Reanalyzing Indo-Iranian "stems": A case study of Adıyaman Kurmanji*

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1. Introduction

Indo-Iranian languages present several challenges for recent theoretical approaches to morphology (Halle & Marantz 1993, *et seq*) and agreement/case splits (Coon 2010, *i.a.*). First, the Indo-Iranian verbal system revolves around two verb "stems"—traditionally labeled the "present stem" and the "past stem"—whose semantics are difficult to pin down, leading to the claim that the stems have a morphomic distribution, appearing in fixed constructions (Haig 2008). Second, the form of the stems is highly opaque and irregular, making decomposition into morphemes a challenge. Finally, these stems form the basis of various sorts of case and agreement splits, despite the lack of a clear syntactic or semantic trigger.

In this paper we undertake a case study of one Indo-Iranian language, Adıyaman Kurmanji (AK), a dialect of Kurdish spoken in the town of Adıyaman in southeastern Turkey. We closely examine both the semantics and morphology of verb stems in AK, and argue that the above challenges are only apparent. In particular, we propose (i) a morphological analysis of these stems that opposes a ∅-marked form ("present stem") with an overtly-suffixed form ("past stem"), §2, and (ii) a semantic analysis of this morphology, with the null suffix as nonpast tense, and the overt suffix elsewhere (past tense, nonfinite tense), §3.

This compositional analysis, combined with a variety of morphosyntactic evidence, leads us to several surprising observations. The puzzle we take up in detail in §4 is that T behaves morphologically and syntactically as though it were below Asp in AK. Two additional puzzles that we note but do not explore in detail are that AK exhibits an extremely rare morpheme order within the complex verb, Asp-V-Tns (Julien 2002), and that split ergativity in AK is conditioned by tense, which has been claimed to be unattested (Salanova 2007, Coon 2013). We explore various possible explanations for the special position and role of tense in AK, but ultimately leave these new puzzles open for further research.

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2. Morphological breakdown

AK is an SOV but predominantly head-initial language with frequent *pro* drop (Atlamaz 2012). Like other Indo-Iranian languages, the verbal system of AK revolves around two so-called verb "stems". The term "stem" here carries with it two main implications (Aronoff 1994, 2012, *i.a.*). First is the implication that these verb forms are stored in the lexicon, i.e., stems are not broken down into smaller pieces. Second, stems—since they are stored in the lexicon—can have a distribution that is purely morphologically-determined, or "morphomic"; in other words, the choice of stem can be completely disconnected from syntactic and semantic factors. The specific claim with respect to Indo-Iranian languages is that the "present stem" and the "past stem" are chosen from the lexicon as bases for further verbal morphology, with the choice of stem conventionalized across constructions, with the synchronic distribution due to diachronic factors (Haig 2008).

In this section, we pursue a morphological analysis of the verb stems in AK by isolating a piece of morphology that differentiates the stems. We postpone a discussion of the semantics of this stem-differentiating morpheme to §3, instead using the stems' traditional labels—"present stem" and "past stem"—throughout this section.

At first glance, there seems to be no consistent morphological relation between the present stem and the past stem. Some common verbs come in suppletive stem pairs, (1), while other stem pairs differ in unpredictable phonological material, (2), and yet others do not differ at all, (3).

(1)

	"present stem"	"past stem"
'go'	her	çü
'say'	we	go
'see'	wun	di
'come'	e	hot

(2)

	"present stem"	"past stem"
'eat'	x	xor
'catch'	g	geşt
'give'	d	do
'do'	k	kır

(3)

	"present stem"	"past stem"
'sew'	drü	drü
'die'	mır	mır
'chew'	cü	cü
'cry'	gri	gri

Looking further than these common and irregular verbs, however, two more consistent patterns emerge. A number of verbs form the past stem by adding *-i* to the present stem, (4), and a number of verbs form the past stem by adding *-t* to the present stem, (5).

(4)

	"present stem"	"past stem"
'boil'	kel	keli
'rain'	bor	bori
'steal'	dız	dızi
'buy'	kırr	kırri

(5)

	"present stem"	"past stem"
'milk'	do	dot
'hear'	biz	bist
'hold'	gr	gırt
'want'	xaz	xast

As is evident from a quick glance through (1)–(5), the grouping of verbs into different types of stem pairs is not semantically or phonologically conditioned.

We can make a number of concrete observations based on these verb stem pairs. First, whenever there is a clear and non-null phonological relation between the stems, the past stem always builds on the present stem, with the additional segments in the past stem following the present stem. The two most regular and common strategies for deriving the past stem from the present stem are adding *-i* or *-t*. We conjecture, then, that the present stem reveals the phonological form of the verb root, while the past stem consists of the verb root plus a suffix, which we will take to be *-i* in its default/elsewhere form.[1] For semantic reasons discussed in the following section, we also posit that the present stem bears a null suffix; both verb stems can thus be broken down into a root and a suffix. A number of representative vocabulary items are given in (6):[2]

(6) *Some relevant vocabulary items (first pass)*

"present" → -∅
"past" → -t / $]_V$__ ; where V = { $\sqrt{\text{MILK}}$, $\sqrt{\text{HEAR}}$, $\sqrt{\text{WANT}}$ ...}
"past" → -∅ / $]_V$__ ; where V = { $\sqrt{\text{SEW}}$, $\sqrt{\text{DIE}}$, $\sqrt{\text{CHEW}}$ ...}
"past" → -or / $]_V$__ ; where V = { $\sqrt{\text{EAT}}$}
"past" → -eşt / $]_V$__ ; where V = { $\sqrt{\text{CATCH}}$}
"past" → -i
$\sqrt{\text{BOIL}}$ → kel

[1]It is difficult to determine with any certainty whether *-i* or *-t* is the elsewhere form of the suffix that forms the past stem, since both exponents appear frequently and neither picks out a natural class of verbs on semantic or phonological grounds. We have chosen *-i* as the elsewhere allomorph based on the fact that the suffixation of *-t* is often accompanied by small phonological changes in the verb root, while *-i* is typically not accompanied by such changes, cf. (4)–(5). Nothing hinges on this choice.

[2]We treat the suppletion cases, (1), as portmanteaux, because these verbs never co-occur with additional (overt) past stem morphology. We analyze portmanteaux as resulting from insertion at non-terminal nodes (Caha 2009, Radkevich 2010), but nothing hinges on this; we could instead take root suppletion to occur in the context of the "past stem" suffix, with a null allomorph of this suffix occurring with the suppletive root. Finally, if we are correct in taking both verb stems to contain the verb root and an additional piece, then it is important to note that there is nothing about (1) that tells us for certain whether it is the "past stem" or "present stem" that is the elsewhere (non-portmanteau) form of the verb root, or whether both are portmanteaux.

$\sqrt{\text{MILK}}$	→ do
$\sqrt{\text{SEW}}$	→ drü
$\sqrt{\text{EAR}}$	→ x
$\sqrt{\text{CATCH}}$	→ g
$\sqrt{\text{GO}}$	→ her
$\sqrt{\text{GO}}$,"past"	→ çü

As a first step, then, we have shown that the verb stems break down into predictable pieces.

3. Semantic breakdown

In the previous section, we proposed that the two verb stems in AK consist of the verb root and a suffix: $\sqrt{\text{V}}$-∅ for the "present stem", $\sqrt{\text{V}}$-*i* for the "past stem" (plus a number of other allomorphs of this suffix, cf. (6)). We are now in a position to investigate the semantic range of these verb stems, in order to see whether a consistent semantics can be attributed to the different pieces we have identified, thereby nullifying the need for an appeal to "stems" as a theoretical primitive in the system. Our core observations in this section will be that the verb stems are distributed based on tense, but not aspect, corresponding closely (but not perfectly) to their traditional labels, as schematized in (7).

(7) a. "Present stem": V-TENSE.NONPAST (abbrev: T.NONPST)
b. "Past stem": V-TENSE.ELSEWHERE (abbrev: T.ELSE)

The null suffix in the present stem consistently expresses nonpast tense, while the overt suffix that forms the past stem spells out both past tense and nonfinite tense, hence it is the elsewhere exponent of T. For clarity and consistency, we adopt the proposed glosses in (7) (abbreviated as indicated) in the examples that follow.[3]

3.1 The "present stem"

There are three main uses of the present stem, (8).

(8) a. *Present habitual:* IMPF-V-T.NONPST
Ez çay-ê **dı-kırr-∅-ım**.
I.NOM tea-OBL IMPF-buy-T.NONPST-1SG
'I buy tea.'

b. *Present progressive:* IMPF-V-T.NONPST-COP
Ez çay-ê **dı-kırr-∅-ım-e**.
I.NOM tea-OBL IMPF-buy-T.NONPST-1SG-COP
'I am buying tea.'

[3]There is also a copula that will surface in the examples in this section. There are in fact two copulas in AK, the "present copula" and the "past copula". Just like the "present" and "past" labels for the stems, however, it is not clear that these are informative labels. Since we will only be dealing with the "present copula" in this paper, we will simply gloss it as COP.

c. *Future:* AUX + SBJN-V-T.NONPST
Ez dıkê çay-ê **bı-kırr-∅-ım**. (dı-k-e = IMPF-do-COP)[4]
I.NOM AUX tea-OBL SBJN-buy-T.NONPST-1SG
'I will buy tea.'

The present progressive, (8b), can get a future interpretation in matrix contexts when it appears with future adverbials e.g., 'tomorrow' *sıwe*. However, the present stem in all of its forms is ungrammatical in matrix contexts with past tense adverbials, e.g., 'yesterday' *dhıni* and 'two hours ago' *dı saata ber ve*.

Thus far the best characterization of the present stem is that it encodes nonpast tense. Looking further to embedded clauses, we can see that the present stem in fact expresses a *relative* nonpast tense. Under a matrix past verb, the present stem is interpreted as cotemporal with the matrix verb phrase or temporally following the matrix verb phrase, (9). (Though not shown here for space reasons, this is also true for the other forms of the present stem.)

(9) Mı go-∅ [kı çay-ê **dı-kırr-∅-ım-e**].
I.OBL say.T.ELSE-3SG that tea-OBL IMPF-buy-T.NONPST-1SG-COP
'I said that I was buying/was going to buy tea.' (*saying before/cotemp. with buying*)

Finally, as can be seen throughout (8), the present stem is always prefixed. Following Giorgi & Pianesi (1997) among others, we take present tense to be incompatible with perfective aspect, hence the obligatoriness of the imperfective prefix, *dı-*, which appears in (8a)–(8b). In addition, there seems to be a surface requirement in AK that verbs cannot bear more than one prefix: in environments where the subjunctive is required, as in (8c), the imperfective prefix cannot appear, and instead we see the subjunctive prefix *bı-*.

Our conclusion about the present stem, then, is that it expresses a relative nonpast tense. We therefore propose that the present stem consists of the verb root with a null suffix that contributes this relative nonpast tense.

3.2 The "past stem" in finite clauses

The default, context-free interpretation of the "past stem" is a simple past tense, (10).

(10) *Simple past:* V-T.ELSE
Mı çay **kırr-i-∅**.
I.OBL tea.NOM buy-T.ELSE-3SG
'I bought tea.'

This simple past seems to be interpreted as perfective, a point we will return to later. With the addition of the imperfective prefix, the interpretation is past imperfective, (11).

[4]It is not clear whether this decomposition of the future auxiliary is correct synchronically, or whether it is now an unanalyzed whole. Since the conveyed meaning is neither imperfective nor present tense, and since the auxiliary does not need to agree with the nominative subject (as present stems normally do), we simply gloss the future auxiliary as AUX, taking it to be morphologically simplex.

(11) *Past progressive/habitual:* IMPF-V-T.ELSE
Mı çay **dı-kırr-i-∅**.
I.OBL tea.NOM IMPF-buy-T.ELSE-3SG
'I was buying tea.' / 'I used to buy tea.'

The past stem, (10)–(11), is grammatical with past adverbials in matrix clauses, but not with future adverbials, the converse of the present stem.[5,6]

Just like nonpast tense morphology in AK, (9), past morphology expresses a relative tense. Under a matrix past tense, the past stem is interpreted relative to that past time, (12).

(12) Mı go-∅ kı çay **(dı-)kırr-i-∅**.
I.OBL say.T.ELSE-3SG that tea IMPF-buy-T.ELSE-3SG
'I said that I bought/was buying/used to buy tea.' (*saying after buying*)

Our first hypothesis is that the suffix that forms the past stem encodes relative past tense.

A logical question to ask at this point is whether the past stem is in fact perfective, in addition to (or instead of) being past. However, while the (non-imperfective-marked) past stem is interpreted as perfective by default, cf. (10), it does not have the expected entailments of a true perfective, as shown in the felicitous continuations of (13a) in (13b–c).

(13) a. Ehmet dhıni xanı çê **k-ır-∅**.
Ahmet yesterday house good do-T.ELSE-3SG
'Ahmet built a house yesterday.'

b. ...hema, soğ ne-k-ır-∅.
but finish NEG-do-T.ELSE-3SG
'...but (he) didn't finish (it).' *(completedness not entailed)*

c. ...hema, hin jı çê dı-k-∅-ê.
but still too good IMPF-do-T.NONPST-COP.3SG
'...but (he) is still building (it).' *(boundedness not entailed)*

While the entailment of completedness is not a reliable indicator of high perfective aspect crosslinguistically, the entailment of boundedness is (Altshuler 2015). The past stem in AK thus fails the crucial test in (13c), and so we conclude that it is not perfective.[7] We instead

[5]The plain past stem can also have a reading that is something like "about to" when combined with the present adverbial *nha* "now". This interpretation is restricted to predicates that can be construed to have a process and subsequent logical culmination. We take this to be a pragmatically-available interpretation, based on a culmination being so imminent that it can be said to already have happened. Thus, such sentences are only felicitous when the process is already underway. We thank Sabine Iatridou for helpful discussion.

[6]In counterfactuals, the verb takes the form of a past stem bearing a counterfactual suffix, and in this case the past stem can appear with future adverbials. We take this to be part of a larger pattern whereby past tense morphology is co-opted in counterfactuals (Iatridou 2000, Bjorkman & Halpert 2012, *i.a.*).

[7]When a finite verb lacks overt tense (i.e., in the present stem), the interpretation is present tense; we therefore take there to be a null present tense morpheme. When a finite verb lacks overt aspect, the interpretation is *not* perfective; we therefore do not posit a null perfective aspect morpheme.

take the default perfective interpretation of simple past clauses to be a result of implicature, triggered by the absence of the imperfective prefix.

Our preliminary conclusion is that the suffix that forms the past stem contributes a (relative) past tense in finite clauses. We will see in the next section, however, that this suffix does not uniquely expone past tense, but rather is underspecified for tense.

3.3 The "past stem" in non-finite clauses

There is a complication to the clean opposition of nonpast (null suffix) vs. past (overt suffix): all participles and nominalizations in AK are formed on the past stem. This is notable because these participles and nominalizations do not semantically encode tense in AK. Adjectival participles, (14), as well as nominalizations, (15), are compatible with both past and future readings.

(14) *Past and future readings of adjectival participles:*

a. Me beq-ê **kuşt**-i di
we.OBL frog-EZ kill.T.ELSE-PART see.T.ELSE
'We saw the killed frog.' (*frog already dead at present*)

b. Em dıkê beq-ê **kuşt**-i bı-wun-∅-ın
we.NOM AUX frog-EZ kill.T.ELSE-PART SBJN-see-T.NONPST-PL
'We will see the killed frog.' (*frog may or may not be dead yet at present*)

(15) *Past and future readings of nominalizations:*

a. Me **fırr-i**-n-ê Mehemed-ê mezı k-ır
we.OBL fly-T.ELSE-NMLZ-EZ Mehemed-OBL watch do-T.ELSE
'We watched Mehemed's flying/flight.' (*flying/flight in the past*)

b. Em dıkê **fırr-i**-n-ê Mehemed-ê mezı
we.NOM AUX fly-T.ELSE-NMLZ-EZ Mehemed-OBL watch
bı-k-∅-ın
SBJN-do-T.NONPST-PL
'We will watch Mehemed's flying/flight.' (*flying/flight in the future*)

Our conclusion based on the appearance of the past stem in nonfinite environments is that the exponent of past tense, *-i*, is not exclusively used for past tense. Rather, this exponent is the elsewhere morphological realization of T, (16).

(16) *Updated vocabulary items*

a. T[PRES] → -∅
b. T → *-i* (and other allomorphs, cf. (6))

Both T[PAST] and T[NONFIN] are realized with the same vocabulary item, namely, the suffix that forms the so-called past stem. Note that this is a marked morphological system,

as the underspecified/elsewhere morphology is richer (overt, with many allomorphs) than the non-underspecified morphology, which is consistently null.

3.4 Interim summary

We summarize the morphology of the core verb forms we have covered in (17) and (18):

(17) *Core verb forms built on the "present stem"*

a.	present habitual	IMPF-V-T.NONPST
b.	present progressive	IMPF-V-T.NONPST-COP
c.	future	Aux + SBJN-V-T.NONPST

(18) *Core verb forms built on the "past stem"*

a.	simple past	V-T.ELSE
b.	past habitual/progressive	IMPF-V-T.ELSE
c.	participles/nominalizations	V-T.ELSE-PART/NOMZN

The "present stem" and "past stem" approximate the right labels, but: (i) the morphology is fully compositional and predictable, so there is no need for "stems" as a theoretical primitive, nor for an appeal to a morphomic distribution of the stems; (ii) the "present stem" is nonpast; and (iii) the "past stem" represents the verb root bearing the elsewhere morphology of T, surfacing both in past tense and nonfinite environments.

4. Locating T in Adıyaman Kurmanji

We have now identified the core pieces of aspectual and temporal verbal morphology in AK: present tense T as -∅, elsewhere T as *-i* (etc.), imperfective aspect as *dı-*, and subjunctive mood as *bı-*. Combining this with a variety of morphosyntactic evidence points us to a rather surprising conclusion about the syntactic position of T in AK. In particular, T seems to be (syntactically and/or morphologically) below Asp, in conflict with the expected superiority of T over Asp. In this section, we present the morphosyntactic evidence for the low position of T, and we explore various ways of situating this finding theoretically.

4.1 Evidence for the low position of T

There are four pieces of evidence that suggest a close relationship between T and *v*+V. First, the choice of verb root affects the choice of an allomorph for T:

(19)

	V-T.NONPST	V-T.ELSE
'eat'	x-∅	x-or
'catch'	g-∅	g-eşt
'die'	mır-∅	mır-∅
'steal'	dız-∅	dız-i
'hear'	biz-∅	bis-t

As can been seen in (19), it is impossible to pick the right phonological form of T without knowing the identity of V. Second, for a number of verbs, the choice of tense in T affects the form of the verb:

(20)

	V.T.NONPST	V.T.ELSE
'go'	her	çü
'say'	we	go
'see'	wun	di

As seen in (20), it is impossible to pick the right phonological form of the verb without knowing the identity of T. Under the fairly standard assumption that there are locality restrictions on allomorph-conditioning (and portmanteaux), T and V must be local.

But how local exactly are T and V to each other? V and *v* seem to be spelled out together in the normal case and are inseparable as V+*v* (or *v* is typically null). But, when *v* is overtly pronounced separately from the verb root as a causative morpheme, *v* conditions the form of T rather than V doing so. Take, for example, the verb 'boil' *kel*. The regular past stem is *kel-i*. When the past stem of 'boil' bears the causative *v* suffix *-on/-ın*, the elsewhere T is instead spelled out as *-d* (determined by CAUS) and appears outside the causative morpheme, as seen in *kel-on-d* (**kel-on-i*, **kel-i-on*). Causative morphology thus shows us that T is separated from the verb root by (at least) *v*, both linearly and with respect to allomorph-conditioning.

Unlike causative morphology, however, V-T allomorphy is not blocked by an overt exponent for Asp. Imperfective aspect blocks neither the verb root from conditioning the form of T, (21), nor T from conditioning the form of V, (22), cf. (19)–(20).

(21)

	IMPF-V-T[PRES]	IMPF-V-T(ELSE)
'eat'	dı-x-∅	dı-x-or
'catch'	dı-g-∅	dı-g-eşt
'die'	dı-mır-∅	dı-mır-∅
'steal'	dı-dız-∅	dı-dız-i
'hear'	dı-biz-∅	dı-bis-t

(22)

	IMPF-V.T[PRES]	IMPF-V.T(ELSE)
'go'	dı-her	dı-çü
'say'	dı-we	dı-go
'see'	dı-wun	dı-di

Further, imperfective Asp never conditions V's form, nor does V condition Asp's form.[8]

It is worth pausing for a moment to fully understand the implications of this data. If Asp were between T and V (as is standard), then we would have the structure in (23).

[8]The only apparent exception to this generalization involves vowel-initial verb roots which trigger surface allomorphy of *dı*, e.g., "bring" *dı-un* → *tin*; "come" *dı-e* → *te*. We take this to be a purely phonological process, and so do not consider it to be a counterexample.

(23) T > Asp > *v*+V

Taking as input the structure in (23), accounts of allomorph selection that rely on strict adjacency (e.g., Bobaljik 2012) cannot account for any of (19)–(22), since T is separated from *v*+V by Asp. Accounts that allow allomorph conditioning via "spans" (Svenonius 2012, Merchant 2015) also cannot account for any of (19)–(22), since Asp is "otiose" (irrelevant for the choice of allomorph) and so cannot be included in a conditioning span. Accounts that allow "pruning" of null nodes (e.g., Embick 2003, 2010, Calabrese 2012) can account for (19)–(20), but not (21)–(22), since Asp is overt and thus cannot be pruned, leaving T and *v*+V still non-local. These problems all disappear if Asp is in fact above T in AK. We return to this point in §4.2.3.

The final piece of evidence for the low position of T comes from the morphology that is (im)possible in nominalizations. In particular, we know from the overt suffix that surfaces in participles and nominalizations that (nonfinite) T is present in nominalizations, cf. (14)–(15). Further, this nonfinite T is obligatory, (24), and Asp is disallowed, (25).[9]

(24) *Participles/nominalizations not allowed to lack T*

a. *beq-ê **kuj**-i
frog-EZ kill-PART
Intended: 'the killed frog'

b. ***x**-ın-ê Mehemed-ê
eat-NMLZ-EZ Mehemed-OBL
Intended: 'Mehemed's eating'

(25) *Participles/nominalizations not allowed to have Asp*

a. beq-ê **(*dı-)kuşt**-i
frog-EZ IMPF-kill.T.ELSE-PART
'the killed frog'

b. **(*dı-)x-or**-ın-ê Mehemed-ê
IMPF-eat-T.ELSE-NMLZ-EZ Mehemed-OBL
'Mehemed's eating'

For nominalizations to include T but not Asp, there must be a syntactic constituent in the clause that contains T and lacks Asp.

To summarize: (i) V conditions allomorphy on T; (ii) T conditions allomorphy of V; (iii) this conditioning is not blocked by overt Asp; and (iv) nominalizations include T but not Asp. All of these facts point to T being closer to V than Asp is at some point in the syntactic or morphological components of the derivation.

[9]It is impossible to rule out the presence of an empty/null Asp in (25). However, participles and nominalizations in many languages preserve aspectual distinctions (Alexiadou 2001, Aikhenvald 2011, *i.a.*), so we might expect Asp to be able to be imperfective, and thus overt, if the Asp projection were present here.

4.2 The puzzle and some solutions

Why is Asp being above T surprising or problematic? Compositional semantic analyses of tense and aspect crucially rely on Asp mediating between T and the VP event/situation (e.g., Klein 1994, Stowell 1995, Demirdache & Uribe-Etxebarria 2000, Iatridou et al. 2001), (26a). Simplifying somewhat, the role of Asp is to relate the time argument of the VP (the event time) to Asp's own time argument (the reference/assertion time), which T in turn relates to its time argument (the utterance time in matrix clauses). If Asp and T are structurally reversed, (26b), they are in the wrong relative positions to do their jobs.

(26) a. Standard hierarchy: T > Asp > V
b. Reversed hierarchy: Asp > T > V

How can we reconcile the morphosyntactic evidence—which points to (26b)—with the semantic evidence (a standard tense/aspect system)—which points to (26a)?

4.2.1 A semantic solution

Perhaps the most obvious solution is to design a complex semantics for tense and aspect in AK, such that the apparent problem of the reversed hierarchy goes away. This solution would adopt (26b) and simply re-engineer the denotations of T and Asp in AK to get the clause-level semantics right. This is in principle possible, and essentially would involve allowing T and Asp to bypass their local time arguments for more distant ones, such that T could still relate the reference time to the utterance time, and Asp could still relate the reference time to the event time.

A number of problems arise for this solution. One problem is that it adds significant power to the semantics of tense and aspect, by taking away the restriction that each temporal or aspectual operator relate its own time argument in one of several fixed ways to that of its complement. Another problem is that we would expect languages to be able to freely choose between (26a) and (26b), rather than nearly always choosing (26a). Perhaps most importantly, under this analysis it is entirely accidental that the complex denotations of T and Asp in the reversed hierarchy in AK end up mimicking exactly the output of the (comparably) simple denotations of T and Asp in the standard hierarchy.

4.2.2 A syntactic solution

A very different sort of solution involves syntactic licensing, in the style of Stowell (2007). The basic idea here is that tense morphology need not surface in the same position as tense interpretation, but rather the morphology could appear in a low position, with its form conditioned/licensed by a temporal operator higher in the structure, in T. For Stowell (2007), this is the case in English for low past tense morphology on the verb licensed under a high Past operator in T. For AK, since the more specific morphology is nonpast tense (the present stem), it would have to be low nonpast tense morphology licensed under a

high Nonpast operator, with the elsewhere morphology (the past stem) occurring when the Nonpast operator is absent.

Such an analysis can maintain the standard hierarchy, (26a). However, one of the primary motivations for this type of analysis of tense morphology is the presence of sequence-of-tense effects. We have already seen in AK, however, that there are no sequence-of-tense effects, neither for present tense, (9), nor for past tense, (12). A Stowell-type analysis therefore does not fare well for AK.

4.2.3 Two morphological solutions

Finally, there are two routes towards a morphological solution. On the one hand, we could maintain both the standard hierarchy, (26a), and a strict locality condition on allomorph-selection (Bobaljik 2012), but invoke an operation that brings T closer to *v*+V in the post-syntax, before Vocabulary Insertion. In particular, we could invoke the Lowering operation (Embick & Noyer 2001, 2007), which allows a head to adjoin to the head of its complement. Operating on the standard hierarchy, (26a), one operation of Lowering would adjoin T to Asp, a position from which T would be local to *v*+V; this would allow T to condition allomorphy of *v*+V and vice versa.

On the other hand, we could loosen the locality restriction on allomorph-selection to allow (somewhat) non-local conditioning. This again maintains the standard hierarchy, (26a), while allowing T to condition the form of *v*+V across an overt Asp, without invoking any special morphological operations. For a revised version of the relevant locality condition, one option is to allow linear adjacency to be sufficient for allomorph-conditioning, regardless of structural distance, as proposed by Ostrove (2015). Another would be to allow conditioning of allomorphy to proceed (basically) freely within the same complex head, as proposed by Harley & Choi (2016), building on Bobaljik (2012); see also Bobaljik (2000).

The major benefit of a morphological solution to our puzzle is that nothing special needs to be said about tense/aspect semantics in AK; T and Asp appear in their standard positions, (26a), and have a standard semantics. Note, however, that none of these morphological solutions naturally explains the exclusion of Asp from nominalizations and participles, cf. (24)–(25) and fn. 9.

We leave it as an open question here which—if any—of these solutions to the low tense puzzle is the right one.

5. Conclusion

In this paper, we have shown that so-called verb stems in Indo-Iranian need not be treated as morphomic stems and so are not generally problematic for recent theoretical approaches to morphology and case/agreement splits. In particular, we showed that verb stems can be decomposed into morphemes (exponents) that relate systematically to semantic tense.

Solving this puzzle has uncovered several more. First, tense seems to occupy an unusually low position in AK, as discussed in §4. This puzzle might have a semantic, syntactic, or morphological solution. Second, though not discussed further in this paper for space reasons, is that split ergativity in AK is triggered by a change in tense. The directionality of this

split aligns with the purported universal directionality of tense-based split ergativity, with ergative alignment in the past tense (Dixon 1994). However, more recently, Coon (2013), following Salanova (2007), has surveyed a number of purported cases of tense-based split-ergativity, and concludes that there are no true tense-based splits; rather, these splits are in fact aspectually-conditioned. If our analysis of AK verbal morphology is correct, then Indo-Iranian languages (or at least AK) have true tense-based splits. A final observation is that the morpheme order in AK verbs, Asp-V-T, is extremely rare (Julien 2002).

Taking into account these other ways that AK is exceptional—a tense-based split and a rare morpheme order—may help us differentiate among the possible analyses of low tense in AK, §4.2. For example, a semantic solution would solve all three puzzles in one fell swoop: the reversed order of heads (Asp > T) allows T to affect the case/agreement alignment and results in a rare morpheme order within the complex verb. Alternatively, if case and agreement are post-syntactic phenomena, a morphological Lowering account might also solve all three puzzles together. We leave this open for future research, as well as the question of whether our analysis can extend to other Indo-Iranian languages.

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