Discontinuous Agreement in Semitic: A Fission-based Approach, Draft*

Matthew Hewett, The University of Chicago

February 26, 2020

Discontinuous agreement involves agreement indexing a single argument (e.g. the subject) that is expressed in more than one position or by more than one morpheme on the verb (Campbell 2012; Halle 2000; Harbour 2008a; Noyer 1992; Shlonsky 1989). The two primary verbal conjugations in Semitic–referred to as the *prefix conjugation* and *suffix conjugation*, respectively–exemplify this phenomenon.

(1) a. **Prefix Conjugation (PC)**
ti-gambir-u:
2-sit-M.PL
'You (m.pl.) sit.'

b. **Suffix Conjugation (SC)**
gambar-t-u:
sat-2-M.PL
'You (m.pl.) sat.'

(Ṣanʕānī Arabic; Watson (1993: 56))

The prefix conjugation is typically interpreted as non-past or imperfective and is characterized by the presence of both prefixes and suffixes indexing subject agreement. The suffix conjugation is typically interpreted as past or perfective and marks subject agreement exclusively through the use of suffixes.

Discontinuous agreement has sustained interest in work on syntax and morphology since Shlonsky (1989) and Noyer (1992) first discussed the issue due to the fact that discontinuous agreement appears to constitute one domain in which the one-to-one mapping between syntactic terminals and morphological positions of exponence seems to break down. Given the traditional assumption that φ-features (that is, person, gender, and number features, a.o.) realizing agreement with the subject are bundled in a single head in the syntax, it is unexpected that φ-featural agreement could occur either discontinuously, as in (1b), or, more radically, discontiguously—both discontinuous and nonadjacent—as in (1a).

This study provides an analysis of discontinuous agreement in Semitic which ultimately seeks to answer the following three questions which arise in light of forms like those in (1a)–(1b).

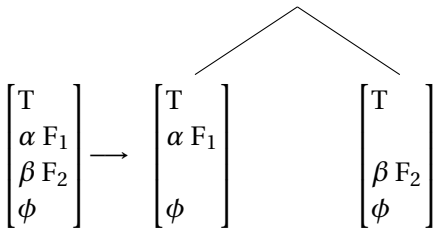
*This paper owes much to lengthy conversations at one stage or another with Karlos Arregi, Jason Merchant, Erik Zyman, Andy Murphy, and Ömer Eren. Many thanks also to audiences at the Morphology & Syntax workshop at The University of Chicago. All errors are solely my responsibility.

(2) a. Number of Positions Question: How many syntactic terminals are there corresponding to the multiple positions of φ-exponence (e.g. 1 or 2)?
b. Stem-Affix Ordering Question: What regulates the relative ordering possibilities between stems and affixes (e.g. why do we find *ti-gambir-u:* and *gambar-t-u:* but not **ti-u:-gambir*)?
c. Affix-Affix Ordering Question: What regulates the relative ordering possibilities between affixes and other affixes (e.g. why do we find *ti-gambir-u:* and not **u:-gambir-ti*)?

Previous accounts have largely taken three approaches to these questions. Purely syntactic approaches posit distinct syntactic projections for each φ-feature category (e.g. PersP, NumP, GenP) (Fassi Fehri 2000; Martinović 2019; Nevins 2002; Shlonsky 1989; Tourabi 2002). Purely morphological approaches posit a single syntactic node bearing φ-features which can be split up and linearly manipulated via post-syntactic operations (Halle 2000; Noyer 1992). Finally, hybrid approaches suppose some division of labor between the syntax and post-syntactic modules to derive the linear order of frayed strings of φ-featural agreement (Campbell 2012; Harbour 2007, 2008a, 2016; Trommer 2003b).

The analysis laid out here shares much in common with hybrid approaches to discontinuous agreement, though it departs from these proposals in several crucial ways, providing a novel account of the Semitic data in the framework of Distributed Morphology (DM) with important consequences for the formalization of certain post-syntactic operations (Halle and Marantz 1993, 1994; Harley and Noyer 1999). First, in response to the *Number of Positions* question, I argue that syntactic operations target a single φ-bearing terminal, in most cases either T or Asp. Multiple positions of exponence are achieved through a post-syntactic operation called *Fission*. I adopt the formalization of Fission from Arregi and Nevins (2012), arguing that Fission creates two positions of exponence out of a single syntactic terminal. While certain (targeted) features from the original terminal are split up by this operation, all other (non-targeted) features are copied into both output nodes. This account provides a straightforward explanation for apparent multiple exponence (or what have sometimes been called "impure discontinuities", Campbell (see 2012); Harbour (see 2008a)), since certain features may be present on both fissioned terminals. What's more, in response to the *Affix-Affix Ordering* question, I propose an enrichment to the definition of Fission: Fission is argued to determine the linear order of the output terminals, governed by the relative markedness of the features targeted by that operation (see Campbell 2012 for a related proposal). The schematic shape of a morphological Fission rule is given in (3), where two features F_1 and F_2 on a head T are targeted by Fission.

(3) Structure of a Morphological Fission rule, where ϕ indicates all other featural content in the matrix



This proposal is in line with work on φ-feature geometries such as Harley and Ritter (2002); Noyer (1992) and McGinnis (2005) which seek to capture implicational universals among person, number, and gender via dependency relations. Finally, in response to the *Stem-Affix Ordering* question, I propose that the order of morphemes in the prefix and suffix conjugations are derived by morphological *Metathesis* rules, adopting the framework of Generalized Reduplication (Arregi and Nevins 2012, 2018; Harris and Halle 2005; Pavlou 2018). Modeling morphological displacement in this way leads to an account of doubled first person plural morphemes in various Semitic languages which prove problematic for previous accounts of discontinuous agreement.

My analysis also has important consequences for the shape of the post-syntactic component of the grammar. On the basis of arguments from derivational feeding relationships, I propose that the operations Impoverishment, Fission, Metathesis, and Vocabulary Insertion apply sequentially in determining the shape of discontinuous agreement morphemes. This provides support for the modular account of post-syntactic operations laid out in Arregi and Nevins (2012).

The rest of the paper is organized as follows. In section §1 I give an overview of the data to be discussed, which come from several branches of the Semitic language family, arguing that the agreement morphemes in (1) are affixes, not clitics. In section §2 I review previous literature on discontinuous agreement in Semitic, arguing that none is able to account for the full range of data. In section §3 I sketch my Fission-based proposal for discontinuous agreement in Semitic. In section §4 I present novel evidence from the allomorphy of discontinuous agreement affixes as a proving ground for evaluating the various proposals proffered to account for discontinuous agreement, ultimately arguing that only the present proposal succeeds in capturing all of the attested patterns. In section §5 I extend the analysis from section §3 to account for microvariation in the realization of first person plural agreement across Semitic, and I provide further evidence that Fission is sensitive to the relative markedness of the features it targets. Section §6 concludes.

1 Discontinuous agreement in Semitic: Data

The prefix and suffix conjugations are attested throughout the Semitic language family, though their precise functions vary from language to language.[1] As mentioned above, the prefix conjugation is characterized by prefixal and suffixal markers of φ-featural agreement with the subject, whereas the suffix conjugation exclusively bears suffixal agreement. Tables 1 and 2 summarize the agreement markers for Amharic, Modern Standard Arabic[2], Ṣanʕānī Arabic (a dialect of Arabic spoken by in and around the Old City of Ṣanʕā', Yemen), Moroccan Arabic, the Mehreyyet dialect of Mehri (a Modern South Arabian language spoken in Oman), and Biblical Hebrew. Given the varied nature of the sources of these data, the verb root varies between paradigms.[3] Agreement affixes appear in boldface.[4]

[1] For instance, in Akkadian, the primary representative of the East Semitic branch of the Semitic family, the prefix conjugation is used for preterite, perfect, and imperfect (also called durative or present) forms of the verb, whereas the suffix conjugation is used for so-called "stative" forms which lack a specific tense interpretation (see Huehnergard 2011; von Soden 1995). However in most West Semitic languages, the contrast between the prefix and suffix conjugations marks a tense/aspect distinction: the suffix conjugation is most commonly used as a past or perfective verb, whereas the prefix conjugation is non-past or imperfective.

[2] I have elected to use the jussive paradigm to illustrate the prefix conjugation markers in Modern Standard Arabic to simplify the discussion. The exponent of the jussive mood is a null agreement affix -∅ which attaches at the right edge of the verb outside the agreement morphology, e.g. *ya-ktub-uː-∅* "let them write". This is to be expected if mood morphemes are introduced by a functional head (e.g. Mood) which merges above TP and therefore outside of the locus of φ-featural agreement morphology which I take to be T or Asp. The indicative and subjunctive moods also build off of the basic prefix conjugational stem, but introduce overt suffixes, as in the indicative form *ya-ktub-uː-**na*** "they will write". By restricting the present discussion to the jussive paradigm, I aim only to reduce distractions from morphological noise. The agreement morphemes themselves do not differ between these three moods.

[3] The root traditionally used for citation forms varies by language: $\sqrt{\text{fʕl}}$ for Modern Standard Arabic, $\sqrt{\text{prs}}$ for Akkadian, and $\sqrt{\text{qṭl}}$ for Biblical Hebrew, to name a few.

[4] Of the languages represented in these two tables, only Modern Standard Arabic and Mehreyyet have productive dual agreement morphology on verbs, and Modern Standard Arabic only in the 2nd and 3rd persons. All other languages use plural morphology to index agreement with a dual subject, even when that subject bears overt dual morphology, as in Biblical Hebrew:

(i) wə-suggər-û dəlāt-ayim bāś-śûq
and-be.shut-PL door-DL on.the-street
'and the doors on the street are shut' (Qoh 2.4)

	Old Babylonian	Amharic	Modern Standard Arabic	Ṣanʕānī Arabic	Moroccan Arabic	Mehreyyet	Biblical Hebrew
1S	**a**-prus	**ɨ**-säbr	ʔ**a**-fʕal	ʔ**a**-gambir	**n**ə-ktəb	**a**-wōkab	ʔ**e**-šmōr
2MS	**ta**-prus	**t**ɨ-säbr	**ta**-fʕal	**ti**-gambir	**t**ə-ktəb	**t**-wōkab	**ti**-šmōr
2FS	**ta**-prus-**ī**	**t**ɨ-säbr-**i**	**ta**-fʕal-**ī**	**ti**-gambir-**ī**	**t**-kətb-**i**	**t**-wīkab	**ti**-šmər-**î**
3MS	**i**-prus	**y**ɨ-säbr	**ya**-fʕal	**yi**-gambir	**y**ə-ktəb	**ya**-wōkab	**yi**-šmōr
3FS	**i**-prus	**t**ɨ-säbr	**ta**-fʕal	**ti**-gambir	**t**ə-ktəb	**t**-wōkab	**ti**-šmōr
1D	**ni**-prus	ɨ**nn**ɨ-säbr	**na**-fʕal	**ni**-gambir	**n**-kətb-**u**	**(n)a**-wakb-**ōh**	**ni**-šmōr
2MD	**ta**-prus-**ā**	**t**ɨ-säbr-**u**	**ta**-fʕal-**ā**	**ti**-gambir-**ū**	**t**-kətb-**u**	**t**-wakb-**ōh**	**ti**-šmər-**û**
2FD	**ta**-prus-**ā**	**t**ɨ-säbr-**u**	**ta**-fʕal-**ā**	**ti**-gambir-**ayn**	**t**-kətb-**u**	**t**-wakb-**ōh**	**ti**-šmōr-**nâ**
3MD	**i**-prus-**ū**	**y**ɨ-säbr-**u**	**ya**-fʕal-**ā**	**yi**-gambir-**ū**	**y**-kətb-**u**	**ya**-wakb-**ōh**	**yi**-šmər-**û**
3FD	**i**-prus-**ā**	**y**ɨ-säbr-**u**	**ta**-fʕal-**ā**	**yi**-gambir-**ayn**	**y**-kətb-**u**	**t**-wakb-**ōh**	**ti**-šmōr-**nâ**
1P	**ni**-prus	ɨ**nn**ɨ-säbr	**na**-fʕal	**ni**-gambir	**n**-kətb-**u**	**n**-wōkab	**ni**-šmōr
2MP	**ta**-prus-**ā**	**t**ɨ-säbr-**u**	**ta**-fʕal-**ū**	**ti**-gambir-**ū**	**t**-kətb-**u**	**t**-wakb-**am**	**ti**-šmər-**û**
2FP	**ta**-prus-**ā**	**t**ɨ-säbr-**u**	**ta**-fʕal-**na**	**ti**-gambir-**ayn**	**t**-kətb-**u**	**t**-wakb-**an**	**ti**-šmōr-**nâ**
3MP	**i**-prus-**ū**	**y**ɨ-säbr-**u**	**ya**-fʕal-**ū**	**yi**-gambir-**ū**	**y**-kətb-**u**	**ya**-wakb-**am**	**yi**-šmər-**û**
3FP	**i**-prus-**ā**	**y**ɨ-säbr-**u**	**ya**-fʕal-**na**	**yi**-gambir-**ayn**	**y**-kətb-**u**	**t**-wakb-**an**	**ti**-šmōr-**nâ**

Table 1: Prefix Conjugation agreement morphemes across Semitic

	Old Babylonian	Amharic	Modern Standard Arabic	Ṣanʕānī Arabic	Moroccan Arabic	Mehreyyet	Biblical Hebrew
1S	pars-**āku**	säbbär-**k^{w}**	faʕal-**tu**	gambar-**t**	ktəb-**t**	kis-**k**	šāmar-**tî**
2MS	pars-**āta**	säbbär-**k**	faʕal-**ta**	gambar-**t**	ktəb-**ti**	kis-**k**	šāmar-**tā**
2FS	pars-**āti**	säbbär-ʃ	faʕal-**ti**	gambar-**tī**	ktəb-**ti**	kis-**š**	šāmar-**t**
3MS	paris	säbbär-**ä**	faʕal-**a**	gambar	ktəb	kūsa ~ ksūh	šāmar
3FS	pars-**at**	säbbär-**ätʃtʃ**	faʕal-**at**	gambar-**at**	kətb-**at**	ksū-**t**	šāmər-**â**
1D	pars-**ānu**	säbbär-ɨ**n**	faʕal-**nā**	gambar-**nā**	ktəb-**na**	kis-**kī**	šāmar-**nû**
2MD	pars-**ātunu**	säbbär-**a**tʃtʃ**uh**	faʕal-**tumā**	gambar-**tū**	ktəb-**tu**	kis-**kī**	šəmar-**tem**
2FD	pars-**ātina**	säbbär-**a**tʃtʃ**uh**	faʕal-**tumā**	gambar-**tayn**	ktəb-**tu**	kis-**kī**	šəmar-**ten**
3MD	pars-**ū**	säbbär-**u**	faʕal-**ā**	gambar-**ū**	kətb-**u**	kisy-**ōh**	šāmər-**û**
3FD	pars-**ā**	säbbär-**u**	faʕal-**atā**	gambar-**ayn**	kətb-**u**	kisy-**tōh**	šāmər-**û**
1P	pars-**ānu**	säbbär-ɨ**n**	faʕal-**nā**	gambar-**nā**	ktəb-**na**	kūs-**an**	šāmar-**nû**
2MP	pars-**ātunu**	säbbär-**a**tʃtʃ**uh**	faʕal-**tum(ū)**	gambar-**tū**	ktəb-**tu**	kis-**kam**	šəmar-**tem**
2FP	pars-**ātina**	säbbär-**a**tʃtʃ**uh**	faʕal-**tunna**	gambar-**tayn**	ktəb-**tu**	kis-**kan**	šəmar-**ten**
3MP	pars-**ū**	säbbär-**u**	faʕal-**ū**	gambar-**ū**	kətb-**u**	ksīw ~kūs-**am**	šāmər-**û**
3FP	pars-**ā**	säbbär-**u**	faʕal-**na**	gambar-**ayn**	kətb-**u**	kūsa ~ ksūh	šāmər-**û**

Table 2: Suffix Conjugation agreement morphemes across Semitic

Data from the following sources: Old Babylonian (Huehnergard 2011: 601, 624), Amharic (Leslau 1995: 146–147, 151–152), Modern Standard Arabic (Ryding 2005: 475) Ṣanʕānī Arabic (Watson 1993: 56), Moroccan Arabic (Aoun et al. 2010: 20–21), Mehreyyet (Watson 2012: 86–87), Biblical Hebrew, adapted from (Van der Merwe et al. 2017: 91).

While my parsing of the suffix conjugation agreement morphemes is relatively unexceptional, my parsing of prefix conjugation prefixes consisting of both a consonant and a vowel (e.g. Biblical Hebrew ʔ*e*-*šmōr* "I (will) guard") requires some justification, since many authors assume that the vowel is distinct from the agreement affix proper (see, e.g., Halle 2000). The main evidence in favor of grouping the prefix vowel together with the prefix consonant comes from alternations between prefix conjugation verbs and imperatives. Consider the pair in (4) from Modern Standard Arabic.

(4) a. lam **tu**-darris-**ī** tˤ-tˤifla
NEG.PAST 2-teach-2.F.SG the-child.ACC
'You (f.sg.) didn't teach the child.'
b. darris-**ī** tˤ-tˤifla
teach.IMP-2.F.SG the-child.ACC
'Teach (f.sg.) the child!'

The imperative in Modern Standard Arabic, as with most other Semitic languages, is formed by combining the consonantal root with the vocalic pattern for jussive verbs, which in this case is the sequence /a,i/ (see Kramer 2019 on Amharic). Jussive verbs are typically used in hortatory or directive contexts for the first and third persons, and are otherwise used in Modern Standard Arabic in the negated past tense with the morpheme *lam* (NEG.PAST) and in conditionals. Suffixal agreement is used to mark the gender and number of the subject, as with verbs in the prefix conjugation. The primary difference between jussive prefix conjugation verbs and imperatives is that prefixal subject agreement markers are banned in the imperative. Compare (4b) with (5).

(5) *tu-darris-**ī** tˤ-tˤifla
2-teach.IMP-2.F.SG the-child.ACC
(int.) 'teach (f.sg.) the child!'

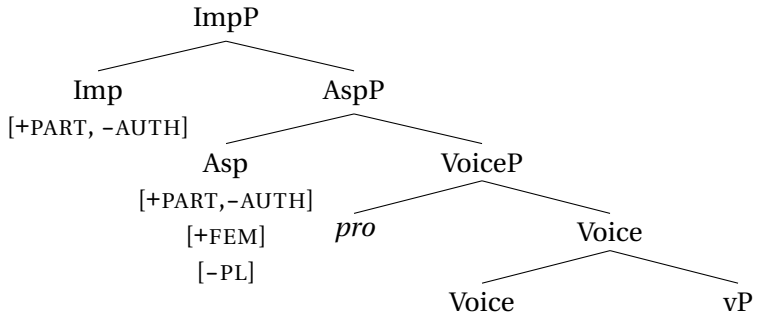
Observe in this regard that when prefixal agreement disappears in the imperative, both the prefixed consonant /t/ and vowel /u/ go missing. Kramer (2019: 11–12) analyzes this deletion as the result of a featural haplology rule which operates in response to a morphotactic constraint in the grammar disallowing two instances of the same morphosyntactic feature(s) in a row. The basic structure of haplology rule is given in (6), where *X* corresponds to phonological material, *F* to the feature(s) associated with that exponent, and α to the value of the feature *F* in question.[5]

(6) **Featural Haplology**[6]
$[X_1 \ * \ X_2] \longrightarrow [X_1]$
$[F\alpha] \quad [F\alpha] \quad [F\alpha]$

[5] Kramer assumes that haplology operates after Vocabulary Insertion (VI) and Linearization and that morphosyntactic features persist into the post-VI/Linearization structure.
[6] The '*' diacritic indicates immediate precedence.

In order to account for the missing prefix in (4b), Kramer proposes that there is a functional head in the left periphery of imperatives which introduces the imperative meaning and which bears second person features, licensing a null subject, as shown in the tree in (7).[7]

(7) *Syntax of feminine singular imperative darris-ī* (see Kramer 2019: 9)



Head movement of the verb through the Asp and Imp heads will yield a single complex head which is linearized as in (8).

(8) [∅ * tu * ∅ * darris * ī]
[Imp,+PART,–AUTH] [+PART,–AUTH] [Voice] v+√ * [+FEM,–PL]

(8) meets the structural description of the haplology rule in (6): the Imp head bears two features, [+PART,–AUTH], which match the features [+PART,–AUTH] of the immediately following terminal associated with φ-agreement on Asp. This configuration triggers the structural change shown in (9), correctly deriving an imperative that lacks the person-marking prefix *tu-*.[8]

(9) [∅ * tu * ∅ * darris * ī] ⟶
[Imp,+PART,–AUTH] [+PART,–AUTH] [Voice] v+√ * [+FEM,–PL]

[∅ * ∅ * darris * ī]
[Imp,+PART,–AUTH] [Voice] v+√ * [+FEM,–PL] =*darris-ī* 'teach (fs)!'

If Kramer's haplological analysis of the disappearing person prefix in Semitic imperatives is correct, then this constitutes strong evidence that the prefixed consonant and vowel jointly realize (some aspect of) agreement with the subject and should therefore be parsed together as a single morpheme.

Next, it is important to establish that the morphemes in question are indeed affixes and not clitics. Drawing on Zwicky and Pullum (1983) and Kramer (2019), I argue on the basis of four diagnostics that subject-

[7] Although Kramer's analysis is for Amharic imperatives specifically, I see no reason why the analysis could not be directly adopted for the Modern Standard Arabic data, as I assume in the main text.

[8] Kramer assumes that the second person features associated with the prefix must be present at Vocabulary Insertion in order to condition allomorphy on the suffix, given that *-ī* (and its Amharic equivalent *-i*) is the realization of feminine singular only in the second person, not in the third person (or, for that matter, in the first person), cf. Table 1. Thus, she assumes the following vocabulary entry (Kramer 2019: 4):

(i) [+feminine, +singular] ↔ *ī* / ___[+participant, –author]

indexing agreement morphemes in Semitic are affixal.

First, whereas affixes are highly selective with respect to their hosts, clitics are not. In Biblical Hebrew, we find that subject-indexing prefixes in the prefix conjugation and suffixes in the suffix conjugation are morphophonologically distinct from the accusative and possessive pronominal clitics in that language.

(10) a. Biblical Hebrew subject-marking prefixes

	SG	PL
1	*ʔe-*	*ni-*
2M	*ti-*	*ti-*
2F	*ti-*	*ti-*
3M	*yi-*	*yi-*
3F	*ti-*	*ti-*

b. Biblical Hebrew object clitics

	SG	PL
1	*-nî*	*-nû*
2M	*-kā*	*-kem*
2F	*-ēk*	*-ken*
3M	*-ô/-hû*	*-ēm*
3F	*-āh*	*-ān*

c. Biblical Hebrew possessive pronominal clitics

	SG	PL
1	*-î*	*-nû*
2M	*-kā*	*-kem*
2F	*-ēk*	*-ken*
3M	*-ô/-hû*	*-ēm*
3F	*-āh*	*-ān*

I take this as evidence that subject-indexing morphemes on verbs in Biblical Hebrew (and Semitic in general) are highly selective, and cannot freely attach to hosts of any category. This is a property standardly attributed to affixes.

The second argument for analyzing subject-indexing agreement in Semitic as affixal comes from Preminger (2009) and Arregi and Nevins (2012: 95–103). Lack of agreement in many languages results in the insertion of default (or unmarked) φ-feature values into the probing head. Lack of cliticization, however, does not trigger default cliticization. Kramer (2019) shows for Amharic that default third masculine singular agreement shows up in weather predicates. Failure to include the subject-indexing morphemes /yɨ/ is ungrammatical.

(11) **y**ɨ-zänb **y**ɨ-mäsl-all
3.M.SG-rain.IPFV 3.M.SG-seem.IPFV-AUX.3.M.SG
'It seems that it will rain.' (Kramer 2019: 8, citing Leslau 1995: 307)

Since subject-indexing morphemes are subject to default insertion, this suggests that they are affixes and not clitics.

The third and fourth arguments also come from Kramer (2019: 8). Clitics are often analyzed as D elements that are head-adjoined to a functional head such as T^0 (Uriagereka 1995; see also the references in Yuan 2018: 53). Crucially, subject-indexing morphemes in Semitic look nothing like determiners. First, there are, to

my knowledge, no Semitic languages in which definite articles inflect for person or number.[9] Determiners are largely invariant when compared to subject-indexing morphology on the verb.

(12) Modern Standard Arabic

a. Determiner: *al-* 'the'

b. Subject-indexing prefixes

	SG	DL	PL
1	*ʔa-*	*na-*	*na-*
2M	*ta-*	*ta-*	*ta-*
2F	*ta-*	*ta-*	*ta-*
3M	*ya-*	*ya-*	*ya-*
3F	*ta-*	*ta-*	*ya-*

If the subject agreement markers in (12b) were in fact D^0s, parallel to the definite determiner *al-*, then we would be forced to say that these D^0s mysteriously gain overt φ-feature inflection upon head-adjunction to T^0. I propose instead that this is evidence for distinguishing the two sets of morphemes: *al-* is an actual D^0, whereas the markers in (12b) are affixes in T.

Finally, clitics are not necessarily expected to exhibit allomorphy depending on the features of the verb stem (see Zwicky and Pullum 1983). The form of the first person subject-agreement morpheme in the Old Babylonian Akkadian prefix conjugation, however, is sensitive to modal features associated with the verb, as shown in (13): the first person singular prefix is *a-* in the preterite, but *lu-* in the jussive.

(13) Old Babylonian Akkadian

a. **a**-prus
1.SG-decide.PRET
'I decided'

b. **lu**-prus
1.SG-decide.JUSS
'Let me cut'

Such sensitivity is to be expected if these morphemes are affixes.[10] In light of these four diagnostics, I will henceforth assume that the morphemes indexing subject agreement in Semitic are affixes and not clitics doubling the subject.

[9] Indeed, in most Semitic languages, definite articles do not inflect for person, number, or *gender*, the main exception being Amharic: *u* 'the.MS' and *wa* 'the.FS' (Kramer 2015: 15).

[10] See the discussion in section §3, however, for some potential evidence that object clitics in various Semitic languages, including the Argobba of Shonke and T'ollaha, Mehreyyet, and Ṣanʕānī Arabic, can trigger changes in the form of adjacent subject agreement morphemes on the verb. If my analysis is correct and these all constitute true cases of allomorphy, then this final diagnostic for the clitic/affix distinction may not be relevant.

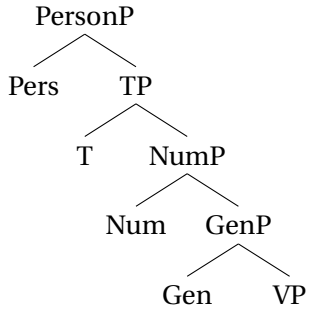
2 Review of previous scholarship

In this section, I discuss three primary classes of analyses which have been proposed to account for discontinuous agreement, the vast majority of which have been leveraged directly on Semitic. These three groups, following Harbour's (2008a: 191) taxonomy, can be classified as fundamentally syntactic, fundamentally morphological, and hybrid, proposing some interaction between morphology and syntax in deriving frayed agreement strings. I will consider each in turn, ultimately arguing in favor of my own hybrid approach.

2.1 Fundamentally syntactic theories of discontinuous agreement

Shlonsky (1989) was the first to offer a syntactic account of discontinuous agreement in Semitic. His proposal has come to be known as the PersonP hypothesis. Shlonsky claimed that each φ-feature category—namely, person, number, and gender—projects independently along the main functional spine.[11] This is schematically shown in (14).

(14)



Shlonsky's proposal aimed to capture the following implicational hierarchies which he claimed were substantiated by data from Romance, Semitic, and Russian.

(15) a. If a verb is inflected for number then it is also inflected for gender
b. If a verb is inflected for person then it is also inflected for number

The implicational universal in (15a) is ostensibly supported by the Modern Hebrew present tense form (called *Benoni*) in (16), which inflects for number and gender but not person. By contrast, the Modern Hebrew past and future tenses in (19) inflect for person, number, and gender, in line with the universal in (15b).

(16) Hebrew Benoni: number and gender inflection
ata šomer ʔal ha-xacilim
you guard.M.SG on the-eggplants
'You guard/are guarding the eggplants.' (Shlonsky 1989: 5)

[11] For related proposals in which the prefix and suffix (or, in the suffix conjugation, the two suffixes) are argued to realize distinct heads in the syntax, see Banksira (1999, 2000), Fassi Fehri (2000), Tourabi (2002), and Bruening (2017: 51–55).

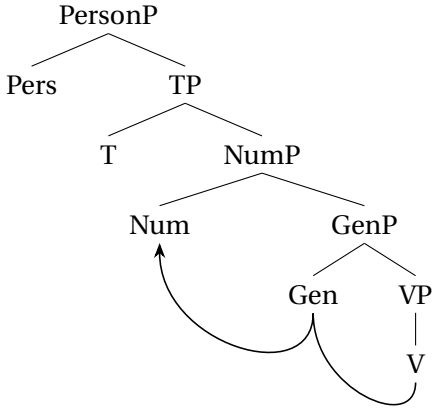
(17) Hebrew past and future: person, number, and gender inflection

a. ata šamar-ta ʔal ha-xacilim
you guard-2.M.SG on the-eggplants
'You guarded the eggplants.'

b. ata ti-šmor ʔal ha-xacilim
you 2-guard on the-eggplants
'You will guard the eggplants.' (Shlonsky 1989: 4–5)

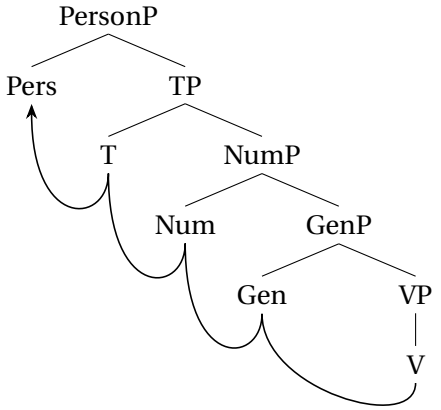
Shlonsky argued that this contrast can be captured, assuming a clause structure like that in (14), by positing verb movement to different heights in the Benoni and non-Benoni forms. In the Hebrew Benoni, Tense is "weak" and cannot attract the verb; thus, the verb undergoes head movement only to Number and cannot continue on to Person.[12]

(18) Benoni verbs move only to Number, blocked from moving to Person



Past and future Tense morphemes are "strong" and hence can attract the verb. Consequently, nothing stops the verb from moving on to Person, resulting in a kind of snowballing head movement.

(19) Past and future verbs move through T to Person

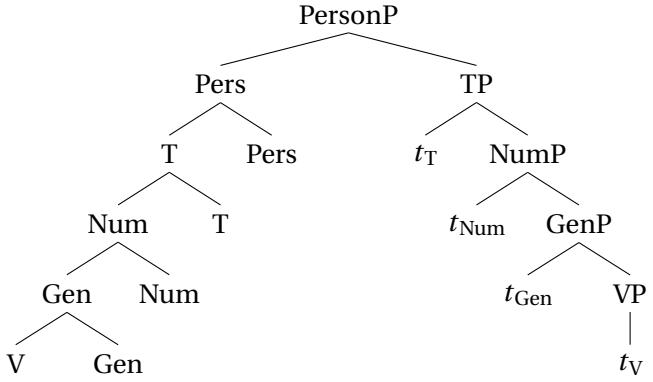


[12] Note however that this analysis does not yet explain why Person is obligatorily *silent* in the Benoni, an issue that Shlonsky and the literature inspired by his analysis have yet to address.

Martinović (2019: 35) extends Shlonsky's proposal to derive the different order of agreement affixes vis-à-vis the stem in the Biblical Hebrew prefix and suffix conjugations.[13] She proposes that verbs in the suffix conjugation raise to Person with the effect that Person, Gender, and Number are entirely suffixal in the resulting complex head. A sample derivation is given in (20).[14]

(20) a. zərāq-tem
throw.PFV-2.M.PL
'You all threw.' (Biblical Hebrew; Harbour 2007: 223)

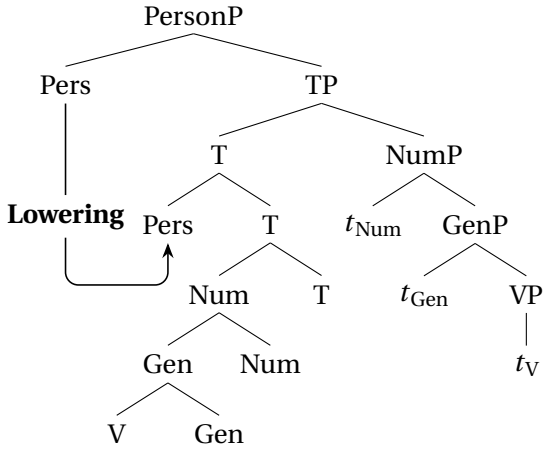
b.



By contrast, verbs in the prefix conjugation raise only to T. Person then lowers to T, yielding Person as a prefix and Number and Gender as suffixes, as shown in (21) (see Embick and Noyer 2001).

(21) a. ti-zrəq-ū
2-throw.IPFV-M.PL
'You all will throw.' (Biblical Hebrew; Harbour 2007: 223)

b.



Although the PersonP hypothesis provides an analysis for the implicational generalizations in (15) and, following Martinović, is equipped to explain the general distinction between the prefix and suffix conjugations, I submit that it is makes incorrect empirical predictions and requires unfounded theoretical assumptions. First,

[13] Martinović (2019) and Harbour (2007) attribute this analysis to Nevins (2002), though I have been unable to find such a proposal in the slides from Nevins (2002).

[14] I have updated the transcription of these data to be in line with the present work.

the PersonP hypothesis as assumed in Shlonsky (1989) and Martinović (2019) predicts the following order of morphemes in the suffix conjugation in accordance with the Mirror Principle (Baker 1985), contrary to fact: V-Gen-Num-T-Pers.[15] Rather, morphemes indexing person are typically closest to the verb stem in the suffix conjugation across Semitic, as shown for Tunis Arabic in (22): the suffix *t* is present in all [+participant] cells other than the first person plural and precedes the second person plural suffix *u*.

(22) Tunis Arabic suffix conjugation (Gibson 2009)

	SG	PL
1	ktib-**t**	ktib-na
2	ktib-**t**	ktib-**t-u**
3m	ktib-∅	kitb-**u**
3f	kitb-it	kitb-**u**

In other words, the actual order of morphemes in the suffix conjugation is V-Pers-Num/Gen when person and number/gender marking can be separated. I take this as the first piece of evidence that the PersonP hypothesis is on the wrong track.

Second, since the PersonP hypothesis assumes that φ-features project independently, it predicts only pure discontinuities in which person and number can be cleanly separated. It cannot accommodate impure discontinuities as in (23), where the prefix marks second person and the suffix marks second person feminine singular (see Campbell 2012; Harbour 2008a).[16]

(23) ta-ktub-ī
2-write-2.F.SG
'you will write/are writing' (Modern Standard Arabic)

The presence of person marking on both agreement affixes is unexpected if the relevant heads independently probe for different φ-features.

The final issue is that the PersonP hypothesis provides no explanation as to why the verb moves to different heights in the prefix and suffix conjugations. In a theory of syntax in which both head movement and phrasal movement are feature-driven, there is no way to prevent snowballing head movement from taking the complex head in (21b) all the way to Person without, for instance, positing two distinct "flavors" of Person, one of which bears a strong feature driving head movement of the complex T head to Person in the suffix conjugation, and

[15] The one avenue I see to salvage this analysis would be to assume that Pers actually first merges with the VP, followed by Gen and Num. Suffix conjugation verbs would simply involve head movement of the verb through Person, Gender, and Number, yielding the order V-Pers-Gen-Num where person features are closer to the verb stem than number/gender. In the prefix conjugation, by contrast, Person could first Lower onto V and, assuming Martinović's analysis whereby Lowering can feed syntactic movement, the VP could then undergo predicate fronting to a position c-commanding both Num and Gen, yielding the morpheme order Pers-V-Num-Gen. I set this proposal aside as the details of such an analysis have yet to be worked out.

[16] Or feminine singular in the context of second person, see Harbour (2008b); Kramer (2019); Noyer (1992).

one of which does not bear a strong feature for the prefix conjugation. I see no good empirical reason to posit multiple distinct Person heads, in particular since there is significant overlap between the forms of the prefixes and suffixes in many Semitic languages (see for instance the Ṣanʕānī Arabic data in Tables 1 and 2). In summary, I contend that there are empirical and theoretical reasons to reject the PersonP hypothesis in accounting for discontinuous agreement in Semitic.[17]

2.2 Fundamentally morphological theories of discontinuous agreement

Morphological theories of discontinuous agreement share the intuition that φ-features are bundled in a single terminal in the syntax, but that those features are broken up post-syntactically. Noyer (1992) and Halle (2000) posit an operation called *Fission* which creates two loci of phonological exponence out of a single syntactic node during Vocabulary Insertion. Fission can't apply arbitrarily, however. For both Noyer and Halle, Fission is only licensed when features in a terminal node are left unmatched by a vocabulary entry during Vocabulary Insertion. Those undischarged features are then copied into a separate terminal of exponence which can be subject to further insertion operations. Fission is thus crucially motivated by a language's inventory of vocabulary entries: if certain vocabulary entries fail to realize all of the features in a given node, Fission applies automatically. The ordering of fissioned nodes with respect to each other and with respect to the verb stem is then determined either by language-specific, morphological well-formedness conditions (stated in terms of templates in Noyer (1992: 39)) or by idiosyncratically listing the prefixal or suffixal status of a given morpheme on each vocabulary entry (Halle 2000).

As an illustration of morphological theories of discontinuous agreement, consider how Halle (2000) derives the Biblical Hebrew verb in (24).

(24) yi-zrəq-û
3-throw-M.PL
'They will throw.' (Biblical Hebrew)

(25) *Vocabulary entries*
a. *û* ⟶ [–Auth, +Pl], Suff
b. *yi* ⟶ [–PSE[18], –Fem], Pref

[17] An additional piece of evidence against the PersonP hypothesis will be introduced later in this paper. There, I argue that the prefix *ti-* in third person feminine verbs in Modern Standard Arabic realizes the features [–augmented, +feminine] and does not index person features in any way.

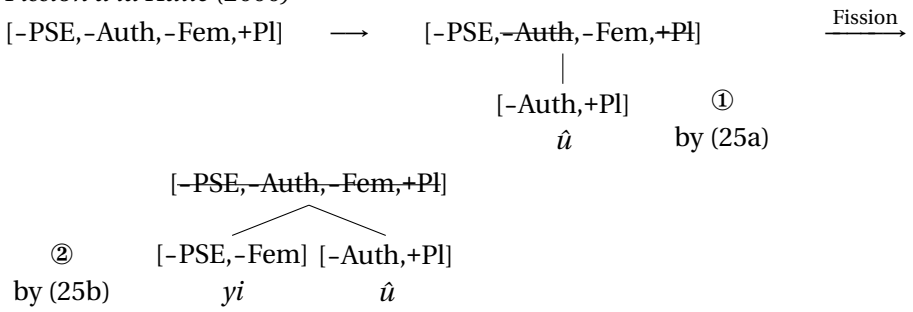
(i) ta-ktub-aː
F-write.IPFV-DL
'They two (f.) will write/are writing' (Modern Standard Arabic)

If my analysis is correct, then we have evidence that prefixes cannot exclusively be derived by Lowering the Pers head to the complex verb in T, as assumed in (21b).

[18] Participant in the speech event.

The vocabulary entry in (25a), being ordered first, would apply first, matching the features [–Auth, +Pl] and inserting the phonological exponent *u*ː which is idiosyncratically specified to be a suffix. The unmatched features [–PSE, –Fem] are then copied into a subsidiary, fissioned morphemes, licensing a subsequent application of Vocabulary Insertion, at which point the rule in (25b) applies, matching the remaining features and resulting in a prefix *yi*-. The derivation is schematized in (26) (see also Nevins 2002).

(26) *Fission à la Halle (2000)*



The main takeaway from these analyses is that Fission depends on the particular inventory of vocabulary entries in the language.

Despite these Fission analyses' success in deriving most of the relevant verbal forms in Semitic, they seem to miss two significant generalizations. First, Halle's Fission analysis must stipulate prefixhood and suffixhood on a morpheme-by-morpheme basis, an answer to the *Stem-Affix Ordering* question which is hardly enlightening. Given that morpheme order within words is typically regulated either by principles of the syntax-to-morphology mapping (e.g. the Mirror Principle), or by post-syntactic operations (e.g. Metathesis, see Arregi and Nevins (2012, 2018) and Harris and Halle (2005)), I submit that we should look for a more principled explanation underlying the distinction between prefixes and suffixes in Semitic. Second, several scholars have pointed out that Noyer's and Halle's analyses miss a fairly robust cross-linguistic generalization concerning the relative ordering possibilities between discontinuous agreement morphemes (see Fassi Fehri 2000; Harbour 2008a; Tourabi 2002; Trommer 2003b): when person and number agreement with the subject can be identified with separate affixes on the verb, person tends to precede number (otherwise referred to as the "person-left, number-right" ordering generalization in (Harbour 2008a: 186)). Evidence in support of this generalization from four unrelated languages is given in (27) from Harbour (2008a: 200).

(27) a. yi-zrəq-û
3-throw-M.PL
'They will throw' (Biblical Hebrew)

b. v-c'er-t
1-write-PL
'We write' (Georgian)

c. Suek Bostonea s-ixus-e-n
you.PL to Boston 2-go-PL-PST
'You all are going to Boston' (Basque)

d. ma-rna-n-panya
AUX-1EX-2-PL
'We [verb] you' (Walmatjari)

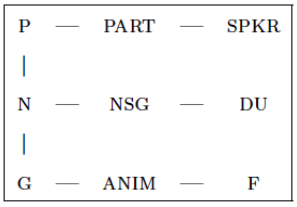
In light of the difficulties faced by purely morphological approaches, I will instead move on to consider hybrid approaches to discontinuous agreement.

2.3 Hybrid approaches to discontinuous agreement

Hybrid approaches to discontinuous agreement take for granted that syntactic structure building is responsible for combining probes valued under Agree with the subject with other syntactic heads such as the verb root. The result is the formation of complex heads. Post-syntactic operations, however, are ultimately responsible for translating hierarchical syntactic relations into linear precedence relations and for breaking up φ-features.

Hybrid approaches are thus able to integrate many of the key insights from fundamentally syntactic and fundamentally morphological theories of discontinuous agreement, while nonetheless innovating. Campbell's (2012) account, for instance, eschews representations of φ-features as unordered bundles and argues that φ-feature sets take the form of two-dimensional, hierarchically organized structures which encode intra- and inter-categorial entailment relations, inspired by Béjar (2003); Béjar and Rezac (2009); Harley and Ritter (2002); Noyer (1992). The inter-categorial relations between φ-features essentially replicate the dominance relations among PersP, NumP, and GenP in work on the PersonP hypothesis. An example of such a φ-feature set is given in (28).[19]

(28) Feature structure for the first person dual feminine (Campbell 2012: 99)



Campbell's account also adopts the basic mechanism of Fission proposed in Noyer (1992) and Halle

[19]Campbell admits that some languages might simply lack certain feature categories (e.g. a language could robustly lack gender agreement). Still, when present, these categories are hypothesized to conform to the hierarchy P > N > G. Intra-categorial relationships among φ-feature values, on the other hand, are assumed to be variable. For instance, Campbell points out that languages may encode the relative ranking between first and second persons differently: first person could be more highly specified in one lanugage (i.e. occur further to the right in the horizontal dimension of the structure in (28)), and second person could be more highly specified in another.

(2000) (with some slight modifications, for which see Campbell 2012: ch. 5 for details): Fission (or in Campbell's terminology, *Split*) is a post-syntactic operation which is licensed by the presence of undischarged features in a syntactic terminal after Vocabulary Insertion has selected the most optimal vocabulary entry to realize that node. According to Campbell, Vocabulary Insertion (in her terminology, *Insert*) applies from top to bottom through the φ-set in (28), thereby constraining the application of Fission. Since person features are higher in the φ-set, they will always be targeted first by Vocabulary Insertion, and only hierarchically lower features will be subject to Fission.

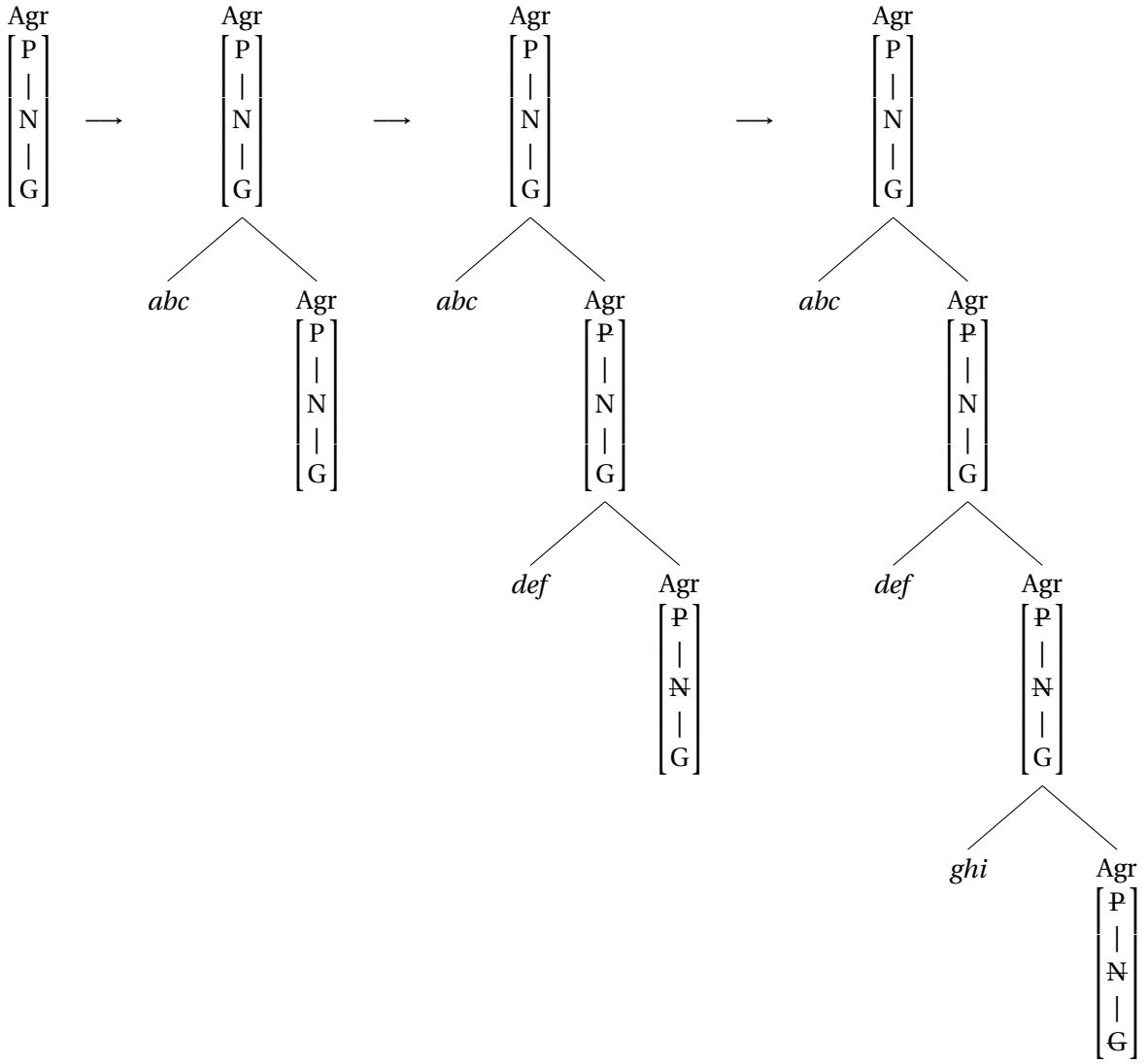
Let us consider a schematic illustration of the mechanics of Campbell's Fission account applied to an Agr node valued for person, number, and gender features.[20] In (29b), Vocabulary Insertion begins at the top of the φ-set and adds the vocabulary entry realizing person features to the Agr node. Since the gender and number features have been left unrealized, Fission applies, creating a new position of exponence, represented in Campbell's system as a new, hierarchically lower terminal node in the complex Agr^0 head. Insert then scans the φ-set from top to bottom once again, and the next vocabulary entry that can apply which has not been previously added to the word and which matches an as-yet-undischarged feature is chosen, and *def* is added to Agr. Once again, since the gender features on Agr remain unrealized, Fission creates an additional position of exponence licensing a final application of Vocabulary Insertion.

(29) *Insert and Split à la Campbell (2012: 114)*

a. *Vocabulary entries*
abc ↔ [P]
def ↔ [N]
ghi ↔ [G]

b. *Derivation*

[20] I abstract over intra-categorial relations between φ-features here.



According to Campbell (2012), this conceptualization of Fission accurately predicts the "person-left, number-right" generalization. Assuming that linearization proceeds root-outward (see Bobaljik 2000) and top-to-bottom in the post-Fission, complex Agr^0 head, linearization of the final structure in (29b) is argued to apply first to exponents of person features (somewhat confusingly, since these exponents are actually the highest in the complex head), then to exponents of number features, etc. Campbell (2012: 155) claims that this will successfully predict strings as in (30) where number occurs outside of person.[21]

(30) VERB-P-N-G

Another hybrid proposal which incorporates features of both syntactic and morphological accounts of discontinuous agreement is that of Harbour (2008a).[22] Like Campbell, Harbour proposes that φ-features have

[21] As Campbell herself observes, her proposal makes a slightly more nuanced prediction, namely that, *ceteris paribus*, exponents of hierarchically higher φ-features should always appear closer to the verb stem than lower ones (2012: 154–157). When φ-features are prefixal, Campbell predicts the string G-N-P-VERB.

[22] Harbour (2016) slightly updates this analysis with a more developed proposal in line with Mirror Theory (see Adger et al. 2009). I

internal structure, which he represents as in (31) where φ is a category label and syntactic head in the functional spine of the clause, and π (= person) and ω (= number) are dependents of that node. [23]

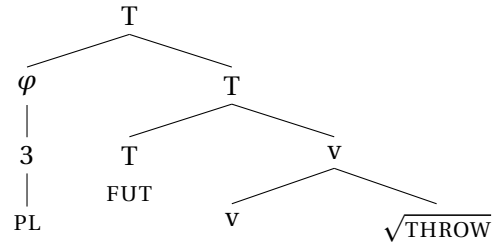
(31)
φ
|
π
|
ω

Like Noyer and Halle, Harbour proposes that sub-φ-structures can receive separate exponents and can be independently linearly manipulated by morphological operations. Languages with discontinuous agreement then are distinguished by virtue of the fact that their lexicons contain vocabulary entries matching sub-φ trees (see also Kramer 2019: 10).

Let us consider how the Biblical Hebrew verb in (32) would be derived in Harbour's system.

(32) yi-zrəq-û
3-throw-PL
'They will throw'

In the derivation of this clause, the verb moves to T, resulting in the complex head in (33) (Harbour 2008a: 189).

(33)


Next, Vocabulary Insertion, which is assumed to apply cyclically, root-outwards, proceeds up the tree until it reaches the φ-node, yielding the structure in (34).[24]

will set aside this anlaysis for the present discussion given that it involves several assumptions, the exposition of which would take use too far afield.

[23] Harbour (2008a: 195) offers a semantic justification for the structure in (31): person is more abstract than number, reflecting a general tendency for abstractness to increase as one moves higher in the tree. He also extends the "person-left, number-right" generalization to the pronominal domain, showing that the generalization holds irrespective of the headedness of the language.

(i) Modern Standard Arabic (head-initial) pronouns

Person	Singular	Dual	Plural
1	*'anā*	*naḥnu*	*naḥnu*
2M	*'ant-a*	*'ant-um-ā*	*'ant-um*
2F	*'ant-i*	*'ant-um-ā*	*'ant-un-na*
3M	*h-uwa*	*h-um-ā*	*h-um*
3F	*h-iya*	*h-um-ā*	*h-un-na*

(ii) Walmatjari (head-final) pronouns

Person	Singular	Dual	Plural
1EX	*nga-ju~ji*	*nga-jarra*	*nga-nimpa~nampa*
1IN		*ngali-jarra*	*ngali-mpa*
2	*nyuntu*	*nyurra-jarra*	*nyurra-warnti*
3	*nyantu*	*nyantu-jarra*	*nyantu-warnti*

[24] I leave aside the interesting matter of how the stem-internal vowel (in this case /ə/), which is traditionally assumed to be part of the templatic melody associated with this verb, is determined.

(34) [φ [zrəq]]
|
3
|
PL

At this stage in the derivation, Harbour assumes that Vocabulary Insertion and linearization happen simultaneously, such that when the φ-set is targeted for insertion, sisterhood relations are immediately transformed into linear adjacency relations. I follow Harbour in adopting Raimy's (2000) formalization of linear adjacency and precedence represented by an arrow, here extended to the morphological domain.

(35) [φ → zrəq]
|
3
|
PL

The vocabulary entries in (36) will then insert the matching exponents into sub-φ-structures in (35), assuming that no more specific entry can apply and realize the entire φ-structure.

(36) a. $\begin{bmatrix}\varphi \\ | \\ 3\end{bmatrix} \leftrightarrow$ *yi*

b. [PL] ↔ *û*

(37) [yi → zrəq]
|
û

At this stage in the derivation, we seem to have reached an impass: how is *û* to be linearized? Harbour's proposal, drawing inspiration from Kayne's (1994) Linear Correspondence Axiom, is to propose two constraints on structure-preservation in linearization. First, linearization must preserve previously established linear adjacency relations. This rules out a form like **yi-û-zrəq* in (37), since that would involve disrupting the adjacency relation between *yi* and *zrəq*. Moreover, Harbour proposes that linearization must map dominance relations among φ-features onto linear precedence relations. This rules out **û-yi-zrəq*, since *yi* dominates *û* and therefore must precede it.[25] The only option then is to linearize *û* at the right edge of the word as shown in (38).

(38) [yi →zrəq] ⇒ [yi→zrəq→û]
|
û

[25]Note that this assumption does not naturally follow from the purported parallel between Harbour's linearization mechanism and Kayne's Linear Correspondence Axiom (LCA). The LCA is defined in terms of asymmetric c-command, whereas Harbour's linearization mechanism is sensitive to dominance. Thanks to Erik Zyman for pointing out this inconsistency to me.

This has the consequence that person is consistently linearized to the left of number when person and number are realized discontinuously. Harbour is thus successful in deriving the basic pattern of discontinuous agreement in Semitic.[26]

In summary, Campbell's and Harbour's hybrid approaches to discontinuous agreement succeed in predicting the cross-linguistically robust "person-left, number-right" generalization where purely morphological analyses failed, or otherwise resorted to stipulating relative affix order. These analyses rely on the assumption that Fission is essentially iterated Vocabulary Insertion applying to a single syntactic terminal, licensed by the presence of features left undischarged by previous cycles of Vocabulary Insertion (see also González-Poot and McGinnis 2006; Halle 2000; McGinnis 2013; Noyer 1992; Trommer 1999, 2003a).

Moreover, hybrid approaches have a ready explanation for impure discontinuities as in (39) which prove problematic for the PersonP hypothesis. The suffix -*î* indexes feminine singular features in the second person, as in (39a), but not in the third person, as in (39b).

(39) a. **ti**-zrəq-**î**
2-throw.IPFV-2.F.SG
'you (f.sg.) will throw'

b. **ti**-zrōq
3.F.SG-throw.IPFV
'she will throw' (Biblical Hebrew)

Harbour (2007: 241–242) and Kramer (2019: 10) propose to analyze this multiple exponence of second person features as a kind of contextual allomorphy. Consider how the form in (39a) would be derived in Harbour's system. Regular syntactic operations will feed root-out, cyclic Vocabulary Insertion and linearization, landing us at the stage in the derivation sketched in (40).[27]

(40) [φ → zrəq]
2
F SG

Now, the vocabulary entries in (41) will match the corresponding sub-φ-structures in (40) and both *ti* and *î* will be inserted.

(41) Harbourian Biblical Hebrew vocabulary entries

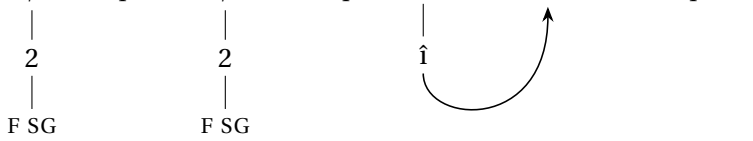
[26] Moreover, one of the strongest arguments in favor of Harbour's analysis is that it can be extended straightforwardly to account for cross-linguistic generalizations about multiple discontinuous agreement affixes "flanking" the verb.

[27] Harbour (2007: 241) hypothesizes that gender and number might be collocated at one hierarchical position in the φ-structure.

a. $\begin{bmatrix}\varphi\\ |\\ 2\end{bmatrix} \leftrightarrow ti$

b. [F SG] $\leftrightarrow \hat{\imath}$ / $\begin{bmatrix}\varphi\\ |\\ 2\\ |\\ \_\_\end{bmatrix}$

(42) [ϕ [zrəq]] ⇒ [ϕ → zrəq] ⇒ [ti → zrəq] ⇒ [ti→zrəq→î]



Crucially, however, according to the rule in (41b), this step of Vocabulary Insertion must apply while feminine singular features are still highly local to second person features. In other words, hybrid approaches which equate Fission with iterated Vocabulary Insertion assume that Vocabulary Insertion must precede displacement of gender/number features. The availability of multiple, sub-φ-exponence in these models is determined *prior* to linearization.

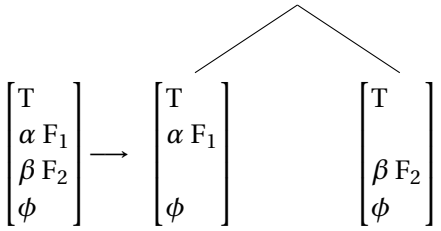
These analyses therefore make the following strong prediction: the form of displaced morphemes should never be sensitive to the context of their surface, displaced position. I will ultimately argue that this prediction is false on the basis of several examples from several Semitic languages as well as data from genetically unrelated and typologically distinct languages. This, I argue, constitutes evidence against any analysis in which Vocabulary Insertion can precede (or cooccur with) certain linearization operations (see also (Arregi and Nevins 2012: 272–273)). More generally, I will also argue against the notion implicit in previous morphological and hybrid approaches to discontinuous agreement that Fission involves the consumption of unused or undischarged features. Before I do so, however, I will sketch my Fission-based proposal for discontinuous agreement.

3 Discontinuous agreement is derived by Fission

In this section, I argue that discontinuous agreement in Semitic can be captured by adopting a slightly modified version of the operation *Fission* as defined in Arregi and Nevins (2012). On the basis of data from Basque clitics, Arregi and Nevins (2012) propose that Fission creates two positions of exponence out of a single syntactic node. This is shown in (43): Fission targets a node bearing at least two features F_1 and F_2 and splits these two features up into two separate output nodes, copying all orthogonal features (represented as ϕ) into both terminals in the process.[28]

[28] For a related, but distinct proposal, see Calabrese (2003).

(43) Structure of a Morphological Fission rule



I will refer to the copying nature of Fission as the *feature preservation* component of Fission, as stated in (44).

(44) **Feature preservation under Fission:**
Given a Fission rule $\mathscr{F}$ which targets a node X^0 bearing at least two features [αF_1] and [βF_2], all features [ϕ] on X^0 such that $\phi \neq F_1, F_2$ are copied into both output nodes.

Building on work by Harbour (2008a) and Campbell (2012), a.o., I assume that φ-feature sets have internal structure which can be directly manipulated by post-syntactic operations (see also Noyer 1992). I propose that φ-features are organized according to a (context-free) markedness hierarchy: more marked feature categories are represented higher in the φ-set in (45).[29] I submit that person is a more marked category than number, following the observation from work on the PersonP hypothesis that, in at least Semitic, Romance, and Russian, number agreement is possible without concomitant person agreement, but the opposite is not true. I will also assume without further comment that number is more marked than, and hence occurs higher in (45) than, gender, though this decision has no impact on the analysis.[30]

(45) Intercategorial hierarchy of φ-features
[Person
Number
Gender]

I also propose that markedness determines the relative height of within-category relations among features. For my analysis of the Semitic data, I adopt the binary features [±author] and [±participant] to account for the three-way person distinction present in all the languages under discussion, where [±author] is a more marked feature category than [±participant]. For number, I adopt the features [±augmented] and [±singular] to account for the three-way number distinction made in languages like Modern Standard Arabic—where augmented is more marked than singular—and [±singular] alone for languages which only distinguish singular and plural number. All the Semitic languages investigated here make a two-way gender distinction in some part of the verbal agreement paradigm, for which I adopt the binary feature [±feminine]. Possible values of

[29] Harbour (2008a: 195), on the other hand, argues that person is higher in the φ-set than number because person is semantically more abstract than number, and semantic abstractness typically increases as one moves up the tree.

[30] See Baier (2018) for arguments from anti-agreement that gender should dominate number in the φ-set, rather than the other way around.

person, number, and gender features are given in (46)–(48).

(46) Person features

a. 1st person
$\begin{bmatrix} \text{+ author} \\ \text{+ participant} \end{bmatrix}$

b. 2nd person
$\begin{bmatrix} \text{- author} \\ \text{+ participant} \end{bmatrix}$

c. 3rd person
$\begin{bmatrix} \text{- author} \\ \text{- participant} \end{bmatrix}$

(47) Number features

a. Singular
$\begin{bmatrix} \text{- augmented} \\ \text{+ singular} \end{bmatrix}$

b. Dual
$\begin{bmatrix} \text{- augmented} \\ \text{- singular} \end{bmatrix}$

c. Plural
$\begin{bmatrix} \text{+ augmented} \\ \text{- singular} \end{bmatrix}$

(48) Gender features

a. Masculine
[- feminine]

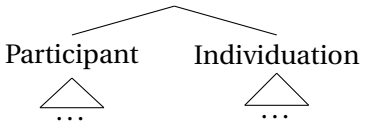
b. Feminine
[+ feminine]

The full arrangement of features that I will be assuming for my analysis of the Semitic data is given in (49).

(49) $\begin{bmatrix} \pm \text{ author} \\ \pm \text{ participant} \\ \pm \text{ augmented} \\ \pm \text{ singular} \pm \text{ feminine} \end{bmatrix}$

It is important to note that, despite superficial similarities between my hierarchicaly representation of φ-features and the feature geometries of Harley and Ritter (2002) and McGinnis (2005), there are key differences between the two. First, I do not assume that the presence of a particular φ-feature is parasitic on the presence of a node dominating that feature. There are no direct dependencies entailed by my feature structure in (49). Second, whereas Harley and Ritter and McGinnis assume that more marked features are dependents of less marked features and hence occur more deeply embedded in the geometry, more marked features in my system are higher in the φ-set. Entailment relations are thus recast from top-to-bottom in the φ-structure: [±author] is higher than [±participant] and entails it. Finally, feature geometries do not typically accord any direct relationship between person features and number features. For instance, in Harley and Ritter's system, the PARTICIPANT node (representing person features) and the INDIVIDUATION node (representing gender and number features) are direct dependents of the root node REFERRING EXPRESSION.

(50) (adapted from Harley and Ritter 2002: 486)



Without additional stipulations, this type of feature geometry cannot encode markedness relations between person and number/gender, and hence will fail to capture the implicational universals in (15), a.o. I will therefore set aside such analyses in favor of the kind of feature structure in (49).[31]

[31] My analysis also contrasts with the language-specific feature hierarchies of Lumsden and Halefom (2003), which are both extra-syntactic and highly language-specific.

Some of the strongest evidence in favor of my representation of φ-features comes from the cross-linguistically robust "person-left, number-right" generalization. According to my analysis of markedness, this generalization can be recast as follows: more marked features are consistently linearized to the left. This can be captured with the following structure-preserving rule, which I propose as an update to Arregi and Nevins' definition of Fission which ensures that the dominance relations in (49) are translated to the linear precedence preferences we see from language to language in discontinuous agreement.

(51) **Structure preservation in Fission**
Given two features F_1 and F_2 on a syntactic terminal X^0 which are targeted by a Fission rule $\mathscr{F}$, such that F_1 is higher in X^0's φ-structure than F_2, $\mathscr{F}$ linearizes F_1 to the left and F_2 to the right.

Although I will simply assume for the moment that such a principle applies equally to intercategorial and intracategorial relations among φ-features, I provide an explicit argument in Section §5.2 that Fission operations which split up number features obey the constraint in (51) when I discuss the distribution of the third feminine prefix *ta-* in Modern Standard Arabic. This addendum to Fission is arguably more explanatorily satisfactory than the language-specific Person-Number Order statements provided by Arregi and Nevins.

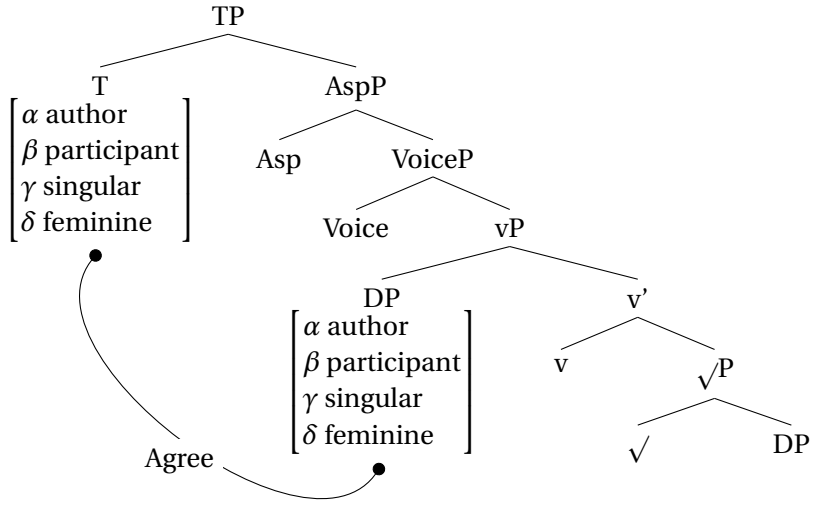
(52) Person-Number Order
Given two clitics Cl_1 and Cl_2 such that Cl_1 and Cl_2 have the same case features and Cl_2 is [–singular], Cl_1 must precede Cl_2. (Arregi and Nevins 2012: 265)

I take the more general flavor of the structures in (49) and the structure-preservation principle in (51) as a point in favor of the present analysis, since the phenomena they are designed to account for do not seem language-specific and should therefore fall out from basic principles of the system, such as interactions between Fission and feature markedness.

Before considering concrete examples of how this modified version of Fission derives discontinuous agreement, it is necessary to clarify some preliminaries. For all of the Semitic verbs to be discussed below, I assume that the clause structure looks something like that in (53). The external argument is introduced by v (see Merchant 2013, 2017), after which Voice, Asp, and T are externally merged into the structure. For ease of exposition, I will represent the φ-feature probe which is valued under Agree with the subject on T, though readers should keep in mind that this will need revising from language to language, especially when there is independent evidence that agreement with the subject winds up on other functional heads (see Kramer (2019) for the claim that this head is Asp in Amharic, and see Tucker (2011, 2013) for evidence of φ-feature agreement on Asp and T in Modern Standard Arabic and Maltese). Thus, when T (or Asp) is merged into the structure, it bears an unvalued φ-probe which triggers a search for an appropriate goal with valued, matching φ-features in

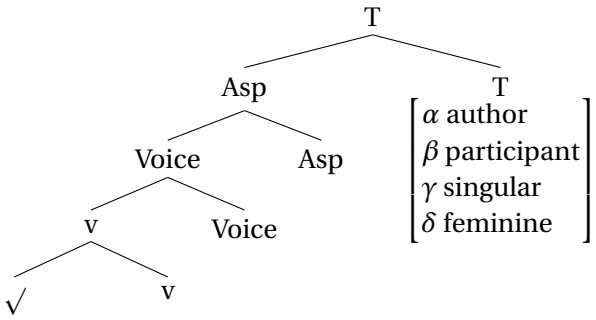
its c-command domain. T locates these features on the subject DP, valuing the probe on T.

(53) Semitic clause structure



Successive-cyclic head movement will raise the verb to T (or Asp, depending on the language), yielding a complex head (for evidence for V-to-T movement in individual Semitic languages, see e.g. Shlonsky 1997 for Modern Hebrew and Arabic, Aoun et al. 2010 for Arabic, and Harbour 2007 and Hewett 2019 for Biblical Hebrew, a.o.).

(54)



It is at this point that the structure in (54) can be sent off to the post-syntactic component where my analysis takes off.

3.1 Deriving prefix conjugation affixes

I will first consider the Ṣanʕānī Arabic prefix conjugation paradigm in (55).[32]

[32] In the interest of space, I only discuss the "basic" or "underived" template, referred to in Watson (1993: 435) as *Form I*, following the tradition of enumerating the verbal templates with roman numerals. In other templates, the forms of the agreement affixes (in particular, their vowels) may be subject to change, but the distribution of those affixes is not. The tables in (i) and (ii) summarize the variation in prefix vowels by template for Modern Standard Arabic and Old Babylonian Akkadian. All verbal forms are listed with third masculine singular agreement.

(i) Modern Standard Arabic prefix conjugation vowels

(55) Ṣanʕānī Arabic prefix conjugation $\sqrt{\text{gmbr}}$ 'sit'

	Singular	Plural
1	ʔ**a**-gambir	**ni**-gambir
2M	**ti**-gambir	**ti**-gambir-**ū**
2F	**ti**-gambir-ī	**ti**-gambir-**ayn**
3M	**yi**-gambir	**yi**-gambir-**ū**
3F	**ti**-gambir	**yi**-gambir-**ayn**

The reader may observe that in the first person singular and plural in Ṣanʕānī Arabic (as in the vast majority of Semitic languages), gender is not marked. This neutralization extends to the Ṣanʕānī Arabic suffix conjugation (see Table 2) and to the pronominal inventory.

(56) a. Ṣanʕānī Arabic nominative pronouns

	Singular	Plural
1	anā	iḥnā
2M	ant	antī
2F	antī	antayn
3M	hū	hum
3F	hī	hin

b. Ṣanʕānī Arabic possessive pronouns

	Singular	Plural
1	-ī	-nā
2M	-(a)k	-kum
2F	-(i)š	-kin
3M	-(i)h	-hum
3F	-hā	-hin

(Watson 2011)

I analyze this neutralization as a *metasyncretism*—a kind of syncretism that holds for certain feature specifications, regardless of the particular form chosen to instantiate those features. Following Harley (2008), I appeal to an Impoverishment rule which deletes the feature [±feminine] in the context of [+author, +participant] as an account of these facts.

Form	*Imperfect Active* 3.M.SG
I	ya-fʕal
II	yu-faʕʕil
III	yu-faːʕil
IV	yu-fʕil
V	ya-ta-faʕʕil
VI	ya-ta-faːʕil
VII	ya-n-faʕil
VIII	ya-f-t-aʕil
IX	ya-swadd
X	ya-sta-fʕil
Quad 1	yu-faʕlil
Quad 2	ya-ta-faʕlal

(ii) Old Babylonian Akkadian prefix conjugation vowels (Huehnergard 2011: 623)

Form	*Preterite* 3.M.SG
I	i-prus
II	u-parras
IV	u-ša-pris
V	u-p-t-arris
VII	i-p-paris
VIII	i-p-t-aras
X	u-šta-pris

(57) First person gender impoverishment

$$\begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \\ \pm \text{ feminine} \end{bmatrix} \longrightarrow \begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \end{bmatrix}$$

Thus, the first person singular and plural will be realized by the vocabulary entries in (58) after the impoverishment rule in (57) has applied (I assume the prefix conjugation agreement occurs on a T^0 which bears a [–past] feature).

(58) Vocabulary entries for first person prefixes in Ṣanʕānī Arabic

a. $\begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \\ \text{+ singular} \\ \text{– past} \end{bmatrix} \leftrightarrow ʔa$ (1st singular)

b. $\begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \\ \text{– singular} \\ \text{– past} \end{bmatrix} \leftrightarrow ni$ (1st plural)

In contrast to the monomorphemic first person agreement affixes, agreement in the second and third person in (55) is often discontinuous. The exceptions are the second person masculine singular, and third person masculine and feminine singular forms. However, whereas the second and third person masculine singular forms contain regular person prefixes (*ti* for the second person, *yi* for the third person), third feminine singular agreement consists solely of the prefix *ti*. Harbour (2008b) has convincingly argued on synchronic and diachronic grounds from several Semitic languages that this prefix is just one instance of a more general *t* affix which marks feminine gender throughout Semitic.[33] For instance, Modern Hebrew present tense (*Benoni*) forms show agreement for gender and number but not for person. The feminine singular ending *et* (and indeed the feminine plural ending *ot*) strikingly contains a *t*.

(59) Modern Hebrew present tense agreement, $\sqrt{\text{sgr}}$ 'close'

	Singular	Plural
Masc	soger	sogr-im
Fem	soger-**et**	sogr-ot

(60) a. Masculine singular
{ani / ata / hu} soger-∅ et ha-delet
{1.SG / 2.M.SG / 3.M.SG} close.PRES-M.SG ACC the-door
'I am/you (m.sg.) are/he is closing the door.'

b. Feminine singular
{ani / at / hi} soger-**et** et ha-delet
{1.SG / 2.F.SG / 3.F.SG} close.PRES-F.SG ACC the-door
'I am/you (f.sg.) are/she is closing the door.'

[33] See Hasselbach (2014a,b) for historical comparative data on gender marking in the nominal and verbal domains throughout the Semitic language family.

Likewise, a certain class of adjectives whose stems end in *-i* (an ending referred to as *nisbe* or *nisba* in the Semitic specialist literature, after the term *yā' an-nisba* '*y/i* of attribution' from the Arab grammarian tradition) regularly end in *t* when inflected for feminine gender.

(61) a. *ivri~ivri**t*** 'Hebrew.M.SG~F.SG'
b. *'acbani~'acbani**t*** 'nervous.M.SG~F.SG' (Harbour 2008b: 82)

Third feminine singular agreement in the suffix conjugation is also systematically marked by an affix containing *t* across Semitic.[34] The suffix conjugation paradigms from Syriac[35] (a dialect of Late Aramaic) and Tigrinya (Semitic, Ethiopia) suffice to illustrate this pattern.

(62) Syriac suffix conjugation $\sqrt{\text{qṭl}}$ 'kill'

	Singular	Plural
1	qeṭl-eθ	qṭal-n
2M	qṭal-t	qṭal-ton
2F	qṭal-t	qṭal-ten
3M	qṭal	qṭal
3F	qeṭl-**a**θ	qṭal

(Pat-El 2019: 663)

(63) Tigrinya suffix conjugation $\sqrt{\text{ngr}}$ 'say'

	Singular	Plural
1	nəgər-ku	nəgər-na
2M	nəgər-ka	nəgər-kum
2F	nəgər-ki	nəgər-kin
3M	nəgər-ə	nəgər-u
3F	nəgər-ə**t**	nəgər-a

(Bulakh 2019: 187)

I conclude that there is a *-t-* affix throughout Semitic which realizes at least [+feminine], and which may in some cases also realize number features (e.g. [+singular]), but which does not realize person features. In order to prevent any person-related exponent from appearing in third feminine singular verbal forms, I posit another impoverishment rule which deletes the feature [–author] in a T^0 morpheme specified as [–participant, +singular, +feminine].[36]

(64) Third feminine singular author impoverishment

$$\begin{bmatrix} \text{T} \\ \text{– author} \\ \text{– participant} \\ \text{+ singular} \\ \text{+ feminine} \end{bmatrix} \longrightarrow \begin{bmatrix} \text{T} \\ \\ \text{– participant} \\ \text{+ singular} \\ \text{+ feminine} \end{bmatrix}$$

The vocabulary entry in (65) will then match the post-impoverishment feature bundle, correctly deriving the prefix *ti* for third feminine singular agreement. This derivation is sketched in (66).

[34] See Harbour (2008b: 87–90) on allomorphy of the third feminine singular suffix in Hebrew and Aramaic that can obscure this fact.

[35] /θ/ is a post-vocalic allophone of /t/ in Syriac. Post-vocalic fricativization is common among Northwest Semitic languages, including Hebrew and pre-modern dialects of Aramaic.

[36] In principle, this impoverishment rule could also delete [α participant] features, though I state the rule as in (64) since it is structurally simpler and still captures the fact that third person feminine feminine (and dual) will not undergo non-author Fission.

(65) Vocabulary entry for feminine singular in Ṣanʕānī Arabic

$$\begin{bmatrix} \text{T} \\ \text{+ singular} \\ \text{+ feminine} \\ \text{- past} \end{bmatrix} \leftrightarrow ti$$

(66) Derivation of third feminine singular agreement

$$\begin{bmatrix} \text{T} \\ \text{- author} \\ \text{- participant} \\ \text{+ singular} \\ \text{+ feminine} \\ \text{- past} \end{bmatrix} \xrightarrow[\text{by (64)}]{\text{Impoverishment}} \begin{bmatrix} \text{T} \\ \\ \text{- participant} \\ \text{+ singular} \\ \text{+ feminine} \\ \text{- past} \end{bmatrix} \xrightarrow[\text{by (65)}]{\text{Vocabulary Insertion}} ti$$

The remainder of the cells in the Ṣanʕānī Arabic prefix conjugation paradigm are marked either by a combination of both prefixes and suffixes (second person feminine singular and second and third person plural), or by regular person-marking prefixes (second and third person masculine singular). I account for these forms by proposing that a post-syntactic Fission rule splits up the features [-author] and [αsingular]. Features split up by Fission are boxed throughout the remainder of the paper as an aid to the reader.

(67) Semitic non-author Fission rule

$$\begin{bmatrix} \text{T} \\ \boxed{\text{- author}} \\ \boxed{\alpha \text{ singular}} \\ \phi \end{bmatrix} \longrightarrow \begin{bmatrix} \text{T} \\ \boxed{\text{- author}} \\ \\ \phi \end{bmatrix} \begin{bmatrix} \text{T} \\ \\ \boxed{\alpha \text{ singular}} \\ \phi \end{bmatrix}$$

Thus, Fission will produce discontinuous agreement in the second and third person unless a more specific rule can apply and block non-author Fission. I argue that this is precisely what happens in deriving the shape of third feminine singular agreement affixes. The impoverishment rule in (64) is hypothesized to occur *prior to* the Fission operation in (67). Since the aforementioned impoverishment rule is specified to delete the feature [-author], the structural description for Fission—namely, a T^0 morpheme bearing the features [-author] and [αsingular]—will not be met, and Fission will be prevented from applying. I therefore assume the following schematic order of operations:

(68) **Order of post-syntactic operations** (to be revised)
Impoverishment → Fission → Vocabulary Insertion

All other second and third person forms will be subject to this rule, however. Below I provide explicit vocabulary entries and derivations for each of the remaining agreement affixes from (55).

(69) Vocabulary entries for second and third person agreement in the Ṣanʕānī Arabic prefix conjugation

a. $\begin{bmatrix} \text{T} \\ \text{– author} \\ \text{+ participant} \\ \text{– past} \end{bmatrix} \leftrightarrow ti$ (2)[37]

b. $\begin{bmatrix} \text{T} \\ \text{– past} \end{bmatrix} \leftrightarrow yi$ (3)[38]

c. $\begin{bmatrix} \text{T} \\ \text{+ participant} \\ \text{+ singular} \\ \text{+ feminine} \\ \text{– past} \end{bmatrix} \leftrightarrow \bar{\imath}$ (2.f.sg)

d. $\begin{bmatrix} \text{T} \\ \text{– singular} \\ \text{+ feminine} \\ \text{– past} \end{bmatrix} \leftrightarrow ayn$ (f.pl)

e. $\begin{bmatrix} \text{T} \\ \text{+ singular} \\ \text{– past} \end{bmatrix} \leftrightarrow \varnothing$ (m.sg)

f. $\begin{bmatrix} \text{T} \\ \text{– singular} \\ \text{– past} \end{bmatrix} \leftrightarrow \bar{u}$ (m.pl)

(70) Derivations for second and third person prefix conjugation agreement

a. Second masculine singular

$$\begin{bmatrix} \text{T} \\ \boxed{\text{– author}} \\ \text{+ participant} \\ \boxed{\text{+ singular}} \\ \text{– feminine} \\ \text{– past} \end{bmatrix} \xrightarrow[\text{by (67)}]{\text{Fission}} \left[\begin{bmatrix} \text{T} \\ \boxed{\text{– author}} \\ \text{+ participant} \\ \\ \text{– feminine} \\ \text{– past} \end{bmatrix} \begin{bmatrix} \text{T} \\ \\ \text{+ participant} \\ \boxed{\text{+ singular}} \\ \text{– feminine} \\ \text{– past} \end{bmatrix}\right] \xrightarrow[\text{by (69a), (69e)}]{\text{Vocabulary Insertion}}$$

$$\left[\begin{bmatrix} \text{T} \\ \text{– author} \\ \text{+ participant} \\ \\ \text{– feminine} \\ \text{– past} \end{bmatrix} \begin{bmatrix} \text{T} \\ \\ \text{+ participant} \\ \text{+ singular} \\ \text{– feminine} \\ \text{– past} \end{bmatrix}\right]$$

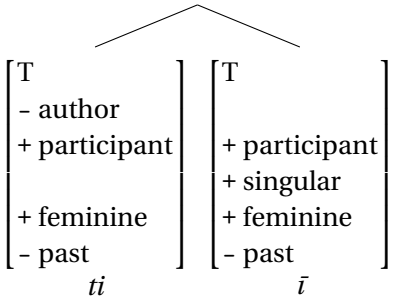
ti ∅

b. Second feminine singular

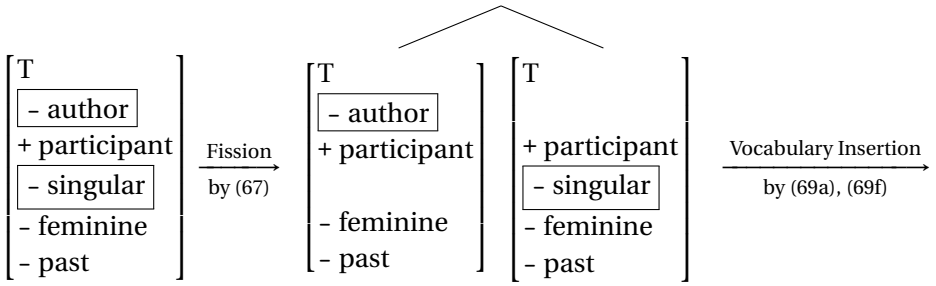
$$\begin{bmatrix} \text{T} \\ \boxed{\text{– author}} \\ \text{+ participant} \\ \boxed{\text{+ singular}} \\ \text{+ feminine} \\ \text{– past} \end{bmatrix} \xrightarrow[\text{by (67)}]{\text{Fission}} \left[\begin{bmatrix} \text{T} \\ \boxed{\text{– author}} \\ \text{+ participant} \\ \\ \text{+ feminine} \\ \text{– past} \end{bmatrix} \begin{bmatrix} \text{T} \\ \\ \text{+ participant} \\ \boxed{\text{+ singular}} \\ \text{+ feminine} \\ \text{– past} \end{bmatrix}\right] \xrightarrow[\text{by (69a), (69c)}]{\text{Vocabulary Insertion}}$$

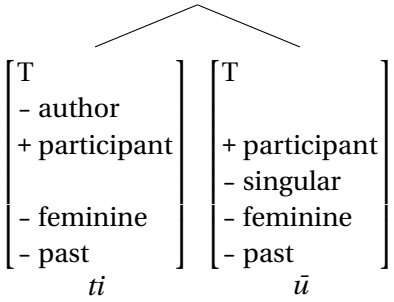
[37] In line with Harbour (2008b) and the discussion above on the feminine *t* across Semitic, I assume that there are two homophonous *ti* prefixes in Ṣanʕānī Arabic: one realizing [+singular, +feminine] features and one realizing [–author, +participant] features.

[38] I assume that the third person prefix *yi* is a radical elsewhere form, inserted when no more specific vocabulary entry can apply in accordance with the Subset Principle (see Halle 2000: 128).

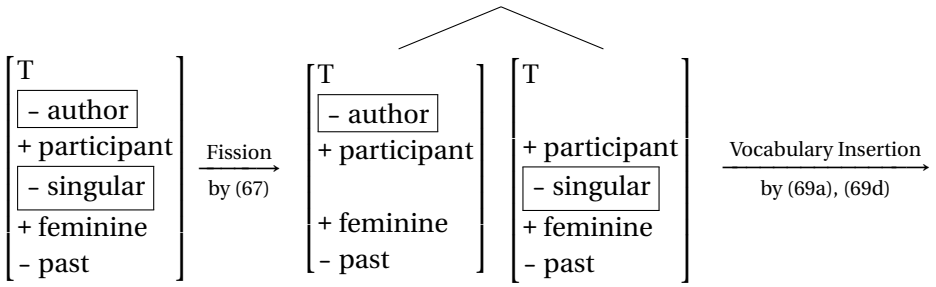


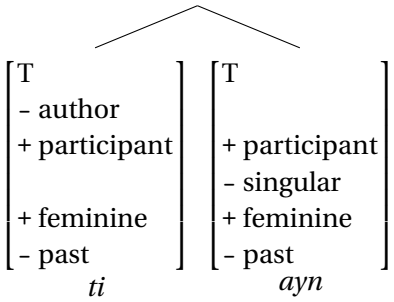
c. Second masculine plural



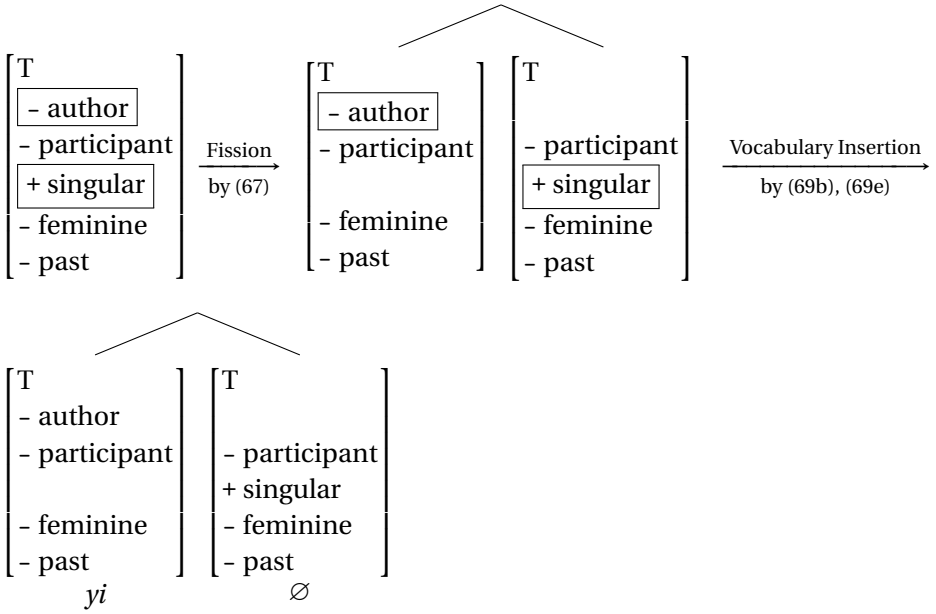


d. Second feminine plural

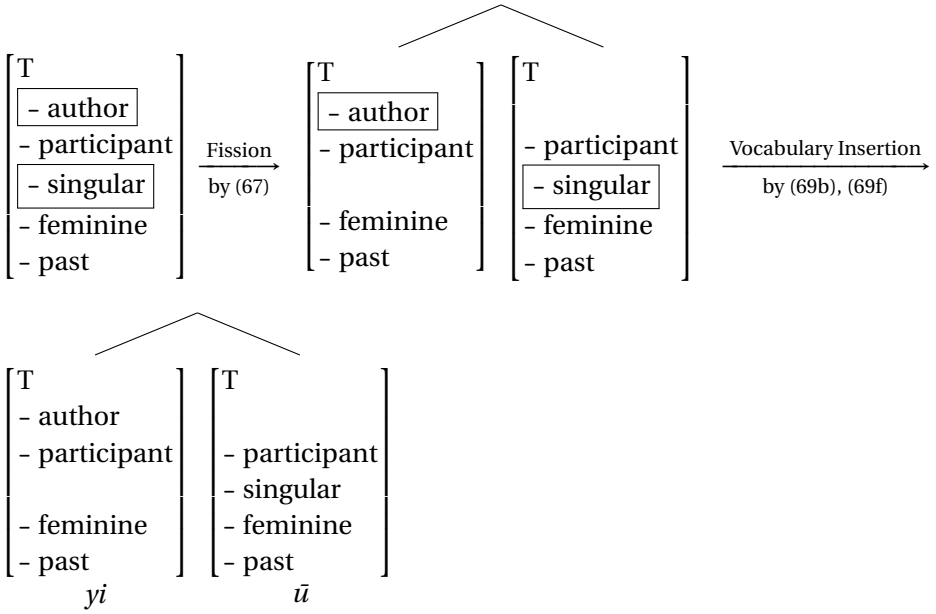




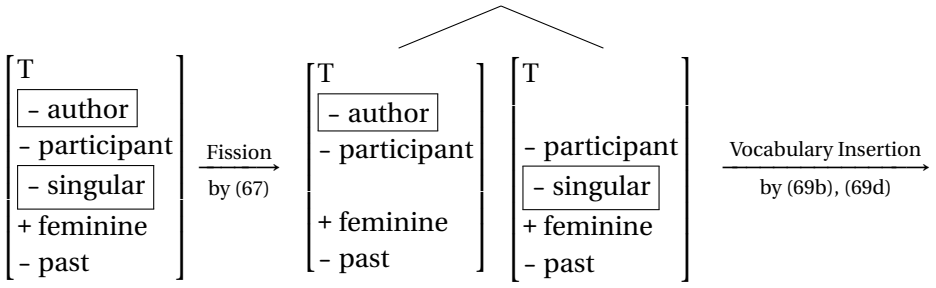
e. Third masculine singular

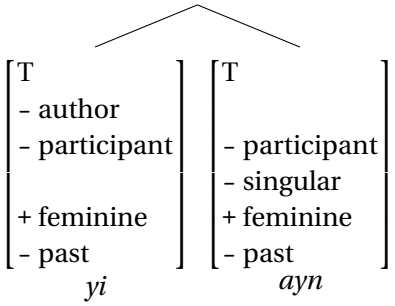


f. Third masculine plural



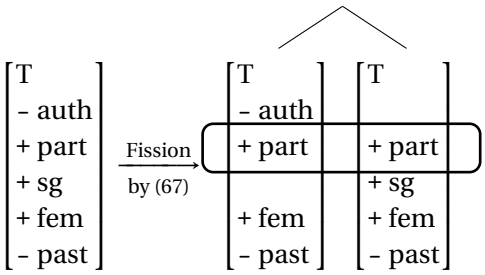
g. Third feminine plural





Before moving on, I would like to note one innovation of this analysis which distinguishes it from previous accounts of discontinuous agreement (see also Arregi and Nevins 2012). By hypothesis, Fission only splits up the features it targets in the input morpheme; all other features are copied into both output nodes. This property is what I referred to as Feature Preservation under Fission in (44). Feature copying predicts the existence of so-called impure discontinuities which appear to involve multiple exponence of a single feature. Take the second feminine singular form *ti-gambir-ī* and the derivation in (70b). After Fission, both terminals bear the feature [+participant] inherited from the input morpheme. This is shown in (71).

(71) Second feminine singular: *ti-gambir-ī* 'you (f.sg) will sit'



During Vocabulary Insertion, then, the maximally specific vocabulary entries which can now match the features of the leftmost and rightmost fissioned terminals are (69a) and (69c), respectively. Importantly, both of the chosen vocabulary entries match the feature [+participant]. In other words, impure discontinuities constitute true multiple exponence under this account, and are not the product of contextual allomorphy as they have been argued to be in many previous analyses of Semitic discontinuous agreement. I will argue below that analyzing impure discontinuities as the product of contextual allomorphy fails to predict that fissioned morphemes can exhibit sensitivity in form to their surface, displaced position. The fact that we do find such allomorphy attested across the Semitic language family provides strong support for the formalization of Fission adopted here.

3.2 Deriving suffix conjugation affixes

Similar combinations of operations can be used to derive the agreement affixes in the Ṣanʕānī Arabic suffix conjugation paradigm in (72). As the reader may observe, I depart from analyses which assign each of these affixes a monomorphemic parse (see Halle 2000) and propose that the suffixes can be decomposed into two affixes, just as the prefix conjugation forms are often transparently composed of two affixes (see Banksira (1999); Fassi Fehri (2000), and Lumsden and Halefom (2003) for other decompositional approaches to the suffix conjugation, though their analytical conclusions differ greatly from one another and from the analysis presented here).

(72) Ṣanʕānī Arabic suffix conjugation $\sqrt{\text{gmbr}}$ 'sit'

	Singular	Plural
1	gambar-**t**	gambar-**nā**
2M	gambar-**t**-∅	gambar-**t-ū**
2F	gambar-**t-ī**	gambar-**t-ayn**
3M	gambar-∅-∅	gambar-∅-**ū**
3F	gambar-**at**	gambar-∅-**ayn**

A cursory survey of the forms of the suffix conjugation agreement affixes and comparison with the prefix conjugation morphemes provides provisional support for this conclusion: every second person cell contains *t*, just as in the prefix conjugation, and all of the prefix conjugation suffixes (namely, *ī*, *ū*, and *ayn*) are attested as the rightmost component of the suffix conjugation agreement. I will henceforth assume that this decompositional analysis is tenable and worth investigating in the present Fission-based framework.

As in the prefix conjugation, the first person suffix conjugation forms are unmarked for gender, and the feminine suffix is the general Semitic *t* (*modulo* the associated vowel) which typically marks feminine singular agreement. I account for these patterns by proposing that the first person gender Impoverishment rule in (73) and the third feminine singular author Impoverishment rule in (74) apply equally in the suffix and prefix conjugations. I implement this intuition technically by leaving the Impoverishment rules underspecified with respect to the tense feature on T.

(73) First person gender impoverishment (repeated from (57))

$$\begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \\ \pm \text{ feminine} \end{bmatrix} \longrightarrow \begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \\ \end{bmatrix}$$

(74) Third feminine singular author impoverishment (repeated from (64))

$$\begin{bmatrix} \text{T} \\ \text{– author} \\ \text{– participant} \\ \text{+ singular} \\ \text{+ feminine} \end{bmatrix} \longrightarrow \begin{bmatrix} \text{T} \\ \\ \text{– participant} \\ \text{+ singular} \\ \text{+ feminine} \end{bmatrix}$$

These Impoverishment rules will then feed Vocabulary Insertion, at which point the vocabulary entries in (75)–(76) will be selected as the most optimal candidates.

(75) Vocabulary entries for first person suffixes in Ṣanʕānī Arabic

a. $\begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \\ \text{+ singular} \\ \text{+ past} \end{bmatrix} \leftrightarrow t$ (1st singular)

b. $\begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \\ \text{– singular} \\ \text{+ past} \end{bmatrix} \leftrightarrow nā$ (1st plural)

(76) Vocabulary entry for the feminine singular suffix in Ṣanʕānī Arabic

$\begin{bmatrix} \text{T} \\ \text{+ singular} \\ \text{+ feminine} \\ \text{+ past} \end{bmatrix} \leftrightarrow at$ (3rd feminine singular)

For all other person-number-gender combinations, I propose that non-author Fission applies, yielding discontinuous (but not discontiguous, in this case) agreement. The full set of vocabulary entries I posit for each cell exhibiting discontinuous agreement in (72) and derivations for each of these forms are given below. Note that there is significant overlap between the exponents of the suffix conjugation and of the prefix conjugation in Ṣanʕānī Arabic, lending some support to my decompositional analysis of these agreement suffixes.

(77) Vocabulary entries for second and third person agreement in the Ṣanʕānī Arabic suffix conjugation

a. $\begin{bmatrix} \text{T} \\ \text{– author} \\ \text{+ participant} \\ \text{+ past} \end{bmatrix} \leftrightarrow t$ (2)

b. $\begin{bmatrix} \text{T} \\ \text{+ past} \end{bmatrix} \leftrightarrow \varnothing$ (3)

c. $\begin{bmatrix} \text{T} \\ \text{+ participant} \\ \text{+ singular} \\ \text{+ feminine} \\ \text{+ past} \end{bmatrix} \leftrightarrow \bar{\imath}$ (2.f.sg)

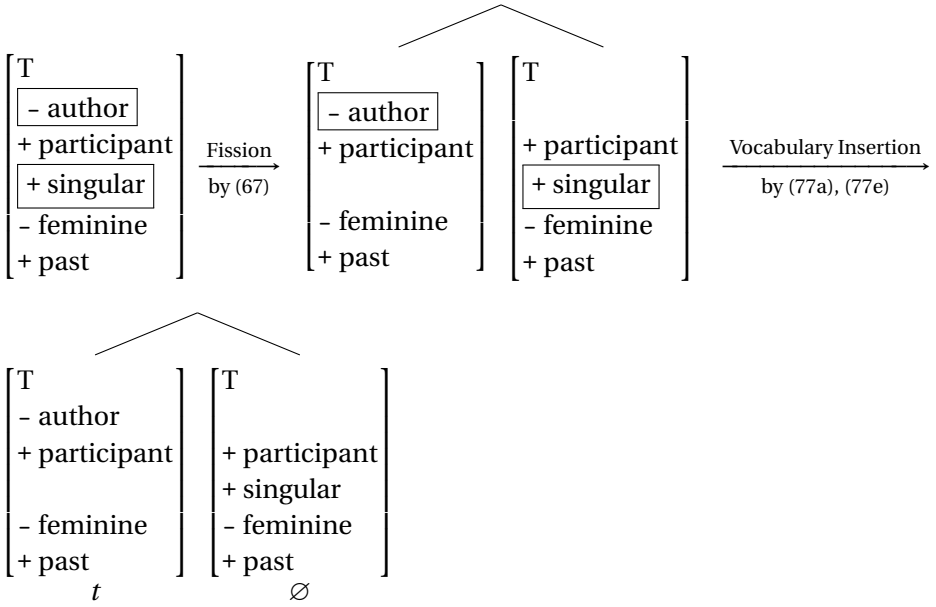
d. $\begin{bmatrix} \text{T} \\ \text{– singular} \\ \text{+ feminine} \\ \text{+ past} \end{bmatrix} \leftrightarrow ayn$ (f.pl)

e. $\begin{bmatrix} \text{T} \\ \text{+ singular} \\ \text{+ past} \end{bmatrix} \leftrightarrow \varnothing$ (m.sg)

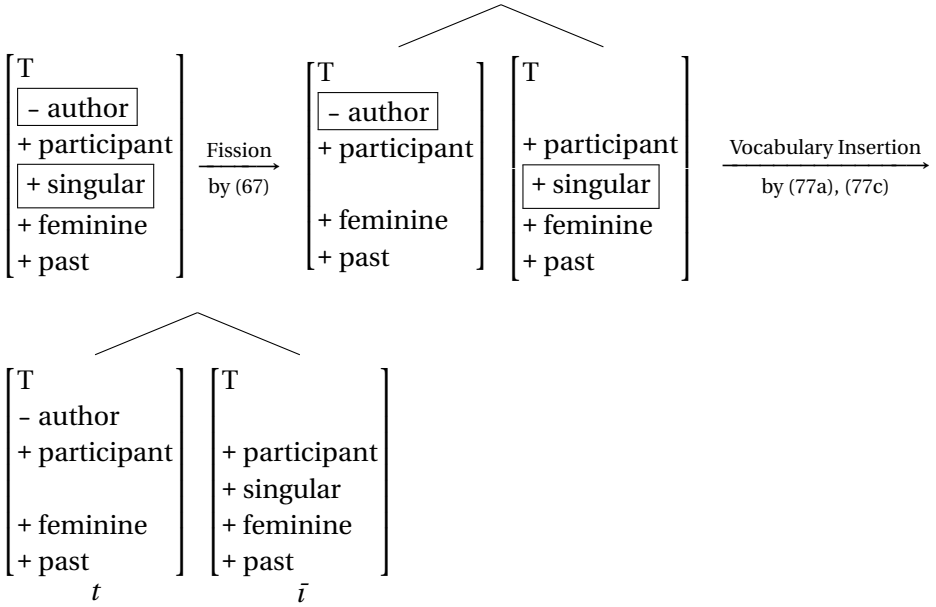
f. $\begin{bmatrix} \text{T} \\ \text{– singular} \\ \text{+ past} \end{bmatrix} \leftrightarrow \bar{u}$ (m.pl)

(78) Derivations for second and third person suffix conjugation agreement

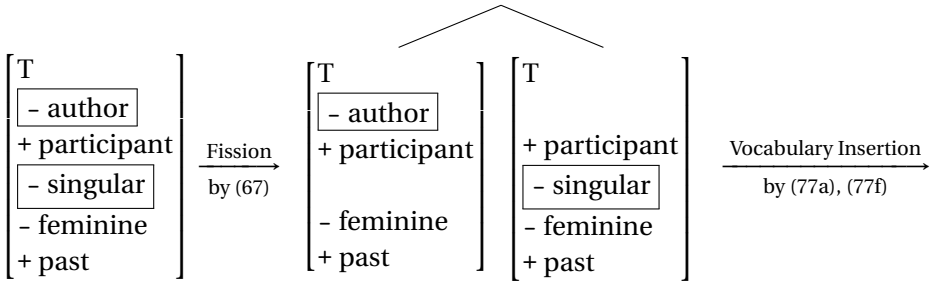
a. Second masculine singular

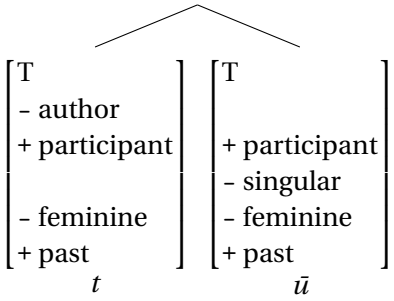


b. Second feminine singular

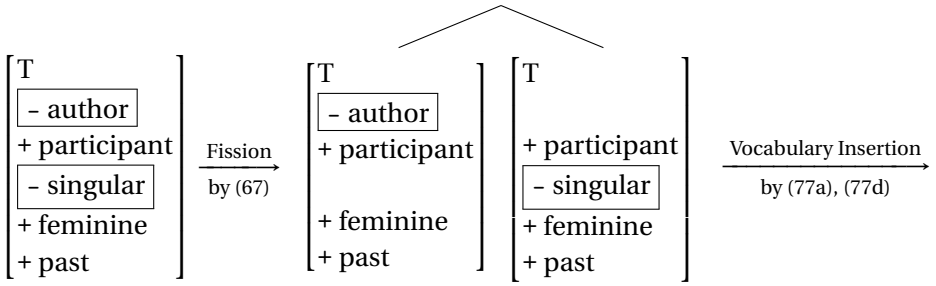


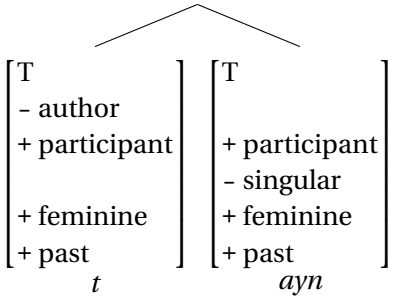
c. Second masculine plural



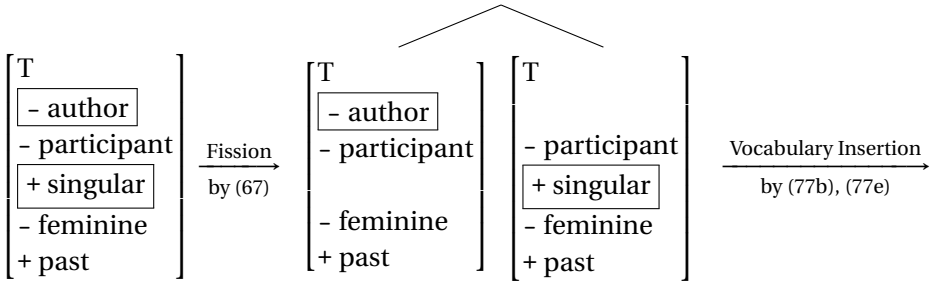


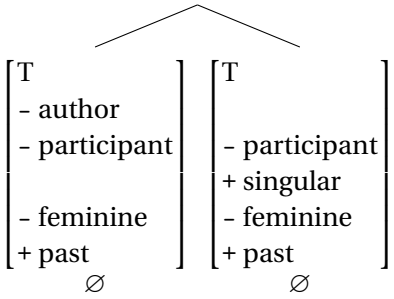
d. Second feminine plural



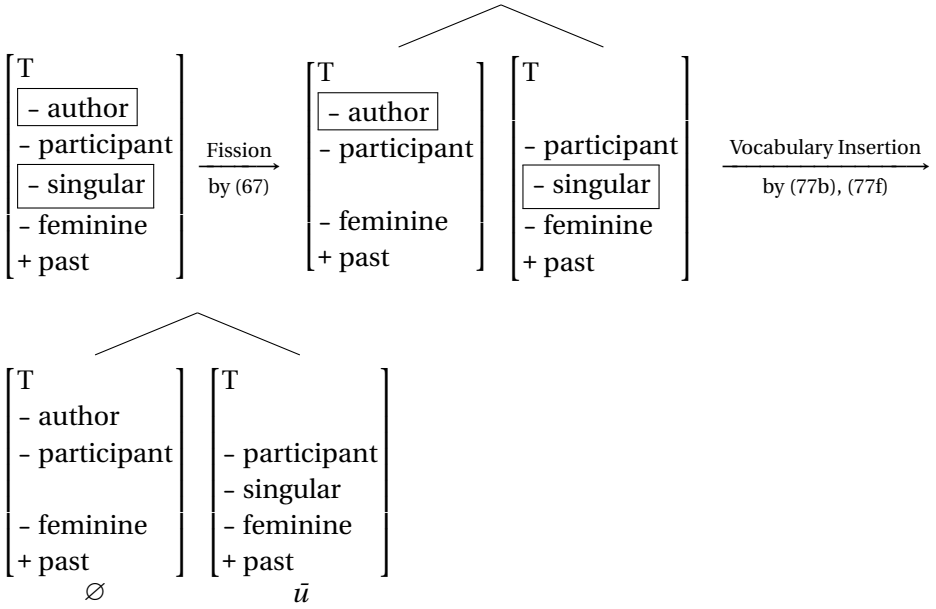


e. Third masculine singular

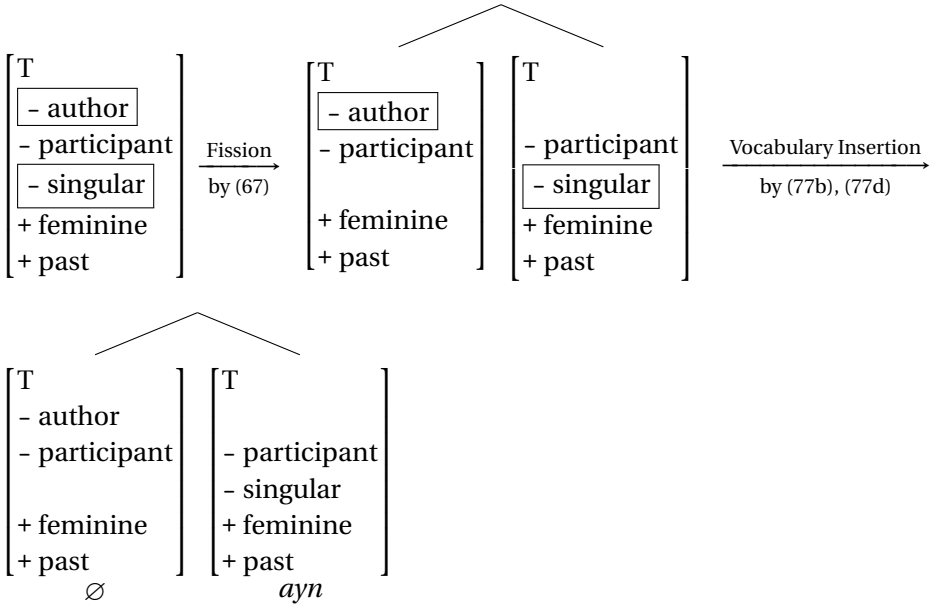




f. Third masculine plural



g. Third feminine plural



Summarizing this section so far, then, I have derived the forms of all of the prefix and suffix conjugation agreement morphemes in Ṣanʕānī Arabic, and have done so with only a handful of post-syntactic operations. Two Impoverishment rules were hypothesized to apply first, deleting certain, contextually marked features in a derivation with first person agreement or third feminine singular agreement. The third feminine singular author impoverishment rule, in turn, bled application of the non-author Fission rule, accounting for why third feminine singular agreement never surfaces discontinuously. All other agreement was taken to be underlyingly discontinuous, split up by the aforementioned Fission operation. Although the discussion has centered on Ṣanʕānī Arabic, the analysis can be straightforwardly extended to other Semitic languages, where microvari-

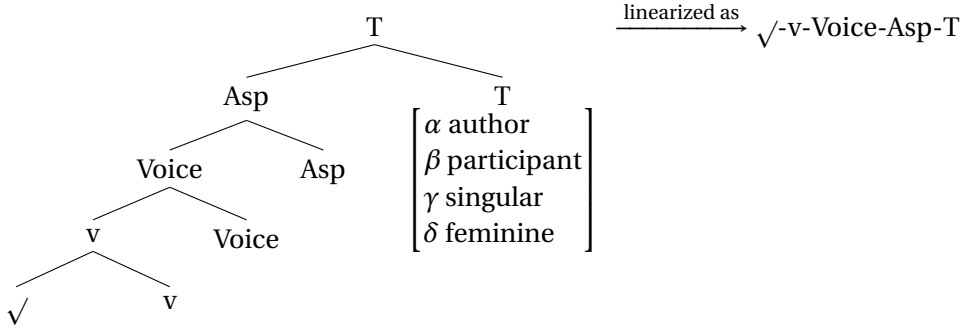
ation can often be attributed to the relative degree to which a language exhibits syncretism in its paradigms (compare, for instance the Moroccan Arabic prefix conjugation forms in Table 1, where gender marking has been neutralized to the masculine form in the second person). In two later sections, I will show how the analysis can be extended to account for two issues in particular: variation in the form of first person plural agreement across Semitic, and the form of third feminine dual agreement in Modern Standard Arabic. For now, however, the final puzzle to be explained is how these morphemes get in the right order with respect to the stem. This is the topic of the next section.

3.3 Metathesis and linearizing agreement

The final question to be answered in my analysis is how prefixes end up as prefixes, and suffixes as suffixes; in other words, what derives the difference between the prefix and suffix conjugations. Recall that purely syntactic analyses in the vein of the PersonP hypothesis took variable affix placement to indicate verb movement to different heights in the clause. However, I have rejected this proposal on a number of grounds, and I will instead pursue a hybrid account in which complex X^0's bearing φ-agreement are the ouput of syntactic structure-building and are the input to post-syntactic operations. These operations then determine the ordering of those complex X^0s and their pieces.

I have been assuming that Semitic verbs quite generally have the form of the complex head in (79) (repeated from (54)). Reading the linear order of morphemes directly off of this complex head predicts that agreement morphemes should be consistently linearized to the right of the verb, *ceteris paribus*.

(79)



We need not say anything else to derive the suffix conjugation in Semitic: T, and therefore all φ-agreement with the subject, with or without Fission, is suffixal. Therefore, it appears that the suffix conjugation is synchronically simpler, derived by the inventory of syntactic and post-syntactic operations presented so far.[39]

[39] It is interesting to note in this regard that the suffix conjugation can formally be reconstructed for the Afroasiatic language phylum, being formally attested in Semitic, Egyptian, Berber, and likely Cushitic for stative or resultative predicates (Hetzron 2003: 548; Gragg 2019: 36). The prefix conjugation is more problematic, being attested only in Semitic, Berber, and Cushitic, and not in Egyptian, Omotic, or Chadic. Therefore, it is at least a possibility that the prefix conjugation constitutes an innovation in a sub-branch of

In order to account for the presence of prefixes in the prefix conjugation, I adopt the analysis of morphological *Metathesis* laid out in Arregi and Nevins (2012: chap. 5) using the formalization of Generalized Reduplication proposed in (Harris and Halle 2005). The Generalized Reduplication framework was designed to account for instances of full and partial reduplication in morphology, thereby unifying morphological *metathesis* and *doubling*. This is desirable in light of Haselpemath's (1993) observation that doubling often precedes metathesis in the diachronic "externalization of inflection".[40] The following brief explication of the Generalized Reduplication formalism draws heavily on the discussion in Arregi and Nevins (2018: 630–632).

Reduplication is argued to involve the repetition of contiguous sequences of elements from the base within a locally defined domain. The domain of reduplication is formally demarcated by square brackets [...]. Partial reduplication arises when only some of the copied material is deleted. I follow Arregi and Nevins' (2018: 630–631) use of angle brackets to indicate the direction and position of deletion, which differs slightly from the original proposal in Harris and Halle (2005).

(80) Partial Reduplication
   a. Repeat all material inside [...]:
      [A B] → ABAB
   b. Delete the material after ⟩ in the second copy, doubling of A:
      [A ⟩ B] → ABA
   c. Delete the material before ⟨ in the first copy, doubling of B:
      [A ⟨ B] → BAB

Combining the angle brackets in a single rule gives rise to wholesale metathesis of the targeted sequence.

(81) Metathesis of A and B
   [A ⟩⟨ B] → BA

Thus, partial reduplication (i.e. doubling) and metathesis differ only in the presence or absence of a single angle bracket.

Returning to the Semitic data, I propose the metathesis rule in (82) to account for the presence of a

Afroasiatic–a possibility which would accord nicely with my treatment of the suffix conjugation as formally simpler. Furthermore, there is accumulating evidence from many languages that split ergativity and agreement reversal can be accounted for by positing an additional φ-probe in the imperfective aspect, over and against the perfective aspect (see Coon 2010; Kalin and van Urk 2015). The suffix conjugation marks past tense or perfective aspect in the majority of Semitic languages, supporting the view that the suffix conjugation is less complex than the prefix conjugation.

[40] Haspelmath notes, for instance, that the Latin word *ipse* 'self' can be diachronically decomposed into a demonstrative *is* which inflected regularly for case, number, and gender, and an invariant suffix *pse*. From Pre-Classical Latin to Classical Latin, however, case morphology gradually migrated outward, first being marked on both the demonstrative stem and on the suffix, and finally only being marked at the right edge of the word.

(i) Pre-Classical Latin *ea-**m**-pse* (f.sg.acc) > *ea-**m**-ps-**am*** > Classical Latin *i-ps-**am***

prefix throughout the prefix conjugation. I will assume throughout what follows that the input sequence of morphemes has already been assigned some default linear order. In all the relevant cases, I take this order to be the Mirror-Principle obeying order represented in the complex T head in (79). I also follow Arregi and Nevins (2012) and define this Metathesis rule in terms of a structural description and a structural change.[41]

(82) Long-distance Metathesis
  a. Structural description: $[_{T^{0max}}\ \sqrt{}$ v Voice Asp $T_{[-past]}$
  b. Structural change:
    i. Insert [to the immediate left of $\sqrt{}$, and] to the immediate right of $T_{[-past]}$.
    ii. Insert ⟩⟨ to the immediate left of $T_{[-past]}$.

The effect of this rule is (1) to copy the verb stem and a right-adjacent T terminal specified as [-past], and (2) to delete the verb in the first copy and the T terminal in the second copy. The presence of the morphological boundary in the structural description ensures that this Metathesis rule will only apply once: once Metathesis has occured, the verb stem (in particular, the verb root) will no longer be initial within T^{0max}, and the structural description for Metathesis to apply again will not be met.[42]

This rule will apply regardless of whether or not Fission has previously applied to T. If Fission has not applied, as in the case of the first person singular prefix conjugation form in Ṣanʕānī Arabic, Long-distance Metathesis will displace T to the left of the verb.

(83) Displacement of non-fissioned T: ʔ*a-gambir* 'I will sit'[43]

[41] As with the proposed Impoverishment and Fission rules, this Metathesis rule will need to be slightly altered in order to capture those languages for which φ-probes have been argued to be located on Asp, instead of T. In those cases, Metathesis will be licensed by the presence of an Asp head bearing a categorial feature [-perfective], or the like.

[42] In the system of Arregi and Nevins (2012, 2018), morphological metathesis, like most other post-syntactic operations, is motivated by a morphotactic constraint in the grammar. Metathesis operations are hypothesized to apply within the *Linear Operations* module of the post-syntactic component, and are therefore subject to morphotactic constraints which hold at this derivational stage. My analysis could be adapted to such a system by positing the following morphotactic constraint which requires a T terminal marked as [-past] to be initial within a specific domain: namely, within the complex T head (referred to here as T^{0max}, but also known in the literature as an *M*-word) (see Arregi and Nevins 2012).

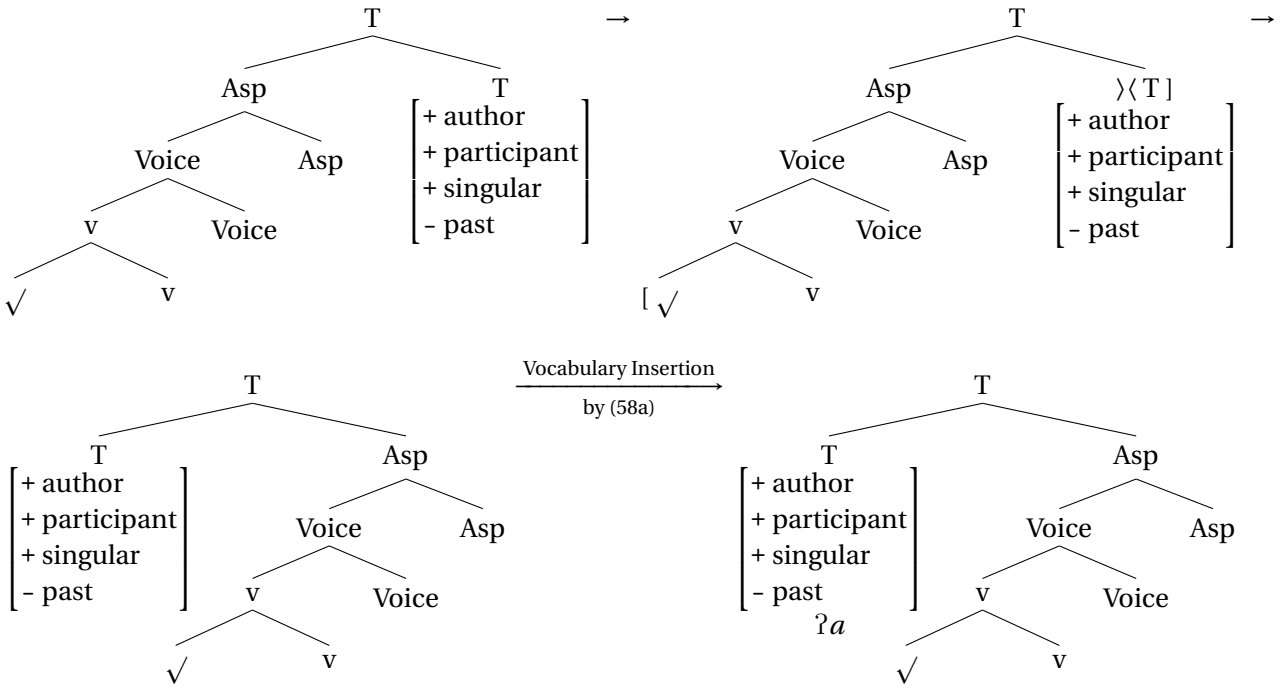
(i) **T-initiality**
Terminal $T_{[-past]}$ must be initial within T^{0max}.

This constraint could also be amended to block Metathesis of both fissioned T terminals by targeting the T node which immediately dominates the two fissioned T^0s with some notion of minimal compliance in rule application: essentially, application of a rule such as Long-distance Metathesis must alter the least amount of structure possible to comply with the constraint in (i). Following Arregi and Nevins (2012: 324), I will assume the following structure preservation principle:

(ii) **Minimal Structure Change**
Application of a linear rule *R* alters hierarchical relations in order to minimally satisfy all blocking constraints and the constraint that triggers *R*, if any.

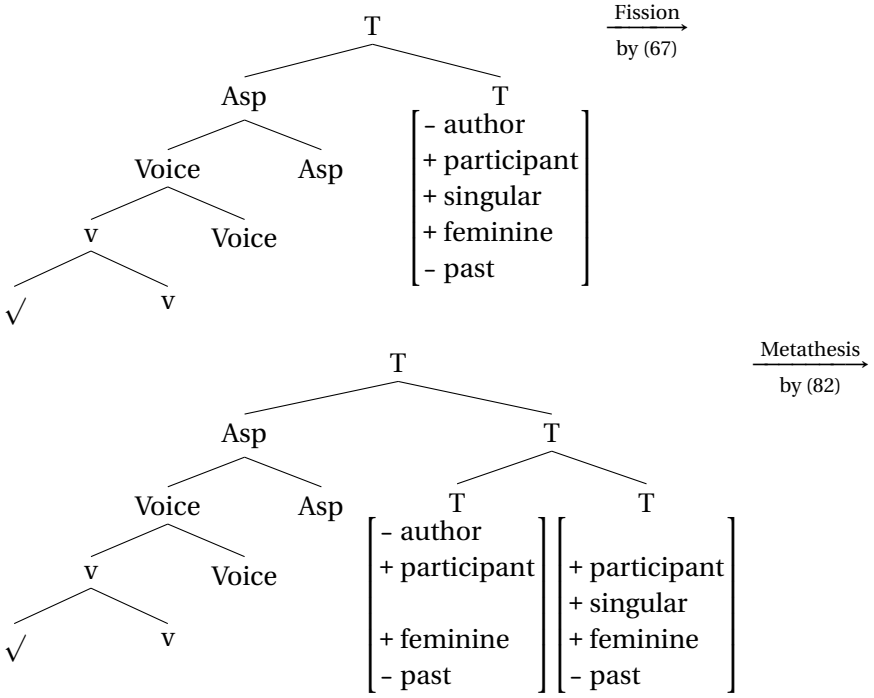
Metathesizing (or doubling) the leftmost T^0 node will minimally satisfy T-initiality in (i).

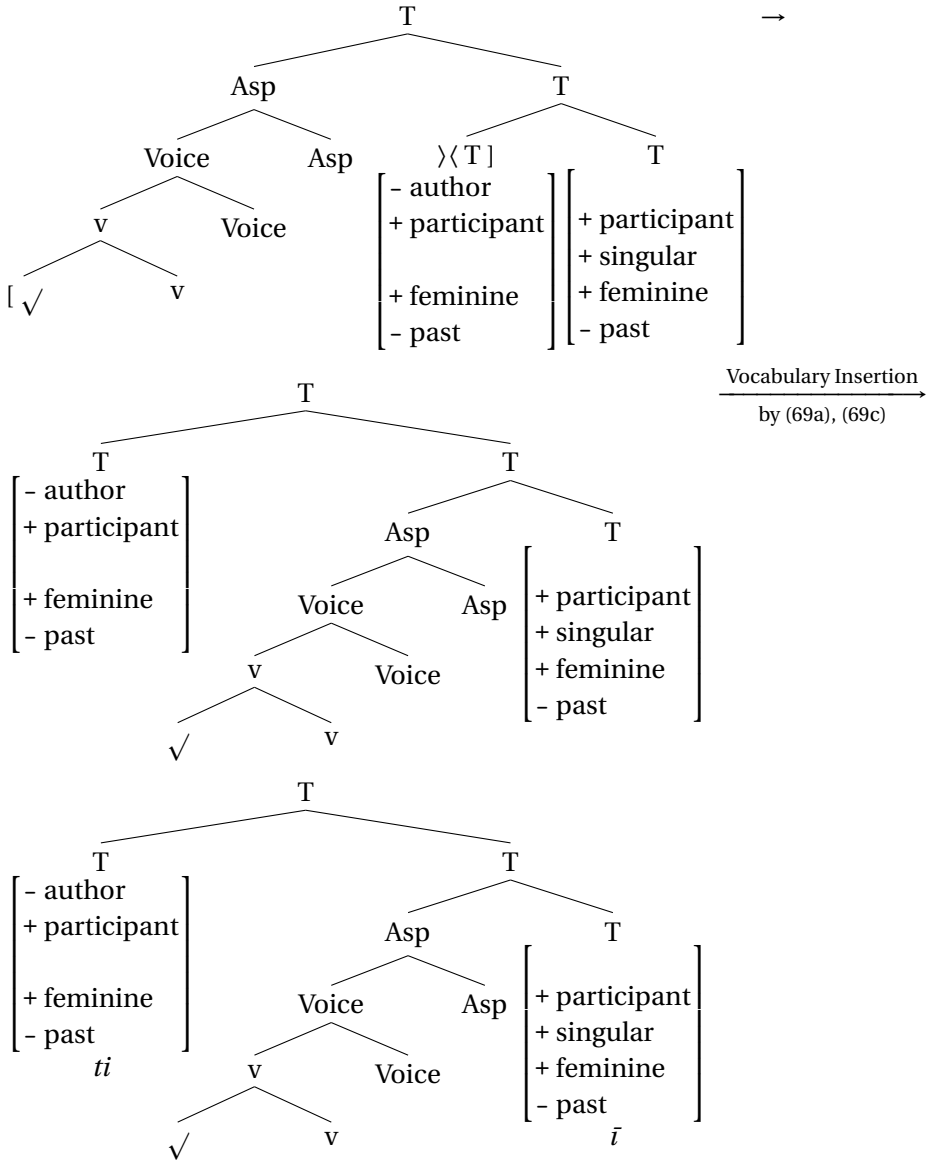
[43] For the sake of space, I assume that the first person gender Impoverishment rule in (57) has applied, deleting [±feminine] features prior to the stage at which Metathesis applies.



If Fission has applied, yielding two adjacent T terminals, as in the case of the second feminine singular prefix conjugation in Ṣanʕānī Arabic, Long-distance Metathesis will displace the leftmost T morpheme to the left of the verb.

(84) Displacement of fissioned T: *ti-gambir-ī* 'you (f.sg) will sit'





A welcome consequence of this formalization of morpheme displacement in discontinuous agreement is that it predicts the affix-affix ordering tendency known as the "person-left, number-right" generalization uncovered in previous literature. According to the structure-preserving rule in (85) which preserves featural markedness by translating hierarchical relations in the φ-set to linear precedence relations, the leftmost T morpheme that is the output of the non-author Fission rule in (67) will always be specified for both [±author] features and [±participant] features.

(85) **Structure preservation in Fission**
Given two features F_1 and F_2 on a syntactic terminal X^0 which are targeted by a Fission rule $\mathscr{F}$, such that F_1 is higher in X^0's φ-structure than F_2, $\mathscr{F}$ linearizes F_1 to the left and F_2 to the right.

Thus, the metathesis rule in (82) will generally target the T terminal fully specified for person features. This, I argue, is the origin of the "person-left, number-right" generalization. I argue in Section §5.2 that this gen-

eralization is just one instance of a general preference for more marked features to be linearized to the left in Fission. Crucially, this preference holds for both between-category and within-category markedness relations.

The derivations in (83) and (84) assume that Long-distance Metathesis (and more generally, linearization) precedes Vocabulary Insertion, though I have not yet given the reader any evidence in favor of this ordering. In the following section, I will argue on the basis of a wide-ranging set of data that displacement can feed contextual allomorphy of (discontinuous) agreement affixes. Such sensitivity, I propose, is not predicted by the accounts of discontinuous agreement in Harbour (2008a) and Campbell (2012) which tightly interleave Vocabulary Insertion and linearization.

4 Allomorphy in discontinuous agreement and the nature of Fission

In the forgoing sections, I detailed several alternative analyses put forth to account for discontinuous agreement in Semitic and sketched my own analysis, building on explicit proposals for both Fission and morphological Metathesis made in Arregi and Nevins (2012). One significant point of disagreement between my analysis and the hybrid approaches of Harbour (2008a) and Campbell (2012) concerns the nature of Fission. Whereas I have hypothesized that Fission is an autonomous post-syntactic operation, Harbour and Campbell suppose (following Noyer 1992 and Halle 2000) that Fission is simply iterated Vocabulary Insertion at a single syntactic terminal.

As previously mentioned, these two families of approaches make differing predictions with respect to the relative timing of displacement vis-à-vis Vocabulary Insertion. Equating Fission with Vocabulary Insertion predicts that Vocabulary Insertion must precede displacement. This assumption is necessary for Harbour and Campbell to account for the presence of impure discontinuities as in (86), where second person features appear to be marked on the prefix and suffix simultaneously.

(86) ti-gambir-ī
2-sit.IPFV-2.F.SG
'you (f.sg) will sit' (Ṣanʕānī Arabic)

Under these accounts, this apparent multiple exponence is illusory and should instead be attributed to the fact that the feminine singular suffix is local enough to, and hence can be conditioned by, the prefix prior to linearization. In other words, impure discontinuities constitute allomorphy conditioning subsets of features within the same φ-set. This is shown for Ṣanʕānī Arabic in the following: note in particular that the contextual specification for the vocabulary entry inserting *ī* in (87b) makes reference to hierarchically local second person

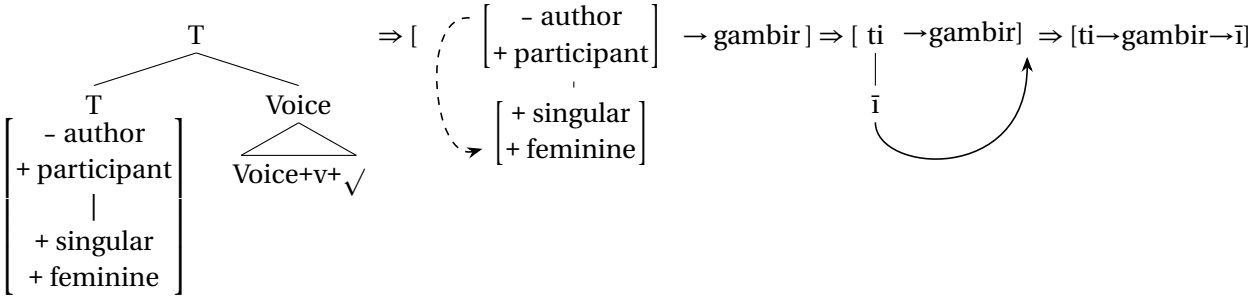
features.[44]

(87) Vocabulary entries for second feminine singular in Ṣanʕānī Arabic (*background assumption: Fission is iterated VI*)

a. $\begin{bmatrix} \text{– author} \\ \text{+ participant} \end{bmatrix} \leftrightarrow ti$

b. $\begin{bmatrix} \text{+ singular} \\ \text{+ feminine} \end{bmatrix} \leftrightarrow \bar{\imath} \,/\, \begin{bmatrix} \text{– author} \\ \text{+ participant} \\ | \\ \_\_ \end{bmatrix}$

(88)



By contrast, I assumed in Section §3 that Vocabulary Insertion follows both Fission and Metathesis in line with the general architecture of the post-syntactic component proposed in Arregi and Nevins (2012). Unlike Harbour and Campbell, this ordering is not determined by my analysis of impure discontinuities, which were instead argued to involve true multiple exponence arising from feature copying in Fission. The two sets of predictions, then, are summarized in (89).

(89) **Predicted interactions between displacement and Vocabulary Insertion**

a. Vocabulary Insertion precedes displacement (*background assumption: Fission is iterated VI*) (Campbell 2012; Harbour 2008a)

b. Displacement precedes Vocabulary Insertion (*background assumption: Fission is a distinct operation*) (Arregi and Nevins 2012)

In this section, I argue that only the prediction in (89b) is borne out on the basis of several allomorphic alternations in which the form of a discontinuous agreement affix is sensitive to its surface linear position. The general shape of these allomorphy patterns are given in (90), where Z is either a morpheme or a domain boundary (e.g. a word edge #).

[44] I omit the φ-node proposed in Harbour (2008a) in the following. As far as I can tell, this simplification does not affect the predictions of the analysis in any way.

(90) **Attested allomorphy in discontinuous agreement**

a. X_{φ}- VERB -Y_{φ} Z , where the form of Y_{φ} depends on Z

b. Z X_{φ}- VERB -Y_{φ} , where the form of X_{φ} depends on Z

As I will demonstrate, Vocabulary Insertion must follow displacement to capture both patterns in (90), regardless of the underlying position of φ-features. If φ-features start at the X position, then Y must be displaced prior to Vocabulary Insertion to capture (90a). If φ-features start at the Y position, then X must be displaced prior to Vocabulary Insertion to capture (90b). I will begin by discussing one example of each pattern in (90), arguing that neither can be captured by analyses which do not make reference to Fission as an operation distinct from Vocabulary Insertion. Afterwards, I show that allomorphy in discontinuous agreement is a general phenomenon which can even interact with impure discontinuities, producing agreement affixes which involve both multiple exponence of a single feature and adjacency-based allomorphy.

4.1 Suffix allomorphy and the timing of displacement

In Ṣanʕānī Arabic, the feminine plural suffix in both the prefix and suffix conjugations appears as *-ayn* when word-final, but as *-ann* when preceding object clitics.[45] Agreement morphemes are underlined and the feminine plural suffix is additionally bolded.

(91) a. yi-št-**ayn**
3-want-F.PL
'they (f.pl) want'

b. yi-št-**ann**-iš
3-want-F.PL-2.F.SG.OBJ
'they (f.pl) want you (f.sg)' (Watson 2011)

I submit that the alternation *-ayn*~*-ann* is not one of monophthongization driven by syllable structure constraints in the language. All else equal, we would have predicted a sequence *-aynVC* in (91b) (where *V* and *C* stand for an unspecified vowel and consonant, respectively), since *-aynVC* sequences are attested elsewhere in the language.

[45] The classic litany of diagnostics to distinguish clitics from affixes presented in Zwicky and Pullum (1983) does not predict this allomorphy to be possible: only affixes are claimed to be able to induce changes in the phonological shapes of their hosts (Zwicky and Pullum's criterion C). However, there is at least some evidence that this test needs to be rethought, given that certain clitic auxiliaries in English, which Zwicky and Pullum themselves treat, license stem allomorphy of the first and second person singular pronouns "I" and "you" (Wescoat 2005).

(i) a. I [aɪ]
b. I'll [aɪl] ~ [ɑl]

(ii) a. you [juː]
b. you're [juːɹ] ~ [jɔɹ]

Thanks to Jason Merchant for pointing out these facts to me. I will nonetheless refer to morphemes like *-iš* in Ṣanʕānī Arabic as clitics due to the fact that they are in complementary distribution with full DP arguments of the verb. Only in clitic left dislocation configurations are DP arguments found with coreferential clitics on the verb (see Watson 1993: 387).

(92) a. bayn-ih
in-3.M.SG
'in it'

b. dayn-ih
debt-3.M.SG.POSS
'his debt' (Watson 2002: 209)

I will therefore assume that variation in the form of the feminine plural suffix in Ṣanʕānī Arabic is contextual allomorphy triggered by the local presence of an object clitic. I formalize this generalization with the vocabulary entries in (93): a T morpheme bearing the features [–singular] and [+feminine] is realized as *ann* when right-adjacent to a clitic (here represented as D^0), and as *ayn* otherwise.

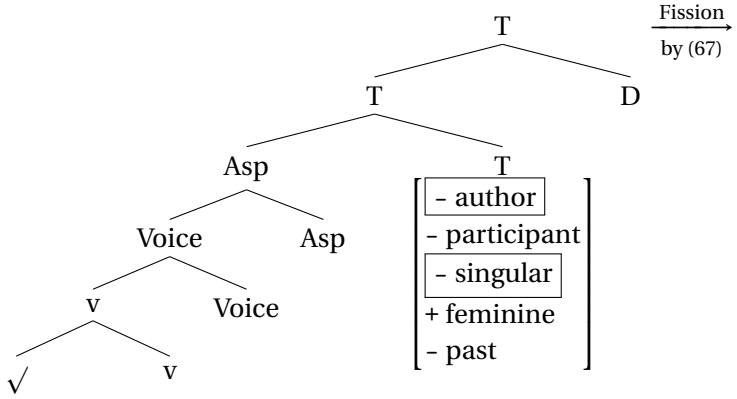
(93) Vocabulary entries for Ṣanʕānī feminine plural

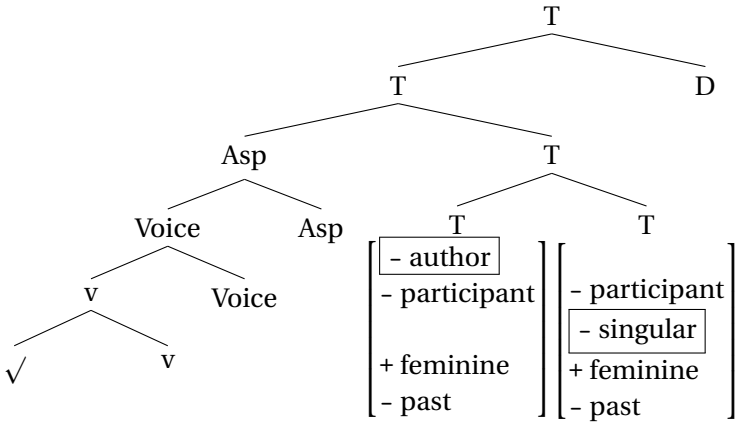
a. $\begin{bmatrix} \text{T} \\ \text{– singular} \\ \text{+ feminine} \end{bmatrix} \leftrightarrow$ *ann* / ___ D^0 (f.pl)

b. $\begin{bmatrix} \text{T} \\ \text{– singular} \\ \text{+ feminine} \end{bmatrix} \leftrightarrow$ *ayn* (f.pl) (*elsewhere*)

The alternation in (91) thus bears out the general allomorphy pattern from (90a), where the rule mapping phonological content to the features of the suffix must make reference to its surface linear position. Let us consider how each family of Fission analyses fares in explaining these data. The Fission analysis I presented in Section §3 faces no difficulties in accounting for (91). After successive cyclic head movement of the verb to T and adjunction of a clitic D^0 to T, non-author Fission creates two nodes in place of the input T morpheme, splitting up the features [–author] and [–singular] and copying all other features in the process.

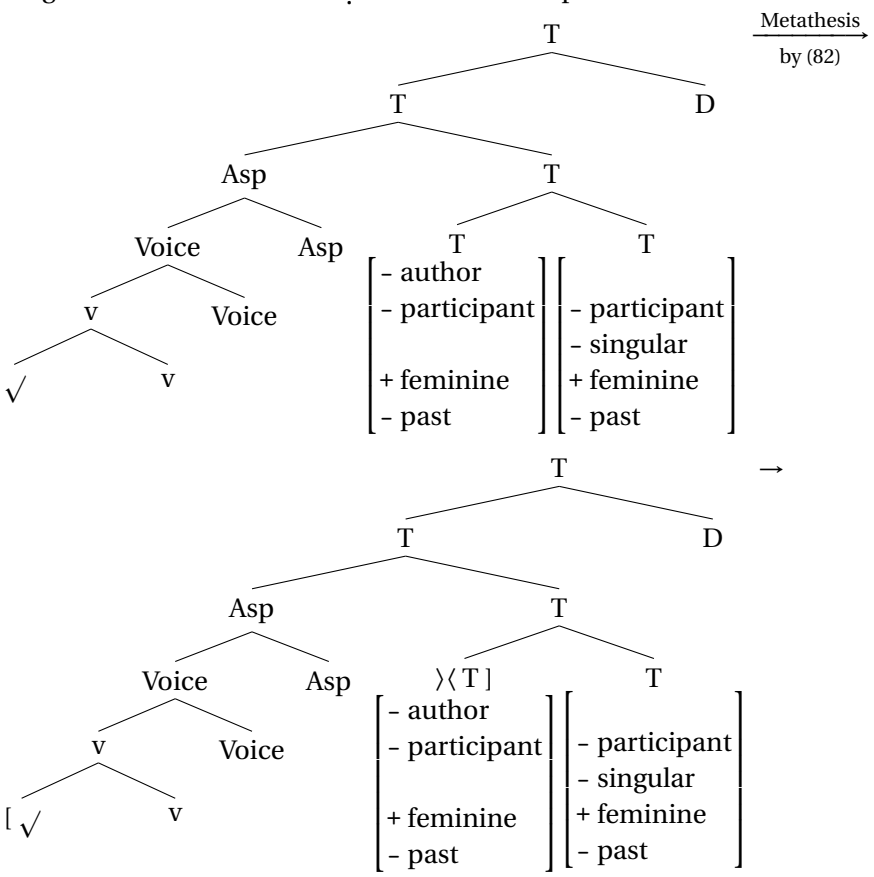
(94) Non-author Fission in Ṣanʕānī feminine plural

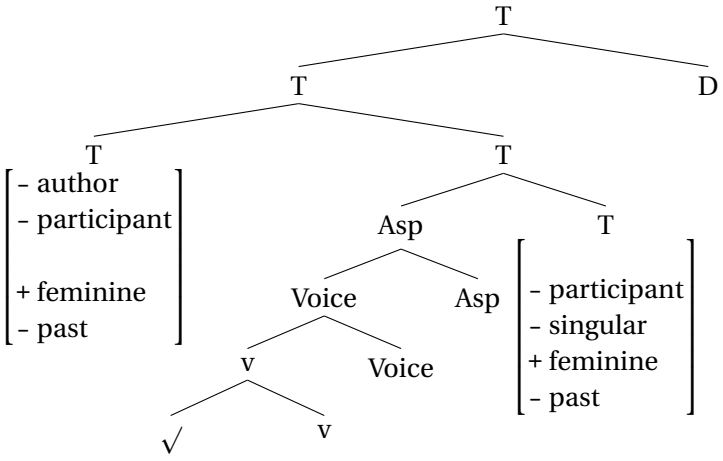




Next, Long-distance Metathesis will invert the order of the leftmost T morpheme and the verb stem, correctly deriving the presence of a prefix in the prefix conjugation.

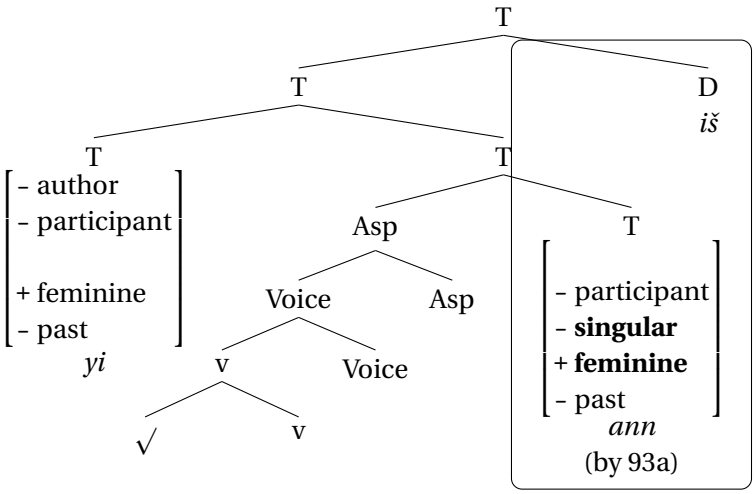
(95) Long-distance Metathesis of Ṣanʕānī feminine plural





Finally, at Vocabulary Insertion, the vocabulary entry in (93a) will be selected to match the features of the rightmost T by the Subset Principle given that this morpheme is right-adjacent to a D^0 morpheme. This is shown in (96), where the domain which ultimately determines selection of the appropriate vocabulary entry is boxed.

(96) Vocabulary Insertion of Ṣanʕānī feminine plural



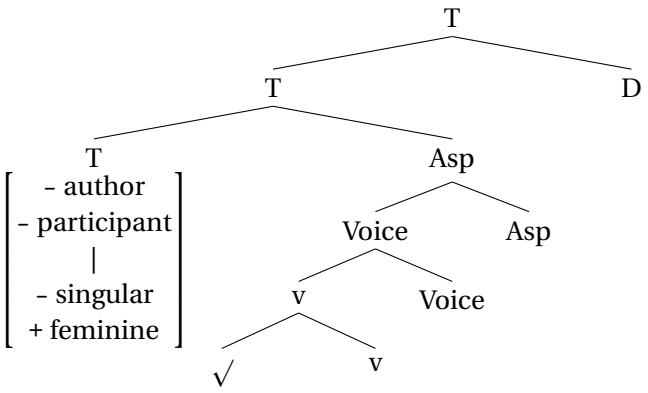
In summary, under my analysis, Fission and Long-distance Metathesis feed Vocabulary Insertion, and the allomorphy of agreement suffixes by linearly-adjacent morphemes is predicted. I therefore propose a revised order of post-syntactic operations in (97), updated from (68).

(97) **Order of post-syntactic operations** (final)
Impoverishment → Fission → Metathesis → Vocabulary Insertion

Next, let us consider how an analysis in which Fission is interleaved with Vocabulary Insertion would derive the alternations in (91). I will focus this discussion on the explicit proposals made in Harbour (2008a), but note that the predictions are shared by this general family of analyses, including Campbell (2012) and McGinnis (2013), among others. Successive-cyclic head movement of the verb root to T, followed by head adjunction

of an object clitic D^0, yields the structure in (98). Following Harbour (2007: 242), I assume without further comment that a metathesis operation or the like will post-syntactically reverse the order of φ (represented here on T, for simplicity) and the verb stem—similar to what my Long-distance Metathesis operation accomplishes, though Harbour's proposed metathesis rule crucially applies *before* Fission and Vocabulary Insertion.

(98)



As the reader may recall from the discussion of impure discontinuities above, Harbour's analysis makes the strong prediction that Vocabulary Insertion must precede displacement. If this hypothesis is to be maintained in deriving the pre-clitic form of the Ṣanʕānī feminine plural suffix we must posit vocabulary entries as in (99).

(99) Vocabulary entries for Ṣanʕānī feminine plural (*background assumptions: Fission is iterated VI, VI precedes displacement*)

a. $\begin{bmatrix} \text{– author} \\ \text{– participant} \end{bmatrix} \leftrightarrow yi$

b. $\begin{bmatrix} \text{– singular} \\ \text{+ feminine} \end{bmatrix} \leftrightarrow ann$ / [___] $_T$] $_T$] D^0 $_T$]

c. $\begin{bmatrix} \text{– singular} \\ \text{+ feminine} \end{bmatrix} \leftrightarrow ayn$

Crucially, the contextual specification for the most specific rule in (99b) must, under this view, make reference to a domain spanning several projections of T^0. I submit that this type of rule is too non-local given constrained theories of allomorphy (see, e.g., Embick 2010) and should therefore be abandoned.

The rule in (99b) is concerning despite the fact the φ-features on T and the clitic D^0 are in the same M-word.[46] This is because allomorphy in discontinuous agreement is never long-distance. Compare the attested

[46] Other restricted theories of allomorphy have likewise noted that, although allomorphy is attested within complex heads, it is rarely (if ever) unbounded. Thus, Bobaljik proposes the following as a necessary but not a sufficient condition on locality for allomorphy.

(i) "[A] morpheme (or feature) β may condition allomorphy for morpheme α only if the two are in the same morphological 'word' (i.e. complex X^0)." (Bobaljik 2012: 12–13)

a. $\alpha \ldots]_{X^0} \ldots \beta$

b. $^*\alpha \ldots]_{XP} \ldots \beta$

Nevertheless, Bobaljik recognizes that there are certain configurations even within complex heads which block allomorphy of α conditioned by β, as I assume in the main text.

patterns in (90), repeated here as (100), with those unattested in (101).[47]

(100) **Attested allomorphy in discontinuous agreement**

a. X_{φ}- VERB -Y_{φ} Z , where the form of Y_{φ} depends on Z

b. Z X_{φ}- VERB -Y_{φ} , where the form of X_{φ} depends on Z

(101) **Unattested allomorphy in discontinuous agreement**

a. * X_{φ}- VERB -Y_{φ} Z , where the form of X_{φ} depends on Z

b. * Z X_{φ}- VERB -Y_{φ} , where the form of Y_{φ} depends on Z

If it were possible for vocabulary entries to look like (99b), then we would erroneously predict the unattested patterns of allomorphy in (101) to be possible; this is because the prefix and suffix are assumed to be derived from the same underlying syntactic position—namely, T. When the contextual specification for the rule in (99b) is met, both number/gender features and person features are assumed to be equidistant from D^0. Therefore, there is nothing to block a speaker of Ṣanʕānī Arabic from innovating a vocabulary entry as in (102) where a prefix is conditioned by an object clitic.

(102) Impossible vocabulary entry for a discontinuous prefix matching person features

$$\begin{bmatrix} \text{– author} \\ \text{– participant} \end{bmatrix} \leftrightarrow \textit{ka} \,/\, [\_\_]_{T}]_{T}]\ D^0\ _{T}]$$

Yet such rules do not exist, and indeed do not exist for any of the languages under discussion. I conclude, then, that analyses which equate Fission with Vocabulary Insertion and which predict that Vocabulary Insertion should precede displacement overgenerate and require relatively unconstrained locality conditions on the form of vocabulary entries.

Note that if Vocabulary Insertion were to be delayed until *after* the relevant sub-φ-structures were displaced, the presence of impure discontinuities as in *ti-gambir-ī* 'you (f.sg) will sit' would remain a puzzle under this view, as impure discontinuities have been argued by Harbour and others to involve contextual allomorphy. Just as D^0 is too far from number/gender features to condition allomorphy on them in (99b), so too would number/gender features in impure discontinuities be too far from person features after displacement.

Consequently, impure discontinuities, on the one hand, and allomorphy of the Ṣanʕānī feminine plural, on the other, seem to require incompatible assumptions under a theory in which Fission is equated with Vocabulary Insertion: there is no way to simultaneously predict allomorphy conditioned pre- and post-linearization

[47] Thanks to Karlos Arregi, Andy Murphy, and Erik Zyman for pointing out the particular importance of these facts for the present analysis.

without admitting phonological rewrite rules or another enrichment to the post-syntactic component.[48] The issue is summarized in (103):

(103) **Necessary order of operations for a Harbourian-style analysis of discontinuous agreement**
   a. Impure discontinuities (form of the suffix depends on features of the prefix):
   Vocabulary Insertion ⟶ Linearization
   b. Ṣanʕānī Arabic feminine plural allomorphs (form of the suffix depends on its linear position):
   Linearization ⟶ Vocabulary Insertion

At this point, a defender of the view that Fission is tantamount to iterated Vocabulary Insertion might question whether the tree structure in (98) is the right one. What if instead the T node bearing φ-features started next to D, such that number/gender features were always sufficiently local to D, and person features were displaced to the left of the verb stem? The next section takes up this question and shows that revising Harbour's analysis in this way fails to predict the mirror phenomenon from (100b) in which the form of a discontinuous prefix is determined after displacement.

4.2 Prefix allomorphy and the timing of displacement

Just as the form of the Ṣanʕānī Arabic feminine plural suffix was sensitive to linearly adjacent material in its surface position, so too do we find cases of prefixes sensitive to their surface environment. In Wolane (pronounced /wolɛneː/), a Semitic language in southern Ethiopia with about 70,000 speakers, first person agreement is discontinuous (see more on discontinuous first person agreement in Semitic in Section §5.1) . First person singular and plural prefix conjugation verbs share a *y-* prefix (a palatal approximant), homophonous with the third person default agreement prefix *y-*. First person plural verbs additionally bear the suffix *-n(ɛ)*,[49] likely related to the cognate first person plural prefix from other Semitic languages (Meyer 2006: 109–110; similar patterns of first person agreement can be found in the closely related languages Zay (Meyer 2005) and Silt'e (Gutt 1997)). The paradigm of subject agreement with affirmative, indicative, non-past main verbs in Wolane is given in (104), where first person agreement on the main verb is set in bold face.

(104) Wolane affirmative indicative non-past main verb $\sqrt{\text{sbr}}$ 'break' (Meyer 2006: 97)

[48] Even then, however, it is unclear what the locality conditions on rewrite rules should be. This issue is magnified by the presence of examples (to be discussed in the main text below) where impure discontinuities interact with true contextual allomorphy. Under a theory like Harbour's, these phonological rewrite rules would need to "see" both the prefix and suffix simultaneously, despite the fact that they are non-contiguous, separated by the verb stem and valence-changing morphology.

[49] As best I can tell, the front, low-mid vowel /ɛ/ given here as part of the prefix is deleted before vowels, but is overt otherwise (see Meyer 2006: 40–42, 108–112).

	SG	PL
1	**y**-sɛbr-ā-h^{w}	**y**-sɛbr-**n**-ān
2m	t-sɛbr-ā-he	t-sɛbr-u-ā-h^{w}m
2f	t-sɛbr-i-ā-š	t-sɛbr-u-ā-h^{w}m
3m	y-sɛbr-ān	y-sɛbr-u-ān
3f	t-sɛbr-ā-t	y-sɛbr-u-ān

Affirmative matrix verbs require the presence of an auxiliary, in this case the enclitic *-ān* (proposed to be diachronically related to the pan-Ethiopian Semitic copula and non-past auxiliary **hallawa* in Hetzron (1972: 38)) which shows suffixal agreement with the subject.[50]

What is interesting for our purposes is that the first person agreement prefix has an allomorph *l(ɛ)-* when non-initial within the morphological word. The suffix *-nɛ*, by contrast, remains invariant across paradigms. The following examples present verbs with non-initial first person agreement morphemes, including with the prefixed complementizer *t-* 'when' in (105) and prefixed negation and a relative complementizer in (106).

(105) Wolane first person verbs in subordinate contexts

a. t-**l**-hēd
when-1-go.IPFV
'when I go'

b. t-**l**-hēd-nɛ
when-1-go.IPFV-1PL
'when we go' (Meyer 2006: 110–111)

(106) Wolane first person verbs in negative relative clauses

a. yɛ-ʔa-**l**-sɛbr-ey-ā-h^{w} gəz
REL-NEG-1-break.IPFV-3.M.SG.OBJ-AUX-1.SG thing.M.SG
'the thing which I do not break'

b. yɛ-ʔa-**l**-sɛbr-nɛ-y-ān gəz
REL-NEG-1-break.IPFV-1.PL-3.M.SG.OBJ-AUX thing.M.SG
'the thing which we do not break' (Meyer 2006: 127)

Observe that, although the first person and third person prefixes are homophonous in the paradigm in (104), third person prefixes do not exhibit the *l(ɛ)-* allomorph, as shown by (107) and (108).

(107) Wolane third person masculine singular verbs in subordinate contexts[51]
t-**i**-hēd
when-3-go.IPFV
'when he goes' (Meyer 2006: 110–111)

(108) Wolane third person masculine singular verbs in negative relative clauses
yɛ-ʔa-**y**-sɛbr-ɛy-ān gəz
REL-NEG-3-break.IPFV-3.M.SG.OBJ-AUX thing.M.SG

[50] Meyer (2006: 96) argues that *-ān* is phonologically reduced clitic related to the Wolane existential verb *ʔalɛ* 'exist, be at'.
[51] Third person agreement is realized as *-i-* when syllabified as a syllable nucleus.

'the thing which he doesn't not break' (Meyer 2006: 127)

Thus, whatever competition between vocabulary entries gives rise to the *l(ɛ)-* allomorph must be specific to first person features on the prefix.

I propose the following vocabulary entries to capture the Wolane alternation between first person *y-* and *l(ɛ)-*.

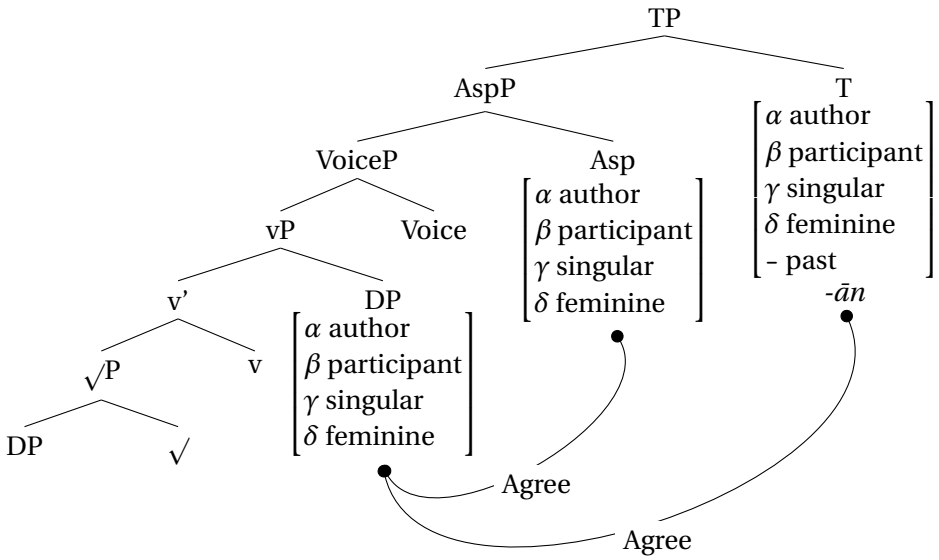
(109) Vocabulary entries for Wolane first person

a. $\begin{bmatrix} \text{+ author} \\ \text{+ participant} \end{bmatrix} \leftrightarrow y$ / # ___

b. $\begin{bmatrix} \text{+ author} \\ \text{+ participant} \end{bmatrix} \leftrightarrow l$ (elsewhere)

I follow Demeke (2003) in analyzing T as the locus of auxiliaries in Ethiopian Semitic, and Asp as landing site for finite verbs in matrix clauses. Both Asp and T are hypothesized to bear φ-probes which enter into an Agree relation with the DP subject, fully valuing the probes features and resulting in person, number, and gender agreement on both the main verb and auxiliary. The tree in (110) illustrates the clause structure I will assume for Wolane (note also that Wolane, like the rest of Ethiopian Semitic, is head-final).[52]

(110) Structure of a Wolane clause

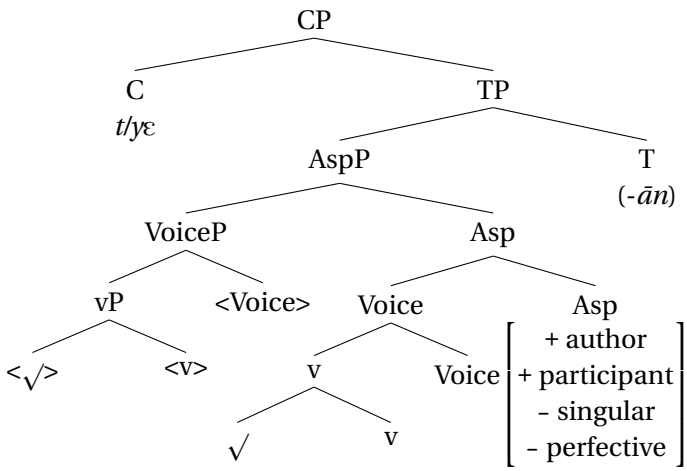


I will also assume that in (105)–(108), C^0 is subject to a 'penultimality' constraint (cf. Arregi and Nevins' (2012) C-/T-Peninitiality constraints) wherein C cannot be too far from the right edge of a particular domain, in this

[52] I abstract away from the question of how the auxiliary ends up cliticized to the right of the verb stem here.

case presumably the CP.[53] I take C^0 to be procliticized to the verb word which has landed in Asp^0, as shown in (111).[54]

(111)



Now, consider how prefixal agreement might plausibly be derived from this structure under a theory like Harbour's (2008a) in which Fission is iterated Vocabulary Insertion and Vocabulary Insertion precedes displacement. Vocabulary Insertion must scan the inventory of vocabulary items, creating a candidate set of rules to realize the Asp^0 node bearing φ-features. Given the two vocabulary entries in (109), only (109b) will apply, since it is context-free; the context in (109a) is not met in (111) and hence it will not qualify as a candidate for insertion. The only prefix that is ever predicted to occur by such a theory is *l(ɛ)-*. Revising the vocabulary entry for the *y-* prefix as in (112) does not resolve the issue, but instead raises the same issue that we encountered with the Ṣanʕānī Arabic feminine plural suffix: permitting vocabulary entries to make reference to such non-local domains opens the back door to otherwise unattested long-distance conditioning of allomorphy.

(112) Revised vocabulary entry for Wolane first person (*untenable*)
$\begin{bmatrix}\text{+ author}\\ \text{+ participant}\end{bmatrix} \leftrightarrow$ *y* / # [$_{CP}$ [$_{TP}$ [$_{AspP}$ [$_{Asp}$ [$_{Asp}$ ___

Schematically, then, the Wolane data bear out the allomorphy pattern in (113), whereas the pattern in (114) is unattested in my language sample.

[53] Note, however, that C-Penultimality differs from, e.g. T-Peninitiality, in that an entire morphological word must follow C^0, not just a morpheme, represented here as a terminal X^{0min}. Thus, it may be that C-Penultimality behaves more like verb second phenomena. I leave a fuller exposition of this issue to future research on Ethiopian Semitic auxiliaries.

[54] The other main alternative is to analyze C^0 and the verb as part of the same underlying complex head. I assume that this could be done under any analysis which unifies head movement and post-syntactic Lowering (Embick and Noyer 2001), such as the *Generalized Head Movement* framework proposed in Arregi and Pietraszko (2018, To appear). I leave this as a potentially fruitful avenue for future research. As far as I can tell, deciding between these two proposals does not affect the empirical generalizations arrived at in the main text (that is, that first person agreement is *y-* when word-initial, *l(ɛ)-* otherwise), nor does it bear on the question of whether or not the "Fission as iterated Vocabulary Insertion" hypothesis is viable.

(113) **Attested allomorphy in discontinuous agreement, (b) case**

Z X_{φ}- VERB -Y_{φ} , where the form of X_{φ} depends on Z

(114) **Unattested allomorphy in discontinuous agreement, (b) case**

* Z X_{φ}- VERB -Y_{φ} , where the form of Y_{φ} depends on Z

I conclude from these data that displacement of the prefix from the suffix position to the left edge of the verb stem must precede Vocabulary Insertion for the more specific allomorph *y-* to be selected. Only once the linear position of the first person agreement morpheme is determined with respect to other morphemes such as C^0 can Vocabulary Insertion apply. This conclusion is, at its core, at odds with an assumption made in most previous accounts of Fission, including Harbour's: namely, that Fission is driven by a language's inventory of vocabulary entries. If determining a morpheme's phonological form occurs after features are split up from the input node, then Fission cannot be drive by competition among candidate vocabulary entries. By contrast, under my analysis, the vocabulary entries in (109) are perfectly valid and hence can capture the observed allomorphy.

Taken together, the Ṣanʕānī Arabic and Wolane data provide strong evidence that displacement must precede Vocabulary Insertion in the post-syntactic component. I have argued at length that this ordering of operations is incompatible with theories in which Fission is equated with Vocabulary Insertion, because determining which φ-feature sets will be matched, and therefore which φ-features will be left undischarged, presupposes at least one cycle of Vocabulary Insertion prior to linearizing the fissed morphemes. The analysis advocated for here, in which Fission is an autonomous post-syntactic operation which applies logically prior to both displacement and Vocabulary Insertion, is not faced with any of these issues. I therefore conclude that the latter characterization of Fission must be correct (or at least on the right track). In the next section, I provide additional support for my argument from discontinuous agreement data exhibiting what I will call "janus-faced allomorphy": in each case, the form of a particular affix simultaneously instantiates an impure discontinuity (i.e. exponence of some feature also realized on the other affix) and shows sensitivity to a linearly adjacent morpheme in the surface string. These data pose significant problems for previous analyses, but are easily accounted for under the present account.

4.3 Janus-faced allomorphy in discontinuous agreement

The picture of allomorphy in discontinuous agreement which I have sketched so far is complicated further by the existence of alternations in which the form of a single suffix is ostensibly doubly conditioned: first by features also realized by the prefix, and second by features associated with the suffix's surface position.

These patterns correspond to a slightly more articulated version of the (a) allomorphy pattern discussed above, shown here in (115): some feature F_1 appears to be realized on both the prefix X and the suffix Y—an impure discontinuity—and the form of Y is determined in part by the presence of a right-adjacent element Z.

(115) **Attested allomorphy in discontinuous agreement, (a) case, with an impure discontinuity**

$X_{[\boldsymbol{F_1}]}$- VERB -$Y_{[\boldsymbol{F_1}, F_2]}$ Z , where the form of $Y_{[F_1, F_2]}$ depends on Z

I will discuss two such alternations in this section. The first is from Mehreyyet, the variety of Mehri (Semitic, Modern South Arabian) spoken in Oman (Rubin 2018; Watson 2012). Second feminine singular agreement in the prefix conjugation exhibits the standard impure discontinuity, marked by the presence of a prefixal *t-* and suffixal *-ī*, both of which index second person features. Somewhat unexpectedly, the suffix disappears when immediately followed by an object clitic.[55] Compare the base example in (116) with the examples containing object clitics in (117).

(116) t̲-ḥaym-ī̲
2-want-2.F.SG
'you (f.sg) want'

(117) a. t̲-ḥam-∅̲-an
2-want-2.F.SG-1.PL.OBJ
'you (f.sg) want us'

b. t̲-ḥam-∅̲-ī
2-want-2.F.SG-1.SG.OBJ
'you (f.sg) want me'

c. t̲-ḥam-∅̲-s
2-want-2.F.SG-3.F.SG.OBJ
'you (f.sg) want it (f.sg)' (Watson 2012: 202)

The loss of this suffix should not be attributed to vowel hiatus, since example (117c) shows that its disappearance can take place before consonant-initial object clitics. It is also unlikely that the disappearance of the suffix is due to resyllabification of the verb after cliticization of the object since the suffix in the expected form **tḥa.ˈmīs* 'you (f.sg) want it (f.sg)' would otherwise be predicted to bear word-level stress according to the stress algorithm of the language (Watson 2012: 34). Moreover, similar phonological sequences exist in the language which do not trigger deletion of *ī*, as in *ðа-xamīs* 'Thursday' (not **ðа-xams*) (Watson 2012: 155).

The present analysis offers an explanation for these data: impure discontinuities such as the multiple

[55] I have nothing to say about why the stem-internal palatal approximant *y* disappears in the presence of a pronominal object. Although Rubin (2018) claims that this monophthongization is due to regular phonological operations in the language, the only cases he cites of the diphthong *ay* being reduced are in superheavy syllables of the shape *CayCC*. Yet in examples (117a) and (117b), the verb stem does not belong to a superheavy syllable; rather, the object clitic is vowel-initial.

exponence of second person features in (116) arise because certain features (in this case, [+participant]) are copied into both output nodes in Fission; this is what I refer to as the feature preservation property of Fission rules in (44). If both instances of the copied feature are then matched independently by vocabulary entries, we predict the aforementioned multiple exponence pattern. Second, the -*ī*~-∅ alternation derives from the fact that Vocabulary Insertion follows both Fission and displacement—at least one of the vocabulary entries competing to match the features of the suffix will make reference to a right-adjacent object clitic. I provide the relevant pieces for this derivation below. After successive cyclic head movement of the verb to T and adjunction of a clitic D^0 to T, non-author Fission (67) creates two nodes, copying the [+participant] feature from the input feature bundle into both output terminals. Next Long-distance Metathesis (82) displaces the left-most T node to the left edge of the word, stranding the suffix in place. Finally, during Vocabulary Insertion, the vocabulary entry in (118b) will be selected to expone the features of the suffixed T morpheme as it is the most specific rule that can apply in this context.

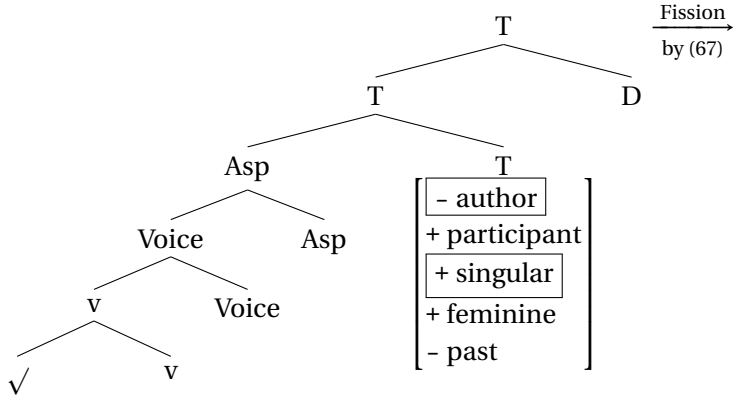
(118) Vocabulary entries for Mehreyyet second feminine singular agreement

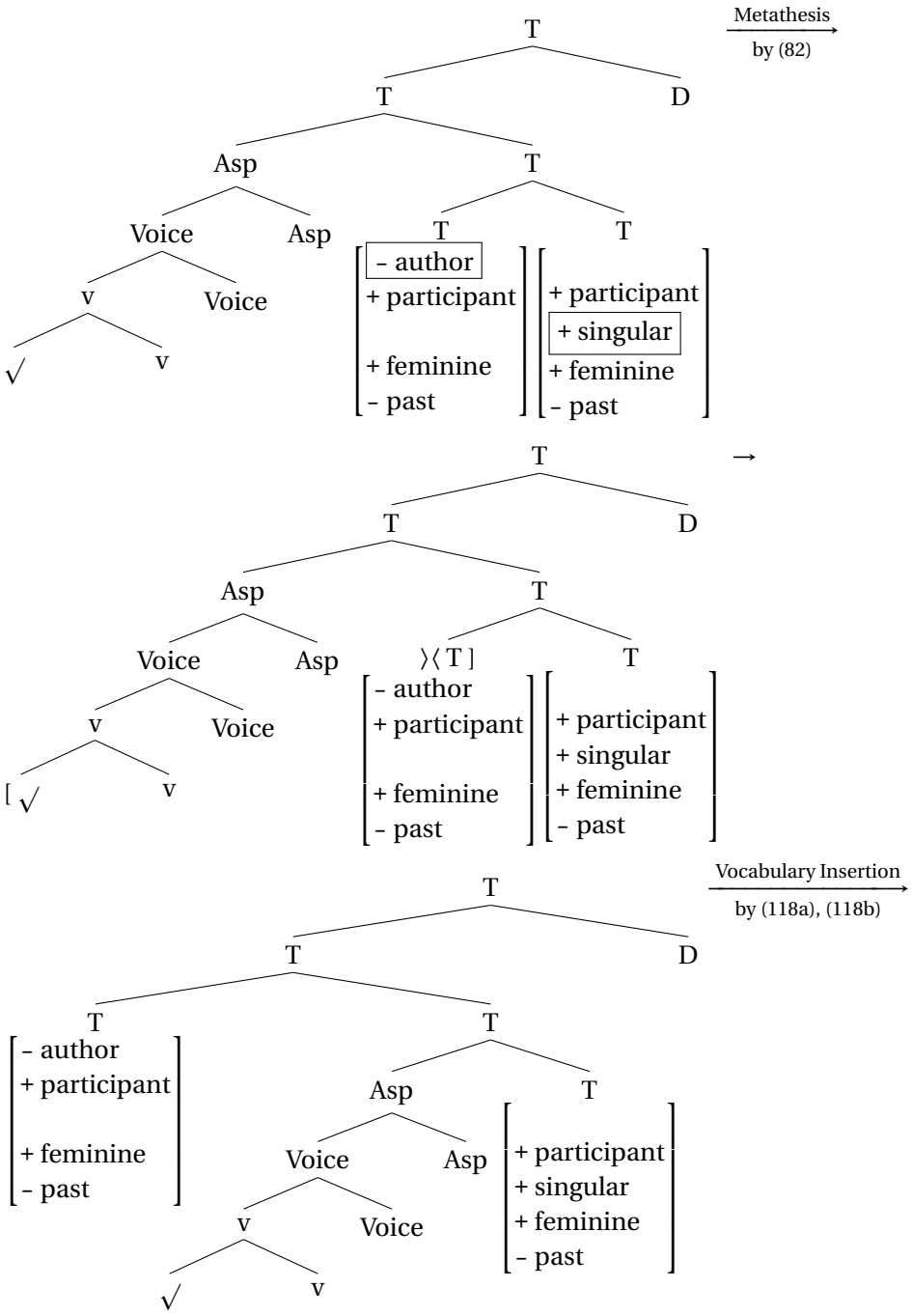
a. $\begin{bmatrix} \text{T} \\ \text{– author} \\ \text{+ participant} \\ \text{– past} \end{bmatrix} \leftrightarrow t$ (2)

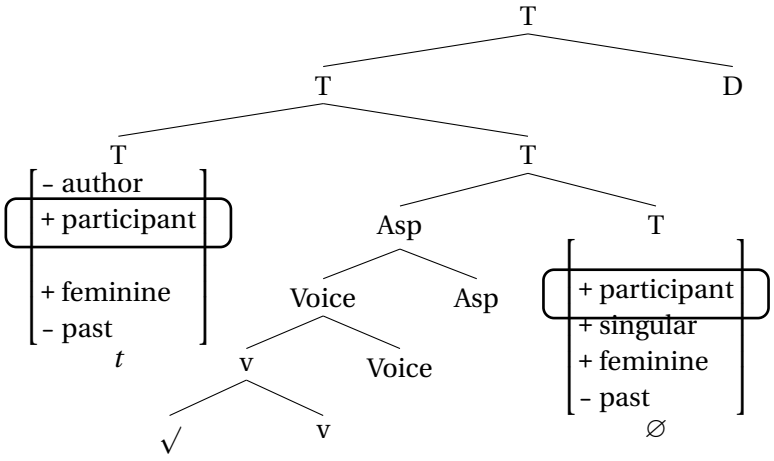
b. $\begin{bmatrix} \text{T} \\ \text{+ participant} \\ \text{+ singular} \\ \text{+ feminine} \\ \text{– past} \end{bmatrix} \leftrightarrow \varnothing$ / ___ D^0 (2fs)

c. $\begin{bmatrix} \text{T} \\ \text{+ participant} \\ \text{+ singular} \\ \text{+ feminine} \\ \text{– past} \end{bmatrix} \leftrightarrow \bar{\imath}$ (2fs)

(119) Derivation of second feminine singular agreement before object clitics in Mehreyyet

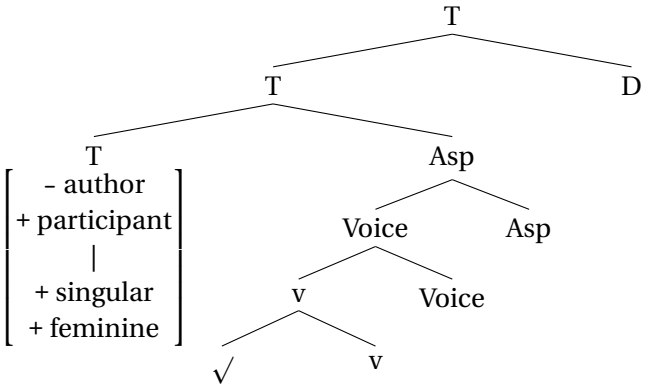



T
D
T
Asp
T
Voice
Asp
T
T
v
Voice
√
v
– author
+ participant
+ feminine
– past
+ participant
+ singular
+ feminine
– past
Metathesis
by (82)
→
⟩⟨ T]
[√
Vocabulary Insertion
by (118a), (118b)



Analyses which treat Fission as iterated Vocabulary Insertion fail to explain these data for the reasons discussed in Sections §4.1-4.2. I represent the complex head which serves as the input to the post-syntactic component for (117) in (120) below, assuming the structure that Harbour (2008a) proposes for φ-features.

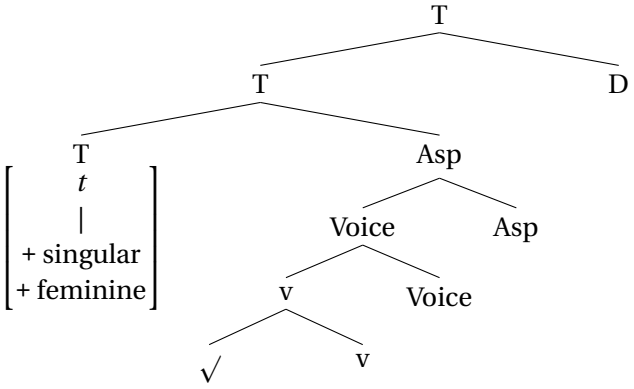
(120) Input for *t-ḥam-∅-s*



According to the rule in (121), the person features [–author, +participant] will be realized as *t*.

(121) $\begin{bmatrix} \text{– author} \\ \text{+ participant} \end{bmatrix} \leftrightarrow t$ (2)

(122)



Two vocabulary entries will then compete to match the undischarged number/gender features: one which realizes the allomorph *ī*, and one which yields the null allomorph ∅. If Vocabulary Insertion precedes linearization,

these vocabulary entries must be stated as in (123).

(123) Vocabulary entries for Mehreyyet second feminine singular (*background assumptions: Fission is iterated Vocabulary Insertion, Vocabulary Insertion precedes displacement*)

a. $\begin{bmatrix} \text{+ singular} \\ \text{+ feminine} \end{bmatrix} \leftrightarrow \varnothing \;/\; \begin{bmatrix} \text{– author} \\ \text{+ participant} \\ | \\ \_\_ \end{bmatrix} {}_{\text{T}]}\,{}_{\text{T}]}\,\text{D}^0\,{}_{\text{T}]}$

b. $\begin{bmatrix} \text{+ singular} \\ \text{+ feminine} \end{bmatrix} \leftrightarrow \bar{\imath} \;/\; \begin{bmatrix} \text{– author} \\ \text{+ participant} \\ | \\ \_\_ \end{bmatrix}$

Just as with Ṣanʕānī Arabic and Wolane, I submit that the contextual specification in (123a) is far too unconstrained, though it is necessary to derive the correct form of the suffix in a system like that of Harbour (2008a). If, on the other hand, displacement could precede Vocabulary Insertion in his system, we would be no better off: allomorphy of the suffix would need to again span at least two T^0 heads, this time to "see" the second person features in the prefixal φ-set.

(124) Vocabulary entry for Mehreyyet second feminine singular (*background assumptions: Fission is iterated Vocabulary Insertion, displacement precedes Vocabulary Insertion*)

$\begin{bmatrix} \text{+ singular} \\ \text{+ feminine} \end{bmatrix} \leftrightarrow \varnothing \;/\; \begin{bmatrix} \text{– author} \\ \text{+ participant} \end{bmatrix} {}_{\text{T}]}\,{}_{\text{T}]}\,\_\_\,\text{D}^0\,{}_{\text{T}]}$

Therefore, I conclude that it cannot be the case that Fission cleanly splits, e.g. person from number features; rather, impure discontinuities must arise as a result of feature copying.

The second alternation bearing out the general schema in (115) comes from the variety of Argobba (a Semitic language of Ethiopia closely related to Amharic) spoken in the villages of Shonke and T'ollaha (henceforth simply referred to as Argobba; see Demeke (2015) on variation among Argobba varieties). Imperfective verbs in Argobba contain a main verb and encliticized auxiliary *-hall*, which has four allomorphs: [-hall], [-ɛll], [-ll], and [-nn] (cf. the Wolane non-past auxiliary *-ān* in (104) above) (Wetter 2010: 205). These verbs are typically referred to as "complex imperfectives" in the literature on Ethiopian Semitic languages (see Bulakh 2014; Leslau 1958, 1995, 1997, 1999). Both the main verb and auxiliary exhibit full agreement with the subject: agreement is discontinuous on the main verb and entirely suffixal on the auxiliary. The plural suffix attached to imperfective main verbs with second and third person subjects normally appears as *u*.

(125) a. *tawdulluxum*
t̲-awid-**u̲**-ll-uxum
2-tell.IPFV-PL-AUX-2.PL
'you (pl.) tell'

b. *yawdullɛy*
y-awid-**u**-ll-ɛy
3-tell.IPFV-PL-AUX-3.PL
'they tell' (Wetter 2010: 171)

Interestingly, in the third person only, the plural suffix disappears before object clitics. Compare (125b) with (126b).

(126) a. *tawiduyyɛmlluxum*
t-awid-**u**-yyɛm-ll-uxum
2-tell.IPFV-PL-3.PL.OBJ-AUX-2.PL
'you tell them'
b. *yawidɨyyɛmɨllɛy*
y-awid-∅-yyɛm-ll-ɛy
3-tell.IPFV-PL-3.PL.OBJ–AUX-3.PL
'they tell them' (Wetter 2010: 392, 394)

This fact is striking since the same plural morpheme in the second person verb in (126a) is not liable to disappear in the same context.

It is unlikely that deletion of the plural suffix in the third person occurs during prosodification of the verbal complex to comply with foot structure requirements of the language, given that an epenthetic ɨ is inserted between the verb stem and the object clitic in (126b); I see no good reason why a phonological rule would delete an underlying *u* vowel just to trigger a repair process of epenthesis. Furthermore, even if we were willing to admit that the verbs in (126a) and (126b) are syllabified differently (note that the form of suffixal agreement on the auxiliary varies between the two), and therefore entertain the idea that phonological operations might target *u* only in the third person plural, there are nonetheless near minimal pairs bearing out the *u*~∅ alternation which do not seem amenable to such an analysis. The relevant data come from imperative and jussive verbs in Argobba, where the distribution of the plural suffix *u* is essentially identical to that of imperfective verbs.[56] Crucially, *u* still disappears only in the context of third person agreement, even when the syllable structures and overall phonological environments between the second and third person verbs are nearly identical, as shown in (127).

(127) a. *ʔawiduyyɛm*
awid-**u**-yyɛm
tell.IMV-2.PL-3.PL.OBJ

[56]These verb forms have a non-overlapping distribution according to person features: jussives are used with first and third person subjects, whereas imperatives are used with second person subjects. Although the second person *t* prefix is absent in the imperative (on which see the discussion above and in Kramer (2019)), a glottal stop is epenthesized to the vowel-initial stem to comply with the language's preference for C-initial syllables (Wetter 2010: 42).

'tell (pl) them!'

b. *yawidɨyyɛm*
y-awid-∅-yyɛm
3-tell.JUS-3.PL-3.PL.OBJ
'they shall tell them' (Wetter 2010: 394)

Without a clear phonological motivation for deleting the plural *u* suffix just in case the verb also bears third person features, I propose to analyze the *u*~∅ alternation as one of contextual allomorphy: ∅ occurs in the third person before object clitics[57], and *u* occurs elsewhere. This is essentially the same paradigm as that described for Mehreyyet above, and hence constitutes another barrier to most previous analyses of discontinuous agreement.

Before moving on, however, it is important to note that the -∅ realization of the plural suffix cannot be due to post-syntactic *Obliteration*. Obliteration, as defined in Arregi and Nevins (2012: 9), is a radical kind of Impoverishment which deletes the entire terminal node, rather than deleting a particular feature on a terminal. As Arregi and Nevins point out, the presence of Obliteration rules can be diagnosed by the presence or absence of allomorphy which is sensitive to the affected node. Just such a diagnostic is available in the case of the Argobba suffix: the form of the object clitic is conditioned by features of the preceding subject-marking suffix. Object clitics (excluding applicatives) have three allomorphs in the third person, but only two allomorphs for first and second persons.[58] I will diverge from the descriptive literature which refers to these allomorphs as "Light" and "Heavy" variants (recalling the traditional classification of object clitics in the related Gurage languages, see Banksira 2000; Hetzron 1977; Rose 1996, 2007) and instead call the three allomorphs "A", "B", and "C" to avoid confusion with "light" and "heavy" terminology in the phonological literature. The allomorphs are listed in (128) below.

(128) A, B, and C object clitics of Argobba of Shonke and T'ollaha

[57] And object clitics only: the plural suffix is realized as *u* before other overt phonological material such as the negative morpheme *m*.

(i) *ayawidum*
al-y-awid-**u**-m
NEG-3-tell.IPFV-PL-NEG
'they don't tell' (Wetter 2010: 407)

[58] I assume that the deficient paradigms with local persons can be captured via underspecification in vocabulary entries.

	A	B	C
1SG	-ɲ(ɲ)	-ɲ(ɲ)	-ɲ(ɲ)
2MSG	-ɛx	-ɛx	-kk
2FSG	-ɛš	-ɛš	-čč
3MSG	-ɛy	-ɛbb	-yy/-i
3FSG	-ɛya	-ɛbba	-yya
1PL	-ɛna	-ɛna	-nna
2PL	-ɛxum	-ɛxum	-kkum
3PL	-ɛyem	-ɛbbem	-yyɛm

Though the distribution of these allomorphs is extremely intricate, one intriguing generalization is that the C allomorph is always selected when following a verb bearing subject agreement features in the set {2.F.SG, 2.PL, 3.PL}, as shown in (129).[59]

(129) C clitics always occur after verbs bearing 2.F.SG, 2.PL, or 3.PL agreement

a. 2.F.SG
tawidiyyɛmɨllɨš
t̲-awid-i̲-**yy**ɛ**m**-ll-š
2-tell.IPFV-2.F.SG-3.PL.OBJ-AUX-2.F.SG
'you (f.sg) tell them'

b. 2.PL
tawiduyyɛmlluxum
t̲-awid-u̲-**yy**ɛ**m**-ll-uxum
2-tell.IPFV-PL-3.PL.OBJ-AUX-2.PL
'you tell them'

c. 3.PL
ʔ*awideyyɛm*
awid-e̲-**yy**ɛ**m**
tell.PFV-3.PL-3.PL.OBJ
'they told them' (Wetter 2010: 394)

After verbs bearing other φ-featural agreement, we find the A and B allomorphs. I list only examples with B allomorphs in (130) for simplicity.

(130) B clitics occur after verbs bearing 2.M.SG and 3.M.SG agreement, a.o.

[59] A full description of the distribution of these allomorphs is given in (i).

(i) Distribution of object clitic allomorphs in Argobba
  a. A clitics occur…
    i. After suffix conjugation subject agreement suffixes bearing features in the set {1sg, 2msg, 3msg, 3fsg, 1pl}
    ii. After converb agreement suffixes bearing features in the set {2msg, 1pl}
  b. B clitics occur after prefix conjugation agreement suffixes bearing features in the set {1sg, 2msg, 3msg, 3fsg, 1pl}
  c. C clitics occur…
    i. After all subject agreement suffixes bearing features in the set {2fsg, 2pl, 3pl}
    ii. After converb agreement suffixes bearing features in the set {1sg, 3msg, 3fsg,}

a. 2.M.SG
tawidɛbbemɨllɨx
t̲-awid-ɛ**bbem**-ll-x
2-tell.IPFV-3.PL.OBJ-AUX-2.M.SG
'you tell them'

b. 3.M.SG
yawidɛbbemɛll
y̲-awid-ɛ**bbem**-ɛll-∅
3-tell.IPFV-3.PL.OBJ-AUX-3.M.SG
'he tells them' (Wetter 2010: 394)

Relevant to the Obliteration question from above is the fact that the C allomorph for object clitics is selected with third person plural verbs, despite the lack of an overt subject agreement suffix. Compare (131) with the phonologically similar third person masculine singular verb in (130b), where the B allomorph, rather than the C allomorph, is selected.

(131) *yawidɨyyɛmɨllɛy*
y̲-awid-∅̲-yyɛm-ll-ɛy
3-tell.IPFV-PL-3.PL.OBJ–AUX-3.PL
'they tell them' (Wetter 2010: 394)

I propose that third person plural features must be underlyingly present in (131) to trigger allomorphy on the object clitic at Vocabulary Insertion. Therefore, such examples cannot involve Obliteration of the discontinuous agreement suffix.

In summary, I have argued that janus-faced allomorphy in discontinuous agreement is not accounted for by any theory which ties Fission directly to Vocabulary Insertion. As the data from Mehreyyet and Argobba have illustrated, discontinuous agreement affixes can exhibit impure discontinuities simultaneously with allomorphy sensitive to the surface linear order of morphemes. These patterns are problematic for theories which analyze impure discontinuities as a species of allomorphy (e.g., Campbell 2012; Harbour 2008a), since these theories will always require at least one of the triggers for allomorphy to be non-local. By contrast, these data provide strong evidence in favor of the conceptualization of Fission laid out in Arregi and Nevins (2012) and adopted here: impure discontinuities are predicted by feature copying, and variation in the form of a suffix in its surface linear position is true allomorphy.

Thus, the preceding sections have argued the following points at length: (1) Fission must involve feature copying in order to account for impure discontinuities; (2) Displacement must precede Vocabulary insertion to predict allomorphy of displaced affixes conditioned at their surface positions; (3) Impoverishment must precede Fission in order for third feminine singular author Impoverishment to bleed non-author Fission. These

conclusions support the modular view of the post-syntactic component as laid out in Arregi and Nevins (2012) and demonstrate that post-syntactic operations cannot be reduced to Vocabulary Insertion (contra Trommer 1999). Finally, the contrast between attested and unattested patterns of allomorphy in discontinuous agreement provide interesting fodder for future research into the nature of locality in post-syntactic rules. It may turn out that different kinds of rules can make reference to different domains. For instance, Bobaljik (2012: 142, fn. 3) observes that vocabulary entries which make reference to word boundaries in their contextual specifications seem to open a possible back door source for unattested ABA patterns in comparative morphology. With a rule as in (132), the comparative form could be targeted independently of the superlative.

(132) $\sqrt{} \leftrightarrow x$ / ___] CMPR] #

Bobaljik proposes two solutions to this issue. First, it could be the case that the word boundary, notated # in (132), is morphophonological, and hence only available after the root has been vocabularized. Second, there could be an adjacency condition on allomorphy such that the trigger for suppletive allomorphy must be adjacent to the targeted root. Returning to Semitic discontinuous agreement, the Wolane data seem to demand that word boundaries such as # be referenced in vocabulary entries (see example (109)). Thus, if the locality conditions which constrain allomorphy of roots and of other terminal nodes are the same, then it cannot be the case that the symbol # is invisible for the purposes of suppletion. The Wolane data thus provide provisional support for Bobaljik's adjacency hypothesis (see also Embick 2010).

In the final section, I will demonstrate that the operations I have proposed—in particular, Impoverishment, Fission, and Long-distance Metathesis—explain microvariation in Semitic discontinuous agreement paradigms.

5 Extending the analysis

In the following subsections, I demonstrate the flexibility of the analysis proposed in Section §3 and defended in Section §4 in accounting for variation in the exponence of φ-featural agreement across Semitic. First, I will discuss extensions of discontinuous agreement to the first person in the Gurage languages of Ethiopia (see Meyer 2019) and in North African Arabic varieties. In the following subsection, I provide further evidence that the order of terminals produced by Fission is regulated by the relative markedness of the targeted features. I show that the presence of third person feminine prefixes in Modern Standard Arabic must be accounted for via a general tendency for more marked features to occur leftmost in discontinuous agreement.

5.1 Variation in the realization of first person plural agreement

One of my main motivations for considering discontinuous agreement to be the result of post-syntactic operations, and not the product of multiple distinct heads probing a single goal in the syntax, has been that discontinuous agreement is lacking in certain cells of most Semitic agreement paradigms. Take the preterite prefix conjugation from Old Babylonian Akkadian in (133), where agreement affixes are underlined and first person agreement is additionally bolded.

(133) Old Babylonian preterite conjugation $\sqrt{\text{prs}}$ 'cut'

	Singular	Plural
1	**a**-prus	**ni**-prus
2M	ta-prus	ta-prus-ā
2F	ta-prus-ī	ta-prus-ā
3	i-prus	i-prus-ū

Whereas second and third person agreement is discontinuous (at least in the plural cells), first person agreement is marked solely by the presence of a prefix: *ʔa-* in the singular, *ni-* in the plural. This observation led me to posit the non-author Fission rule in (67) above, with the result that only T/Asp nodes specified as [–author] would undergo Fission. This is not the whole story, however. In several Semitic languages, agreement with a first person plural subject in the prefix conjugation is also marked by multiple affixes on the verb.[60] The aim of this section is to discuss two patterns of multiple affixation in first person plural agreement, showing how each can be accounted for.

The first set of languages is represented here by Gumer (/gumər/), a Semitic language of Ethiopia belonging to the West Gurage subbranch of Southern Ethiopian Semitic, closely related to Chaha (Meyer 2019; Völlmin 2017). In Gumer affirmative, matrix, imperfective, indicative contexts, first person singular agreement is marked by the prefix ə- and first person plural agreement is marked by the presence of both a prefix and a suffix, as shown in (134).[61] Note that [ɨ] is the general epenthetic vowel in the language, so the first person plural affixes should be represented underlyingly as *n-* and *-nə*, respectively (see Völlmin 2017: 32–37).

(134) Gumer imperfective first person agreement $\sqrt{\text{kft}}$ 'open'

	Singular	Plural
1	ə-kəft	**n**ɨ-kəft-ɨ**n**ə

[60] As far as I can tell, no language doubly marks first person in the suffix conjugation. I will not attempt to derive this generalization here, though it is remarkable given the fact that suffixal agreement is often amenable to decomposition in the second and third persons. See my discussion in Section §3.2 for more details.

[61] Similar facts hold for Chaha, on which see Banksira 2000: 242–252 and Rose 2007: 417, and for the Argobba variety of Aliyu Amba, on which see Leslau 1997: 48.

However, whenever the first person singular prefix is non-initial in the morphological word, it surfaces as *n*-.

(135) Non-initial first person prefixes are always *n*-

a. Gumer negative imperfective
a-**n**-kəft
NEG-1-open.IPFV
'I don't/won't open'

b. Gumer subordinated imperfective
tɨ-**n**-cot
when-1-work.IPFV
'when I work' (Völlmin 2017: 139, 157)

Thus, in non-initial contexts, there is a systematic syncretism between the first person prefixes. This pattern thus closely parallels the Wolane data from Section §4.3.

I propose that multiple exponence of subject agreement in the first person plural in Gumer is the result of the Doubling rule in (136).

(136) First person plural Doubling in Gumer

a. Structural description: $[_{\text{Asp}^{0\text{max}}}\ \sqrt{}\ \text{v Voice Asp}_{\text{[+author, -singular, -perfective]}}$

b. Structural change:

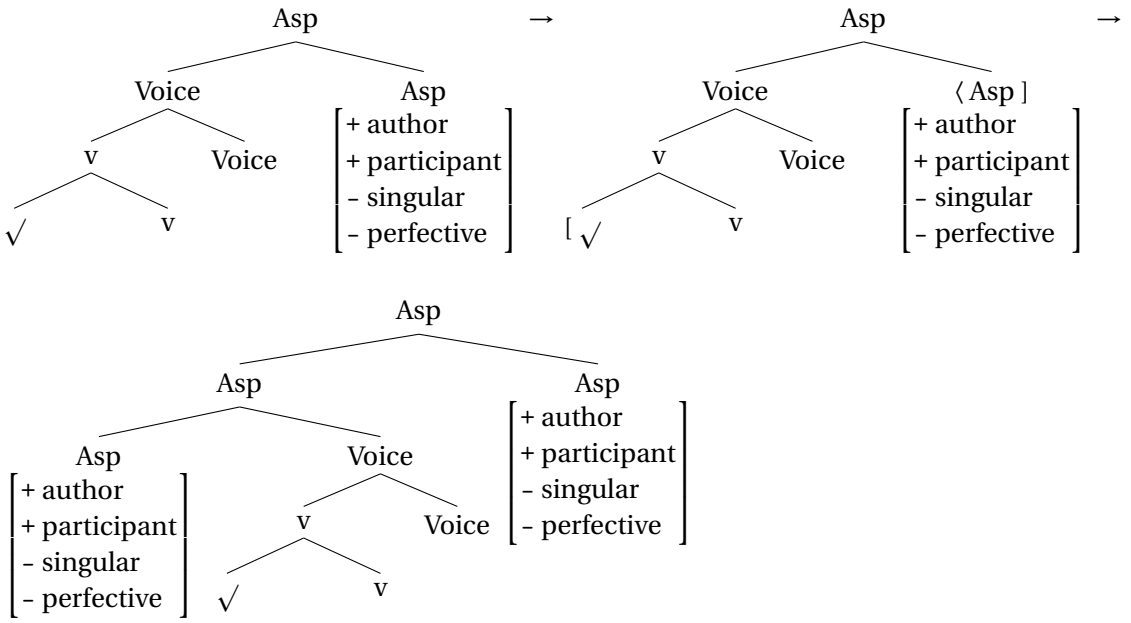
i. Insert [to the immediate left of $\sqrt{}$, and] to the immediate right of $\text{Asp}_{\text{[+author, -singular, -perfective]}}$.

ii. Insert ⟨ to the immediate left of $\text{Asp}_{\text{[+author, -singular, -perfective]}}$.

As I discussed in Section §3.3, Doubling rules have essentially the same character as Metathesis rules in the Generalized Reduplication framework of Harris and Halle (2005), the difference being that Metathesis rules combine two angle brackets inside the domain of reduplication, while Doubling rules use only a single angle bracket. Application of the this Doubling rule will create a copy of Asp on either side of the verb stem *only* when Asp bears the features [+author, -singular, -perfective].[62] I illustrate a Doubling derivation for the first person plural verb *n*ɨ-*k*ə*ft*-ɨ*n*ə 'we open' in (137) (I abstract away from the position and realization of T in what follows, though see Rose 2007 for discussion of T in the closely related language Chaha).

(137) Doubling of non-fissioned Asp in Gumer: *n*ɨ-*k*ə*ft*-ɨ*n*ə 'we open'

[62] I assume that the morphotactic constraint which drives displacement more broadly in Semitic, which I defined as T-Initiality above, is satisfied by the Doubling rule in (136). When Doubling and Long-distance Metathesis compete to alter a given input structure, Doubling will always apply when its structural description is met via Subset Principle reasoning: the structural description of the Doubling rule in (136) is contained within the structural description of Long-distance Metathesis in (82) (*modulo* the variation between Asp and T). Application of Doubling will then bleed the more general Long-distance Metathesis rule, since both are specified to only occur when the verb stem is left-most within the relevant domain, here taken to be a maximal 0-level projection of the targeted complex head.



The vocabulary entries which realize first person agreement in Gumer are given in (138).

(138) Vocabulary entries for Gumer first person agreement

a. $\begin{bmatrix}\text{Asp}\\ \text{+ author}\\ \text{+ participant}\\ \text{– perfective}\\ \text{+ singular}\end{bmatrix}$ ↔ ə / # ___ (1sg word-initial prefix)

b. $\begin{bmatrix}\text{Asp}\\ \text{+ author}\\ \text{+ participant}\\ \text{– perfective}\end{bmatrix}$ ↔ *n* (elsewhere) (1 elsewhere prefix)

c. $\begin{bmatrix}\text{Asp}\\ \text{+ author}\\ \text{+ participant}\\ \text{– singular}\\ \text{– perfective}\end{bmatrix}$ ↔ *n*ə / Voice^0 ___ (1pl suffix)

In the case of the first person singular, the rules in (138a) and (138b) will compete for insertion. If the Asp morpheme in question is word-initial, the more specific rule in (138a) will apply in accordance with the Subset Principle, and otherwise (138b), which lacks a contextual specification, will apply. In the case of the first person plural, Doubling will displace an Asp morpheme to the left edge of the verb stem, which can then only be matched by the rule in (138b). Likewise, the stranded Asp affix can only be matched by the rule in (138c). My analysis thus correctly derives the fact that the prefix and suffix are *both* specific to the first person. Previous accounts of discontinuous agreement which link the presence of multiple affixation to the consumption of undischarged features fail to predict this pattern.[63]

[63] This analysis can be trivially extended to account for the Wolane paradigm in (104), where I submit that first person prefixal agree-

The second group of languages in which first person agreement in the prefix conjugation is marked by multiple affixation is North African Arabic. Consider the Moroccan Arabic paradigm in (139).

(139) Moroccan Arabic prefix conjugation $\sqrt{\text{ktb}}$ 'write' (Caubet 2009)

	SG	PL
1	**nə**-ktəb	**n**-kətb-**u**
2m	tə-ktəb	t-kətb-u
2f	t-kətb-i	t-kətb-u
3m	yə-ktəb	y-kətb-u
3f	tə-ktəb	y-kətb-u

In contrast Gumer, the suffix attested with first person plural agreement in Gumer is the general plural suffix *-u*. I take this as an indication that Fission has indeed been generalized to all persons in Moroccan Arabic. I therefore propose the following rule for North African Arabic:[64]

(140) Fission for all persons in North African Arabic

$$\begin{bmatrix} \text{T} \\ \alpha \text{ author} \\ \beta \text{ singular} \\ \phi \end{bmatrix} \longrightarrow \begin{bmatrix} \text{T} \\ \alpha \text{ author} \\ \\ \phi \end{bmatrix} \quad \begin{bmatrix} \text{T} \\ \\ \beta \text{ singular} \\ \phi \end{bmatrix}$$

This rule splits up [α author] and [β singular] features on T^0 bearing φ-featural agreement, copying all other features ϕ in the process. By deriving discontinuous agreement in the first person through Fission, we predict that number should not be marked on the prefix, since [β singular] features will be stranded on the suffix after Fission. And in fact, this prediction is borne out: discontinuous first person agreement in Moroccan Arabic utilizes the number-neutral prefix *n-*. I propose the vocabulary entries in (141) to account for the first person agreement data in (142) and (143).

(141) Moroccan Arabic first person vocabulary entries

ment is only accidentally homophonous with the default third person agreement prefix *y-*. As discussed in the main text, only first person prefixes have the non-word-initial allomorph *l(ɛ)-*. The main difference between Wolane and Gumer, then, is that the highly specific rule producing a word-initial allomorph in Wolane will be underspecified for number.

[64] In fact, this rule will likely need to be revised due to the fact that first person agreement is not discontinuous in the suffix conjugation in these languages.

(i) Moroccan Arabic suffix conjugation $\sqrt{\text{ktb}}$ 'write' (Caubet 2009)

	SG	PL
1	ktəb-**t**	ktəb-**na**

A more accurate description would thus need to define two Fission rules: one which applies for all persons in the prefix conjugation, and a more specific non-author rule for the suffix conjugation.

a. $\begin{bmatrix} \text{T} \\ \text{+ participant} \\ \text{+ author} \end{bmatrix} \leftrightarrow$ n (1)

b. $\begin{bmatrix} \text{T} \\ \text{– singular} \end{bmatrix} \leftrightarrow$ u (pl)

c. $[\text{T}] \leftrightarrow \varnothing$ (sg else)

(142) Fission of Moroccan Arabic first person singular prefix conjugation

a. nə-ktəb-∅
1-write-SG
'I write'

b.

$$\begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \\ \text{+ singular} \\ \text{– past} \end{bmatrix} \xrightarrow[\text{by (140)}]{\text{Fission}} \begin{array}{cc} \begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \\ \\ \text{– past} \end{bmatrix} & \begin{bmatrix} \text{T} \\ \\ \text{+ participant} \\ \text{+ singular} \\ \text{– past} \end{bmatrix} \\ n & \varnothing \\ \text{by (141a)} & \text{by (141c)} \end{array}$$

(143) Fission of Moroccan Arabic first person plural prefix conjugation

a. n-kətb-u
1-write-PL
'we write'

b.

$$\begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \\ \text{– singular} \\ \text{– past} \end{bmatrix} \xrightarrow[\text{by (140)}]{\text{Fission}} \begin{array}{cc} \begin{bmatrix} \text{T} \\ \text{+ author} \\ \text{+ participant} \\ \\ \text{– past} \end{bmatrix} & \begin{bmatrix} \text{T} \\ \\ \text{+ participant} \\ \text{– singular} \\ \text{– past} \end{bmatrix} \\ n & \varnothing \\ \text{by (141a)} & \text{by (141b)} \end{array}$$

In summary, I have argued in this section that the general framework I proposed in Section §3 is equipped to explain variation in the realization of discontinuous first person agreement in Semitic. In the case of Gumer (and Gurage languages more broadly), discontinuous agreement was argued to arise from a Doubling rule that creates a copy of Asp to the left of the verb. My analysis crucially relies on the Generalized Reduplication framework which models morphological metathesis and reduplication with the same underlying set of operations. Moreover, I argued that discontinuous agreement in the North African Arabic first person is best analyzed as an extension of Fission. In the next (and final) subsection, I will discuss the interaction between featural markedness and Fission, explicitly arguing for the hierarchical organization of φ-features assumed in rules like (140).

5.2 On markedness and the hierarchy of φ-features

In Section §3, I hypothesized an update to Arregi and Nevins' (2012) definition of Fission which I have been assuming throughout this paper. Based on the observation that person features consistently precede number/gender features in discontinuous agreement cross-linguistically (see Campbell 2012; Harbour 2008a; Trommer 2003b), I proposed the structure preservation rule in (144) (repeated here from (51)).

(144) **Structure preservation in Fission**
Given two features F_1 and F_2 on a syntactic terminal X^0 which are targeted by a Fission rule $\mathscr{F}$, such that F_1 is higher in X^0's φ-structure than F_2, $\mathscr{F}$ linearizes F_1 to the left and F_2 to the right.

The result is that Fission inherently imposes a linear order on the two output nodes. The logic underlying this constraint is that more marked features—which, by hypothesis, occur higher in the φ-set—are linearized to the left under Fission. Given the general nature of this structure preservation rule, I predict that we should find other pairs of discontinuous agreement morphemes occurring in the order "marked > unmarked". I propose that the third person feminine singular/dual prefix *ta-* in Modern Standard Arabic constitutes just such a case.

Consider the paradigm of Modern Standard Arabic third feminine agreement in the prefix conjugation in (145): the prefix *ta-* appears in both the singular and dual cells, whereas the default prefix *ya-* is used in the plural.

(145) Modern Standard Arabic third person feminine jussive $\sqrt{\text{ktb}}$ 'write'

	SG	DL	PL
3.F	**ta**-ktub	**ta**-ktub-**a:**	ya-ktub-na

As I argued in Section §3.1, the feminine *t* affix in Semitic does not realize person features, but instead only marks number/gender agreement (see also Harbour 2008b). Consequently, I posited an Impoverishment rule which deletes author features on a node also specified as [–participant, +singular, +feminine].

(146) Third feminine singular author impoverishment

$$\begin{bmatrix} \text{T} \\ \text{– author} \\ \text{– participant} \\ \text{+ singular} \\ \text{+ feminine} \end{bmatrix} \longrightarrow \begin{bmatrix} \text{T} \\ \\ \text{– participant} \\ \text{+ singular} \\ \text{+ feminine} \end{bmatrix}$$

This rule has the effect of bleeding non-author Fission since Impoverishment rules precede Fission (see (97)). This is a welcome result for the third feminine singular, where no Semitic language seems to exhibit discontinuous agreement. However, third feminine dual agreement in (145) is patently discontinuous (a *ta-* prefix and *-a:* suffix) and therefore demands a Fission-style analysis in my system.

Given that the prefix *ta-* is attested with both singular and dual agreement, an Impoverishment rule like the one in (146) must have applied in both cases blocking non-author Fission. Assuming the features [±singular] and [±plural] to distinguish singular, dual, and plural in Modern Standard Arabic, we can propose the Impoverishment rule in (147) to account for this syncretism: this rule targets T morphemes specified as [–augmented], a feature shared between the singular and dual, and therefore will never apply in the plural which is [+augmented].

(147) Modern Standard Arabic third feminine non-plural impoverishment

$$\begin{bmatrix} \text{T} \\ \text{– author} \\ \text{– participant} \\ \text{– augmented} \\ \text{+ feminine} \end{bmatrix} \longrightarrow \begin{bmatrix} \text{T} \\ \\ \text{– participant} \\ \text{– augmented} \\ \text{+ feminine} \end{bmatrix}$$

Non-author Fission cannot apply to the output of the Impoverishment rule in (147) in the third feminine dual since the targeted node will lack an [author] feature. Instead, I propose that Modern Standard Arabic has innovated a Fission rule which applies only in the highly marked scenario of third feminine dual agreement. Rather than splitting up person and number features, however, this rule separates the number features [±augmented] and [±singular].

(148) Modern Standard Arabic third feminine dual Fission

$$\begin{bmatrix} \text{T} \\ \\ \text{– participant} \\ \boxed{\text{– augmented}} \\ \boxed{\text{– singular}} \\ \text{+ feminine} \\ \phi \end{bmatrix} \longrightarrow \overset{\frown}{\begin{bmatrix} \text{T} \\ \\ \text{– participant} \\ \boxed{\text{– augmented}} \\ \\ \text{+ feminine} \\ \phi \end{bmatrix} \begin{bmatrix} \text{T} \\ \\ \text{– participant} \\ \\ \boxed{\text{– singular}} \\ \text{+ feminine} \\ \phi \end{bmatrix}}$$

This rule takes for granted that [±augmented] features dominate [±singular] features in the φ-set, though we can demonstrate this fact empirically. Recall the syncretism between the third feminine singular and dual prefixes (i.e. *ta-*) to the exclusion of third feminine plural (i.e. *ya-*). The only features shared between the third feminine singular and dual after Fission which could be matched by a single vocabulary entry are [–participant], [–augmented], and [+feminine].

(149) Feature structures of third feminine agreement in Modern Standard Arabic (post-Fission)

a. Third feminine singular
$$\begin{bmatrix} \text{T} \\ \\ \text{– } \textbf{participant} \\ \text{– } \textbf{augmented} \\ \text{+ singular} \\ \text{+ } \textbf{feminine} \end{bmatrix}$$

b. Third feminine dual
$$\begin{bmatrix} \text{T} \\ \\ \text{– } \textbf{participant} \\ \text{– } \textbf{augmented} \\ \text{– singular} \\ \text{+ } \textbf{feminine} \end{bmatrix}$$

c. Third feminine plural
$$\begin{bmatrix} \text{T} \\ \\ \text{– participant} \\ \text{+ augmented} \\ \text{– singular} \\ \text{+ feminine} \end{bmatrix}$$

Since I have argued that *ta-* does not realize person features, the only features remaining which could be matched in both the singular and dual are [–augmented] and [+feminine]. This in turn entails that augmented features are linearized to the left in third feminine dual Fission, since *ta-*, the leftmost agreement morpheme, must realize [–augmented, +feminine]. The following vocabulary entries capture the distribution of third feminine agreement in Modern Standard Arabic.

(150) Vocabulary entries for Modern Standard Arabic third person feminine

a. $\begin{bmatrix} \text{T} \\ \text{– augmented} \\ \text{+ feminine} \\ \text{– past} \end{bmatrix} \leftrightarrow ta$

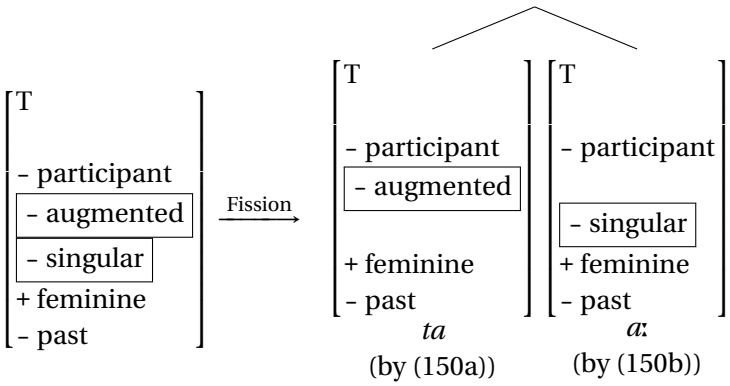
b. $\begin{bmatrix} \text{T} \\ \text{– singular} \\ \text{– past} \end{bmatrix} \leftrightarrow a\text{:}$

c. $\begin{bmatrix} \text{T} \\ \text{– past} \end{bmatrix} \leftrightarrow ya$

d. $\begin{bmatrix} \text{T} \\ \text{– singular} \\ \text{+ augmented} \\ \text{+ feminine} \\ \text{– past} \end{bmatrix} \leftrightarrow na$

Before moving on, it is worth seeing in detail how this system derives the third feminine dual. After third feminine non-plural impoverishment has deleted the feature [–author], third feminine dual Fission as stated in (148) will separate [–augmented] from [–singular] in the context of the features [–participant, +feminine], copying all orthogonal features in the process. Next, at Vocabulary Insertion, the entries in (150a) and (150b) will match the left and right fissioned nodes, respectively. The Fission and Vocabulary Insertion steps of the derivation are shown in (151).

(151)



There is a further motivation for placing [±augmented] higher in the φ-set than [±singular]: augmented agreement is more marked than singular agreement in Semitic. As observed by Arregi and Nevins (2012: 204), marked feature values induce more neutralizations than their unmarked counterparts. In Modern Standard Arabic, gender agreement is neutralized in the second person dual, though it is present in both the second person singular and plural.

(152) Modern Standard Arabic second person jussive $\sqrt{\text{ktb}}$ 'write'

	SG	DL	PL
2M	ta-ktub-∅	ta-ktub-**a:**	ta-ktub-u:
2F	ta-ktub-i:	ta-ktub-**a:**	ta-ktub-na

The present analysis offers a principled connection between the relatively marked status of [±augmented] features and the fact that augmented features are linearized to the left when targeted by the Fission rule in (148): this is simply a correllary of the structure preservation rule in (144), whereby more marked features are linearized to the left. Previous analyses have focused predominantly on the "person-left, number-right" generalization and have consequently overlooked this general property of Fission. I submit that the linearization of third feminine dual agreement in Modern Standard Arabic provides strong support for the architecture of φ-features and the post-syntactic component argued for here.

6 Conclusion

Although Semitic discontinuous agreement has been discussed extensively in the previous literature on Distributed Morphology, going back to Rolf Noyer's (1992) MIT dissertation, the basic facts have continued to challenge theories of the post-syntactic component. My aim in this paper has been to simultaneously cast a broad and a deep net: broad enough to admit interesting and thought-provoking microvariation in the exponence of φ-agreement, and deep enough to adequately account for these data with an explicit set of articulated

operations. By assuming just a handful of operations, I have argued that we can account for the majority of Semitic discontinuous agreement paradigms: (i) first person and third person feminine impoverishment rules, (ii) non-author Fission, and (iii) morphological metathesis of T/Asp. I count the flexibility and generalizability of the present analysis as one of its core strengths. Crucially, however, the operations as defined here are not unconstrained: they are restricted to certain local domains (e.g. the linear adjacency restriction on vocabulary entries discussed in Section §4), they are sensitive to relative feature markedness encoded in terms of dominance relations among φ-features, and they are serially ordered. All but the last constraint are plausibly related to meta-constraints which hold of other operations in the grammar in general (e.g. locality and markedness). By grounding these operations in more abstract linguistic principles, I have tried to reduce the number of ad hoc stipulations in my account, many of which have plagued previous accounts of discontinuous agreement. This is in line with the *Crossmodular Structural Parallelism* hypothesis laid out in Arregi and Nevins (2012), whereby mechanisms used at one level of language (e.g. phonology) are expected to be recycled at other levels of language. For instance, by connecting the "person-left, number-right" generalization identified in previous literature with a general preference for more marked features to be linearized to the left in Fission, I have eliminated the need for language-specific ordering rules. What's more, by modeling morpheme displacement in the Generalized Reduplication framework, I straightforwardly predict the presence of Doubling structures as in the Gumer first person plural, as discussed in Section §5.1.

My analysis also sheds light on the nature of Fission as a post-syntactic operation. One of the central arguments of this paper has been that Fission cannot be reduced to Vocabulary Insertion, as has been frequently assumed. Rather, the presence of allomorphy in discontinuous agreement which is always defined over the surface string of morphemes requires that Fission, displacement, and Vocabulary Insertion be teased apart, as argued at length in Section §4. Thus, the radically reductionist stance taken in Trommer (1999) that all post-syntactic operations can be distilled into Vocabulary Insertion is untenable. Finally, by hypothesizing that Fission inherently imposes a linear order on the two resulting output nodes, I make a strong, testable set of predictions: more marked features should tend to come to the left in discontinuous agreement, *ceteris paribus*. I leave this matter as an open question for future research which may determine whether or not the explanation I have given for the "person-left, number-right" generalization is satisfying. Potentially relevant data may come from discontinuous realizations of tense and aspect in many languages, as discussed in Campbell (2012).

References

Adger, David, Daniel Harbour, and Laurel J Watkins. 2009. *Mirrors and Microparameters: Phrase Structure Beyond free word order*. 122. Cambridge University Press.

Aoun, Joseph E., Elabbas Benmamoun, and Lina Choueiri. 2010. *The Syntax of Arabic*. Cambridge: Cambridge University Press.

Arregi, Karlos, and Andrew Nevins. 2012. *Morphotactics: Basque Auxiliaries and the Structure of Spellout*. Dordrecht: Springer.

Arregi, Karlos, and Andrew Nevins. 2018. Beware Occam's syntactic razor: Morphotactic analysis and Spanish mesoclisis. *Linguistic Inquiry* 49:625–683.

Arregi, Karlos, and Asia Pietraszko. 2018. Generalized head movement. *Proceedings of the Linguistic Society of America* 3:1–15.

Arregi, Karlos, and Asia Pietraszko. To appear. The ups and downs of head movement. *Linguistic Inquiry* Accessed at lingbuzz/004096.

Baier, Nicholas. 2018. Anti-Agreement. Doctoral Dissertation, UC Berkeley.

Baker, Mark. 1985. The mirror principle and morphosyntactic explanation. *Linguistic inquiry* 16:373–415.

Banksira, Degif Petros. 1999. Chaha Subject Affixes as Two Independent Heads. In *Papers on Morphology and Syntax, Cycle One*, ed. Karlos Arregi, Benjamin Bruening, Cornelia Krause, and Vivian Lin, volume 33 of *MIT Working Papers in Linguistics*, 27–46.

Banksira, Degif Petros. 2000. *Sound Mutations: The Morphophonology of Chaha*. Philadelphia/Amsterdam: John Benjamins.

Béjar, Susana. 2003. *Phi-Syntax: A Theory of Agreement*. University of Toronto Doctoral dissertation.

Béjar, Susana, and Milan Rezac. 2009. Cyclic agree. *Linguistic Inquiry* 40:35–73.

Bobaljik, Jonathan David. 2000. The ins and outs of contextual allomorphy. *University of Maryland Working Papers in Linguistics* 10:35–71.

Bobaljik, Jonathan David. 2012. *Universals in Comparative Morphology: Suppletion, Superlatives, and the Structure of Words*, volume 50. MIT Press.

Bruening, Benjamin. 2017. Consolidated Morphology: A non-distributed, purely syntactic theory of morphology. Ms. University of Delaware.

Bulakh, Maria. 2014. Multiple exponence in the long prefix conjugation of the Transversal South Ethio-Semitic languages. In *Explorations in Ethiopian Linguistics: Complex Predicates, Finiteness and Interrogativity*, ed. Ronny Meyer, Yvonne Treis, and Azeb Amha, 149–178. Wiesbaden: Harrassowitz Verlag.

Bulakh, Maria. 2019. Tigrinya. In *The Semitic Languages*, ed. John Huehnergard and Na'ama Pat-El, 174–201. London/New York: Routledge, 2nd edition.

Calabrese, Andrea. 2003. On fission and impoverishment in the verbal morphology of the dialect of Livinallongo. In *The Syntax of Italian Dialects*, ed. Christina Tortora, 3–30. Oxford University Press.

Campbell, Amy. 2012. The Morphosyntax of Discontinuous Exponence. Doctoral Dissertation, University of California, Berkeley.

Caubet, Dominique. 2009. Moroccan Arabic. In *Encyclopedia of Arabic Language and Linguistics*, ed. Lutz Edzard and Rudolf de Jong. Leiden: Brill.

Coon, Jessica. 2010. Complementation in Chol (Mayan): A theory of split ergativity. Doctoral Dissertation, Massachusetts Institute of Technology.

Demeke, Girma Awgichew. 2003. The Clausal Syntax of Ethio-Semitic. Doctoral Dissertation, University of Tromsø.

Demeke, Girma Awgichew. 2015. *Argobba Speech Varieties. Volume One: Comparison*. Trenton, New Jersey: Red Sea Press.

Embick, David. 2010. *Localism versus Globalism in Morphology and Phonology*, volume 60. Cambridge, MA: MIT Press.

Embick, David, and Rolf Noyer. 2001. Movement operations after syntax. *Linguistic inquiry* 32:555–595.

Fassi Fehri, Abdelkader. 2000. Distributing features and affixes in Arabic subject verb agreement paradigms. In *Research in Afroasiatic Grammar: Papers from the Third Conference on Afroasiatic Languages. Sophia Antipolis, France, 1996*, ed. Jacqueline Lecarme, Jean Lowenstamm, and Ur Shlonsky, 79–100. Amsterdam/Philadelphia: John Benjamins Publishing Company.

Gibson, Maik. 2009. Tunis Arabic. In *Encyclopedia of Arabic Language and Linguistics*, ed. Lutz Edzard and Rudolf de Jong. Leiden: Brill.

González-Poot, Antonio, and Martha McGinnis. 2006. Local versus long-distance fission in Distributed Morphology. In *Proceedings of the 2005 Annual Conference of the Canadian Linguistic Association*, ed. Claire Gurski. Http://westernlinguistics. ca/ Publications/CLA-ACL/CLA-ACL2005.html.

Gragg, Gene. 2019. Semitic and Afro-Asiatic. In *The Semitic Languages*, ed. John Huehnergard and Na'ama Pat-El, 22–48. London/New York: Routledge, 2nd edition.

Gutt, Ernst-August. 1997. Concise grammar of Silt'e. In *Silt'e–Amharic–English Dictionary (with Concise Grammar by Ernst-August Gutt)*, ed. Eeva H. M Gutt and Hussein Mohammed Mussa, 896–957. Addis Ababa: Addis Ababa University Press.

Halle, Morris. 2000. Distributed Morphology: Impoverishment and fission. In *Research in Afroasiatic Grammar: Papers from the Third Conference on Afroasiatic Languages. Sophia Antipolis, France, 1996*, ed. Jacqueline Lecarme, Jean Lowenstamm, and Ur Shlonsky, 125–149. Amsterdam/Philadelphia: John Benjamins Publishing Company.

Halle, Morris, and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In *The view from building 20*, ed. Kenneth Hale and Samuel Jay Keyser, 111–176. Cambridge, MA: MIT Press.

Halle, Morris, and Alec Marantz. 1994. Some key features of distributed morphology. In *Papers on phonology and morphology*, ed. Andrew Carnie, Heidi Harley, and Tony Bures, 275–288. Cambridge, MA: MIT Press.

Harbour, Daniel. 2007. Against PersonP. *Syntax* 10:223–242.

Harbour, Daniel. 2008a. Discontinuous agreement and the syntax-morphology interface. In *Phi theory: Phi-features across modules and interfaces*, ed. Daniel Harbour, David Adger, and Susana Béjar. Oxford University Press.

Harbour, Daniel. 2008b. On homophony and methodology in morphology. *Morphology* 18:75–92.

Harbour, Daniel. 2016. *Impossible Persons*. Cambridge, MA: MIT Press.

Harley, Heidi. 2008. When is a syncretism more than a syncretism? Impoverishment, metasyncretism, and underspecification. In *Phi Theory: Phi-features across Modules and Interfaces*, ed. Daniel Harbour, David Adger, and Susana Béjar. Oxford University Press.

Harley, Heidi, and Rolf Noyer. 1999. Distributed morphology. *Glot International* 4:3–9.

Harley, Heidi, and Elizabeth Ritter. 2002. Person and number in pronouns: A feature-geometric analysis. *Language* 78:482–526.

Harris, James, and Morris Halle. 2005. Unexpected plural inflections in Spanish: Reduplication and metathesis. *Linguistic Inquiry* 36:195–222.

Haspelmath, Martin. 1993. The diachronic externalization of inflection. *Linguistics* 31:279–309.

Hasselbach, Rebecca. 2014a. Agreement and the development of gender in semitic (part I). *Zeitschrift der Deutschen Morgenländischen Gesellschaft* 164:33–64.

Hasselbach, Rebecca. 2014b. Agreement and the development of gender in semitic (part II). *Zeitschrift der Deutschen Morgenländischen Gesellschaft* 164:319–344.

Hetzron, Robert. 1972. *Ethiopian Semitic: Studies in Classification*. Manchester University Press.

Hetzron, Robert. 1977. *The Gunnän-Gurage Languages*. Naples: Istituto Orientale di Napoli.

Hetzron, Robert. 2003. Afroasiatic Languages. In *The Major Languages of South Asia, the Middle East and Africa*, 131–135. Routledge.

Hewett, Matthew. 2019. Resumption in Biblical Hebrew. Qualifying Paper, The University of Chicago.

Huehnergard, John. 2011. *A Grammar of Akkadian*, volume 45 of *Harvard Semitic Studies*. Winona Lake, IN: Eisenbrauns, 3rd edition.

Kalin, Laura, and Coppe van Urk. 2015. Aspect splits without ergativity. *Natural language & Linguistic theory* 33:659–702.

Kayne, Richard S. 1994. *The Antisymmetry of Syntax*. Cambridge, MA: MIT Press.

Kramer, Ruth. 2015. *The Morphosyntax of Gender*. Oxford: Oxford University Press.

Kramer, Ruth. 2019. The morphosyntax of discontinuous agreement in Amharic: The case of the missing morphemes. Handout from Penn Linguistics Conference 43.

Leslau, Wolf. 1958. *The Verb in Harari (South Ethiopic)*, volume 21 of *University of California Publications in Semitic Philology*. Berkeley: University of California Press.

Leslau, Wolf. 1995. *Reference Grammar of Amharic*. Otto Harrassowitz Verlag.

Leslau, Wolf. 1997. *Ethiopic Documents: Argobba. Grammar and Dictionary*, volume 47 of *Aethiopistische Forschungen*. Wiesbaden: Harrassowitz Verlag.

Leslau, Wolf. 1999. *Zway Ethiopic Documents: Grammar and Dictionary*, volume 51 of *Aethiopistische Forschungen*. Wiesbaden.

Lumsden, John S, and Girma Halefom. 2003. Verb conjugations and the strong pronoun declension in Standard Arabic. In *Research in Afroasiatic Grammar II: Selected Papers from the Fifth Conference on Afroasiatic Languages, Paris, 2000*, ed. Jacqueline Lecarme, 305–338. Amsterdam/Philadelphia: John Benjamins Publishing Company.

Martinović, Martina. 2019. Interleaving syntax and postsyntax: Spellout before syntactic movement. *Syntax* .

McGinnis, Martha. 2005. On markedness asymmetries in person and number. *Language* 81:699–718.

McGinnis, Martha. 2013. Agree and fission in Georgian plurals. *Distributed Morphology Today: Morphemes for Morris Halle* 39–58.

Merchant, Jason. 2013. Voice and ellipsis. *Linguistic Inquiry* 44:77–108.

Merchant, Jason. 2017. Capturing Perlmutter's Generalization with Selection. Ms., University of Chicago.

Van der Merwe, Christo H, Jacobus A Naudé, and Jan H Kroeze. 2017. *A Biblical Hebrew Reference Grammar*. London/New York: Bloomsbury Publishing, 2nd edition.

Meyer, Ronny. 2005. *Das Zay. Deskriptive Grammatik einer Ostguragesprache (äthiosemitisch)*. Köln: Rüdiger Köppe Verlag.

Meyer, Ronny. 2006. *Wolane. Descriptive Grammar of an East Gurage Language (Ethiosemitic)*. Köln: Rüdiger Köppe Verlag.

Meyer, Ronny. 2019. Gurage (Muher). In *The Semitic Languages*, ed. John Huehnergard and Na'ama Pat-El, 229–256. London/New York: Routledge, 2nd edition.

Nevins, Andrew. 2002. Fission without a license. *Talk presented at Concordia University, Montreal, November* .

Noyer, Robert Rolf. 1992. Features, Positions and Affixes in Autonomous Morphological Structure. Doctoral Dissertation, Massachusetts Institute of Technology.

Pat-El, Na'ama. 2019. Syriac. In *The Semitic Languages*, ed. John Huehnergard and Na'ama Pat-El, 653–678. London/New York: Routledge, 2nd edition.

Pavlou, Natalia. 2018. Morphosyntactic Dependencies and Verb Movement in Cypriot Greek. Doctoral Dissertation, The University of Chicago.

Preminger, Omer. 2009. Breaking agreements: Distinguishing agreement and clitic doubling by their failures. *Linguistic Inquiry* 40:619–666.

Raimy, Eric. 2000. *The Phonology and Morphology of Reduplication*. Berlin: Mouton de Gruyter.

Rose, Sharon. 1996. Allomorphy and morphological categories in Muher. In *Essays on Gurage language and culture. Dedicated to Wolf Leslau on the occasion of his 90th birthday*, 205–227. Wiesbaden: Harrasowitz.

Rose, Sharon. 2007. Chaha (Gurage) Morphology. In *Morphologies of Asia and Africa*, ed. Alan S Kaye, 403–427. Winona Lake, IN: Eisenbrauns.

Rubin, Aaron D. 2018. *Omani Mehri: A New Grammar with Texts*. Leiden/Boston: Brill.

Ryding, Karin C. 2005. *A Reference Grammar of Modern Standard Arabic*. Cambridge: Cambridge University Press.

Shlonsky, Ur. 1989. The hierarchical organization of subject verb agreement. Ms., University of Haifa, Haifa, Israel.

Shlonsky, Ur. 1997. *Clause Structure and Word Order in Hebrew and Arabic: An Essay in Comparative Semitic Syntax*. Oxford: Oxford University Press.

von Soden, Wolfram. 1995. *Grundriss der akkadischen Grammatik*, volume 3., ergänzte Auflage of *AnOr*. Rome: Pontificio Instituto Biblico.

Tourabi, Abderrezzak. 2002. Arabic subject-verb agreement affixes: Morphology, specification and spell-out. *MIT Working Papers in Linguistics* 42:329–356.

Trommer, Jochen. 1999. Morphology consuming syntax' resources: Generation and parsing in a minimalist version of Distributed Morphology. In *Proceedings of the ESSLI Workshop on Resource Logics and Minimalist Grammars*, 469–80.

Trommer, Jochen. 2003a. Feature (non-)insertion in a minimalist approach to spellout. In *Proceedings from the Annual Meeting of the Chicago Linguistic Society*, volume 39, 236–255. Chicago Linguistic Society.

Trommer, Jochen. 2003b. The interaction of morphology and syntax in affix order. In *Yearbook of morphology 2002*, 283–324. Springer.

Tucker, Matthew A. 2011. The morphosyntax of the Arabic verb: Toward a unified syntax-prosody. In *Morphology at santa cruz: Papers in honor of jorge hankamer*, ed. Nicholas LaCara, Anie Thompson, and Matthew A. Tucker.

Tucker, Matthew A. 2013. Building verbs in Maltese. Doctoral Dissertation, UC Santa Cruz.

Uriagereka, Juan. 1995. Aspects of the syntax of clitic placement in Western Romance. *Linguistic inquiry* 26:79–123.

Völlmin, Sascha. 2017. Towards a Grammar of Gumer — Phonology and Morphology of a Western Gurage Variety. Doctoral Dissertation.

Watson, Janet C E. 1993. *A Syntax of Ṣanʕānī Arabic*. Wiesbaden: Harroswitz Verlag.

Watson, Janet C E. 2002. *The Phonology and Morphology of Arabic*. Oxford: Oxford University Press.

Watson, Janet C. E. 2011. Ṣanʕānī Arabic. In *Encyclopedia of Arabic Language and Linguistics*, ed. Lutz Edzard and Rudolf de Jong. Leiden: Brill.

Watson, Janet CE. 2012. *The Structure of Mehri*. Wiesbaden: Harrasowitz.

Wescoat, Michael T. 2005. English nonsyllabic auxiliary contractions: An analysis in LFG with lexical sharing. In *Proceedings of the LFG05 Conference*, ed. Miriam Butt and Tracy Holloway King, 468–486. Stanford: CSLI Publications.

Wetter, Andreas. 2010. *Das Argobba: Eine deskriptive Grammatik der Varietät von Shonke und T'ollaha (Zentraläthiopien) [A descriptive grammar of the variety of Shonke and T'ollaha (Central Ethiopian)]*. Köln: Rüdiger Köppe Verlag.

Yuan, Michelle. 2018. Dimensions of ergativity in Inuit: Theory and microvariation. Doctoral Dissertation, Massachusetts Institute of Technology.

Zwicky, Arnold M, and Geoffrey K Pullum. 1983. Cliticization vs. inflection: English n't. *Language* 502–513.