

Where does *that* fit in? Morphological variation and reanalysis in Georgian placeholder verbs

Steven Foley¹ and Nino Amiridze²

¹University of Georgia, Athens; ²Ivane Javakhishvili Tbilisi State University

Draft: October 18, 2024

This paper focuses on morphosyntactic innovation and variation, using as a lens the placeholder verb construction which has emerged relatively recently in colloquial Georgian. Derived from reanalysis of the event-anaphoric verb phrase “do that”, placeholder verbs exhibit remarkable morphological variability. We advance a few theoretical analyses, each accounting for different combinations of the attested variants, and evaluate them in light of a morphological acceptability experiment. Judgement patterns across participants suggest that multiple grammars of the construction coexist: an unsurprising state of affairs, given that the reanalyzed demonstrative pronoun “that” has no unambiguous structural analogue in the standard Georgian verb. Some speakers seem to have internalized it as an incorporated theme; others, as a functional head; still others, as a sort of anaphor for subword constituents. This case study offers a unique snapshot of grammaticization in progress — the emergence of a structurally innovative verb type within a language whose verbal morphology is already quite complex.

Keywords: placeholders, agreement, reanalysis, morphological variation, event anaphora

1. Introduction

The placeholder verb construction emerging in contemporary colloquial Georgian (Amiridze 2010) combines a demonstrative pronoun (*imas* ‘that:DAT’ — always a distal demonstrative, and usually in the dative case) with a morphologically irregular and semantically bleached verb (*k^hmna* ‘do:NMLZ’).¹ Attested since the 1920s, placeholder verbs (PHV) have a few typical functions: as euphemisms, to avoid using certain verbs; as event anaphors, to refer deictically to contextually

¹Georgian data given in IPA transcription. Glossing abbreviations: ABS ‘absolutive’, AGR ‘agreement inflection’, APPL ‘applicative’, AOR ‘aorist (perfective past)’, AUX ‘auxiliary’, CM ‘class marker’, DAT ‘dative’, DEM ‘distal demonstrative’, DO ‘direct object’, ERG ‘ergative’, EVID ‘evidential’, GEN ‘genitive’, IMP ‘imperfect (imperfective past)’, INCH ‘inchoative’, INFL ‘inflection’, IO ‘indirect object’, NACT ‘nonactive (passive or anticausative)’, NEG ‘negative’, NOM ‘nominative’, NPST ‘nonpast’, OBJ ‘object’, PERF ‘perfect (past evidential)’, PFV ‘perfective’, PL ‘plural’, PRES ‘present (imperfective nonpast)’, PRIV ‘privative participle’, PST ‘past’, PTC ‘participle’, PVB ‘preverb (with directional/spacial meaning given in subscript italics)’, REFL ‘reflexive preradical vowel *i-*’, SG ‘singular’, SBJ ‘subject’, SUP ‘supine’, THM ‘thematic suffix’, TR ‘monotransitive preradical vowel *a-*’, X:Y ‘further decomposition of morphemes expressing X and Y is possible’, 1/2/3 ‘first/second/third person’

salient actions; and as syntactic stand-ins for verbs that allude speakers during lexical access. We translate them with the calque *thatdo* (1a). The diachronic connection between PHVs and the event-anaphoric verb phrase (EAVP) “do that” (1b) is quite clear. Indeed the two constructions are generally interchangeable, and can be identical in form except for the orthographic/phonological word boundary.

(1) Euphemism context: The speaker wishes to avoid using a vulgarity.

Deixis context: The speaker is pointing to participants in an unfamiliar or unlexified action.

Tip-of-the-tongue context: The speaker fails to summon a low-frequency verb.

a. Placeholder verb (PHV)

fen =t^h imasfvrebodi

2SG =too **placeholder_verb:IMP:2SG**

‘You were thatdoing too’

b. Event-anaphoric verb phrase (EAVP)

fen =t^h imas fvrebodi

2SG =too **that:DAT do:IMP:2SG**

‘You were doing that too’

But the morphosyntactic behavior of PHVs clearly sets them apart from EAVPs, demonstrating an important degree of grammatical reanalysis away from that collocation. Most strikingly, PHVs exhibit a pattern of morphological variation that is totally unique in the language. There are four major variants, differentiated by the presence and position of certain inflectional prefixes. The *simple PHV* (example (2); also (1a)) consists of just the demonstrative prefix *imas-* ‘DEM’ and the verb *k^hna* ‘do:NMLZ’; agreement prefixes like *v-* ‘1SBJ’ will always come between.

(2) Simple PHV

imas- v- k^hen -i

DEM- **1SBJ-** do -PST.1/2

‘I thatdid (*pro*₃)’, i.e. ‘I thatdid’ [intending an intransitive verb] or ‘I thatdid *pro*₃’ [intending a monotransitive verb]

Simple PHVs contrast with *complex PHVs*, which additionally bear a preverb morpheme. Preverbs are a class of about fifteen prefixes that express directed motion and/or perfective aspect; which one appears is generally lexically specified (Makharoblidze 2018). In principle any preverb can combine with a PHV, as long as it matches the one that would appear on the intended verb

(Amiridze 2010:77). And, just in case the preverb is copied, the position of agreement prefixes is variable: they can appear inside the demonstrative (3a), outside it (3b), or doubled on either side (3c).

(3) a. Complex PHV, inner agreement

da- imas- v- k^hen -i

PV_{Baround}- DEM- **1SBJ**- do -PST.1/2

b. Complex PHV, outer agreement

da- v- imas- k^hen -i

PV_{Baround}- **1SBJ**- DEM- do -PST.1/2

c. Complex PHV, doubled agreement

da- v- imas- v- k^hen -i

PV_{Baround}- **1SBJ**- DEM- **1SBJ**- do -PST.1/2

All: ‘I thatdid (*pro*₃)’ [Intending a verb with PVB *da*-]

The PHV construction presents several theoretical puzzles. Prefixal *imas*- ‘DEM’ does not obviously correspond to any extant structural position in the Georgian verb. Thus a profound analytical ambiguity faces the learner when reanalyzing the EAVP as a single word. The morphological variation of PHVs is also totally unique in the language. When it comes to preverbs, which play such a central lexical and inflectional role in the language, there is generally no flexibility as to whether and which one will appear. Likewise, agreement prefixes in normal verbs have a rigid position; doubled agreement prefixes per se are not unusual in Georgian (Harris 2017:159–161), but in the contexts where it occurs, that doubling is obligatory.

Tackling these puzzles, the rest of this article has the following structure. Section 2 compares the morphosyntax of EAVPs and PHVs, illustrating that some important step(s) of grammatical innovation has taken place. Section 3 advances four kinds of theoretical analyses, making precise different perspectives on that innovation. They boil down to just how prefix *imas*- ‘DEM’ has been reanalyzed: as an incorporated theme of the lexical verb *k^hna* ‘do:NMLZ’; as a novel instance of an extant functional category (namely, a preverb); as an instance of a totally new functional head, unique to the construction; or as a kind of morphological anaphor, a dummy inserted to support remnants of a subword ellipsis operation. In Section 4, these analyses are evaluated in light of a morphological acceptability study on PHVs. Aggregated results show that, on average, simple PHVs are most acceptable, and that complex PHVs with outer prefixal

agreement are the least. However, patterns of individual variation across participants suggests that multiple grammars coexist across the population — perhaps all four outlined in Section 3. Section 5 concludes with a summary of findings.

2. Evidence of reanalysis and innovation

PHVs’ roots in EAVPs are apparent, but it is also clear that they have undergone morphosyntactic reanalysis. Prefixal *imas-* ‘DEM’ exhibits few properties of syntactically independent direct objects, if any. First of all, it is frozen in position, obligatorily preceding the stem of the verb *kʰna* ‘do:NMLZ’ (4a), crucially inside of negation particles (4b). In contrast, in an EAVP, the syntactically independent demonstrative pronoun can freely scramble (5a) — just as any direct object can in this language, whose word order is quite flexible (Skopeteas et al. 2009) — as long as it doesn’t come between negation and the verb (5b).

(4) PHV: *imas-* ‘DEM’ must be prefixed to the verb

- a. {*imas-*} *fvrebodi* {*-*imas*}
 {DEM-}do:IMP:2SG {*-DEM}
 “You were thatdoing”
- b. {*-*imas-*} **ar** {*imas-*} *fvrebodi*
 {*-DEM-} NEG {DEM-} do:IMP:2SG
 “You weren’t thatdoing”

(5) EAVP: OV and VO orders are both possible, but not NegOV

- a. {*imas*} *fvrebodi* {*imas*}
 {DEM:DAT} do:IMP:2SG {DEM:DAT}
 “You were doing that”
- b. {*imas*} **ar** {*-*imas*} *fvrebodi*
 {DEM:DAT} NEG {*-DEM:DAT} do:IMP:2SG
 “You weren’t doing that”

Second, prefixal *imas-* ‘DEM’ is also frozen in form. Georgian is a split-ergative language (Harris 1981, 1985; Nash 2017), where case marking on core arguments is dependent on tense² and finiteness. In about half of the tenses (including the present, imperfect, future, and conditional),

² We use the term ‘tense’ as a shorthand for “inflectional tense–aspect–mood category”, also referred to in the Kartvelological literature as ‘screeve’ (Boeder 2005:29). For example, the aorist tense/screeve is a perfective past. Shared morphology across tense/screeve paradigms motivates more general glosses like ‘PST’ for suffixes like *-e/i*.

direct objects are in the so-called dative case (6a); in the other half (the aorist, optative, perfect, and pluperfect), direct objects are nominative (6b); and in nonfinite clauses (including nominalizations and supines³), they are genitive (6c).

(6) Case marking of direct objects shifts across tenses and clause types

- a. **imas** {*fvrebi*, *fvrebodi*, *izam*, *izamdi*}
DEM:DAT {do:PRES:2SG, do:IMP:2SG, do:FUT:2SG, do:COND:2SG}
 “You {are doing, were doing, will do, would do} **that [DAT]**”
- b. **is(a)** {*k^heni*, *k^hna*, *gik^hnia*, *gek^hna*}
DEM.NOM {do:AOR:2SG, do:OPT:2SG, do:PERF:2SG, do:PLU:2SG}
 “You {did, may/should do, (must) have done, had done} **that [NOM]**”
- c. **imis** {*k^hna*, *sak^hnelad*}
DEM:GEN {do:NMLZ:NOM, do:SUP}
 “(the act of) doing **that [GEN]**; (so as) to do **that [GEN]**”

In clear contrast (7a,b,c), prefixal *imas-* ‘DEM’ does not shift case form across different tenses of PHVs (Amiridze 2010:82).⁴

(7) Prefixal *imas-* ‘DEM’ does not shift form

- a. **imas-fvrebi**, **imas-fvrebodi**, **imas-izam**, **imas-izamdi**
DEM-do:PRES:2SG, **DEM-do:IMP:2SG**, **DEM-do:FUT:2SG**, **DEM-do:COND:2SG**
 “You are thatdoing, were thatdoing, will thatdo, would thatdo”
- b. **imas-k^heni**, **imas-k^hna**, **imas-gik^hnia**, **imas-izamdi**
DEM-do:AOR:2SG, **DEM-do:OPT:2SG**, **DEM-do:PERF:2SG**, **DEM-do:PLU:2SG**
 “You thatdid, may/must thatdo, (must) have thatdone, had thatdone”
- c. **imas-k^hna**, **imas-sak^hnelad**
DEM-do:NMLZ:NOM, **DEM-do:SUP**
 “(the act of) thatdoing; (so as) to thatdo”

³ The form glossed here as a supine is, morphologically speaking, the future/modal participle inflected for the adverbial case. Harris (1981:154) calls it an infinitive.

⁴ For PHVs the second group of tenses, the nominative-case form of the prefixal demonstrative (e.g. *is(a)-k^heni* ‘you thatdid’) seems to be a marginal possibility, though consultants generally prefer the dative forms given in (7b). As for nonfinite PHVs, prefixal demonstratives in the genitive form (e.g. **imis-k^hna* ‘thatdoing’) are judged as quite unacceptable.

A final piece of syntactic evidence for reanalysis is the argument structure of PHVs. Suppose that the intended verb is monotransitive, like (8). Note that theme of this intended verb is diagnosable as a direct object, since it is inflected nominative in this tense, the aorist.

- (8) *surat^h-i da- va- laik^h-e.*
 picture -NOM PVB_{around}- 1:TR- like -PST.1/2
 “I liked the photo (i.e. on social media)”

Either the EAVP or the PHV construction can be used to avoid using the verb. (This particular verb is illustrative because, as a recent loan word from English, speakers are likely to be unfamiliar with an interlocutor’s use of it.) However, if the speaker also wishes to include the theme argument of the intended verb, the two constructions must express it differently. In the EAVP, the event-anaphoric demonstrative pronoun is already the verb’s syntactic direct object, so the extra argument can only be expressed as a syntactic indirect object. Indirect-objecthood here is diagnosable by the dative case in this tense, and the appearance of applicative morphology (*u-* ‘3DAT’) on the verb.

- (9) *me =t^h surat^h-s is v- u- k^hen -i.*
 1SG=too picture -DAT DEM.NOM 1SBJ- 3DAT- do -PST.1/2
 “I also did that [DO, NOM] **to the picture** [IO, DAT]”

In contrast, when the intended verb’s theme is included in the PHV construction, it must be the clause’s syntactic direct object. PHVs can be applicativized, but only if the intended verb is also applicativized.⁵

- (10) *me =t^h surat^h-i imas- v- k^hen -i.*
 1SG=too picture -NOM DEM- 1SBJ- do -PST.1/2
 “I also thatdid **the picture** [DO, NOM]”

In sum, PHVs have clearly different syntax from EAVPs, evincing reanalysis of *imas* ‘DEM:DAT’ from a phrasal argument to some kind of affix. There are also several important

⁵ As a general rule, if the intended verb is active (i.e. transitive, ditransitive/applicativized, or unergative), the PHV construction will mirror that argument structure, as diagnosed by case marking and verbal agreement morphology; arguments of the PHV will have the same thematic interpretation as they do in the intended clause. However, if the intended verb is nonactive (i.e. a passive, anticausative, or psych verb), it is often not clear to speakers how to form the corresponding PHV (cf. Amirdze 2010:71–79). There might be a morphological explanation for this fact: as an independent verb, *k^hna* ‘do:NMLZ’ has a defective paradigm, lacking nonactive forms. Or, there could be a semantic explanation: perhaps PHVs, even if they do not synchronically contain this verb, still inherit some important part of its lexical semantics. A parallel to EAVPs in English is worth keeping in mind: “I did that” is typically infelicitous if the intended verb is nonagentive and/or stative (e.g. “I resembled her”). Future semantic fieldwork on Georgian EAVPs and PHVs will be necessary to untangle these issues.

morphological differences between the constructions. Most obvious is the option for a PHV to bear a preverb morpheme. Georgian preverbs have two major semantic jobs: to express directed motion, or perfective aspect (Boeder 2005:32–34; Makharoblidze 2018). There are about fifteen common preverbs, and verbs of motion like *svla* ‘go:NMLZ’ freely alternate between them to express direction of motion, even in imperfective tenses (11). For verbs that do not express motion, preverbs are only found in perfective tenses; which preverb will appear is lexically specified, and the same root might even combine with different ones to express radically different lexical meanings (12).

(11) Directional preverbs

a- *v- di -odi*,

ɟʰa- *v- di -odi*,

PVB_{up}- 1SBJ- go.IMPf -NACT:PST.1/2,

PVB_{down}- 1SBJ- go.IMPf -NACT:PST.1/2,

ʃe- *v- di -odi*,

ga- *v- di -odi*

PVB_{in}- 1SBJ- go.IMPf -NACT:PST.1/2,

PVB_{out}- 1SBJ- go.IMPf -NACT:PST.1/2

“I was going up, going down, going in, going out”

(12) Aspectual–lexical preverbs

a- *va- g -e*,

tsʰa- *va- g -e*,

PVB_{up}- 1:TR- build -PST.1/2,

PVB_{away}- 1:TR- lose -PST.1/2,

mo- *vi- g -e*,

ga- *vi- g -e*

PVB_{up}- 1:REFL- win -PST.1/2,

PVB_{away}- 1:REFL- understand -PST.1/2

“I built/established *pro*₃, I lost (*pro*₃), I won (*pro*₃), I understood (*pro*₃)”

Some verbs do not combine with preverbs at all; the lexical verb *kʰna* ‘do:NMLZ’ is an example. (It expresses perfective aspect instead through root suppletion, as is apparent in (6).) Therefore the complex PHVs, which include a preverb, constitute a further step of grammatical innovation beyond the EAVP. Note that which preverb appears is not arbitrary: the complex PHV will copy (in a purely descriptive sense of the word) the intended verb’s preverb, whether it expresses motion or aspect. It is never necessary to copy the intended verb’s preverb; the simple version of the PHV is always an option — and in fact many speakers prefer it to the complex version, as demonstrated in elicitations and in our acceptability study (Section 4). But if a preverb is included, it must match that of the intended verb (Amiridze 2010:77).

- (13) a. Intended verb
gamo- ak^hliaves
 PVB_{out:hither-} stupefy:AOR:3PL
 “They stupefied *pro*₃”
- b. Licit PHVs: without preverb, or with copied preverb
imas- k^hnes ~ *gamo- imas- k^hnes*
 DEM- do:AOR:3PL PVB_{out:hither-} DEM- do:AOR:3PL
 Both: “They thatdid *pro*₃”
- b. Illicit complex PHVs: any mismatched preverb
 **a- imas- k^hnes*, **ɟ^ha- imask^hnes*, **ga- imask^hnes*, etc.
 PVB_{up-} DEM- do:AOR:3PL, PVB_{down-} thatdo:AOR:3PL, PVB_{out-} thatdo:AOR:3PL

The nature of the preverb copying relation, and why it should give rise to variation in the position of agreement prefixes, will be a key topic of Section 3. But before shifting focus, we note a few other ways in which the morphology of PHVs innovates on the independent verb *k^hna* ‘do:NMLZ’ and EAVPs. The first observation has to do with the formation of certain tenses, especially the future. PHVs can inherit all of the irregularities of *k^hna* ‘do:NMLZ’, including its suppletive future root (14a). The allomorphy of this verb is quite unusual; most Georgian verbs form their future tense agglutinatively, with a so-called thematic suffix, and different inflectional classes of verbs are associated with different thematic suffixes (for a full description, see Shanidze 1980 [1953], Aronson 1990, Hewitt 1995). For PHVs, another possibility for the future is to use the default root ($\sqrt{k^h(e)n}$) in combination with either the thematic suffix *-i* ‘THM’ (14b) or *-eb* ‘THM’ (14c). The former is probably an analogy with the verb *ɟek^hmna* ‘create:NMLZ’, whose root is a cognate of *k^hna* ‘do:NMLZ’. The latter thematic suffix is the default one. Innovative strategies for forming different tenses like these are further evidence of grammatical reanalysis in the PHV construction.

(14) Future-tense forms of PHVs and related verbs

- | | | | |
|----|--|-----|---|
| a. | <i>%imas- i- zam -en</i> | cf. | <i>i- zam -en</i> |
| | DEM- REFL- do.FUT -NPST.3PL | | REFL- do.FUT -NPST.3PL |
| | “They will thatdo (<i>pro</i> ₃)” | | “They will do <i>pro</i> ₃ ” |

- | | |
|--|---|
| <p>b. %imas- <i>k^hn</i> -<i>i</i> -<i>an</i>
 DEM- do -THM -NPST.3PL
 “They will thatdo (<i>pro</i>₃)”</p> | <p>cf. <i>je</i>- <i>k^hmn</i> -<i>i</i> -<i>an</i>
 PVB_{in}- create -THM -NPST.3PL
 “They will create <i>pro</i>₃”</p> |
| <p>b. %imas- <i>k^hn</i> -<i>eb</i> -<i>en</i>
 DEM- do -THM -NPST.3PL
 “They will thatdo (<i>pro</i>₃)”</p> | <p>cf. <i>da</i>- <i>a</i>- <i>laik^h</i> -<i>eb</i> -<i>en</i>
 PVB_{in}- TR- like -THM -NPST.3PL
 “They will like <i>pro</i>₃ [on social media]”</p> |

Finally, we note one more dimension of morphological variability in PHVs: the shape and position of morphemes known as preradical vowels. These elements appear in a structural position between agreement prefixes and the root. As the following data points illustrate, whether and which vowel appears depends on the verb’s inflectional class, tense, and argument structure.

- | |
|--|
| (15) v - <i>t^hamaɸ</i> - <i>ob</i> ~ vi - <i>t^hamaɸ</i> - <i>e</i> ~ va - <i>t^hamaɸ</i> - <i>e</i> |
| 1:SBJ - play -THM 1:REFL - play -PST.1/2 1:TR - play -PST.1/2 |
| “I will play” “I played” “I made <i>pro</i> ₃ [DO] play” |
| ~ ve - <i>t^hamaɸ</i> - <i>e</i> ~ vu - <i>t^hamaɸ</i> - <i>eb</i> - <i>ia</i> |
| 1:APPL - play -PST.1/2 1:3DAT - play -THM -PERF:3 |
| “I played with <i>pro</i> ₃ [IO]” “ <i>pro</i> ₃ [DAT.SUBJ] must have made me play” |

Here, it suffices to note that monotransitive verbs will by default have the preradical vowel *a*- ‘TR’, and other ones (e.g. no vowel, or *i*- ‘REFL’) are lexically exceptional for verbs with this argument structure. In monotransitive PHVs, the inner position of prefixal agreement (in between *imas*- ‘DEM’ and the root) will always behave as it does in the independent verb *k^hna* ‘do:NMLZ’. Namely, one of the non-default preradical vowels will appear depending on tense — see (6a,b) and (7a,b) above. However, at the outer position of agreement, available only for complex PHVs, morphology will not inherit the irregularities of *k^hna* ‘do:NMLZ’. Monotransitive complex PHVs will either have no preradical vowel in the outer position, or the default *a*- ‘TR’. The latter option generally seems preferred. To illustrate, the following complex/doubled PHVs with parallel forms of the independent verb *k^hna* ‘do:NMLZ’. In the aorist tense (16a), *k^hna* has no preradical vowel; for the PHV, the transitive vowel *a*- ‘TR-’ is only possible in the outer position. In the future (16b), *k^hna* as the vowel *i*- ‘REFL’; the PHV obligatorily mirrors this at the inner position, but not at the outer position.⁶

⁶ Agreement with first- and second-person objects behaves in an unusual way for PHVs. For regular transitive verbs, note that preradical vowels distinguish direct- (i) and indirect-object agreement (ii). When a PHV takes a first- or

(16) Preradical vowels for lexical ‘do’ and complex PHVs

- | | | | |
|----|--|---|--|
| a. | <i>v-</i> (<i>*a-</i>) <i>k^hen -i</i> | ~ | <i>da-</i> <i>v-</i> (<i>a-</i>) <i>imas-</i> <i>v-</i> (<i>*a-</i>) <i>k^hen -i</i> |
| | 1 SBJ- (*TR-) do -PST.1/2 | | PVB- 1 SBJ- (TR-) DEM- 1 SBJ- (*TR-) do -PST.1/2 |
| | “I did <i>pro</i> ₃ ” | | “I thatdid <i>pro</i> ₃ ” (intending a verb with PVB <i>da-</i>) |
| b. | <i>v-</i> (<i>*i-</i>) <i>zam</i> | ~ | <i>da-</i> <i>v-</i> (<i>a-</i>) <i>imas-</i> <i>v-</i> (<i>*i-</i>) <i>zam</i> |
| | 1 SBJ- (*TR-) do.FUT | | PVB- 1 SBJ- (TR-) DEM- 1 SBJ- (*REFL-) do.FUT |
| | “I will do <i>pro</i> ₃ ” | | “I will thatdo <i>pro</i> ₃ ” (intending a verb with PVB <i>da-</i>) |

The PHV construction is a remarkably intricate case study of morphosyntactic innovation and reanalysis, in a language whose morphosyntax is already quite complex. The key descriptive generalizations presented in this section are summarized below.

(17) Syntactic and morphological differences between PHVs and EAVPs

- Prefixal *imas-* ‘DEM’ is in a fixed position; it cannot scramble like an independent direct object, and it appears inside of negation.
- Prefixal *imas-* ‘DEM’ does not shift in case across tenses and clause types, like independent direct objects do.
- PHVs express the theme of the intended verb as a syntactic direct object; in EAVPs, it must be an applied indirect object.
- PHVs can optionally copy the preverb of the intended verb. Doing so allows for prefixal inflection to appear in a position outside *imas-* ‘DEM’.
- In PHVs, irregular stem allomorphy is inherited from independent *k^hna* ‘do:NMLZ’, though some morphological innovations are attested.

second-person direct object (iii), the outer prefixal position can have the expected monotransitive preradical vowel *a-* ‘TR’ — but, somewhat mysteriously, at the inner prefixal position, the preferred preradical vowel is *i-* ‘IO’, normally associated with indirect object agreement. This may have something to do with the fact that the independent verb *k^hna* ‘do:NMLZ’ cannot felicitously take first- or second-person direct objects (*#mk^hnes* “they did me”). Finally, if the PHV substitutes an applied verb, in either position there will be a preradical vowel that unambiguously registers indirect object agreement (iv).

- | | | | |
|-------|---|------|--|
| (i) | <i>gamo-</i> m- a- <i>k^hliav -es</i> | (ii) | <i>gamo-</i> m- i- <i>k^hliav -es</i> |
| | PVB _{out:hither-} 1 OBJ- TR- stupefy -PST.3PL | | PVB _{out:hither-} 1 OBJ- IO- stupefy -PST.3PL |
| | “They stupefied me [DO]” | | “They stupefied <i>pro</i> ₃ for/on me [IO]” |
| (iii) | <i>gamo-</i> m- (a-) <i>imas-</i> m- (i-) <i>k^hn -es</i> | | |
| | PVB _{out:hither-} 1 OBJ- (TR-) DEM- 1 OBJ- (IO-) do -PST.3PL | | |
| | “They thatdid me [DO]” (Intending the monotransitive verb in (i)) | | |
| (iv) | <i>gamo-</i> m- (i-) <i>imas-</i> m- (i-) <i>k^hn -es</i> | | |
| | PVB _{out:hither-} 1 OBJ- (*IO-) DEM- 1 OBJ- (*IO-) do -PST.3PL | | |
| | “They thatdid <i>pro</i> ₃ for/on me [IO]” (Intending the ditransitive verb in (ii)) | | |

- f. In PHVs, preradical vowels behave as they do for *k^hna* ‘do:NMLZ’ at the inner prefixal position (inside *imas-* ‘DEM’), but have different behavior at the outer position (between a copied preverb and *imas-* ‘DEM’).

3. Analytical possibilities

This section explores a space of theoretical analyses that account for the unique properties of Georgian PHVs. We focus on the four major morphological variants, repeated here. They are distinguished by the presence of a preverb copied from the intended verb, and the position of prefixal agreement: the simple PHV (18); the complex/inner PHV (19); the complex/outer PHV (20); and the complex/doubled PHV (21).

(18) Simple/inner PHV

imas- v- k^hen -i

DEM- 1SBJ- do -PST.1/2

“I thatdid *pro*₃” (Intending a

(19) Complex/inner PHV

da- imas- v- k^hen -i

PVBaround- DEM- 1SBJ- do -PST.1/2

“I thatdid *pro*₃” (Intending a monotransitive verb with PVB *da-*)

(20) Complex/outer PHV

da- v- imas- k^hen -i

PVBaround- 1SBJ- DEM- do -PST.1/2

“I thatdid *pro*₃” (Intending a monotransitive verb with PVB *da-*)

(21) Complex/doubled PHV

da- v- imas- v- k^hen -i

PVBaround- 1SBJ- DEM- 1SBJ- do -PST.1/2

“I thatdid *pro*₃” (Intending a monotransitive verb with PVB *da-*)

An ideal theory of PHVs should, with minimal novel theoretical machinery, be able to explain why these four options are possible, while other logical configurations of morphemes are not. Two specific ungrammatical variants will be particularly important to keep in mind: a simple (preverbless) PHV where prefixal agreement appears outside of *imas-* ‘DEM’ (22); and a complex (preverb-copying) one where *imas-* ‘DEM’ is the outermost prefix (23).

(22) Impossible: Simple PHV with outer (or doubled) agreement

**v- imas- (v-) k^hen -i*

1SBJ- DEM- (1SBJ-) do -PST.1/2

(23) Impossible: Demonstrative prefix outside of copied preverb

**imas- da- v- k^hen -i*

DEM- PVB_{around}- 1SBJ- do -PST.1/2

As a theoretical starting point, we adopt an interpretive postsyntactic theory of morphology like Distributed Morphology (Halle & Marantz 1993, et seq.), in which the linear order of morphemes straightforwardly reflects hierarchical relations between the syntactic terminals that they spell out. Georgian verbal morphology is quite complex, and so here we must abstract away from many of the finer details. We identify four major structural positions, segmented off in the following verb.⁷

(24) *da- va- laik^h -e*

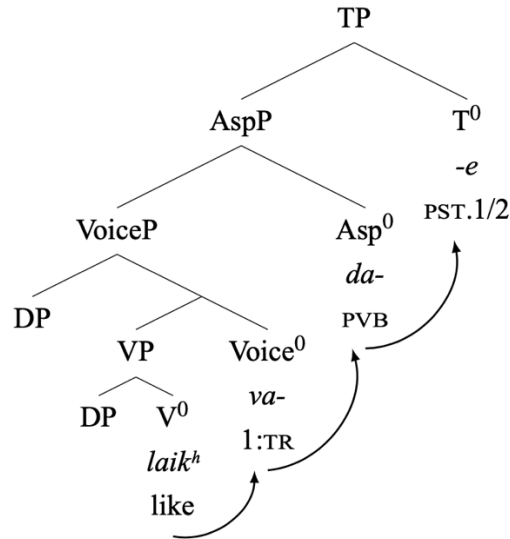
PVB_{around}- 1:TR- like -PST.1/2

“I liked *pro*₃ (on social media)”

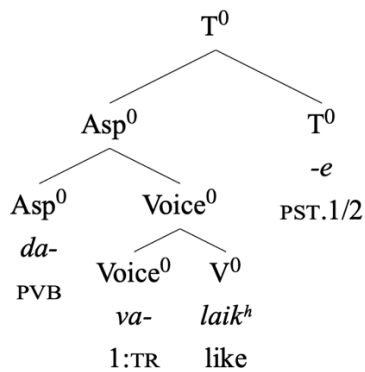
Innermost is the verb root, which we identify as V^0 . We take suffixes to be exponents of T^0 , since they generally express combinations of tense features and agreement with the subject’s phi-features. As for the agreement prefixes, their behavior is well studied (for an overview, see Foley 2022), and the consensus is that they expone the head that introduces the external argument (Béjar 2007, Béjar & Rezac 2011, et seq): here labeled Voice⁰. Finally, we assume that preverbs expone a high Asp⁰, merged between VoiceP and TP (following e.g. Lomashvili 2011, Nash 2017). Thus, we represent the syntactic structure of the finite clause containing a verb like (24) as in (25a). We assume that the verb word itself is the spell out of a complex head like (25b), produced by an operation like head movement.

⁷ It is often possible to segment off more morphemes than these four positions can account for (for example, both the consonantal agreement prefix *v-* ‘1SBJ’ and the preradical vowel *a-* ‘TR’). To accommodate a more granular morphological analysis, it will be necessary to posit some combination of head adjunction, extra functional heads merged along the clausal spine, or postsyntactic fission operations (Noyer 1997). Articulating a more exhaustive theory of Georgian verbal morphology is beyond this scope of this paper, but we occasionally flag analytical choices that interact crucially with particular representational assumptions.

(25) a. Standard clausal structure for Georgian



b. Complex head spelled out by the verb word



The following subsections lay out four analyses of PHVs, from most conservative to most innovative vis-à-vis the EAVP construction. The first casts prefixal *imas-* ‘DEM’ as, at some level of representation, a phrasal complement of the verb *k^hna* ‘do:NMLZ’, the two elements fused together by a novel incorporation operation (Section 3.1). Then we consider the possibility that *imas-* ‘DEM’ has been reanalyzed as an extant (Section 3.2) or novel (Section 3.3) functional head along the clausal spine. Finally we articulate an analysis of PHVs involving ellipsis of a subword constituent corresponding to the intended verb, replaced by a morphological dummy expounded as *imas-* ‘DEM’ (Section 3.4).

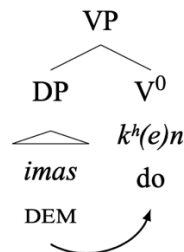
3.1 DEM as incorporated theme

Given the evident diachronic connection between PHVs and EAVPs, one obvious possibility for a synchronic analysis is to unify the constructions at some level of representation. Suppose that in

either case the demonstrative element is initially merged as the phrasal complement of the verb root *k^h(e)n* ‘do’, an ordinary internal argument. At this point, if nothing special occurs, the rest of the clause will be constructed as normal, resulting in an EAVP. An applied argument, morphosyntactically an indirect object, may be added to the structure to convey the theme of the intended event.

Alternatively, a special incorporation operation can apply, fusing together the demonstrative and verb into a complex head to create the PHV (a possibility first suggested by Amiridze 2010:82). The precise mechanism involved might be head movement (Baker 1988, 2009) or M-Merger (Marantz 1988, Embick & Noyer 2001). A pseudo-incorporation analysis (Massam 2001, et seq.) is also conceivable: here the PHV’s prefixal *imas-* ‘DEM’ would be a phrasal argument that remains in situ, whereas other arguments obligatorily evacuate the extended verb phrase (e.g. for case licensing).⁸ Another possibility is that the root *imas-* ‘DEM’ is simply adjoined to the verb root, in a compounding operation rather than incorporation per se. But whatever syntactic operations are involved in creating a PHV, they must be able to feed the licensing of a new morphosyntactic direct object, corresponding semantically to the theme of the intended event. A derivation of PHVs involving incorporation is illustrated below.

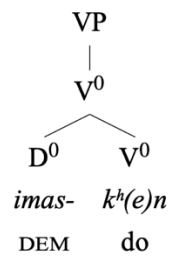
(26) a. A demonstrative pronoun is merged with V⁰, then undergoes incorporation



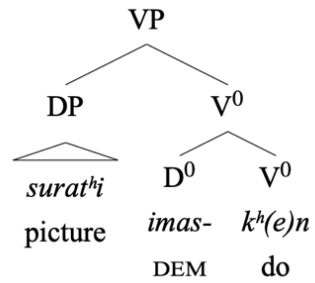
⁸ Something like a pseudo-incorporation analysis might also account for a phenomenon known as tmesis, attested in Old Georgian and Svan (Boeder 1994, Boeder 2005:32, Margiani 2016). There, certain pronouns and other functional elements can appear inside of preverbs, folded into the verb complex. Deriving PHVs from tmesis seems unlikely, though, since it has not been a grammatical possibility in Georgian since the late thirteenth century (Wier 2022).

(i) *ar =t^ha fe- raj- gi- rats^hχ -i -es,* *ramet^hu...*
 NEG =too PVB_{in}- **what:NOM**- 2OBJ:IO- consider -PERF -PL *namely that*
 “There is also something you all have not considered, namely that...”
 (Old Georgian, adapted from Boeder 1994:451)

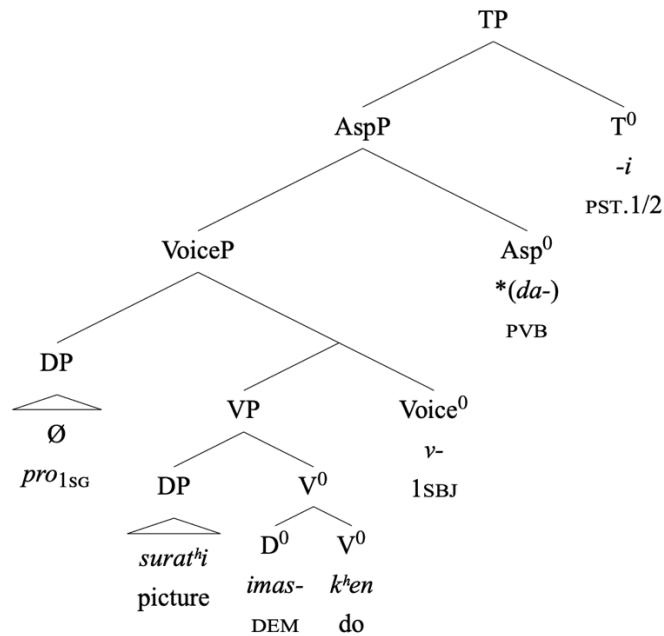
- b. The output is a complex V⁰, the PHV



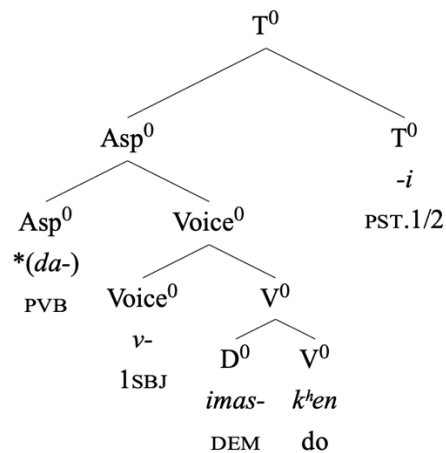
- c. Another internal argument can be merged with the PHV



- d. The rest of the clause is built



- e. The complex head containing the PHV is spelled out



What is appealing about this analytical approach is that it directly captures the connection between the PHV and EAVP constructions. Positing a shared level of syntactic representation offers an avenue to a unified compositional semantics for the two constructions (insofar as one is motivated; an open empirical question is the extent to which the two constructions are interpreted alike). However, incorporation cannot explain much about the morphological variability of PHVs. If the verb and demonstrative form a constituent very low in the verb phrase, all inflection should appear outside of those elements: much like the structure of compound verbs (27), which have two lexical roots inside prefixal agreement and preverbs (Kalandadze 1979).

(27) Standard compound verbs

- a. *ve-* [*t^han* + *χm*] *-eb -i*
 1:APPL- [together + voice] -THM -NPST.NACT.1/2
 ‘I agreed with *pro*₃₁₀’
- b. *da- va-* [*did* + *gul*] *-eb -di*
 PVB_{around}- 1:TR- [big + heart] -THM -PST.1/2
 ‘I would make *pro*₃ arrogant’

This morphological configuration is possible for PHVs; it corresponds to the complex type with outer agreement (20). But recall that the outer position of prefixal agreement is only available when the PHV copies the intended verb’s preverb (22). There is no obvious reason why the incorporation operation would necessitate this aspectual morpheme. And, setting aside the possibility of a powerful postsyntactic operation capable of reordering morphemes, there is no way to capture grammatical variants with prefixal agreement in the inner position (18, 19, 21).

Note also that the incorporation operation here would be unique to the PHV construction, only triggered when *k^h(e)n* ‘do’ takes *imas* ‘DEM’ as its complement. Arguably a *sui generis* operation is appropriate, given the construction’s *sui generis* properties. However, there is some theoretical tension in positing an incorporation operation that must exist alongside another very similar operation in Georgian, independently necessary to account for a more productive construction: nonfinite theme–verb compounds (Amiridze 2010:82). Like PHVs, these are words comprising a verb stem and a nominal root interpreted as its theme (28). However they differ from PHVs in a few key ways. First, the nominal theme appears in a different structural position than prefixal *imas-* ‘DEM’, at the left edge of the word rather than slotted inside the preverb (28a,b). Second, the nominal theme is combined with the verb in these compounds as a bare root, uninflected for case; it is not in the dative case like *imas-* ‘DEM’.⁹ Third, whereas PHVs readily appear with finite inflection (tense and agreement), verb–theme compounds are limited to nonfinite deverbal forms like participles. Finite paraphrases of the compounds must express the theme as a syntactically independent direct object (28c,d).

(28) Theme incorporation outside of PHVs has very different properties

- a. [*χel*] + [*da- ban -il -i*]
 [hand] + [PVB_{around-} bathe -PPTC -NOM]
 ‘with clean hands; always in the clear’
- b. **da-* [*χel + ban*] -*il -i*
 PVB_{around-} [hand + bathe] -PPTC -NOM
 Attempted: ‘with clean hands; always in the clear’
- c. *[*χel*] + [*da- vi- ban -e*]
 [hand] + [PVB_{around-} 1:REFL- bathe -PST.1/2]
 Attempted: ‘I handwashed’
- d. *χel -i* *da- vi- ban -e*
 hand -NOM PVB_{around-} 1:REFL- bathe -PST.1/2
 ‘I washed my hands’

⁹ In fact, given the suppletive inflectional paradigm of the demonstrative (*is* ‘DEM.NOM’ ~ *imas* ‘DEM.DAT’ ~ *iman* ‘DEM.ERG’ ~ *imis* ‘DEM.GEN’; cf. the proximal *es* ‘PROX.NOM’ ~ *amas* ‘PROX.DAT’ ~ etc.), there arguably is no bare root form of the pronoun. Nouns, on the other hand, are always inflected for case by concatenation of a suffix, so a bare form is always clearly available.

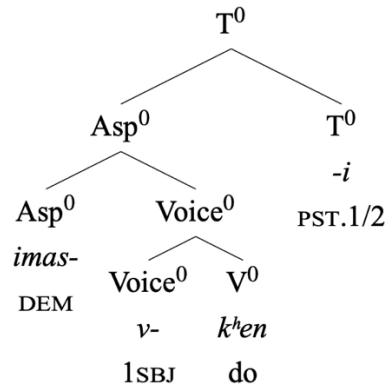
In sum, an incorporation analysis correctly predicts the existence of complex PHVs with outer prefixal agreement (20), and correctly rules out the possibility of the demonstrative appearing outside of preverbs (23). However, it undergenerates PHVs with any kind of inner agreement (18,19,21), and overgenerates simple PHVs with outer agreement (22) modulo an unexplanatory morphological stipulation.

3.2 DEM as an extant functional head

Instead of positing a shared level of representation between PHVs and EAVPs, another possibility is that prefixal *imas-* ‘DEM’ has been reanalyzed as lexical item totally distinct from the independent demonstrative pronoun *imas* ‘DEM:DAT’. Supposing the learner is not compelled to posit a totally novel functional category for this element, there are three major extant categories along the clausal spine that it could be assimilated into: Voice^0 , Asp^0 , and T^0 . Since exponents of T^0 are always linearized as suffixes, the prefixal position of *imas-* ‘DEM’ eliminates that as a possibility. Voice^0 is also a problematic candidate, for syntactic reasons. Nonfinite verb forms — like the nominalization and supine, illustrated above (6c) — are highly impoverished morphosyntactically (Harris 1981): they distinguish perfective and imperfective aspect (by the presence or absence of a preverb), but do not make tense distinctions; they do not distinguish active or nonactive forms, and cannot be applied; they do not display any kind of phi-agreement; and they cannot license DPs in the core cases (nominative, dative, and ergative), instead expressing arguments as either genitive possessors or as PPs. We take this as evidence that nonfinite verbs altogether lack Voice^0 (and also T^0). Since PHVs readily form nonfinite forms (7c), we therefore conclude that *imas-* ‘DEM’ cannot be analyzed as Voice^0 .

That element can, though, be analyzed as a novel exponent of Asp^0 : that is, as a novel preverb. This offers a very straightforward analysis of simple PHVs (18), where *imas-* ‘DEM’ appears in the same position a preverb would for a normal verb. The following structure illustrates.

(29) Prefixal *imas-* as a novel preverb (Asp⁰)



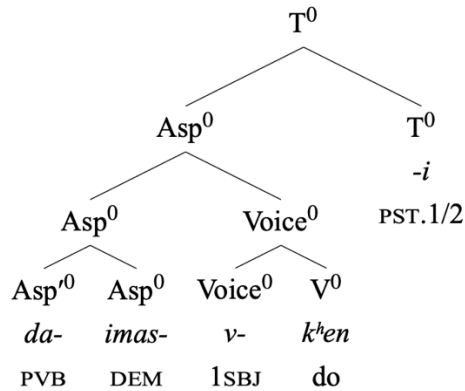
As for complex PHVs, which additionally bear the preverb lexically associated with the intended verb, it seems reasonable to posit head adjunction at Asp⁰. This is arguably independently necessary in Georgian to account for compound preverbs: combinations of an atomic preverb and *mo-* ‘PVB_{hither}’. For verbs where preverbs express directed motion, simple and compound preverbs express, respectively, motion away from and towards the deictic center (30a,b). For verbs where preverbs express perfective aspect, it might simply be lexically specified what kind of preverb there is (30c).

(30) Simple and compound preverbs in standard verbs

- a. *a- vidnen* ~ [*a + mo*]- *vidnen*
PVB_{up}- go:AOR.3PL [PVB_{up} + PVB_{hither}]- go:AOR.3PL
‘They went up (away from here)’ ~ ‘They came up (towards here)’
- b. *fe- it’anes* ~ [*fe + mo*]- *it’anes*
PVB_{in}- take:AOR.3PL [PVB_{in} + PVB_{hither}]- take:AOR.3PL
‘They took *pro*₃ in (thither)’ ~ ‘They brought *pro*₃ in (hither)’
- c. *a- ages* ~ [*a + mo*]- *ages*
PVB_{up}- build:AOR.3PL [PVB_{up} + PVB_{hither}]- throw_{over}:AOR.3PL
‘They established *pro*₃’ ~ ‘They threw *pro*₃ (e.g. blanket) over *pro*₃ (bed/floor)’

Thus, a complex PHV with inner agreement could have the following structure (31). It probably must be stipulated that *imas-* ‘DEM’ is linearized after the intended verb’s preverb, since there are no obvious principles of head adjunction in Georgian that would rule out the other order (23). Note also that identifying *imas-* ‘DEM’ as Asp⁰ also predicts that this morpheme should only appear outside of prefixal agreement, undergenerating two types of complex preverbs (20,21).

(31) Complex/inner PHVs analyzed with novel compound preverbs



3.3 DEM as a novel functional head

Suppose now that learners reanalyze prefixal *imas-* ‘DEM’ as a totally new functional head F^0 , which is found only in the PHV construction. (Equivalently, learners might now posit F^0 in all extended verbal projections, assuming that it has a null exponent in every construction except the PHV.) The reanalyzed EAVP string “that + *do*” is in principle compatible with a structure where this new FP dominates any functional projection above VoiceP. In fact, FP could even be analyzed lower than VoiceP, if the learner is not exposed to any reanalyzable string that contains prefixal agreement (the exponent of Voice^0) — that is, if their crucial input comprises only monotransitive or intransitive PHVs with second- or third-person subjects, like the following.

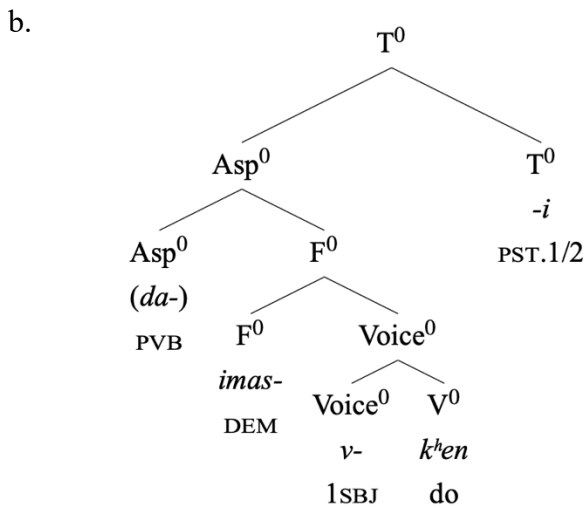
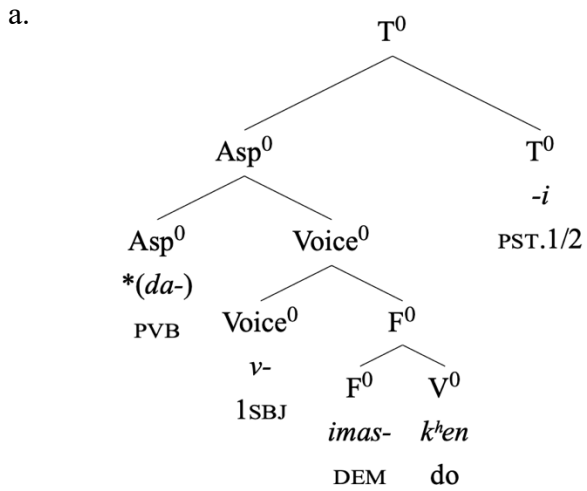
(32) Maximally ambiguous input, without prefixal inflection

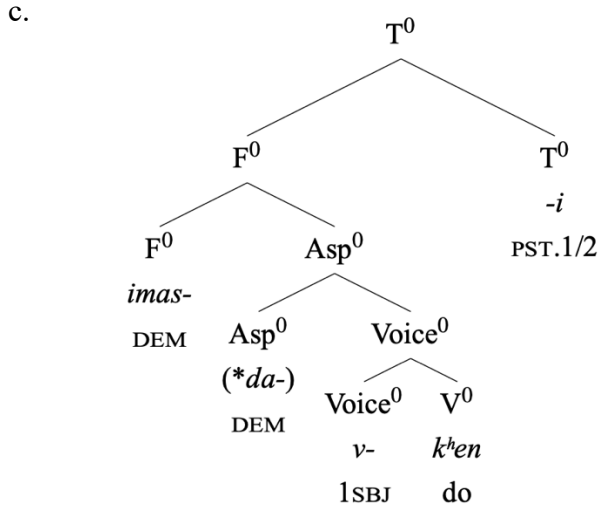
<i>imas- Ø- k^hen -i,</i>	<i>imas- Ø- k^h'n -a,</i>	<i>imas- Ø- k^h'n -es</i>
DEM- 2/3SBJ- do -PST.1/2,	DEM- 2/3SBJ- do -PST.3SG,	DEM- 2/3SBJ- do -PST.3PL
‘You thatdid’	‘ <i>pro</i> _{3SG} thatdid’	‘They thatdid’

The learner’s analysis of *imas-* ‘DEM’ qua F^0 will be disambiguated when the PHV must be inflected for a form that requires prefixal agreement: given a first-person subject, for instance. If that functional head is posited to be in the lowest possible position, just below VoiceP, *imas-* ‘DEM’ would be linearized inside of prefixal agreement (33a): that corresponds to an attested PHV variant, just in case the intended verb’s preverb is copied (20; cf. ungrammatical 22). If the learner posits FP just above VoiceP, the prefixal agreement will be inside of *imas-* ‘DEM’ (33b): deriving both the simple (18) and complex/inner variants (19), assuming the insertion of a copied preverb is free. FP could even be higher, above AspP (33c). That is another way to derive the simple variant

(18) — but given FP that high, it would be necessary to stipulate restrictions on the spell out of Asp⁰, since *imas-* ‘DEM’ must be inside of copied preverbs (23).

(33) Prefixal *imas-* ‘DEM’ as a novel functional head, with variable position





The main merit to this analytical approach is that morphological variation in the PHV construction corresponds straightforwardly to variation in the underlying syntactic structure — structural variation which is expected given the analytical ambiguity of the reanalyzed EAVP string. (Compare, for instance, Han et al. 2007 on variable grammars of negation in Korean compatible with verb-final word order.) However, this analysis offers little explanation for why the position of prefixal agreement depends on the presence of a copied preverb. Complex PHVs must entail some additional grammatical innovation beyond the reanalysis of *imas* ‘DEM’; EAVPs themselves cannot copy preverbs. If that innovation is simply the option to spell out Asp^0 with a pragmatically suitable preverb, there is a priori no reason to expect that spell out operation to be necessary if F^0 is below Voice^0 (33a) and impossible if F^0 is above Asp^0 (33c).

There are also theoretical puzzles with interpreting *imas*- ‘DEM’ as a novel functional head. Across languages, it is generally assumed that lexical items of the same category will have identical extended projections. Yet the PHV construction is the only corner of the language where it is necessary to posit FP (or at least an overt exponent of it). Furthermore, functional projections are generally associated with morphosyntactic features that condition some dimension of inflection. Prefixal *imas*- ‘DEM’, though, appears in every form of the PHV; it seems to contribute core lexical semantic information, not features associated with argument structure or tense–aspect–mood. Insofar as this element is a novel functional category, it is a noncanonical one.

3.4 DEM as a morphological dummy

A fourth analytical possibility we consider involves two major leaps of grammatical reanalysis. First is to posit syntactic coordination below the word level for PHVs — an grammatical option

which is arguably independently necessary in Georgian, to account for a certain type of compound verb exhibiting suspended affixation. The second leap is the reanalysis of *imas-* ‘DEM’ into a morphological dummy, inserted to take the place of an elided constituent within the complex word containing the stem of the intended verb. This would be a very novel analytical option to arrive at in the context of Georgian, but cases of subword anaphora or ellipsis resembling this have been reported in a few unrelated languages (Compton & Pittman 2010, Comrie & Zamponi 2022).

As a starting point, consider a class of ‘truncated compound verbs’ in Georgian, which have been noted for their multiple exponence of prefixal agreement (Amiridze 2010:85, Harris 2017:75–76). Descriptively, these compounds combine two verbs, inflected identically, into a single word (orthographically hyphenated); the lefthand verb is stripped of all suffixes but retains its prefixes. The two verbs typically share the same root, but differ in preverbs: one expressing motion thither and the other motion hither. Example (34a) is very typical, a verb of motion expressing literal back-and-forth motion; (34b) is a metaphorical extension of this, expressing a thorough, exhaustively performed event. Also possible are truncated compounds combining two different roots (34c); the result is a sort of verbal dvandva, with meaning paraphrasable as a coordination like “VP₁ and VP₂”.

(34) Truncated compound verbs

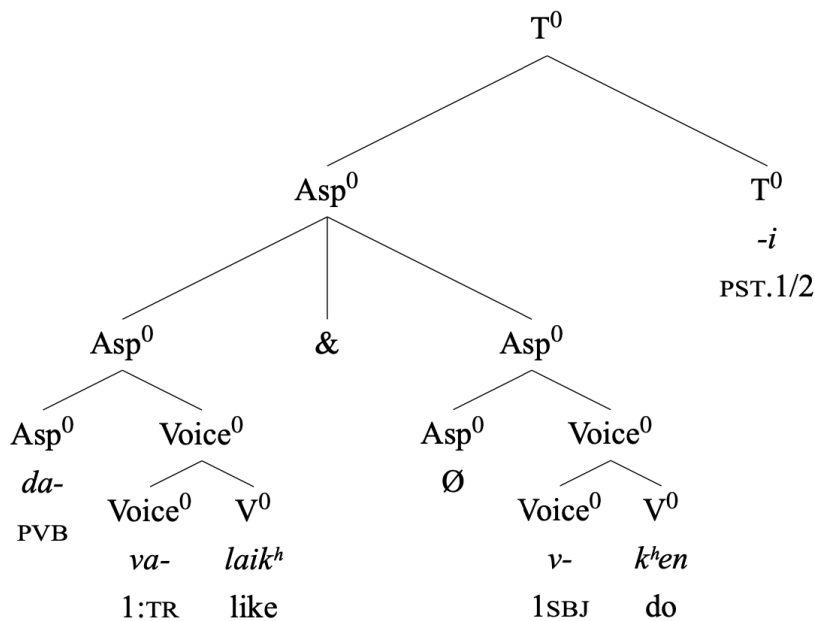
- a. [*mi- vi- ar*] + [*mo- vi- ar*] -*e*
 [PVB_{thither-} 1:REFL- go] + [PVB_{hither-} 1:REFL- go] -PST.1/2
 ‘I went/traveled round and about, back and forth’
- b. [*gada- va- t^hvalier*] + [*gadmo- va- t^hvalier*] -*e*
 [PVB_{across-} 1:TR- look] + [PVB_{across:hither-} 1:TR- look] -PST.1/2
 ‘I gave *pro*₃ a thorough examination; looked *pro*₃ up and down’
- c. [*vi- kvats*’] + [*vi- from*] -*e*
 [1:REFL- strive] + [1:REFL- work] -PST.1/2
 ‘I strived and toiled (for the public good)’

While a thorough investigation and analysis of truncated compounds is beyond the scope of this paper, we assume that they involve coordination at the AspP level, and the suspended affixes

are exponents of a single T^0 scoping over the coordinate structure.¹⁰ We also assume that head movement operates in such a way to produce a complex head mirroring the coordinated phrases.

Let us suppose that PHVs have the syntactic structure of truncated compounds, with the intended verb on the lefthand side of the coordination, and the verb *k^h(e)n* ‘do’ on the right (35). Of course, the main function of this novel construction is to avoid using the intended verb root. We propose that, when spelled out, a constituent within the lefthand coordinate of the complex head containing the intended verb root will be obligatorily elided. Prefixal *imas-* ‘DEM’ is then inserted as a sort of morphological dummy, taking the place of the elided subword. In other words, its function parallels that of dummy *do* in English, inserted when verb phrase ellipsis leaves behind no other host for T^0 (Bresnan 1976, Sag 1976, et seq).

(35) Underlying truncated compound structure for the PHV

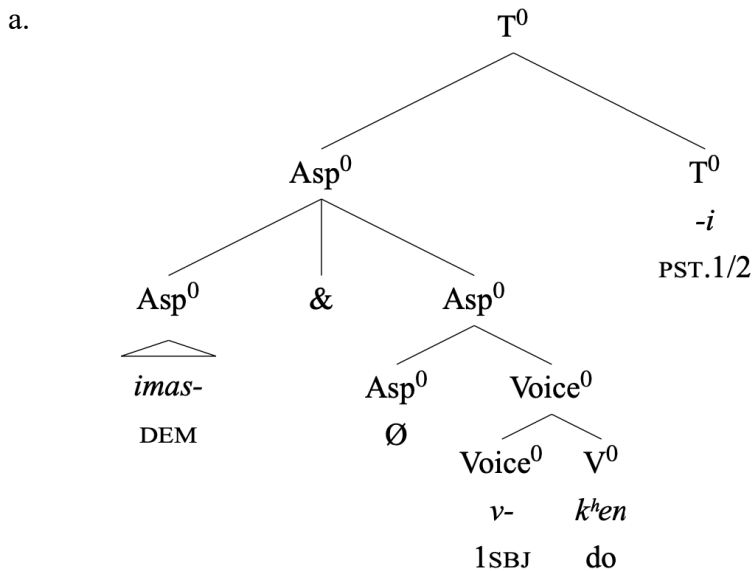


A major advantage to this analysis is its empirical coverage. Most major variants of the PHV can be accounted for, simply by assuming that ellipsis can target different sized constituents within the coordinated complex head: replacing Asp^0 derives the simple variant (36a); replacing

¹⁰ This is similar to, for instance, Kornfilt’s (2000, 2012) analysis of suspended affixation in Turkish. Note, though, that suspended affixation across languages might not be a unified phenomenon (see Ershler 2018). There are also some clear differences between Georgian truncated compounds and verbs coordinated with suspended affixation in languages like Turkish. For instance, the lefthand truncated verb in Georgian will typically not correspond to any phonologically independent form, whereas suspended affixation in other languages often must leave behind a form utterable in isolation. It also seems that truncated compound verbs in Georgian must share all arguments, whereas suspended verbs in other languages might have different internal arguments.

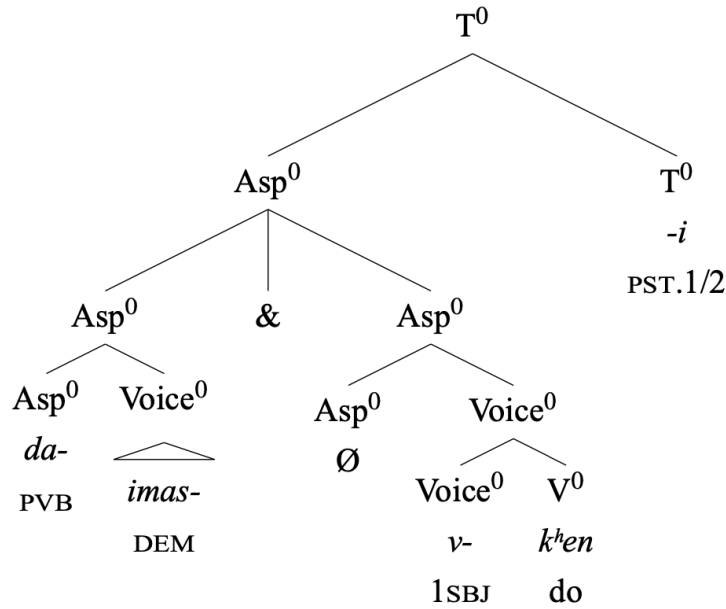
Voice⁰, the complex/inner variant (36b); and replacing V⁰, the complex/doubled variant (36c).¹¹ Indeed this is the only analytical approach that readily accounts for the possibility of doubling prefixal agreement in PHVs. If *imas-* ‘DEM’ is analyzed as a functional head (Section 3.2 or 3.3), one could stipulate that it is optionally also a phi-probe, one that functions identically to Voice⁰. But just why learners would posit that, just in case the PHV also copies the intended verb’s preverb, is mysterious. Note also that there is no danger of overgenerating simple PHVs with outer agreement (22), or complex PHVs with inside preverbs (23). The only significant empirical shortcoming is the undergeneration of complex/outer PHVs (20), since the righthand coordinate containing *k^h(e)n* ‘do’ should include Voice⁰ (exponed as the inner agreement prefix) if the lefthand coordinate includes Asp⁰ (exponed as the copied preverb).

(36) Deriving PHV variants by substituting different sized constituents with *imas-* ‘DEM’

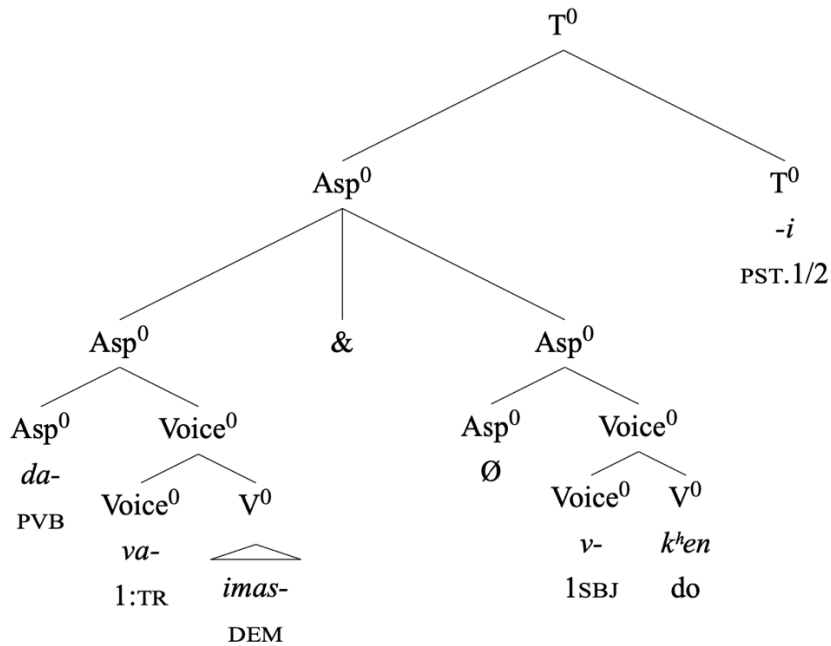


¹¹ The figure in (36c) includes the transitive preradical vowel *a-* in the outer agreement position, maintaining maximal parallelism with the intended verb in the lefthand coordinate of (35). As described in Section 2, preradical vowels here are possible, and often preferred, but not obligatory: *da-va-imas-v-k^hen-i* exists alongside *da-v-imas-v-k^hen-i*. We suggest two ways to account for this variability. First, one could maintain the clausal structure adopted here and posit a postsyntactic fission operation that breaks Voice⁰ into two heads, exponed by *v-* ‘1SBJ’ and *a-* ‘TR’ respectively; fission would be obligatory if the context of the exponed root, and optional in a PHV if the maximal V⁰ is elided. Second, one could posit an extra syntactic projection just below VoiceP, whose head is exponed by the preradical vowel — call that VowelP. Subword ellipsis targeting the maximal V⁰ would leave terminal Vowel⁰ exponable by *a-* ‘TR’, whereas subword ellipsis of the maximal Vowel⁰ would prevent a preradical vowel from appear in the outer position.

b.



c.



Here there is also nothing very mysterious about the fact that PHVs can copy the intended verb's preverb, since PHVs under this analysis literally contain the intended verb. "Copying" here is just ellipsis of a subconstituent of that verb word lower than Asp^0 . In the analytical approaches discussed above (Sections 3.1–3.3), complex PHVs are derived from by spelling out Asp^0 in the construction as a preverb, constrained somehow by a pragmatic matching condition sensitive to the form of the intended verb. And, as noted previously, it may be necessary to stipulate other arbitrary constraints on preverb merger to avoid overgenerating certain morphological forms.

So there are considerable empirical advantages to this analysis, but it also presents some theoretical questions. When reanalyzing EAVPs into the new PHV construction, why would learners have recruited the structure of truncated compounds, a relatively obscure corner of the language? There is no clear semantic parallel: PHVs do not seem to be interpreted as *dvandvas*, coordinative compounds of the intended verb and the lexical verb *k^hna* ‘do:NMLZ’. Nor is there a clear morphological parallel. A hallmark of truncated compounds is doubled prefixal agreement, but there is only a single agreement prefix in an EAVP.

A solution to this puzzle may lie in a tension between the general syntax–semantics of placeholder phenomena, and the specific architecture of the Georgian verb. Let us suppose that placeholder words are demonstrative anaphors for linguistic expressions (Cheung 2015), and they substitute for syntactic constituents. The linguistic expressions relevant for Georgian PHVs would be morphs that distinguish verbal lexical items: the verb root (V^0) and the preverb (Asp^0). These happen not to form a syntactic constituent, and are often discontinuous in finite verbs, potentially separated by an agreement prefix and/or preradical vowel (exponents of $Voice^0$).

We suggest that the truncated compound structure offers a compromise between one pressure to omit lexically contentful material (at V^0 and Asp^0), and another to express obligatory inflectional features (at $Voice^0$). Functionally, it will always be a useful option to omit both the root and the preverb — in tip-of-the-tongue states, it is likely that not even the first segments of the intended verb, corresponding to the preverb, can be summoned; and in euphemism/cipher contexts, it may be pragmatically undesirable to include the preverb as a cue to the intended lexical item. So, being able to elide the maximal Asp^0 dominating the intended verb’s root and preverb is crucial. Yet doing so will also elide the exponent of $Voice^0$, which is often the crucial disambiguator to certain morphosyntactic distinctions (like first-person vs. second-person subject agreement, or monotransitive vs. ditransitive argument structure). The truncated compound structure solves this problem, since the verb *do* in the righthand conjunct will be able to host those obligatory inflectional features at $Voice^0$ and T^0 .¹²

¹² It has been argued that another element in standard Georgian plays a similar role, an affix resembling an independent word which is inserted as a morphological dummy to host certain inflection — namely, the suffixal/enclitic copula found in certain verb forms like (i). Lomashvili and Harley (2011) analyze this element as a last-resort auxiliary verb that expresses features on T^0 . Crucially for them, it offers another site for prefixal agreement to appear.

(i) *gi- q'var* -[*v- ar*]
2:IO- love -[**1SBJ-** AUX.PRES]
 “You (*gi*-...) love me (...*v*-)”

This perspective helps explain why *k^hna* ‘do:NMLZ’ has remained a crucial component of the PHV, a vestige of its EAVP etymology. One can imagine PHVs without it, where *imas* ‘DEM’ is the verb’s only root: forms like those in the following example.¹³ Such forms are not possible, at least not in the construction’s current stage of grammaticization. If the PHV involves constituent ellipsis of the intended verb, and if there is sufficient functional pressure to be able to elide the preverb, then a *do*-less PHV like (37a) will simply be impossible to generate if the intended verb has a preverb.

(37) Hypothetical simple and complex PHVs without ‘do’

a. **va- imas -e*

1:TR- DEM -PST.1/2

b. **da- va- imas -e*

PVBaround- 1:TR- DEM -PST.1/2

Both attempts at: “I thatted *pro*₃” (Intending a transitive verb with PVB *da*-)

4. Individual variation in PHV acceptability

The previous section explores four morphosyntactic analyses of Georgian PHVs, where prefixal *imas*- ‘DEM’ has been reanalyzed as an incorporated theme, an extant functional head, a novel functional head, or a kind of morphological anaphor. The following table summarizes the empirical coverage of these analyses, focusing on the four major attested PHV variants (18–21), and two notable ungrammatical variants (22, 23).

There is an important difference between this suffixal copula and the verb *k^hna* ‘do:NMLZ’ in PHVs. As the above example shows, the lexical verb and the suffixal auxiliary can agree with different arguments. (Specifically, the lexical verb can agree with dative arguments, like the second-person experiencer subject, while the auxiliary cannot agree with dative arguments.) In PHVs with doubled prefixal agreement, mismatches like this are impossible. For instance, if a PHV has a second-person dative argument, both sites of agreement must track it (ii).

(ii) *da= gi- imas- gi- k^hen -i*

PVBaround= 2:IO- DEM- 2:IO- do -PST.1/2

“I thatdid *pro*₃ for/on you (*gi-...gi-*)”

~ **da= gi- imas- v- k^hen -i*

PVBaround= 2:IO- dem- 1SBJ- do -PST.1/2

Attempted: “I (...v-) thatdid *pro*₃ for/on you (*gi-...*)”

¹³ Compare placeholder verbs in Hungarian (Amiridze 2010:83) or Tagalog (Nagaya 2022), where special roots can host verbal inflection on their own without any other verbal co-root.

	Incorporation (Section 3.1)	Extant F ⁰ (Section 3.2)	Novel F ⁰ (Section 3.3)	Ellipsis + dummy (Section 3.4)
Simple PHV, Inner Agr (18) <i>imas- v- k^heni</i> DEM- AGR- STEM	X	✓	✓	✓
Complex, Inner Agr (19) <i>da- imas- v- k^heni</i> PVB- DEM- AGR- STEM	X	✓	✓	✓
Complex, Outer Agr (20) <i>da- v- imas- k^heni</i> PVB- AGR- DEM- STEM	✓	X	✓	X
Complex, Doubled Agr (21) <i>da- v- imas- v- k^heni</i> PVB- AGR- DEM- AGR- STEM	X	X	X	✓
*Simple, Outer Agr (22) <i>*v- imas- k^heni</i> AGR- DEM- STEM	X	✓	X	✓
*Dem before Pvb (23) <i>*imas- da- v- k^heni</i> DEM- PVB- AGR- STEM	✓	X	X	✓

Table 1: Summary of empirical coverage for four analyses of the PHV construction. ✓ = correct prediction; X = incorrect prediction (undergeneration or overgeneration).

No one proposal accounts for all of the key generalizations. However, this is a nonstandard, relatively recent grammatical innovation, one still crystalizing in the contemporary language. There is considerable analytical ambiguity facing a learner reinterpreting the EAVP, so it would not be surprising that individuals have internalized PHVs in different ways: one person reanalyzing *imas-* ‘DEM’ as an incorporated theme, another as a novel functional head, etc. Individual variation — which is clearly evident in corpus research (Amiridze 2010, under review) and elicitation with native speakers — offers another way to evaluate the analyses of PHVs above. The columns of Table 1 are predicted patterns of acceptability: we expect some individuals to accept only the complex/outer variant (these would correspond to the Incorporation dialect), some to reject only

the complex/doubled variant (the Novel F⁰ dialect), etc. But we do not expect a group of individuals that, for instance, accepts only simple and complex/outer PHVs, since we have not identified a theoretical analysis that generates those variants to the exclusion of the others. The rest of this section reports a morphological acceptability study quantifying individual variation in the PHV construction.

4.1 Morphological acceptability study

4.1.1 Materials

32 itemsets were constructed, comprising an intended verb with first-person subject agreement paired with each of the four major PHV variants. A sample itemset follows. An additional 160 similar items served as fillers.¹⁴

(38) Intended verb

gada- v- ri -et^h

PVB_{across}- 1SBJ- madden -PST.1/2:PL

“We drove *pro*₃ mad”

a. Simple PHV

imas- v- k^hen -it^h

DEM- 1SBJ- do -PST.1/2:PL

b. Complex/Inner PHV

gada- imas- v- k^hen -it^h

PVB_{across}- DEM- 1SBJ- do -PST.1/2:PL

c. Complex/Outer PHV

gada- v- imas- k^hen -it^h

PVB_{across}- 1SBJ- DEM- do -PST.1/2:PL

d. Complex/Doubled PHV

gada- v- imas- v- k^hen -it^h

PVB_{across}- 1SBJ- DEM- 1SBJ- do -PST.1/2:PL

All: “We thatdid *pro*₃”

¹⁴ Many of these fillers were designed as itemsets for other experiments on PHVs, run in parallel and testing the effect of other morphological variables. We do not report the results of these experiments here.

4.1.2 Procedure

The study was split into two experimental sessions. Each session comprised five blocks, alternating between a judgement task rating the acceptability of placeholder verbs, and a second distractor task concerning an unrelated morphological construction. Target itemsets were distributed into six lists, corresponding to the six placeholder-judgement task blocks of the two sessions. Table 2 summarizes. Each participant saw only one version of each itemset, distributed by the Latin Square method.

Session 1		Session 2	
Block 1	Placeholder task (32 trials)	Block 1	Placeholder task (32 trials)
Block 2	Distractor task (24 trials)	Block 2	Distractor task (24 trials)
Block 3	Placeholder task (32 trials)	Block 3	Placeholder task (32 trials)
Block 4	Distractor task (24 trials)	Block 4	Distractor task (24 trials)
Block 5	Placeholder task (32 trials)	Block 5	Placeholder task (32 trials)

Table 2: Summary of experimental session structure

The placeholder task elicited an acceptability judgment along a five-point Likert scale. Every trial gave a standard verb paired with a placeholder verb. Participants were instructed to imagine that they were trying to avoid using the standard verb, as if playing a language game. Their task was to rate how appropriate the given placeholder verb would be to replace that intended verb. Figure 1 illustrates with a trial mock-up.

Experimental trial mock-up	
<p>ნაგულისხმევი ზმნა: მოვატყუებ</p>	<p>Intended verb: mo= va- t'q'ueb PVB_{hither}= 1:TR- deceive:FUT 'I will deceive <i>pro</i>₃'</p>
<p>ჩამნაცვლებელი ზმნა: მოიმასვიზამ</p>	<p>Placeholder verb: mo= imas- v- izam PVB_{hither}= DEM- 1SBJ- do:FUT 'I will thatdo <i>pro</i>₃'</p>
<p>1 – 2 – 3 – 4 – 5 (ძალიან ცუდი) (ძალიან კარგი)</p>	<p>1 – 2 – 3 – 4 – 5 (very bad) (very good)</p>

Figure 1: Mock-up of a trial in the acceptability task as it appeared in Georgian (left), with an English translation (right)

This experiment was conducted remotely, hosted online via PCIbex (Zehr & Schwartz 2018). Before starting either experimental session, participants gave consent, supplied demographic information (including age, gender, and city of residence), read instructions, and completed three practice items to familiarize themselves with the Likert-scale methodology. Participants were given a chance to take a break after each distractor block. Upon completion of the experimental sessions, a few optional debriefing questions about the difficulty of the tasks and nature of the stimuli appeared.

4.1.3 Participants

65 native Georgian speakers residing across Georgia were recruited for participation. They all took Session 1, and 36 of them later took Session 2. Data from two participants whose average response times were very short (<1000 ms) were entirely excluded from analysis. All observations with latencies more than 3 standard deviations away from the global average were also excluded.

4.1.4 Analysis

Rating data were analyzed using ordinal linear models with probit link functions, using the *clmm* function of the R package *ordinal* (Christensen 2015). By-participant and by-item random slopes and intercepts were omitted. Given the experiment's nonfactorial design, conditions were sum-coded in the following way: F1 contrasted the simple placeholder verb (38a; $+3/4$) to the mean of the complex placeholders (38b,c,d; each $-1/4$); F2 was Helmert coded, with F2a comparing the mean of the conditions with inner agreement only (38a,b) to the condition with doubled agreement (38d), and F2b comparing the condition with outer agreement only (38c) to the condition with doubled agreement (38d).

4.2 Results

Proportion of responses across the Likert scale and z -transformed ratings are reported in Figure 2.¹⁵ Visual inspection of results suggests that simple PHVs are the most acceptable (highest proportion of 4 and 5 ratings; highest z -scores); complex/inner and complex/doubled PHVs are of intermediate acceptability; and complex/outer PHVs are the least acceptable.

¹⁵ Applying the z -transformation to acceptability data is a standard way to abstract away from individual participants' scale biases — i.e., the idiosyncratic ways in which they map acceptability judgements to Likert-scale categories (Schütze & Sprouse 2014). For each participant, $z = 0$ corresponds to their average rating across the experiment, and $z = +1$ or -1 to an item rated one standard deviation above (more acceptable than) or below (less acceptable than) that average.

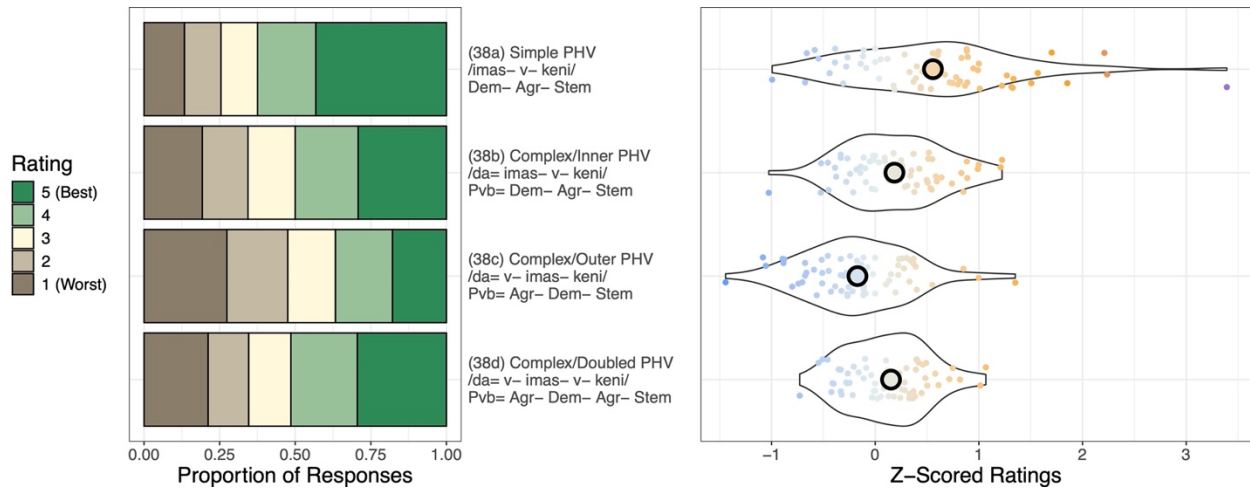


Figure 2: Results of an acceptability experiment comparing the four major kinds of placeholder verbs (38a–d). The lefthand plot reports proportions of Likert-scale responses. The righthand plot gives z-scored ratings; small dots are by-participant mean z-scores, and large dots are the mean of these.

Ordinal modeling finds significant main effects of F1 (Est. = 0.44, SE = 0.082, $z = 5.4$, $p < 0.001$), F2a (Est. = 0.39, SE = 0.10, $z = 3.7$, $p < 0.001$), and F2b (Est. = 0.68, SE = 0.10, $z = 6.3$, $p < 0.001$). This indicates, respectively, that simple PHVs (38a) are reliably more acceptable than complex ones (38b–d), that PHVs with doubled agreement (38d) are less acceptable than those with inner agreement only (38a,b), and that doubled agreement (38d) is more acceptable than outer agreement (38c).

4.3 Exploratory clustering analysis

As discussed above, it is likely that multiple grammars of the PHV construction coexist across Georgian speakers. These should correspond to coherent patterns of acceptability responses to the four major PHV variants across participants in the present study. To help identify such patterns, we conducted an exploratory k -means clustering analysis on by-participant z-scores, using the R package *NbClust* (Charrad et al. 2014). K -means clustering is a technique that partitions data points into a specified number of groups, maximized for internal similarity (for more details about the algorithm and its applications in describing linguistic variation, see e.g. Burnett et al. 2024). Absent top-down predictions for the number of clusters to specify, a range of mathematical metrics are used to identify the optimal number bottom-up.¹⁶ For our data, whether calculated over Euclidean

¹⁶ While Section 3 describes four families of analyses of the PHV constructions, we do not expect a priori that all of these grammars will manifest across speakers, nor that other analytical possibilities will not.

or Manhattan distance, 8 of 30 indices propose 2 as the optimal number of clusters (when considering up to 10 clusters); the next best number of clusters is 5, proposed by 5 indices. Given the exploratory nature of this clustering analysis, we present results of both partitionings.

First, consider the two-way clustering. Figure 3 shows by-participant z -scores of those groups, labeled A1 and A2; Table 3 reports a demographic breakdown. Visually inspecting the average ratings, a few patterns are apparent. Participants in Cluster A1 rated complex/doubled (38d) and simple PHVs (38a) the best, while complex/outer PHVs (38c) were the worst; this is qualitatively similar to the acceptability patterns of the data in aggregate (Figure 2). As for Cluster 2, these participants strongly preferred simple PHVs (38a), but also accepted complex/inner PHVs (38b) to some extent. In fact, the skew of z -scores for this group indicates that they rated most items in the experiment as quite unacceptable, only rating simple PHVs with values at the top of the Likert scale. Among the demographic variables we collected from participants, none obviously correlates with the clusters.

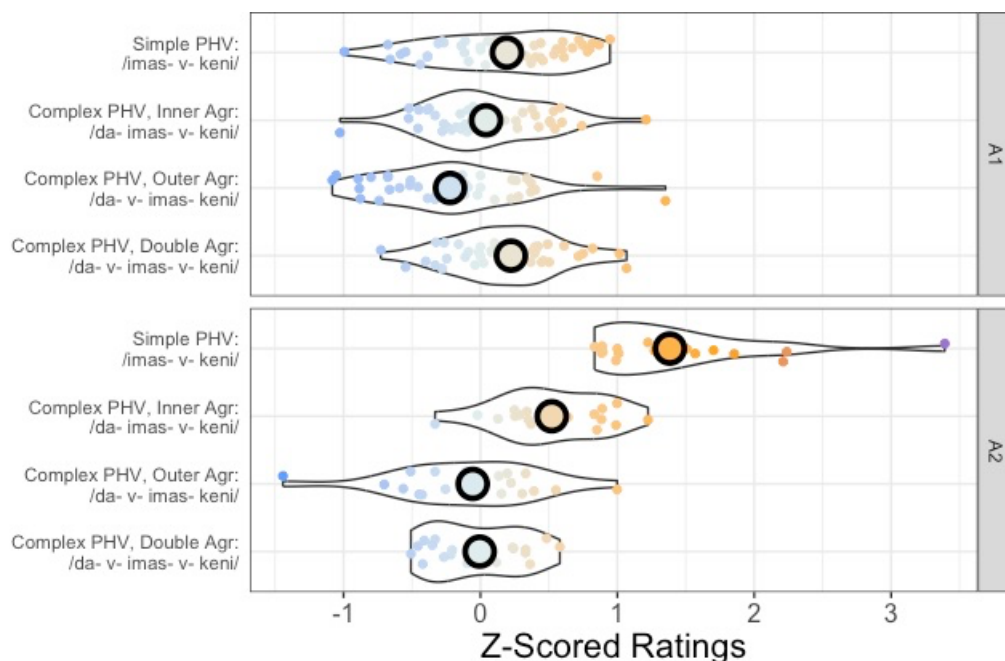


Figure 3: By-participant z -scored acceptability ratings across the four major PHV variants. Participants are partitioned into two clusters (A1, A2) identified by a k -means clustering analysis.

	N_{Part}	Mean Age (years)	Gender		Region of reported city of residence			
			Women	Men	Western Georgia	Tbilisi	Eastern Georgia	n/a
Cluster A1	43	32.3	36	7	5	29	5	4
Cluster A2	20	33.4	14	6	2	12	4	1

Table 3: Demographic breakdown of the two-way clustering analysis. Reported are the number of participants in each cluster, the mean age of the clusters, the gender split, and a coarse-grained geographic split. A few participants did not report their city of residence.

Next, the five-way clustering, reported in Figure 4 and Table 4. Cluster B1 corresponds well to Cluster A1: participants who rate simple and complex/doubled PHVs best. Likewise Cluster B5 corresponds well to A2: participants who rate simple PHVs much better than any other variant. The other three clusters correspond to new acceptability patterns. Participants in Cluster B2 prefer complex/inner (38b) and complex/doubled (38d) PHVs, strongly dispreferring complex/outer PHVs (38c). Those in Cluster B3 rate complex/outer PHVs (38c) as best, and simple ones (38a) as the worst. Finally, participants in Cluster B4 show a preference for simple (38a) and complex/inner PHVs (38b). Again, demographic variables mostly seem to be poor predictors of the clusters, though the average age of Cluster B2 is somewhat higher than the others.

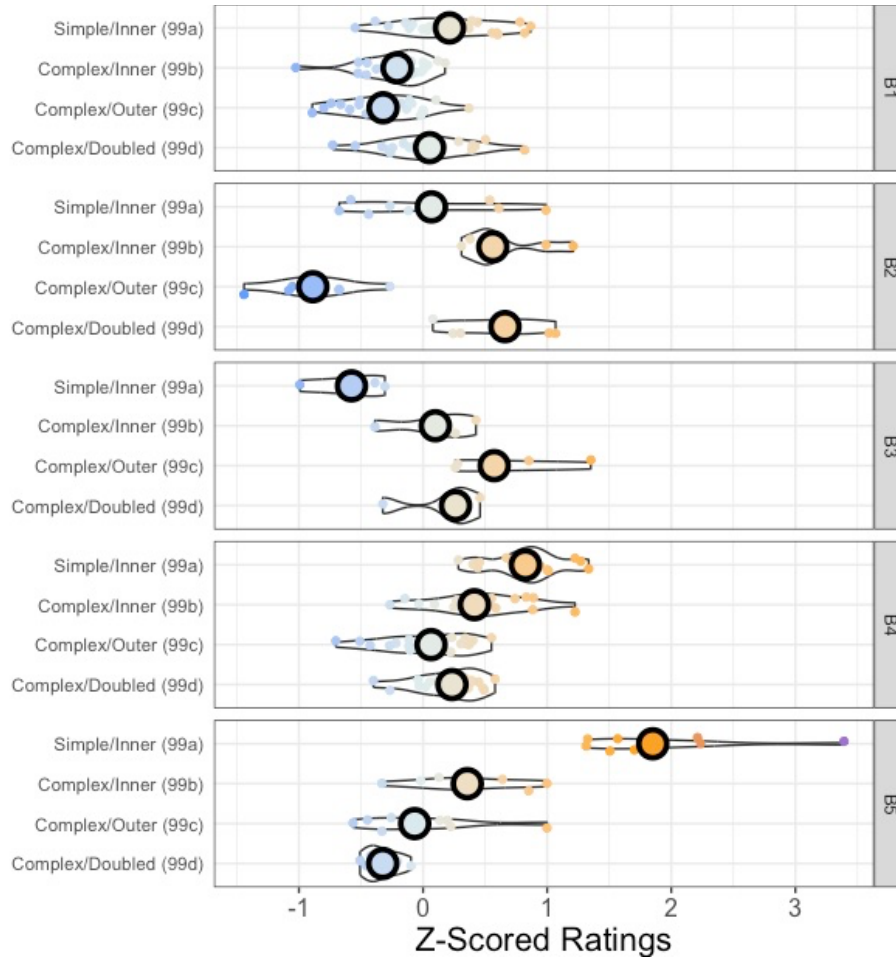


Figure 4: By-participant z-scored acceptability ratings across the four major PHV variants. Participants are partitioned into five clusters (B1–B5) identified by a *k*-means clustering analysis.

	N_{Part}	Mean Age (years)	Gender		Region of reported city of residence			
			Women	Men	Western Georgia	Tbilisi	Eastern Georgia	n/a
Cluster B1	23	30.4	20	3	3	14	3	3
Cluster B2	8	40.8	6	2	1	5	1	1
Cluster B3	4	29.5	2	2	0	2	1	1
Cluster B4	19	32	14	5	2	14	2	1
Cluster B5	9	34	8	1	0	7	2	0

Table 4: Demographic breakdown of the five-way clustering analysis. Reported are the number of participants in each cluster, the mean age of the clusters, the gender split, and a coarse-grained geographic split. A few participants did not report their city of residence.

4.4 Discussion

An acceptability study on Georgian PHVs offers a few insights into morphological variation observed in the construction. The clearest finding is that simple PHVs are generally the most acceptable: analyzing the data in aggregate finds them to be rated significantly better than any variant with a copied preverb, and exploratory clustering analyses find groups of participants who essentially only accept simple PHVs. Just considering the diachronic development of the PHV construction, this asymmetry is not surprising — simple PHVs require the least reanalysis from the EAVP; some other grammatical innovation must be necessary to allow for preverb copying.

Among the analyses proposed in Section 3, there are two that can plausibly account for simple PHVs' acceptability advantage. If *imas-* 'DEM' has been reanalyzed as Asp^0 (i.e. as a new preverb; Section 3.2), simple PHVs are the default prediction (29). The only way to accommodate a copied preverb is to posit an optional head-adjunction mechanism at Asp^0 (31), and a natural linking hypothesis is that this novel operation degrades acceptability. There is also an avenue to explain simple PHVs' advantage with the morphological anaphor theory (Section 3.4). Adopting that analysis, *imas-* 'DEM' in the simple PHV is a dummy inserted to replace an elided constituent corresponding to the entire intended verb (36a), whereas preverb copying corresponds to the elision of a smaller subconstituent of the intended verb (36b,c). It has been independently proposed that ellipsis phenomena generally target the largest syntactic constituent possible (cf. Max Elide; Merchant 2008), so perhaps opting to elide smaller subword units in order to copy the intended preverb comes at an acceptability cost.

Among complex PHVs, the most acceptable on average are those with inner (19) or doubled (21) prefixal agreement. This is evidence in favor of the morphological anaphora analysis of PHVs, which easily accounts for both variants (36b,c) — indeed, this is the only theory that straightforwardly predicts the possibility of doubled agreement at all. The fact that complex/outer PHVs are the least acceptable variant at the population level is a strike against the incorporation analysis (Section 3.1). In the broader context of Georgian grammar, this makes some sense: an extant productive mechanism for theme–verb compounding is limited to nonfinite verbs, and linearizes the incorporated nominal root outside of the verb's preverb (28).

However, our five-way clustering analysis identifies a small minority of participants who prefer the complex/outer variant (Cluster B3), and another group who accept every variant except the complex/doubled one (Cluster B2). This suggests that reanalyzing *imas-* 'DEM' as an

incorporated theme, or a novel functional head with variable merge position, are live possibilities: these are the only analytical approaches that account for the complex/outer variant.

It is notable that B2 and B3 are the smallest groups of participants identified by the exploratory clustering analysis. Tentatively extrapolating from the relative sizes of these clusters, this suggests that the incorporation and novel head grammars of the PHV are the least common among Georgian speakers at large; speakers seem more likely analyze of *imas*- ‘DEM’ as a novel preverb, or as a morphological dummy. We speculate that this may have to do with some of the theoretical tensions pointed out in Sections 3.1 and 3.3. The fact that theme incorporation with a very different morphosyntactic profile independently exists in Georgian (28) is perhaps a reason to dissuade learners from adopting an incorporation analysis of PHVs — even though doing so would retain a common level of representation with the EAVP construction. And, perhaps the tension inherent to positing an extended projection bespoke to the PHV construction is reason to dissuade learners from analyzing *imas*- ‘DEM’ as a novel F⁰. Perhaps, then, analytical biases stemming from language-specific and language-general principles can help explain why grammatical reanalysis has taken the course it has in Georgian. We flag this as an important and promising topic for future research the broader crosslinguistic context of morphosyntactic change.

5. Conclusion

The placeholder verb construction, emerging in colloquial Georgian, is notable case study of morphosyntactic change and variation. It involves the reanalysis of an event-anaphoric verb phrase (literally “do that”) into a single word (roughly “thatdo”), one with structural properties that are altogether novel in the language. We have articulated four representational theories of the placeholder verb construction, each corresponding to a different way of reanalyzing the erstwhile demonstrative pronoun *imas* ‘DEM’: as an incorporated internal argument of the lexical verb *k^hna* ‘do:NMLZ’, as a novel exponent of an existing functional head (Asp⁰), as the exponent of an entirely novel functional head, or as a kind of morphological anaphor substituting a subword constituent. Each analytical approach offers different empirical coverage for the remarkable morphological variation found in placeholder verbs, characterized by the position and number of inflectional prefixes which behave invariably in every other Georgian verb. Results of an acceptability experiment show that this is not per se free variation: on aggregate, certain morphological variants are more acceptable than others; moreover, an exploratory clustering analysis finds evidence of subsets of speakers with coherent patterns of judgements. We interpret this as evidence that, at

least currently, there is no single grammar of the placeholder verb construction. Rather, individuals faced with analytically ambiguous input have made different representational assumptions to accommodate it, and therefore accept different morphological permutations to different degrees.

References

- Amiridze, Nino. 2010. Placeholder verbs in Modern Georgian. In *Fillers, Pauses and Placeholders*, eds. Nino Amiridze, Boyd Davis, and Margaret MacLagan. Typological Studies in Language 93. John Benjamins. 67–94.
- Amiridze, Nino. Under review. Multiple exponence in Georgian placeholder verbs. Manuscript, Ivane Javakhishvili Tbilisi State University.
- Anderson, Stephen. 1992. *A-morphous Morphology*. Cambridge University Press.
- Aronson, Howard I. 1990. *Georgian: A Reading Grammar*. Slavica Publishers.
- Baker, Mark. 1988. *Incorporation: A theory of grammatical function changing*. University of Chicago Press.
- Baker, Mark. 2009. Is head movement still needed for noun incorporation? *Lingua*, 119: 148–165.
- Bates, Douglas, Martin Mächler, Ben Bolker, and Steve Walker. 2015. Fitting linear mixed-effects models using *lme4*. *Journal of Statistical Software*, 67(1): 1–48. DOI: <https://doi.org/10.18637/jss.v067.i01>
- Béjar, Susana. 2003. Phi-syntax: A theory of agreement. Dissertation, University of Toronto.
- Béjar, Susana and Milan Rezac. 2009. Cyclic Agree. *Linguistic Inquiry*, 40(1): 35–73.
- Boeder, Winfried. 1994. Kartvelische und indogermanische Syntax: Die altgeorgischen Klitika [Kartvelian and Indo-Germanic syntax: Old Georgian clitics]. In *Indogermanica et Caucasica: Festschrift für Karl Horst Schmidt zum 65. Geburtstag [Indogermanica et Caucasica: Festschrift for Karl Horst Schmidt on his 65th birthday]*, eds. Roland Bielmeier, Reinhard Stempel, and René Lanszweert. Walter de Gruyter. 447–471.
- Boeder, Winfried. 2005. The South Caucasian languages. *Lingua*, 155: 5–89.
- Bresnan, Joan. 1976. On the form and functioning of transformations. *Linguistic Inquiry*, 7: 3–40.
- Burnett, Heather, Julie Abbou, and Gabriel Thiberge. 2024. Analyzing linguistic variation using discursive worlds. *Journal of Sociolinguistics*, 28: 40–63.
- Charrad, Malika, Nadia Ghazzali, Véronique Boiteau, and Azam Niknafs. 2014. *NbClust*: An R package for determining the relevant number of clusters in a data set. *Journal of Statistical Software*, 61(6), 1–36.

- Christensen, Rune Haubo Bojesen. 2015. *Ordinal*: Regression Models for Ordinal Data. R package version 2015.6-28, URL <https://CRAN.R-project.org/package=ordinal>.
- Compton, Richard and Christine Pittman. 2010. *Pi* as a syntactic pro-form in Inuktitut noun-incorporation and beyond. In Beth Rogers and Anita Szakay (eds.), *Papers for the Fifteenth Workshop on the Structure and Constituency in Languages of the Americas (WSCLA 15)*. 85–97.
- Comrie, Bernard and Raoul Zamponi. 2022. Verb root ellipsis. In Matthew Baerman, Oliver Bond, and Andrew Hippisley (eds), *Morphological Perspectives: Essays in Honor of Greville G. Corbett*. 233–280.
- Embick, David, and Rolf Noyer. 2001. Movement operations after syntax. *Linguistic Inquiry*, 32: 555–595.
- Erschler, David. 2018. Suspended Affixation as Morpheme Ellipsis: Evidence from Ossetic Alternative Questions. *Glossa: a journal of general linguistics* 3(1): 12. 1–41, DOI: <https://doi.org/10.5334/gjgl.501>
- Foley, Steven. 2022. Agreement in the languages of the Caucasus. In Maria Polinsky (ed.), *The Oxford Handbook of Languages of the Caucasus*. Oxford University Press. 845–872.
- Halle, Morris, and Alec Marantz. 1993. Distributed Morphology and the pieces of inflection. In *The view from Building 20: Essays in linguistics in honor of Sylvain Bromberger*, eds. Kenneth Hale and Samuel Jay Keyser. MIT Press. 111–176.
- Harris, Alice C. 1981. *Georgian Syntax: A study in Relational Grammar*. Cambridge University Press.
- Harris, Alice C. 1985. *Diachronic Syntax: The Kartvelian Case*. Academic Press.
- Harris, Alice C. 2017. *Multiple Exponence*. Oxford University Press.
- Hewitt, B. G. 1995. *Georgian: A Structural Reference Grammar*. John Benjamins Publishing Company.
- Kalandadze, Viola. 1979. Rtuli saxelebisagan (k'omp'ozit'ebisagan) nats'armoebi zmnebis da rtuli zmnebis martlts'erisatvis tanamedrove salit'erat'uro kartulshi [On the orthography of verbs derived from complex nouns (compounds) and of complex verbs in modern literary Georgian]. In *Kartuli sit'q'vis k'ult'uris sak'itxebi [Issues in Georgian Speech Culture]*, vol. 2, eds. I. Gigineishvili, L. Lezhava, and K. Lomtadze. Tbilisi: Metsniereba. 141–156.

- Kornfilt, Jaklin. 2000. Directionality of identical verb deletion in Turkish coordination. In *Jorge Hankamer Webfest*. <http://babel.ucsc.edu/Jorge/kornfilt.html>.
- Kornfilt, Jaklin. 2012. Revisiting ‘suspended affixation’ and other coordinate mysteries. In Laura Brugé, Anna Cardinaletti, Giuliana Giusti, Nicola Munaro and Cecilia Poletto (eds.), *Functional Heads: The cartography of syntactic structures 7*. 181–196. Oxford: Oxford University Press. DOI: <https://doi.org/10.1093/acprof:oso/9780199746736.003.0014>
- Lewis, Geoffrey. 1967. *Turkish Grammar*. Clarendon Press.
- Lomashvili, Leila. 2011. *Complex Predicates: The syntax–morphology interface*. John Benjamins Publishing Company.
- Lomashvili, Leila and Heidi Harley. 2011. Phases and templates in Georgian agreement. *Studia Linguistica*, 65(3): 233–267.
- Makharoblidze, Tamar. 2018. On Georgian Preverbs. *Open Linguistics*, 4. 163–183.
- Margiani, Ketevan. 2016. T’mesi anu gank’veta jvel kartusa da svanurši [Tmesis, or ‘cutting-off’, in Old Georgian and Svan]. In *Humanit’arul da socialur-p’olit’ik’ur mecnierebata seria [Humanistic and social-political science series]*, vol. 16. Sokhumi State University Scientific Works.
- Marantz, Alec. 1988. Clitics, morphological merger, and the mapping to phonological structure. *Theoretical morphology: Approaches in modern linguistics*, edited by M. Hammond & M. Noonan, 253–270. San Diego: Academic Press.
- Massam, Diane. 2001. Pseudo noun incorporation in Niuean. *Natural Language and Linguistic Theory* 19, 153–197.
- Merchant, Jason. 2008. Variable island repair under ellipsis. In Kyle Johnson (ed.), *Topics in Ellipsis*. 132–153. Cambridge University Press.
- Nash, Léa. 2017. The structural source of split ergativity and ergative case in Georgian. In *The Oxford Handbook of Ergativity*, eds. Jessica Coon, Diane Massam, and Lisa Demena Travis. 175–200.
- Noyer, Rolf. 1997. Features, positions and affixes in autonomous morphological structure. New York: Garland. Revised version of 1992 MIT Doctoral Dissertation.
- Orgun, Cemil Orhan. 1995. Flat vs. branching morphological structures: The case of suspended affixation. In the *Proceedings of the Twenty-First Annual Meeting of the Berkeley Linguistics Society: General Session and Parasession on Historical Issues in*

- Sociolinguistics/Social Issues in Historical Linguistics*, eds. Jocelyn Ahlers, Leela Bilmes, Joshua Guenter, Barbara Kaiser, and Ju Namkung. 252–261.
- Sag, Ivan. 1976. Deletion and logical form. PhD dissertation, Massachusetts Institute of Technology.
- Shanidze, Akaki. 1980 [1953]. Kartuli enis gramat'ik'is sapudzvlebi [Fundamentals of Georgian grammar]. In *Txzulebani [Collected Works]*, vol. 3. Scientific Academy, Tbilisi State University.
- Skopeteas, Stavros, Caroline Féry, and Rusudan Asatiani. 2009. Word order and intonation in Georgian. *Lingua*, 119. 102–127.
- Schütze, Carson and Jon Sprouse. 2014. Judgment Data. In Devyani Sharma and Rob Podesva (eds.), *Research Methods in Linguistics*. Cambridge University Press.
- Wier, Thomas. 2022. Shifting patterns in Georgian verb morphology: Diachrony and dialectology. In *Building on Babel's Rubble: A Festschrift for Léa Nash*, eds. Nora Boneh, Daniel Harbour, Ora Matushansky, and Isabelle Roy. Sciences du Langage Press.
- Zehr, Jeremy, and Florian Schwarz. 2018. PennController for Internet Based Experiments (IBEX). <https://doi.org/10.17605/OSF.IO/MD832>.