the object in the form of the possessive suffixes. What is left on the verb is a perfect suffix /-i/, after the auxiliary. We illustrate this phenomenon with the subjunctive perfect.

(21) a. **o-kɛʃ-ɛsˈt-ɛ-b-im(ɛ)**
          PV-rinse-PST-SBJV-TRNSAUXAGR
          '(if) I have rinsed.'
      b. arˈmʌz-**em**   **o-kɛʃ-ɛsˈt-ɛ-b-i**
          cloth-POSS1SG PV-rinse-PST-SBJV-PERF
          '(if) I have rinsed a cloth.'

We find the same system of movement for the pluperfect, which uses the auxiliary /-v-/.

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stressing suffixes.

(22) a. **o-kɛʃ-ɛsˈt-ɛ-v-im(ɛ)**
PV-rinse-PST-PLUP-TRNSAUXAGR
'I had rinsed.'

     b. arˈmʌz-**em**   **o-kɛʃ-ɛsˈt-ɛ-v-i**
cloth-POSS1SG PV-rinse-PST-PLUP-PERF
'I had rinsed a cloth.'

As before, we find the agreement shift if the object is bare (22b), plural (23a), definite (23b), or definite plural (23c). The shift is blocked if the object has its own possessive suffix (23d,23e).[9]

(23) a. armʌˈz-on-**em**   **o-kɛʃ-ɛsˈt-ɛ-b-i**
cloth-PL-POSS1SG PV-rinse-PST-SBJV-PERF
'(if) I have rinsed clothes.'

     b. /armʌz-e-**em**   **o-kaʃ-ast-a-b-i**/
armʌˈz-∅-**em**   **o-kɛʃ-ɛsˈt-ɛ-b-i**
cloth-DEF-POSS1SG PV-rinse-PST-SBJV-PERF
'(if) I have rinsed the cloth.'

     c. /armʌz-on-e-**em**   **o-kaʃ-ast-a-b-i**/
armʌz-oˈn-∅-**em**   **o-kɛʃ-ɛsˈt-ɛ-b-i**
cloth-PL-DEF-POSS1SG PV-rinse-PST-SBJV-PERF
'(if) I have rinsed the clothes.'

     d. arˈmʌz-em   **o-kɛʃ-ɛsˈt-ɛ-b-im(ɛ)**
cloth-POSS1SG PV-rinse-PST-SBJV-TRNSAUXAGR
'(if) I have rinsed my cloth.'

     e. arˈmʌz-emon **o-kɛʃ-ɛsˈt-ɛ-b-im(ɛ)**
cloth-POSS1PL PV-rinse-PST-SBJV-TRNSAUXAGR
'(if) I have rinsed our cloth.'

6 Dynamic effect of valency-changes on verbal agreement

The above sections discussed the basic allomorphy of agreement. This section goes over aspects of verbal morphology which further reinforce the valency-conditioned triggers for agreement allomorphy.

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[9]As with the agreement system of the present perfect, we can argue that the agreement system for complex tenses is bi-morphemic for transitive verbs. But it is difficult to find evidence for a bi-morphemic analysis of the intransitive agreement set. We again maintain the mono-morphemic analysis as our null hypothesis.

6.1 Equipollency

For most verbs (or preverb + root combinations), the valency of the verb is constant. But there are some verbs which can shift in transitivity, i.e., equipollence (Haspelmath 1993). The agreement on the verb changes based on the new transitivity.

As an example, consider the verb 'to bear'. This verb can take either transitive or intransitive agreement depending on whether the verb takes a direct object. For example in the simple past sentences below, the 3FSG marker is intransitive /-ε/, but transitive /-eʃ(ε)/. Note that the root uses the past tense suffix *-st*.[10] In 24b, Agr is on the verb because the object is possessed. When there is no possession, then Agr is on the object 24c

> (24) a. marjam-ε **be-ˈzʌ-st-ε**
>   Maryam-F PV-bear-PST-3FSG
>
>   'Maryam gave birth.'
>
>   b. marjam-ε zʌrin-ar-emon   **be-ˈzʌ-st-eʃ(ε)**
>   Maryam-F child-ACC-POSS1PL PV-bear-PST-3FSG
>
>   'Maryam gave birth to our child.'
>
>   c. maryam-ε zʌˈrin-eʃ   **be-ˈzʌ-st**
>   Maryam-F child-3FSG PV-bear-PST
>
>   'Maryam gave birth to a child.'

The existence of equipollent verbs reinforce the generalization that agreement allomorphy is sensitive to valency. For a root like 'to birth' /zʌ/, the choice of Agr suffix is not a memorized fact about the verb in the lexicon. Rather, the choice depends on whether the verb is used transitively or intransitively.

6.2 Valency-changing affixes

The previous sections focused on simple regular verbs. For such verbs, the stem consists of a preverb and root. Takestani likewise has productive processes of valency-changing morphology, specifically causativization and passivization. These processes add an additional suffix to the stem: the causative /-den/ and the passive /-i/. We briefly discuss these operations. When such suffixes are added, the verb's transitivity changes and so dose the agreement system.

Causativizations involve adding the causative suffix /-den/ to the root of the verb (Table 19). Causative verbs are syntactically transitive, and they are inflected like any other transitive verb. That is, they take the same past suffixes as simple transitive verbs.

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[10]The use of [-st] instead of [-ast] is due to vowel deletion in vowel hiatus /be-zʌ-ast/ → [be-zʌ-st].

Table 19: Simple past 3MSG of causatives

	Intransitive 'to cry'	Causative 'to make cry'	cf. Transitive 'to rinse'
UR	be-rban-ast-∅	be-rban-den-ast-eʃ(ε)	o-kaʃ-ast-eʃ(ε)
SR	be-rbaˈn-ast-∅	be-rbaˈn-den-ast-eʃ(ε)	o-kaˈʃ-ast-eʃ(ε)
	'He cried'	'He made someone cry'	'He rinsed'
	PV-√-PST-INTRPSTAGR	PV-√-CAUS-PST-TRNSPSTAGR	PV-√-PST-TRNSPSTAGR

Semantically, the causative suffix acts as a general valency-changing suffix that adds an argument to a verb's argument structure. In terms of lexical distribution, some causative verbs are derived from other verbs, while some causative verbs are derived from bound roots. For example, the verb /ʌ-derd-den-ast-an/ is a morphologically causative verb with /-den/. But it is not derived from a verb */ʌ-derd-ast-an/. The root /-derd-/ cannot form a verb on its own.

(25)   a.   ʌ-   derd -den   -ast -an
            PV- √   -CAUS -PST -INF

            'to cause to pee'

       b.   *ʌ- derd -ast -an
            PV- √   -PST -INF

            Intended meaning: 'to pee'
            Does not exist

In contrast, passivization involves adding the passive suffix /-i/ to the root (Table 20). Passives are syntactically intransitive, and they are inflected the same as any regular intransitive verb. That is, they take the same past suffixes as simple intransitives. Note that a glide is epenthesized between the passive and the past suffix /-ast/ because of vowel hiatus repair.

Table 20: Simple past 3MSG of passives

	Transitive 'to hit'	Passive 'to be hit'	cf. Intransitive 'to return
UR	be-zan-d-eʃ(ε)	be-zan-i-ast-∅	ʌ-gard-ast-∅
SR	be-ˈzan-d-eʃ(ε)	be-zan-i-ˈjast-∅	ʌ-garˈd-ast-∅
	'It hit'	'It was hit'	'He returned'
	PV-√-PST-TRNSPSTAGR	PV-√-PASS-PST-INTRPSTAGR	PV-√-PST-INTRPSTAGR

Causatives can undergo passivization to form passivized causatives (Table 21). As expected, these are semantically intransitive and are inflected as intransitive verbs. Note

how the /i/ phonologically triggers vowel-raising on the immediately-preceding causative /-den/.[11]

Table 21: Simple past 3MSG of passivized causatives

	Causative 'to make drink'	Passivized 'to be made drunk' (i.e., a beverage)
UR	ʌ-χʌr-den-ast-eʃ(ɛ)	ʌ-χʌr-den-i-ast-∅
SR	ʌ-χʌr-deˈn-ast-eʃ(ɛ)	ʌ-χʌr-din-i-ˈjast-∅
	'He caused something to be drunk'	'It was caused to be drunk'
	PV-√-CAUS-PST-TRNSPSTAGR	PV-√-CAUS-PASS-PST-INTRPSTAGR

In these verbs, the passive suffix is added to passivize a verb that already exists in the lexicon. But there are some cases where the passive suffix is added to a root that does not exist as an independent verb. In such cases, the passive suffix creates an inchoative meaning rather than a passive meaning. For example, the intransitive and inchoative verb 'to break' consists of a root and 'passive' suffix: [bi-ʃk-i-jast-an]. It is not derived from a verb like *bi-ʃk-ast-an*. Such a verb does not exist.

(26)   a.   bi-   ʃk   -i   -[j]ast   -an
            PV-   √   -PASS   -PST   -INF
            'to break (intransitive)'

       b.   *bi-   ʃk   -ast   -an
            PV-   √   -PST   -INF
            Intended: 'to break (transitive)'
            Does not exist

Because of such cases, it may be more appropriate to analyze the suffix /-i/ as a generalized argument-demoting suffix rather than just a passive suffix. It is not cross-linguistically surprising that the same morph ends up being used both for passivization and for inchoatives (Haspelmath 1993).

7   Allomorphy of agreement suffixes

The previous sections documented the diverse Agr suffixes used by regular verbs in Takestani. This section synthesizes that information and summarizes the different sets of Agr suffixes. We find that the Agr suffixes display allomorphy that is triggered by present tense,

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[11]A reviewer asks if this vowel raising process is the same as previous vowel changes that we've seen in this paper. We don't know of a complete phonological analysis, so we refrain from speculation.

imperative mood, past tense, voice, perfectivity, and the presence of auxiliaries. These differences end up creating six sets of past agreement suffixes, three for each type of valency: Past Agr, Perf Agr, and Aux Agr.

We do not discuss the wide-ranging differences in the stress of these suffixes. We leave that to future work. Although we've tried to have a complete descriptive picture of stress alternations in verbs, it's not clear to us what the best formal analysis should be.

We first catalog the different sets of affixes in §7.1. Although there are generalizations between inflectional features and stress, there is no clear generalization between inflectional features and individual suffixes. That is, it is unclear whether there are any generalizations in terms of the segmental syncretism between sets of paradigm cells.

In §7.2, we develop a set of realization rules for all these affix allomorphs based on inflectional semantic features. The haphazardness of these rules reinforces the inability to generalize syncretism in terms of pairs of cells. However, we find that if we instead examine the contexts in which different affixes can be used, we do find that each affix allomorph selects one context out of a finite set of possible contexts. Thus, there is no syncretism between cells in terms of using the same allomorph, but there is syncretism between cells in terms of using the same context for allomorphy.

In §7.3, we briefly explain why we analyze all these agreement morphs as suffix allomorphs, instead of analyzing the intransitive set as suffixes and the transitives as clitics.

7.1   Catalog of agreement suffixes

First, in present-based tenses, transitivity does not affect agreement (Table 22). Both transitive and intransitive verbs use the same set of Agr suffixes for the present imperfective and subjunctive present. The present suffixes are prestressing for the present imperfective, and the verb has initial stress in the subjunctive. The imperative uses a separate set. For these Agr suffixes, we list their contexts and the semantic features that trigger their presence.

Table 22: Agreement suffixes for the present-based tenses

Agr type	Present Agr Suffix	Imperative Agr suffix
1SG	-em(ɛ)	
2SG	-i	-∅
3MSG	-e	
3FSG	-ijɛ	
1PL	-om(ɛ)	
2PL	-ʌ	-ʌ
3PL	-endɛ	
Contexts	present imperfective subjunctive present	imperative
Trigger	Tense [-PST]	Mood [+IMP]

For clarity, we provide a tree-based representation in Figure 2. Present tense, agreement, and imperative mood are fused morphs. We treat the V slot as consisting of just the basic verb stem, starting with the root. Preverbs and prefixes are not represented in our simplified representations.

Figure 2: Morphological structure of different present tenses

Pres. Impf & Subj. Pres.	Imperative
T/AGR V T/AGR △ √ -PST/AGR	T/AGR/MOOD V T/AGR/IMP △ √ -PST.AGR.IMP
ʌ-n-gɛrˈd-**i** PV-IMPF-√-**2SG** 'you.SG return'	ˈʌ-gard-∅ PV-√-**2FSG**.IMP 'you.SG return

For the past tense, we find wide-ranging allomorphy for Agr suffixes, primarily conditioned by transitivity. Before we show this set, we provide the following basic templates for verbs (Figure 3). We assume transitivity is specified in the V slot, past tense in the T slot, Aspect (Asp) is fused with Agr, and Auxiliaries intervene between the verb and Agr.

Figure 3: Morphological structure of different past tenses and complex tenses

Synthetic past-based tenses			Periphrastic complex tenses
Simple past	past imperfective	present perfect	subj. perfect and pluperfect
AGR T V T AGR √ +PST AGR	ASP/AGR T V T ASP/AGR √ +PST -PERF/AGR	ASP/AGR T V T ASP/AGR √ +PST +PERF/AGR	ASP/AGR AUX PTCP T V T PTCP AUX ASP/AGR √ +PST PTCP AUX +PERF/AGR
ʌ-garˈd-ast-**ɛ** PV-√-PST-**3FSG** 'she returned'	ʌ-n-garˈd-ast-**ɛ** PV-IMPF-√-PST-**3FSG** 'she would return'	ʌ-gɛrd-ɛst-iˈjʌ PV-√-PST-PRF**3FSG** 'she has returned'	ʌ-gɛrd-ɛsˈt-ɛ-v-**ijɛ** PV-√-PST-PTCP-PLUP-**3FSG** 'she had returned'

In the paradigm in Table 23, we first list the present Agr suffixes (as pre-stressing), then transitive Agr suffixes, then the intransitive Agr suffixes. We then list the semantic features which trigger these allomorphs and state whether the triggering feature/morpheme is adjacent or local to Agr based on the template above. Prestressing suffixes are represented with an asterisk. We adopt a mono-morphemic analysis for the agreement suffixes.

Table 23: Set of agreement suffixes and their allomorphy triggers

	Present-based		Past-based and complex tenses					
			Transitive verbs			Intransitive verbs		
Agr type	Pres Agr	Imp Agr	Past Agr	Perf Agr	Aux Agr	Past Agr	Perf Agr	Aux Agr
1SG	*-em(ɛ)		*-em(ɛ)	-ˈim(ɛ)	-im(ɛ)	*-im(ɛ)	-ˈɛjm(ɛ)	-im(ɛ)
2SG	*-i	-∅	*-i	-ˈi	-i	*-iʃ(ɛ)	-ˈɛjʃ(ɛ)	-iʃ(ɛ)
3MSG	*-e		*-eʃ(ɛ)	-ˈiʃ(ɛ)	-iʃ(ɛ)	*-∅	-ˈi	-e
3FSG	*-ijɛ		*-eʃ(ɛ)	-ˈiʃ(ɛ)	-iʃ(ɛ)	*-ɛ	-iˈjʌ	-ijɛ
1PL	*-om(ɛ)		*-emon	-ˈimon	-imon	*-imon	-ˈɛjmon	-imon
2PL	*-ʌ	-ʌ	*-ijon	-ˈijon	-ijon	*-ijon	-ˈɛjon	-ijon
3PL	*-ende		*-eʃon	-ˈiʃon	-iʃon	* -indɛ	-ˈindɛ	-indɛ
Contexts	pres. impf. imp. subj. pres.		simple past past impf.	pres. perf.	subj perf. plupf.	simple past past impf.	pers. perf.	subj. perf. plupf.
Trigger			Valency +TRNS (non-adjacent) Tense +PST (non-adjacent in Aux Agr)			Valency -TRNS (non-adjacent) Tense +PST (non-adjacent in Aux Agr)		
				Aspect [+PERF] (adjacent)			Aspect [+PERF] (adjacent)	
					Auxiliary (adjacent)			Auxiliary (adjacent)

For discussion, we focus on the past suffixes for verbs. As a broader generalization, the set of Agr suffixes used by transitive verbs is not identical to the set used by intransitive verbs. Furthermore, allomorphy is non-locally triggered by transitivity. Tense [+PST] is non-local in the Aux set but is local elsewhere. The auxiliary is local to the Agr suffix.

As for the individual exponents used for semantic combinations, we can derive many

generalizations. If we look at the transitive verbs, we arrive at generalizations in terms of a) non-identicalness, b) vowel changes, and c) syncretism.

First, we can see that the presence of [+PERF] Aspect triggers a change in the Agr allomorph: 3PL is /*-eʃon/ in past imperfective but /-ˈiʃon/ in present perfect. Second, the first vowel is always changed to an /i/ in the [+PERF] column. Third, the perfect Agr and the auxiliary-induced Agr allomorphs are segmentally syncretic for transitive verbs, but they have different stress patterns: 3PL /-ˈiʃon/ vs. /-iʃon/. Some cells between the simple past Agr and the perfective Agr are also segmentally but not prosodically identical: 2PL /*-ijon/ vs. /-ˈijon/.

As for intransitives, we arrive at quite different generalizations in terms of a) segmental changes and b) syncretism. First, when comparing the simple past Agr set with the perfect Agr set, we find that different pairs of cells experience different segmental changes. Some cells involve adding an /ɛ/ vowel and replacing /i/ with /j/: 1SG is /-im(ɛ)/ in the simple past but /-ɛjm(ɛ)/ in the perfect. Some cells add /i/: 3MSG is /-∅/ for the simple past but /-i/ for the perfect. Some replace /i/ with /ɛ/: 2PL is /-ijon/ versus /-ɛjon/. Some involve a complete change: 3FSG is /-ɛ/ versus /-ijʌ/. And finally, some pairs of cells are segmentally but not prosodically syncretic: 3PL /*-indɛ/ versus /-ˈindɛ/

As for the auxiliary-induced Agr set for intransitives, this set is almost all segmentally syncretic with the simple past Agr set except for the 3rd person markers: 3MSG /-∅/ versus /-e/ and 3FSG /-ɛ/ versus /-ijɛ/. Thus, the auxiliary-induced Agr set is segmentally syncretic with the perfect set only for transitives, while it is partially segmentally syncretic with the simple past set for intransitives. There is no prosodic syncretism: each column (Past Agr, Perf Agr, Aux Agr) has different stress rules.

Thus, it seems that there are no overarching generalizations possible for syncretisms across the verbal system, only clusters of syncretic patterns within each type of transitivity-based paradigm.

The above generalizations regarding segmental similarity and syncretism weaken once we try to contrast each inflectional column between both transitives and intransitives, reorganized in Table 24. We show only the past forms.

Table 24: Organizing past agreement suffixes first by tense instead of by valency

Agr type	Past Agr		Perf Agr		Aux Agr	
Voice	Trans.	Intrans.	Trans.	Intrans.	Trans.	Intrans.
1SG	*-em(ɛ)	*-im(ɛ)	-ˈim(ɛ)	-ˈɛjm(ɛ)	-im(ɛ)	-im(ɛ)
2SG	*-i	*-iʃ(ɛ)	-ˈi	-ˈɛjʃ(ɛ)	-i	-iʃ(ɛ)
3MSG	*-eʃ(ɛ)	*-∅	-ˈiʃ(ɛ)	-ˈi	-iʃ(ɛ)	-e
3FSG	*-eʃ(ɛ)	*-ɛ	-ˈiʃ(ɛ)	-iˈjʌ	-iʃ(ɛ)	-ijɛ
1PL	*-emon	*-imon	-ˈimon	-ˈɛjmon	-imon	-imon
2PL	*-ijon	*-ijon	-ˈijon	-ˈɛjon	-ijon	-ijon
3PL	*-eʃon	*-indɛ	-ˈiʃon	-ˈindɛ	-iʃon	-indɛ
Contexts	simple past past impf.		present perf.		subj perf. plupf.	
Trigger	+Trns (non-adj.)	-Trns (non-adj.)	+Trns (non-adj.)	-Trns (non-adj.)	+Trns (non-adj.)	-Trns (non-adj.)
	+Pst (adj.)		+Pst (adj.)		+Pst (non-adj.)	
			+Perf (adj.)		+Perf (non-adj.)	
					Auxiliary (adj.)	

When comparing across transitives and intransitives, we see other cases of syncretism. For example, 2PL is syncretic for transitives and intransitives in the simple past but not in the perfect. Again, the norm seems to be that valency creates non-identity across Agr suffixes.

The catalog is based on a mono-morphemic analysis of agreement suffixes. As is clear, syncretism and partial similarity is widespread within the mono-morphemic analysis. The next section provides realization rules within the mono-morphemic analysis, in which we uncover similarities in the types of distributions for affixes.

7.2 Distribution of syncretic contexts in the mono-morphemic analysis

In terms of syncretism across cells, the distribution of exponents seems haphazard. However, we show that within the mono-morphemic analysis, the morphs choose one of nine possible morphological contexts.

In Table 25, we repeat the distribution of the different agreement suffixes within the mono-morphemic analysis, color-coding the paradigm cells that are segmentally syncretic. We treat the intransitive 2SG /-iʃ(ɛ)/ and transitive 3SG /-iʃ(ɛ)/ as separate morphs that are accidentally homophonous. We also treat 3MSG /-i/ and 2SG /-i/ as homophonous. In total, we need 26 separate morphs, only two pairs of which are homophonous. Recall

that * means the morph is prestressing.

Table 25: Set of agreement suffixes and their allomorphy triggers

| | Present-based | | Past-based and complex tenses | | | | | |
| | | | Transitive verbs | | | Intransitive verbs | | |
Agr type	Pres Agr	Imp Agr	Past Agr	Perf Agr	Aux Agr	Past Agr	Perf Agr	Aux Agr
1SG	*-em(ε)		*-em(ε)	-ˈim(ε)	-im(ε)	*-im(ε)	-ˈεjm(ε)	-im(ε)
2SG	*-i	-∅	*-i	-ˈi	-i	*-iʃ(ε)	-ˈεjʃ(ε)	-iʃ(ε)
3MSG	*-e		*-eʃ(ε)	-ˈiʃ(ε)	-iʃ(ε)	*-∅	-ˈi	-e
3FSG	*-ijε		*-eʃ(ε)	-ˈiʃ(ε)	-iʃ(ε)	*-ε	-iˈjʌ	-ijε
1PL	*-om(ε)		*-emon	-ˈimon	-imon	*-imon	-ˈεjmon	-imon
2PL	*-ʌ	-ʌ	*-ijon	-ˈijon	-ijon	*-ijon	-ˈεjon	-ijon
3PL	*-ende		*-eʃon	-ˈiʃon	-iʃon	* -indε	-ˈindε	-indε
Contexts	pres. impf. imp. subj. pres.		simple past past impf.	pres. perf.	subj perf. plupf.	simple past past impf.	pers. perf.	subj. perf. plupf.
Trigger			Valency +TRNS (non-adjacent) Tense +PST (non-adjacent in Aux Agr)			Valency -TRNS (non-adjacent) Tense +PST (non-adjacent in Aux Agr)		
				Aspect [+PERF] (adjacent)			Aspect [+PERF] (adjacent)	
					Auxiliary (adjacent)			Auxiliary (adjacent)

These 26 morphs can encode one of 8 possible person features (Table 26). We use binary features for person (± 1, ± 2), number ($\pm$PL), and gender ($\pm$M).

Table 26: Set of person-number agreement combinations

1SG:	[+1, -pl]
2SG:	[+2, -pl]
3SG:	[-1, -2, -pl]
3MSG:	[-1, -2, -pl, +m]
3FSG:	[-1, -2, -pl, -m]
1PL:	[+1, +pl]
2PL:	[+2, +pl]
3PL:	[-1, -2, +pl]

Given these 8 possible feature bundles, it is unclear whether there is any systematic correlation between the feature bundles and syncretism. However, we find that in terms morphological context, the 26 different morphs choose one (or more contexts) out of nine contexts. These contexts are sometimes disjunctively used. We first outline the different allomorphs and then summarize these contexts. In order to illustrate the role of non-locality in allomorphy, we formalize the correspondence between morphosyntactic contexts and morphs via realization rules in the formation of Vocabulary Insertion rules from Distribution Morphology.

We repeat the set of morphs for 1SG in Table 27.

Table 27: Set of 1SG agreement suffixes

	Present-based		Past-based and complex tenses					
			Transitive verbs			Intransitive verbs		
Agr type	Pres Agr	Imp Agr	Past Agr	Perf Agr	Aux Agr	Past Agr	Perf Agr	Aux Agr
1SG	*-em(ɛ)		*-em(ɛ)	-ˈim(ɛ)	-im(ɛ)	*-im(ɛ)	-ˈɛjm(ɛ)	-im(ɛ)

The 1SG surfaces with /-ɛjm(ɛ)/ morph for intransitive perfect agreement, /-em(ɛ)/ is used in the present and past Agr, and /-im(ɛ)/ is elsewhere in the past. Structurally, the morph /-ɛjm(ɛ)/ requires that a) the verb is intransitive, and b) the Agr node is fused with Aspect and adjacent to Tense. The morph /-em(ɛ)/ has however a disjunctive distribution between the present (fused with T[-PST]) and the transitive simple past (next to T[+PST] and without Aspect). The morph /-im(ɛ)/ is then elsewhere in the past paradigm; it simply requires the presence of the Past morph somewhere in the word.

We show realization rules below. The last column provides a shorthand for the type of context.

> **Realization rule 1.** For 1SG
> [+1, -pl]   →   -ɛjm(ɛ)   / V[-TRNS] T[+PST] Asp[+PERF]/Agr[_]   (Intr-Asp-NoAux)
>   -em(ɛ)   / V[+TRNS] T[+PST] Agr[_]   (Trans-NoAsp)
>   / T[-PST]/Agr[_]   (Pres)
>   -im(ɛ)   / T[+PST] … _   (Pst-Else)

Note that the /-im(ɛ)/ morph requires the presence of T[+PST] even if non-adjacent. For example, in the intransitive auxiliary system, the 1SG is /-im(ɛ)/, but the triggering past node /-ast/ is not adjacent: /ʌ-gard-ast-ɛ-b-im(ɛ)/ → [ʌ-gɛrd-ɛsˈt-ɛ-b-im(ɛ)].

For 2SG, we repeat the paradigm in Table 28.

Table 28: Set of 2SG agreement suffixes

	Present-based		Past-based and complex tenses					
			Transitive verbs			Intransitive verbs		
Agr type	Pres Agr	Imp Agr	Past Agr	Perf Agr	Aux Agr	Past Agr	Perf Agr	Aux Agr
2SG	*-i	-∅	*-i	-ˈi	-i	*-iʃ(ɛ)	-ˈɛjʃ(ɛ)	-iʃ(ɛ)

As is clear from the paradigm, the zero morph -∅ is restricted to the imperative. The morph /-ɛjʃ(ɛ)/ is used for the transitive perfect system. The morph /-iʃ(ɛ)/ is intransitive past elsewhere. Finally, the morph /-i/ is elsewhere in the present and transitive past. Structurally, these conditions are as follows: a) the zero morph -∅ requires being part of a fused imperative-agreement suffix, b) /-ɛjʃ(ɛ)/ requires being part of a fused aspect node that is adjacent to T[+PST] just like 1SG /-ɛjm(ɛ)/, c) /-iʃ(ɛ)/ is an elsewhere morph for intransitive past, and d) /-i/ is the elsewhere morph across tenses.

Realization rule 2. For 2SG

[+2, -pl]	→	-∅	/ Mood[+IMP/Agr[_]	(Imp)
		-ɛjʃ(ɛ)	/ V[-TRNS] T[+PST] Asp[+PERF]/Agr[_]	(Intr-Asp-NoAux)
		-iʃ(ɛ)	/ V[-TRNS] T[+PST] ... _	(Intr-Else)
		-i	/ _	(Else)

For 3SG, we repeat the paradigm in Table 29.

Table 29: Set of 3SG agreement suffixes

Agr type	Present-based		Past-based and complex tenses					
			Transitive verbs			Intransitive verbs		
	Pres Agr	Imp Agr	Past Agr	Perf Agr	Aux Agr	Past Agr	Perf Agr	Aux Agr
3MSG	*-e		*-eʃ(ɛ)	-ˈiʃ(ɛ)	-iʃ(ɛ)	*-∅	-ˈi	-e
3FSG	*-ijɛ		*-eʃ(ɛ)	-ˈiʃ(ɛ)	-iʃ(ɛ)	*-ɛ	-iˈjʌ	-ijɛ

The distribution of the 3SG morphs is quite convoluted. For the transitives, /-eʃ(ɛ)/ is restricted to simple past agreement, while /-iʃ(ɛ)/ is past elsewhere. For the intransitives past and perfect system, we find 4 separate morphs, one for each gender-context combination. The present and the past auxiliary-based systems then have one morph for the 3MSG and one morph for the 3FSG. Structurally for the transitives, the /-eʃ(ɛ)/ morph requires being adjacent to the past tense head without being part of a fused Aspect head, while /-iʃ(ɛ)/ is past elsewhere. For intransitives, the four non-auxiliary-based morphs pick one of two contexts: part of a fused aspect node that is adjacent to T[+PST] or being adjacent to T[+PST] elsewhere. The morphs /-e, -ijɛ/ are then elsewhere across the present and past.

Realization rule 3. For 3SG

[-1, -2, -pl]	→	-eʃ(ɛ)	/ V[+TRNS] T[+PST] Agr[_]]	(Trans-NoAsp)
		-iʃ(ɛ)	/ V[+TRNS] T[+PST] ... _	(Trans-Else)
[-1,-2,-pl,+m]	→	-i	/ V[-TRNS] T[+PST] Asp[+PERF]/Agr[_]	(Intr-Asp-NoAux)
		-∅	/ V[-TRNS] T[+PST] Agr[_]	(Intr-NoAsp)
		-e	/ _	(Else)
[-1,-2,-pl,-m]	→	-ijʌ	/ V[-TRNS] T[+PST] Asp[+PERF]/Agr[_]	(Intr-Asp-NoAux)
		-ɛ	/ V[-TRNS] T[+PST] Agr[_]	(Intr-NoAsp)
		-ijɛ	/ _	(Else)

For 1PL, we repeat the paradigm in Table 30.

Table 30: Set of 1PL agreement suffixes

Agr type	Present-based		Past-based and complex tenses					
			Transitive verbs			Intransitive verbs		
	Pres Agr	Imp Agr	Past Agr	Perf Agr	Aux Agr	Past Agr	Perf Agr	Aux Agr
1PL	*-om(ɛ)		*-emon	-ˈimon	-imon	*-imon	-ˈɛjmon	-imon

The morph /-om(ɛ)/ is restricted to the present, /-emon/ to the simple past agreement of transitives, the morph /-ɛjmon/ to the perfect system of intransitives, and the morph /-imon/ is elsewhere. Structurally, we need to treat a) /-om(ɛ)/ as requiring to be fused with the present tense, b) /-emon/ as is adjacent to Tense without an aspect node, c) /-ɛjmon/ as requiring adjacency to past T and being part of Aspect, and d) /-imon/ as elsewhere.

Realization rule 4. For 1PL

$$[+1, +pl] \rightarrow$$
-om(ɛ)	/ T[-PST]/Agr[_]	(Pres)
-emon	/ V[+TRNS] T[+PST] Agr[_]	(Trans-NoAsp)
-ɛjmon	/ V[-TRNS] T[+PST] Asp[+PERF]/Agr[_]	(Intr-Asp-NoAux)
-imon	/ _	(Else)

For 2PL, we repeat the paradigm in Table 31.

Table 31: Set of 2PL agreement suffixes

	Present-based		Past-based and complex tenses					
			Transitive verbs			Intransitive verbs		
Agr type	Pres Agr	Imp Agr	Past Agr	Perf Agr	Aux Agr	Past Agr	Perf Agr	Aux Agr
2PL	*-ʌ	-ʌ	*-ijon	-ˈijon	-ijon	*-ijon	-ˈɛjon	-ijon

The morph /-ʌ/ is restricted to the present, /-ɛjon/ is restricted to the intransitive perfect system, while /-ijon/ is elsewhere. Structurally, /-ʌ/ requires being fused with present T, /-ɛjon/ requires being part of a fused Aspect next to past T, while /-ijon/ is an elsewhere morph.

Realization rule 5. For 2PL

$$[+2, +pl] \rightarrow$$
-ʌ	/ T[-PST]/Agr[_]	(Pres)
-ɛjon	/ V[-TRNS] T[+PST] Asp[+PERF]/Agr[_]	(Intr-Asp-NoAux)
-ijon	/ _	(Else)

Finally, for 3PL, we repeat the following paradigm in Table 32.

Table 32: Set of 3PL agreement suffixes

	Present-based		Past-based and complex tenses					
			Transitive verbs			Intransitive verbs		
Agr type	Pres Agr	Imp Agr	Past Agr	Perf Agr	Aux Agr	Past Agr	Perf Agr	Aux Agr
3PL	*-ende		*-eʃon	-ˈiʃon	-iʃon	* -indɛ	-ˈindɛ	-indɛ

The morph /-ende/ is restricted to the present. For past transitives, /-eʃon/ is restricted to the simple past, and /-iʃon/ is elsewhere. For past intransitives, we only find /-indɛ/. Structurally, the morph /-ende/ requires being fused with present tense. The morph /-eʃon/ requires a) a transitive verb and that b) Agr is next to T without Aspect. The morph /-iʃon/ requires just a past transitive verb, regardless of adjacency. The morph /-indɛ/ is arguably elsewhere.

Realization rule 6. For 3PL

[-1,-2,+pl]	$\rightarrow$	-ende	/ T[-PST]/Agr[_]	(Pres)
		-eʃon	/ V[+TRNS] T[+PST] Agr[_]	(Trans-NoAsp)
		-iʃon	/ V[+TRNS] T[+PST] ... _	(Trans-Else)
		-indɛ	/ _	(Else)

To summarize, the 26 agreement morphs show haphazard patterns of syncretism within a mono-morphemic analysis. However, these 26 morphs have some systematization. Most morphs pick out one of nine morphosyntactic contexts; the 1SG morph /-em(ɛ)/ picks out a disjunction of two contexts. These conditions vary by the presence and adjacency of past T, perfect Asp, Aux, valency, and imperative mood. We list these contexts in Table 33.

Table 33: Contexts for agreement allomorphs

Shorthand	Morphs	Description	Rule
Pres	1SG -em(ɛ) 1PL -om(ɛ) 2PL -ʌ 3PL -ende	Fused with present tense	T[-PST]/Agr[_]
Imp	2SG -∅	Fused with imperative mood	Mood[+IMP]/Agr[_]
Trans-NoAsp	1SG -em(ɛ) 3SG -eʃ(ɛ) 1PL -emon 3PL -eʃon	Past transitive verbs without aspect	V[+TRNS] T[+PST] Agr[_]
Intr-NoAsp	3MSG -∅ 3FSG -ɛ	Past intransitive verbs without aspect	V[-TRNS] T[+PST] Agr[_]
Intr-Asp-NoAux	1SG -ɛjm(ɛ) 2SG -ɛjʃ(ɛ) 3MSG -i 3FSG -ijʌ 1PL -ɛjmon 2PL -ɛjon	Intransitive verbs with aspect and without auxiliary, thus adjacent to T	V[-TRNS] T[+PST] Asp[+PERF]/Agr[_]
Trans-Else	3SG -iʃ(ɛ) 3PL -iʃon	Past transitive elsewhere	V[+TRNS] T[+PST] ... _
Intr-Else	2SG -iʃ(ɛ)	Past intransitive elsewhere	V[-TRNS] T[+PST] ... _
Pst-Else	1SG -im(ɛ)	Past elsewhere	T[+PST] ... _
Else	2SG -i 3MSG -e 3FSG -ijɛ 1PL -imon 2PL -ijon 3PL -inde	Elsewhere	_

Most of the above require that the verb is in the past tense. We focus our discussion on the contexts that reference T[+PST]. These contexts differ in their specifications for verb valency, the presence of aspect, the fusion of aspect and Agr, and the adjacency of Agr to either tense or the auxiliary. Furthermore, the Agr suffix is adjacent to its triggering

morpheme in some contexts, but not all.

First, let us consider the local or adjacent context. Context Trans-NoAsp requires that a) Agr is in a past transitive verb, b) the Agr node is adjacent to T, and c) Agr is not part of a fused Aspect/Agr node. Context Intr-NoAsp requires that a) Agr is in a past intransitive verb, b) the Agr node is adjacent to T, and c) Agr is not part of a fused Aspect/Agr node. Context Intr-Asp-NoAux requires that a) Agr is in a past intransitive verb, b) part of a fused Aspect/Agr node, and c) that the Agr node is adjacent to T without an intervening auxiliary.

The above three contexts are local because all the participating triggers (V, T, Asp) are in a linear chain with the target (Agr). This chain can get rather long such as in the Intr-Asp-NoAux context where all of V-T-Asp affect Agr. Such long chains resemble spans in the theoretical literature on allomorphy (Svenonius 2012; Merchant 2015; Ostrove 2018).

The other past contexts, however, utilize non-local environments. Context Trans-Else requires just that the verb is past transitive. Context Intr-Else requires a past intransitive verb. And context Pst-Else just requires a past verb. For these environments, the Agr node requires the presence of past T and sometimes specifies the valency of the verb (V). However, the Agr node is not always adjacent to either T or V but can be separated from them via the participle suffix and the auxiliary.

The fact that the apparent chaotic use of 26 separate morphs can be reduced to a small set of contexts is surprising. We went through each feature bundle and showed how the 26 morphs are syncretic in their use of distributions.

The above analysis is the one we propose and work with, within a mono-morphemic segmentation. In the appendix, we also show that a bi-morphemic alternative does not significantly reduce the chaos of allomorphy.

7.3   Agreement as suffixes vs. clitics

On a last note, we acknowledge that we call the transitive and intransitive past suffixes as 'suffixes' and not 'clitics'. This is because of the following reasons.

As evidence for clitichood, one could argue that the mobile agreement system for transitive past agreement (§4) is evidence that these transitive suffixes are clitics, not suffixes. A problem with this analysis however is that when the transitive past agreement suffixes are shifted onto a noun, they are changed to possessive suffixes. The agreement and possessive suffixes are not completely identical (§4.1).

As for evidence against clitichood, both the transitive and intransitive agreement suffixes have the exact same prosodic behavior. Both sets trigger vowel harmony, and both sets display the same stress rules. We captured this fact by using recursive prosodic structure,

and by indexing phonological rules to separate prosodic domains (§5.1). Thus, there is no phonological evidence that the transitive and intransitive suffixes belong to different morphophonological categories: either both sets are suffixes or both sets are clitics.

As for the morphology, we do not see what theoretical or empirical benefit there is to labeling the transitive agreement morphs as clitics, while the intransitive as suffixes. Within a realizational model of morphology, whether DM or Paradigm Function Morphology, we would still need rules that would realize a feature bundle like $[+1, +\textsc{pl}]$ into the correct morphs by examining the transitivity of the verb. For example, Moradi (2015:42ff) and Taghipour (2017:66ff) develop compact formalizations of voice-conditioned or valency-conditioned agreement of agreement with PFM and HPSG. But even in those formalizations, the transitive morphs were in competition with the intransitive morphs. The right morph was chosen by examining the transitivity of the verb.

In sum, we do not find conclusive evidence for treating the transitive agreement morphs as clitics. Furthermore, even if these transitive agreement morphs were hypothetically clitics, their competition with intransitive agreement would still constitute a case of long-distance allomorphy that is conditioned by verb valency.

8   Conclusion

Takestani verbal morphology is characterized by systematic allomorphy in subject agreement. In the past tense, the shape of the agreement suffix will vary based on the transitivity value or voice of the verb stem. This generalization is systematic across the language and transparently interacts with valency-changing morphology.

An interest tangential aspect of agreement is the fact that the agreement suffixes are mobile. They can surface either as agreement markers on the verb, or take the shape of possessive suffixes on a noun. On an abstract morphological level, both verbal agreement and object possession suffixes seem to be the same morphological items (morphomes). Both manifestations of agreement show long-distance effects.

Because Takestani shows mobility of past agreement in transitive sentences, it is possible to analyze these suffixes as actually 'clitics'. But regardless if we want to analyze the agreement morphemes as suffixes or clitics, a constant generalization is that the shape of the morpheme is conditioned by the valency of the verb stem. Because of this condition, the choice of allomorph requires long-distance information because the root and the agreement suffix are not adjacent.

In this paper, we utilize a mono-morphemic analysis for the Agr suffixes. That is, we analyzed the 1SG suffix [-im(ε)] as underlyingly a single morpheme /-im(ε)/. This led us to propose 26 agreement morphs. An alternative bi-morphemic analysis would posit /-i-em(ε)/ in order to get a smaller number of morphs. We dismissed such an alternative

because such a segmentation would cause other complications in the grammar. And such a complication wouldn't remove the long-distance effects of allomorphy.

A Simplification of syncretism for the bi-morphemic analysis

The paper explained the distribution of past agreement morphs within a mono-morphemic analysis for non-simple agreement suffixes. This section explores the ramifications of a bi-morphemic analysis.

In Table 34, we show the paradigm of past agreement suffixes within the bi-morphemic analysis. We color-code the segmental syncretism and treat two cells as syncretic by ignoring the aspect suffix /-i/ or /-ɛ/.

Table 34: Bi-morphemic analysis for agreement allomorphs

	Present		Past transitive verbs			Past intransitive verbs		
Agr type	Pres	Imp	Past Agr	Perf Agr	Aux Agr	Past Agr	Perf Agr	Aux Agr
1SG	*-em(ɛ)		*-em(ɛ)	/-ˈi-em(ɛ)/ [-ˈim(ɛ)]	/-i-em(ɛ)/ [-im(ɛ)]	*-im(ɛ) *-im(ɛ)	/-ˈɛ-im(ɛ)/ [-ˈɛjm(ɛ)]	-im(ɛ)
2SG	*-i	-∅	*-i	/-ˈi-i/ [-ˈi]	/-i-i/ [-i]	*-iʃ(ɛ)	/-ˈɛ-iʃ(ɛ)/ [-ˈɛjʃ(ɛ)]	-iʃ(ɛ)
3MSG	*-e		*-eʃ(ɛ)	/-ˈi-eʃ(ɛ)/ [-ˈiʃ(ɛ)]	/-i-eʃ(ɛ)/ [-iʃ(ɛ)]	*-∅	-ˈi	-e
3FSG	*-ijɛ		*-eʃ(ɛ)	/-ˈi-eʃ(ɛ)/ [-ˈiʃ(ɛ)]	/-i-eʃ(ɛ)/ [-iʃ(ɛ)]	*-ɛ	-iˈjʌ	-ijɛ
1PL	*-om(ɛ)		*-emon	/-ˈi-emon/ [-ˈimon]	/-i-emon/ [-imon]	*-imon	/-ˈɛ-imon/ [-ˈɛjmon]	-imon
2PL	*-ʌ	-ʌ	*-ijon	/-ˈi-ijon/ [-ˈijon]	/-i-ijon/ [-ijon]	*-ijon	/-ˈɛ-ijon/ [-ˈɛjjon]	-ijon
3PL	*-ende		*-eʃon	/-ˈi-eʃon/ [-ˈiʃon]	/-i-eʃon/ [-iʃon]	* -indɛ	-ˈindɛ	-indɛ
	-AGR		-AGR-AGR	-PERF-AGR	-PERF-AGR	-AGR	-PERF-AGR	-PERF-AGR

For the perfect and auxiliary agreement systems, our mono-morphemic analysis treated the Asp node as fused with Agr for both transitives and intransitives: transitive perfect 1SG /-im(ɛ)/. For a bi-morphemic analysis, we need to treat Asp and Agr as separate for transitive verbs. The aspect node surfaces as /-i/ for transitives: /-i-em(ɛ)/.

For intransitive verbs, Asp and Agr are separate only for the perfect system in the first and second persons: perfect 1SG /-ɛ-im(ɛ)/ but 3FSG /-ijʌ/. The aspect node is /-ɛ/ for intransitives. Fusion applies for the 3SG and 3PL, and in the auxiliary system.

With the bi-morphemic analysis, we reduce the set of 26 morphs from the mono-morphemic analysis into 20. These 20 morphs select one of the following seven contexts (Table 35).

Table 35: Contexts for agreement allomorphs in the bi-morphemic analysis

Shorthand	Morphs	Description	Rule
Pres	1PL -om(ɛ)) 2PL -ʌ 3PL -ende	Fused with present tense	T[-Pꜱᴛ]/Agr[_]
Imp	2SG -∅	Fused with imperative mood	Mood[+ɪᴍᴘ]/Agr[_]
Intr-NoAsp	3MSG -∅ 3FSG -ɛ	Past intransitive verbs without aspect	V[-Tʀɴꜱ] T[+Pꜱᴛ] Agr[_]
Intr-Asp-NoAux	3MSG -i 3FSG -ijʌ	Intransitive verbs with aspect and without auxiliary, thus adjacent to T	V[-Tʀɴꜱ] T[+Pꜱᴛ] Asp[+ᴘᴇʀꜰ]/Agr[_]
Trans-Else	1PL -emon 3SG -eʃ(ɛ) 3PL -eʃon	Past transitive elsewhere	V[+Tʀɴꜱ] T[+Pꜱᴛ] … _
Intr-Else	1SG -im(ɛ) 2SG -iʃ(ɛ) 1PL -imon 3PL -inde	Past intransitive elsewhere	V[-Tʀɴꜱ] T[+Pꜱᴛ] … _
Else	1SG -em(ɛ) 2SG -i 3MSG -e 3FSG -ijɛ 2PL -ijon	Elsewhere	_

We do not go through the realization rules for each morph. The bi-morphemic system does reduce the set of morphs and the set of contexts. Thus, on economical grounds, the bi-morphemic analysis does appear superior to the mono-morphemic analysis. But as we stated previously, the bi-morphemic analysis has limited plausibility for transitive and intransitive verbs. Furthermore, the bi-morphemic analysis still must reference long-distance allomorphy, as displayed by the … notation.

B   Auxiliary or copula agreement

The paper focuses on verb agreement. But as a reviewer suggests, it is useful to briefly provide data on auxiliaries in Takestani. The verb 'to be' uses its own set of agreement marking for the past and present that are different from normal verb agreement.

For example, for a sentence like 'she is happy', the auxiliary is expressed by adding agreement markers onto the non-verbal predicate 'happy'. For illustration, let us assume that the present auxiliary itself is a zero or covert morph, and that what we see is just an agreement morpheme. Stress is before the auxiliary.

(27) χoˈʃʌːl-∅-ʌ
     happy-Aux-3fsg
     'She is happy.'

To express this meaning in the past, we add the morpheme /-v-/ between the adjective and the agreement. For the 3MSF, the agreement marker is entirely different between the present and the past. This /-v-/ is a marker that is also used in the pluperfect of verbs (§5.1). We gloss it as just a past auxiliary marker here.

(28) χoˈʃʌːl-v-ijɛ
     happy-Aux.Pst-3fsg
     'She was happy.'

It is possible that the auxiliary morpheme and its tense/agreement morphology are phonologically clitics rather than suffixes. Stress does precede this morpheme. We keep that an open question for now. What we focus on is the set of agreement suffixes that we see for the auxiliary. Table 36 provides this set.

Table 36: Tense-agreement marking for the copula or auxiliary

	Present	Past
1SG	χoˈʃʌːl-∅-im(ɛ)	χoˈʃʌːl-v-ɛjm(ɛ)
	'I am happy'	'I was happy'
2SG	χoˈʃʌːl-∅-iʃ(ɛ)	χˈoʃʌːl-v-ɛiʃ(ɛ)
3MSG	χoˈʃʌːl-∅-e	χoˈʃʌːl-v-e
3FSG	χoˈʃʌːl-∅-ʌ	χoˈʃʌːl-v-ijɛ
1PL	χoˈʃʌːl-∅-imon	χoˈʃʌːl-v-ɛjmon
2PL	χoˈʃʌːl-∅-ijon	χoˈʃʌːl-v-ɛjon
3PL	χoˈʃʌːl-∅-endɛ	χoˈʃʌːl-v-indɛ
	happy-Aux-Agr	happy-Aux.Pst-Agr

As we see in §7.1, the set of agreement suffixes for the auxiliary/copula is non-identical to verbal agreement. We thus set aside analyzing auxiliary agreement.

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