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Rescaffolding the bundle in Afroasiatic inflection : Tamazight and Hebrew

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Rescaffolding the Bundle in Afroasiatic inflection: Tamazight and Hebrew[*]

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Abstract

Person, number and gender features in the Afroasiatic verbal system are sometimes prefixes, sometimes suffixes and sometimes both. This paper attempts to derive the Tamazight and Hebrew systems using syntactic tools and eschewing postsyntactic or morphological linearization rules. My point of departure is that syntactic heads contain a single feature and that features can be assembled into bundles and placed to the left or to the right of a stem by syntactic movement alone. In the simplest case, a feature is prefixal when it is merged above the verbal stem and the verbal stem remains below it and is c-commanded by it and it is a suffix when the verbal stem moves above it. The often-complex combination of prefixes and suffixes in the languages studied arises from the combination of multiple steps of movement which can target the stem alone or a category it pied pipes or is pied piped by. Allomorphy is expressed in terms of selectional restrictions and an alternative to impoverishment is proposed to handle neutralization.

Keywords: Hebrew, Tamazight, inflection, morphology-as-syntax, syntactic movement, pied piping

1. Introduction

The Afroasiatic verbal inflection system is known for its extensive combination of both prefixation and suffixation in person, number, and gender (PNG) marking. Verbs in the Indo-European languages generally do not show this variation in whether PNG marking is accomplished by a prefix and/or a suffix. This rich empirical pattern of morphology has led to a great deal of work in frameworks such as Distributed Morphology (DM), from Noyer (1992) and Halle (1997/2000) to Harbour's (This volume) and Hewett's (This volume) and the many references cited in their work.

In DM, the positioning of inflectional affixes that express PNG is accomplished by post-syntactic mechanisms, such as linearization statements, fission, impoverishment and/or morphotactic constraints and repairs such as local dislocation or generalized reduplication. These theoretical tools have received extensive attention in a variety of languages, (see Arregi & Nevins (2012; 2018) for discussion and examples) and are now well-understood to the point where restrictiveness, typological expectations, and considerations of explanation and unification can begin to be provided, alongside their deployment.

Nonetheless, it is always worth freshly asking the question, to what degree the language faculty avails itself of a rich and modular post-syntactic and pre-phonological computational system or whether syntactic processes such as merge, move and agree are sufficient to account for inflectional morpheme ordering. One of the early mottos of DM was "syntax all the way down". What this means is that the leaves of the tree are morphemes, and not words – but it doesn't mean that the positioning of these morphemes is exclusively accomplished by syntactic means. Quite the contrary; 'Distributed' refers to the fact that some of the labor of morpheme positioning is accomplished by syntactic operations, and some by post-syntactic operations such as the ones mentioned above.

In this paper, I explore the extent to which phenomena such as morpheme positioning, allomorphy, and neutralization can be accounted for by syntactic mechanisms alone. This is an exploration, and one carried out in the spirit of Collins & Kayne (2021), although in the present case with languages that have both prefixes and suffixes. In a sense, it is a continuation of the work initiated in Shlonsky (1989) and Nevins (2002) that posited a set of Person, Number, and Gender projections in the clause, in addition to Tense and Aspect.

The efforts in Shlonsky (1989) and Nevins (2002) were limited, in part because the set of functional heads was not richly articulated enough (for example, distinguishing Author and Participant nodes), and in part because the mechanisms of (verb) movement they assumed were limited to head movement. The extension of Webelhuth and Den Besten's (1987) *Remnant VP topicalization* and its generalization to other cases of verb movement, particularly in Kayne (1994) and in work inspired by this monograph, open up new analytic directions also for word-formation.

Kayne's (1994) Linear Correspondence Axiom (LCA) postulated a rigid link between hierarchical structure and linear order. In a language faculty that incorporates the LCA, variation in linear order corresponds to variation in operations of syntactic movement, extensively exploited in subsequent research.

A well-known example of this work is Koopman & Szabolsci (2000). Their monograph analyzed the different orders of infinitival complements and verbal modifiers in Hungarian, illustrated with English words in (1), and verbal complexes in Dutch and German (on West-Germanic verb clusters see also Abels (2016) and for an empirical and theoretical overview Wurmbrand (2017).)

(1)   a.   I will not want to begin to go home.
        b.   I will not want home to go to begin.
        c.   I will not home to go to begin want.
        d.   Home I will want to begin to go.

The basic idea was that there is an underlying common cartography or hierarchy of verbal projections, roughly corresponding to (1a), and that re-ordering comes about by category movement of the VP. The lexical VP can move alone over the infinitival and verbal modifiers, landing in-between them (partial movement) or above all of them (total movement). The VP can also pied-pipe material along or be itself pied-piped, in which cases the moving constituent is a verbal chunk containing the VP as a sub-constituent. For example, one can

think of (1b) as derived from (1a) by movement of [home] above the infinitival [to go] and by subsequent movement of [[home] to go] above [to begin]. (1c) is derived by movement of [[[home] to go] [to begin]] above [want].

At roughly the same period, Cinque (2005; 2009) analyzed the orders of the DP sub-constituents Demonstrative Phrase, Number Phrase and Adjective phrase(s) across a wide array of languages and succeeded to derive Greenberg's (1963) Universal 20[1] from premises like Koopman and Szabolsci's: There is an underlying universal cartography, NP moves alone, or it is pied-piped by a containing constituent, or it pied-pipes constituents that it derivationally comes to c-command. Movement can be partial or total.

This substantial body of work dealt with categories, with full words and not with word-internal morphemes. The aim of this paper is to apply the same principles to the order of affixes within a word. I explore here the idea that the formal operations that give rise to the order of inflectional morphemes on the edges of the Hebrew and Tamazight verbal stems are of the same nature as those that underlie the formation of verbal complexes and drive the ordering options within DP.

For example, the Hebrew second person singular masculine manifests the morpheme order Person[2] – verbal stem in the future tense and verbal stem – Person[2] in the past tense. Gender[feminine] is a prefix in the future tense third person singular and a suffix in the second person singular. I demonstrate that these and similar alternations are derived by recursive application of various movement operations of the stem category V(oice)P (Kastner (2020)) or of categories that contain it as a sub-constituent.

There are two related differences between the order of inflectional morphemes and the order of verbs in a verbal complex. The first is that inflectional morphemes manifest a significant degree of allomorphy and syncretism, to the point that it is sometimes difficult to clearly identify the feature that a morpheme lexicalizes. I explore the hypothesis that allomorphy is syntactically conditioned and can be expressed in terms of selectional restrictions on morphemes, constituting part of their lexical entries. The second major difference is that morphemes can be non-overt. In some cases, a non-overt form is just another allomorph, in the above sense, lexicalizing a specific feature. In other cases, non-overtness is the literal absence of a feature.[2]

The system developed below postulates movement rules, some of which are subject to crosslinguistic variation. The motivations for some of the movement operations and the constraints that they abide by are not always well-understood, but it is important to stress that all the operations postulated all come from a familiar set and many of them are exploited in other syntactic domains.

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[1] "When any or all of the items (demonstrative, numeral, and descriptive adjective) precede the noun, they are always found in that order. If they follow, the order is either the same or its exact opposite."

[2] A major thrust of Kayne's work over the last ten years has been to show that functional heads, including those that trigger Restructuring and participate in the formation of verbal complexes, can or even tend to be non-overt. From this perspective, the second difference between inflectional affixes and verb word dissolves, suggesting even more strongly that we should be looking for the same kind of licensing principles in morphology and syntax in explaining non-overtness.

To the degree that the position and form of affixes can be derived using the same rules and principles that derive word order in complex syntactic objects such as the clause or the DP, a substantial argument in favor of Morphology as an independent computational system is vitiated. Showing that the same computational devices (different kinds of Merge and Move) apply to all syntactic objects, be they words or morphemes, is a step forward, I believe, towards a tighter and more constrained view of externalization, in the sense of Berwick & Chomsky (2011) and related work, and hence towards greater explanatory adequacy.

In Michal Starke's (2020) NELS 51 lecture, *Universal morpholog*y, he identifies "the bundle" as one of the theoretical constructs causing great difficulties in advances in morphosyntactic theory (see also Caha's (2018) treatment of portmanteaus). The bundle, for my purposes, is the set of PNG features expressed in various ways in the Afroasiatic prefixal and suffixal conjugations. Although these patterns show a significant amount of variation, if one were to simply assume that there is a bundle of phi-features in the syntax, and one which undergoes fission, to generate the fact that there is more than one morpheme corresponding to the bundle, and that these morphemes have a linear order amongst them, then there are several logically possible fission patterns that never occur.

For example, it is by and large true that person affixes always precede number and gender affixes, and that when number and gender affixes are distinguishable, as they are in Tamazight, the number affixes precede the gender affixes. In approaches to fission such as Noyer (1992) and Halle (1997/2000), these ordering effects could very well have turned out the opposite. Subsequent refinements to the theory of fission, such as Harbour (2008a) and Hewett (2020, 2022), take important steps towards a more constrained theory of linearization, but why fission occurs or not, and why the affixes are prefixal or suffixal in each conjugation, are still retained as fairly arbitrary properties.

The idea that the PNG features are distinct heads in a c-command relation, rather than an albeit hierarchically-organized *phi*-bundle, as in Harbour (2008a) and Hewett (2022; This volume), was sketched out in Shlonsky (1989) and developed further in Shlonsky (2000). It is recapitulated in (2).

(2)   PersonP>NumberP>GenderP

The sequence in (2) has to a large degree been absorbed into mainstream work in morphosyntax and has fed into what would later come to be known as syntactic cartography, namely, the discovery of the hierarchical order of syntactic features. A thread running through cartographic research is that syntactic heads represent single, atomic features. This idea is encapsulated in Kayne's dictum "one feature one head" and implies that feature bundles and portmanteau morphemes are constructed in the syntax. Kayne (2005: Appendix) and Collins & Kayne (2021) call it the Principle of Decompositionality:

(3)   Principle of Decompositionality
       UG imposes a maximum of one interpretable syntactic feature per lexical item.

Research conducted from the 1990's onwards has shown that the syntactic and morphosyntactic patterning of the different persons, numbers and genders justifies a

decomposition of (2) into finer-grained categories (Harley and Ritter (2002) and much subsequent work). Various proposals for the inventory of inflectional atoms across languages can be found in the literature. Some of these are Author, Participant and Addressee (for Person), Singular, Plural and Augmented (for number). I borrow from this literature while maintaining the hypothesis that inflectional atoms are hierarchically arrayed in the syntactic representation.

As mentioned above, some of the analytical problems that arose for earlier attempts to explain the order of PNG features were specifically due to assumptions about verb-movement being only of the traditional head-to-head type, according to which the verbal head adjoins or incorporates into a locally c-commanding "governing" head. In the present discussion, I move away from the analysis of verb movement as head movement and adopt the category or remnant movement approach to verb movement, as developed in Kayne (1994), Koopman (2017; 2018), Koopman and Szabolsci (2000) and Cinque (2005), among many others.

Finally, I hark back to work in the 1960s and 1970s and explore the consequences of assuming that morphemes are not constructed post-syntactically. Differently from Distributed Morphology and Nanosyntactic phrasal spellout, (on which, see the papers and references in Baunaz et al (2018)), I take an atomistic, early insertion view: Morphemes are formatives (in Chomsky's (1965) sense), which contain semantic, syntactic and phonological features, no internal structure and are inserted as such in the syntactic representation. In this sense, this paper is part of the research agenda that Collins & Kayne (2021) call "morphology as syntax".

In the following section, I provide the components of the computational apparatus that I will be assuming and working with. In sections 3 and 4, I analyze the Tamazight and Hebrew verbal paradigms language by language, form by form. Section 5 summarizes the tools used in the analysis and section 6 is the general conclusion.

2. Architectural and computational assumptions

I assume and, in subsequent sections, partly motivate the following cartography of inflectional categories.[3]

(4)   PastP/PerfectiveP …>… AuthorP …>… ParticipantP …>… FutureP/ImperfectiveP …>… NumberP …>… GenderP …>… 3pP…>… VP

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[3] A BJALL reviewer is concerned that "since gender features on inanimate nouns have no semantic interpretation, they would have no impact on LF and should therefore be eliminated, like AgrP in Chomsky (1995)". The issue here is not the status of gender on nouns but on verbal inflection. Belletti et al. (2012) provide experimental evidence for the computational activity of gender on verbs in Hebrew as compared with Italian (in the comprehension of object relative clauses by children). Crucial to their reasoning is the fact that both languages have gender on nouns but only Hebrew inflects verbs for gender. They argue that "in Hebrew the gender feature belongs to the set of the inflectional features functioning as attractors of the subject…, whereas in standard Italian, the feature set of the clausal inflectional head includes specifications of person and number, but not gender." (p. 1062).

As for the elimination of AgrP, I can see very few, if any, empirical gains if the result is bundling phi features in T. This said, my view that gender features are represented as a distinct syntactic head does raise some substantial questions, see e.g., Kramer (2016), but answering them lies beyond the scope of this article.

The representation of verbs inflected for third person contains the category heuristically labeled 3pP. Second-person inflection emerges from merge of ParticipantP, and first-person requires the projection of AuthorP above ParticipantP. ParticipantP and AuthorP are not projected with third-person inflection and, conversely, 3pP is absent with second and first persons.[4] I take Number and Gender to have two values, singular and plural for the former, masculine and feminine for the latter.[5] Following Cinque (1999), Past and Future are merged in two different positions. In Semitic languages other than Hebrew, Past and Future should probably be replaced by Perfective and Imperfective aspect. Several studies of Arabic morphosyntax have shown that the node coding for imperfective aspect is merged lower than the one coding for perfective (Aoun, Benmamoun & Choueiri 2010; Benmamoun 2000; Shlonsky 1997). Since the form of Tamazight inflection is unaffected by tense/aspect while formally resembling the Semitic future/imperfect, I will assume in this discussion that in Tamazight, only the lower tense/aspect projection is active and label it simply Tense.

I take VP to stand for VoiceP. It houses the stem (Kastner 2020), and its arguments, which I assume are moved out of VP to argumental positions (object and subject). Since my aim in this paper is to explain the constitution of verbal inflection, I intentionally, albeit regrettably leave aside the position of arguments and the mechanism of subject-verb agreement. I am aware that this is a major simplification of the syntactic picture since there is (at least in Semitic) a clear resemblance and thus perhaps a derivational relation between pronouns and inflectional affixes. This resemblance in Hebrew is discussed in Shlonsky (2009), but it calls for further investigation.

I also assume that the head of the Tense (or Aspect) phrase has a V feature. Movement of VP, or of a category that contains it as a sub-constituent, to Spec/TP can be construed as an EPP effect, along the lines of Koopman (2018) and Koopman & Szabolsci (2000). EPP is the internal merge of a goal to a probe's projection and replaces the more traditional head-movement account (V→T). We shall see that, when possible, VP moves alone to Spec/Tense and is pied-piped or pied-pipes another category only when solitary movement is impossible. This can come about because VP needs to meet some other condition that prevents it from moving alone.

From Collins and Kayne (2021), I borrow (5), which I label Edge Visibility.

(5)   Edge Visibility (EV)
        The edge of a category (its head or its spec) must be overt.

(5) is constrained by Koopman's (2000, ch. 11) Generalized Multiply Filled Comp filter, which I name No Crowding (NC), again following Collins & Kayne (2021).[6]

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[4] In Nanosyntax, there is a π head in all the forms, first and second included. An omnipresent πP does no work here, so I retain the mnemonic 3pP, which encodes whatever feature characterizes the third person.

[5] These labels are expository. It could very well be that [masculine] is [-feminine] and singular is [-plural], as is assumed in much of the literature. Neither Hebrew nor Tamazight have a distinct dual number inflection.

[6] NC and EV are collapsed into a single condition in Collins & Kayne (2021). I choose to state them as separate conditions, since they are conceptually distinct.

(6)   No Crowding (NC)
        Either the spec or the head of a category can contain overt material, not both.

NC underlies many of the patterns of morpheme order in the paradigms I study and, together with EV, engenders the following consequences.

(7)   a.   If a category with overt material moves to the specifier of an overt head, it
                may not remain there and must continue to move. Otherwise, a violation of
                NC is incurred.

        b.   If a category with overt material moves to the specifier of a non-overt head, it
                must remain there and cannot move on, to satisfy EV.

Following Koopman & Szabolsci (2000) and particularly Cinque (2005, 2009), I assume that movement can target a category alone or pied-pipe the category that dominates it. Pied-piping can take two forms, *whose picture* type and *picture of who* type, as Cinque has named them.

Note that if the *whose* category is the specifier of a category with *picture* as its head, NC is violated. W*hose* must move out after pied-piping. Koopman & Szabolsci (2000) and Koopman (2000) named this process *splitting* and demonstrated its role in the derivation of verbal complexes. Formally speaking, splitting resembles smuggling, in Collins' (2005) sense, in that the *whose* category is carried along, smuggled by a category that contains it as a sub-constituent and then continues to move alone. We shall see some examples of splitting in Hebrew. The syntax of Tamazight PNG inflection does not employ this device. Finally, though this has little relevance for the linearization of morphemes, I assume that since movement is syntactic throughout, namely, internal merge, it leaves unpronounced copies.

3. Tamazight

This section deals with subject agreement inflection in Tamazight, a variety of Amazigh spoken in central Morocco, illustrated in (8) with the stem *dawa* ('cure'), from Abdel-Massih (2011: 171). As mentioned in the Introduction, the forms are the same across the different tense/aspect stems.

(8)   Tamazight inflectional paradigm

	Singular	Plural
3m	i-dawa	dawa-n
3f	t-dawa	dawa-n-t
2m	t-dawa-d	t-dawa-m
2f	t-dawa-d	t-dawa-n-t
1	dawa-ʁ	n-dawa

The reader will note that this paradigm displays both prefixes and suffixes, that there is an overt singular suffix (*d* in 2ms and 2fs), that first person singular is a suffix, while first person plural is a prefix, and that feminine gender *t* is a prefix in the third person singular and a suffix in the plural.

This paragraph is a flagship example of the Distributed Morphology approach in Harley & Noyer (1999) and problematizes well the notion of the Bundle: if all phi-features are just on T in the verb, why are they spread out sometimes as prefixes, sometimes as suffixes? How are they split up, such that sometimes there is one affix, sometimes two, and sometimes three?

As stated in the Introduction, my aim here is to see how far we can go in deriving the Tamazight forms without relying on morphology-specific technology. I begin my analysis of Tamazight with the second person forms.

3.1. Tamazight second person forms

VP houses the stem *dawa*. Gender is merged with VP and projects GenderP. The head of GenderP is the feminine formative *t*. NumberP is merged above GenderP. I take the plural morpheme in the second person feminine form *t-dawa-n-t* to be underlyingly *m*, just like in the masculine form *t-dawa-m*. The 2fp form is *t-dawa-m-t* in the closely-related Tashlhiyt variety of Amazigh, spoken primarily in southern Morocco. Arguably, this underlying *m* assimilates in coronality to the following *t* in Tamazight but remains *m* in Tashlhiyt.[7]

The next category is labelled Tense, but it may very well be Aspect. This is not germane to the discussion. Crucial, though, is the claim that the head of T(ense) is non-overt. I label it TENSE, adopting a convention introduced by R. Kayne, according to which capitalization of category labels indicates lack of phonological content.
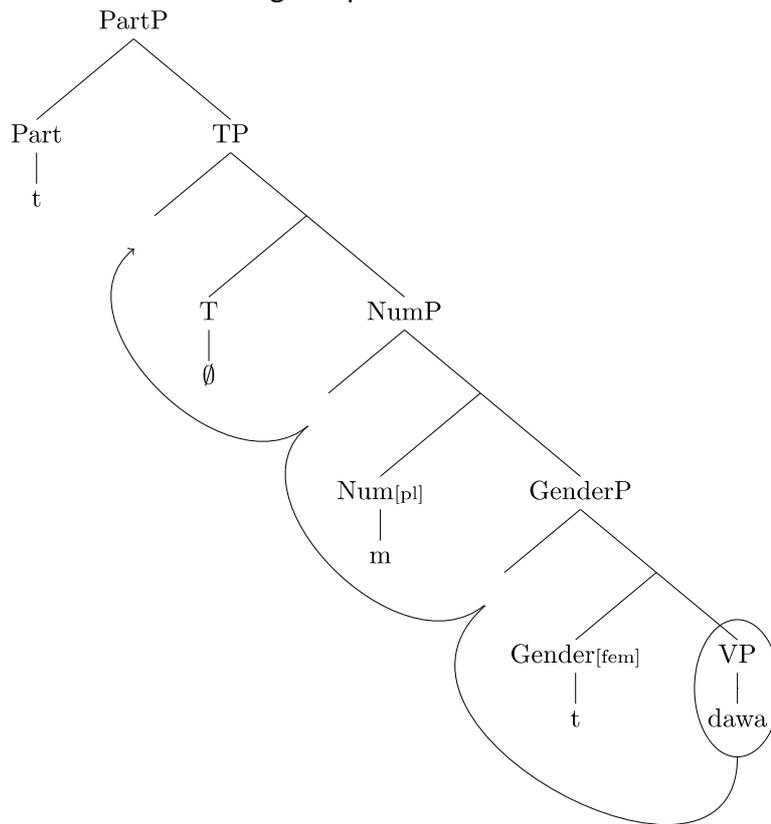
The second person morpheme, Part° is *t*. Feminine gender and participant *t* are distinct, though homophonous morphemes in much of Afroasiatic, as discussed in Harbour (2008b). I come back to this homophony in the discussion of Hebrew and in note 15 below.

Movement is indicated by the arrows in (9). VP moves through Spec/GenderP and Spec/NumberP before landing in Spec/TenseP.[8] The order of morphemes, namely, the fact that the 2nd person is a prefix, and that number and gender are suffixes and appear in that order is a direct consequence of the movement operation.

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[7] For verification of the data, I am grateful to Rachid Ridouane (Tashlhiyt) and Mustapha Mardi (Tamazight) and to Rachid Ridouane for discussion.

[8] As noted by a reviewer, these movement steps violate Anti-locality, (Grohmann (2000), Abels (2003)) in that they involve movement of a head's complement to its specifier. To meet this condition, one could assume that movement of a complement in the system developed here doesn't, in fact, target the closest specifier, but the specifier of a higher category, one that immediately dominates the category from which extraction takes place. This would lead to the postulation of categories between, for instance, GenderP and NumberP and between NumberP and TenseP, akin to the AgrPs, argued in Shlonsky (2004, §6) and Cinque (2005) to be interspersed between AdjP, NumberP and Demonstrative P in the nominal extended projection and to play a rule in establishing agreement relations, (Shlonsky (2012). A reformulation of (5) and (6) would then be necessary.

(9)   Derivation of Tamazight 2fpl *t-dawa-n-t*

```
                    PartP
                  /      \
              Part        TP
               |        /    \
               t       T      NumP
                       |     /     \
                       ∅   Num[pl]   GenderP
                            |       /      \
                            m   Gender[fem]   VP
                                    |         |
                                    t        dawa
```

It is important to stress that VP cannot remain in Spec/GenderP or in Spec/NumberP. as NC requires it to move on. It lands in Spec/TenseP and satisfies EV.
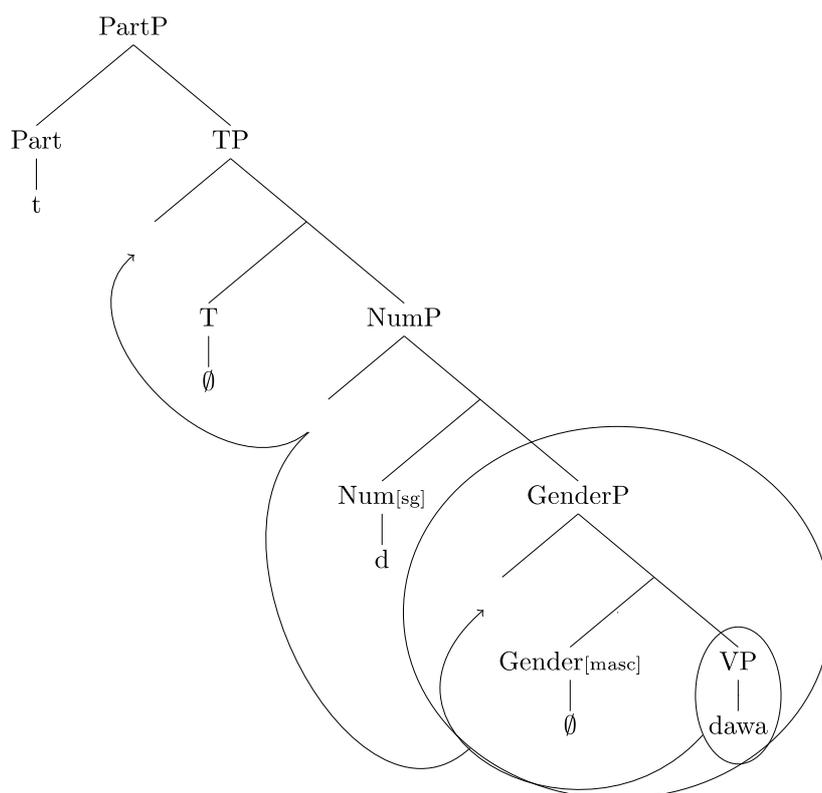
The second person masculine plural form is *t-dawa-m*. It differs from the feminine form in having a non-overt masculine gender morpheme. By EV, Spec/GenderP must therefore be filled. VP moves there, but whereas in *t-dawa-n-t*, VP had to continue to move so as not to violate NC, in *t-dawa-m* VP must remain in Spec/GenderP to satisfy EV. After Merge of Number[plural] *m*, GenderP moves as a constituent, ending up in Spec/TenseP, as in *t-dawa-n-t*. We can say that VP here pied-pipes GenderP, much as *whose* pied-pipes its containing NP in e.g., *whose book did you read*. The derivation is schematized in (10).

(10)   Derivation of Tamazight 2mpl *t-dawa-m*
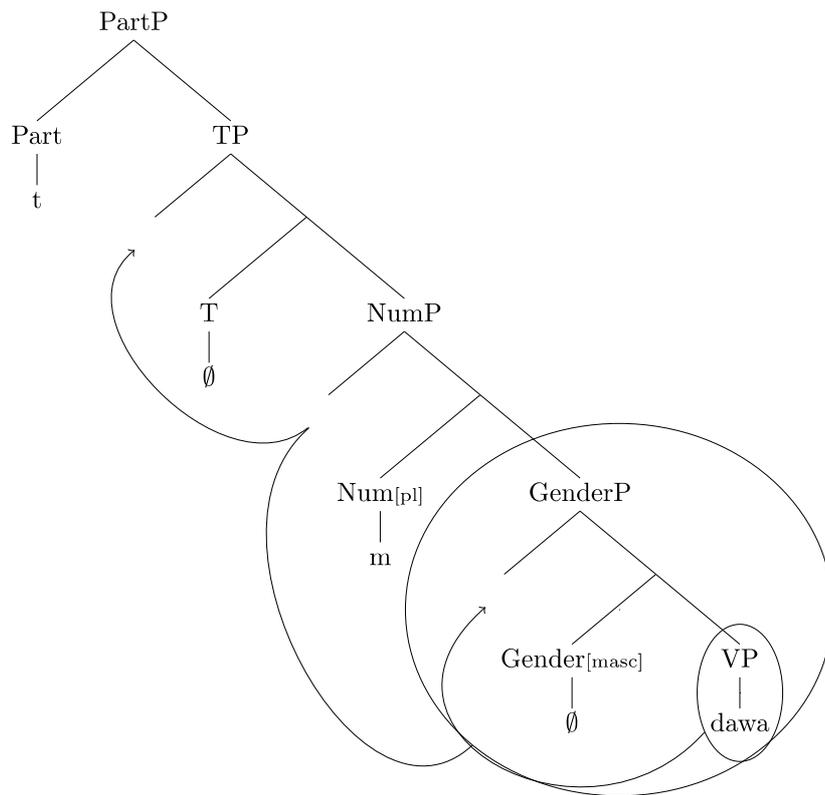
Consider now the second person masculine singular form *t-dawa-d*. Its derivation is basically identical to that of the plural masculine form *t-dawa-m*, presented in the preceding paragraph. The difference between the two forms is number: *m* is plural while *d* is singular.
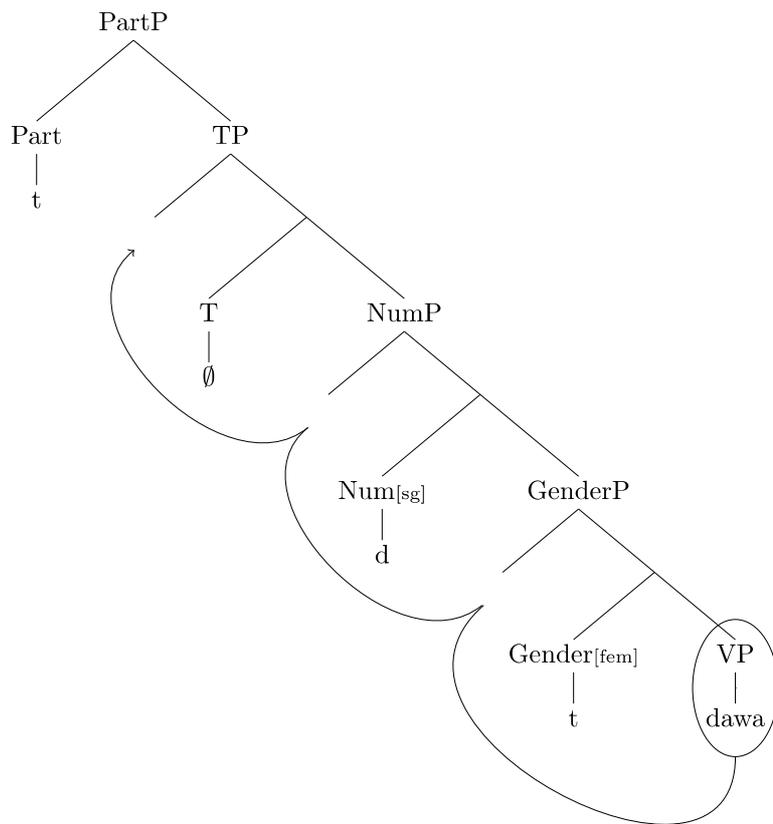
(11)   Derivation of Tamazight 2ms *t-dawa-d*.

```
                    PartP
                   /     \
                Part      TP
                 |       /  \
                 t      T    NumP
                        |    /    \
                        ∅  Num[sg]  GenderP
                           |       /      \
                           d   Gender[masc]  VP
                               |            |
                               ∅          dawa
```

Tamazight displays the same surface forms for the masculine and feminine singular second person forms, namely *t-dawa-d*. It might appear that gender is neutralized in the second person singular. I suggest that it is not. The feminine *t* that appears in the feminine plural *t-dawa-n-t* is merged here as well but it is subject to a phonological truncation rule when it follows the number morpheme *d*. This haplology rule is of the same sort that deletes the possessive *z* when it follows the plural *z* in e.g., *cats's*, yielding *kats* (with subsequent devoicing of *z*). This rule is morphologically conditioned: possessive *z* is silenced only after an affixal *z*, compare *the cats'* [kæts] *behavior* and *Katz's* [kætsəz] *behavior* (see Nevins (2012) and, as a reviewer points out, also Felice (2022) on haplology in Kabyle).[9]

As in the English example just given, *t* truncation in Tamazight only applies to inflectional morphemes. Coronal suffixes which are not inflectional are not subject to haplology but yield gemination. For example, a masculine singular object clitic *t* appearing to the right of *t-dawa-d* is retained and results in gemination, surfacing as *tdawatt* ('you-f/m cured him.'), with regressive voicing assimilation.

The syntactic derivation of the second person feminine singular form is given in (12).

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[9] Thanks to Noam Faust for discussion of this point. See Kramer (This volume) for a study of haplology in the derivation of Amharic imperatives.
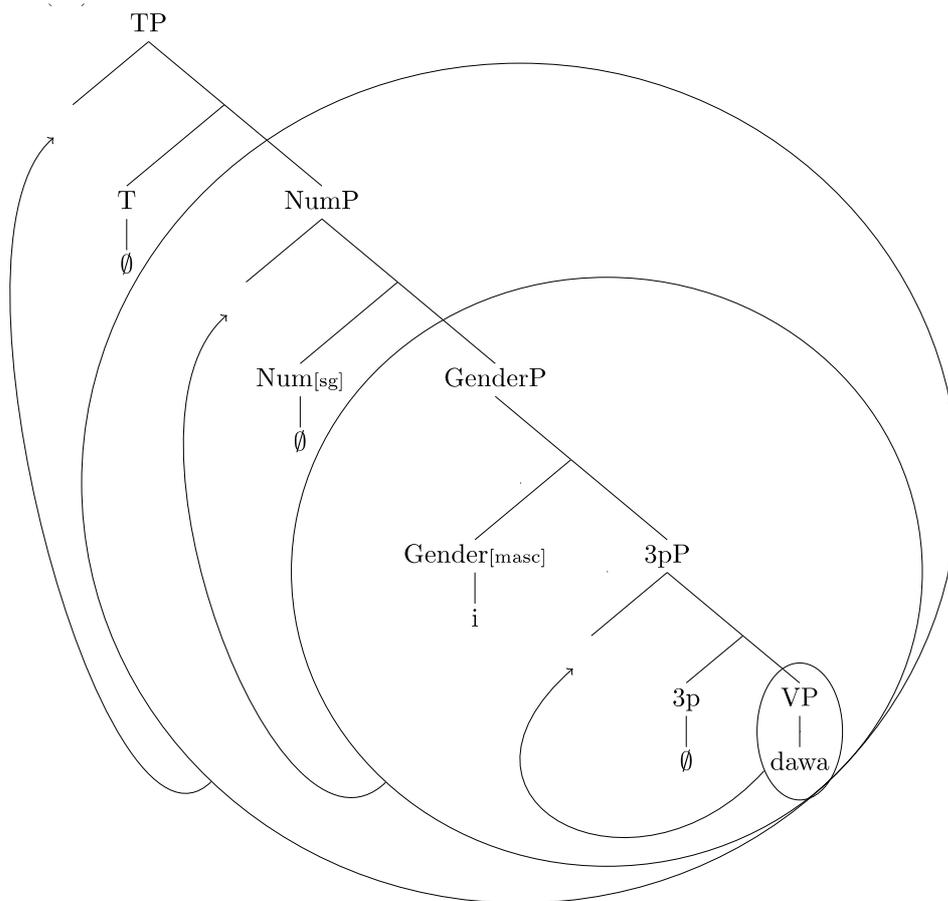
(12)   Derivation of Tamazight 2fs *t-dawa-d*

3.2. Tamazight third person forms

Moving on to the third person forms, consider the singular masculine *i-dawa* and its feminine counterpart *t-dawa*, starting with the former, in (13).

(13)   Derivation of Tamazight 3ms *i-dawa*

```
                          TP
                        /    \
                   T          NumP
                   |         /    \
                   ∅    Num[sg]      GenderP
                        |         /      \
                        ∅   Gender[masc]      3pP
                             |            /    \
                             i          3p      VP
                                        |       |
                                        ∅      dawa
```

(13) incorporates my assumption that the third person category, labelled 3pP, is merged immediately above VP and below GenderP. In this, I deviate from the original proposal in Shlonsky (1989), where the different persons were not hierarchically distinguished, but I believe it is consistent with the robust crosslinguistic evidence that the first- and second-persons cluster together, to the exclusion of the third person. My suggestion is that the first and second persons are structurally adjacent and merged higher in the tree than 3pP.

Such a cartographic rescaffolding of person might explain why Bulgarian auxiliaries inflected for 3p singular follow (i.e., are lower than) dative and accusative arguments, as noted by G. Cinque (personal communication), and precede them (that is, move above them) when inflected for 1p and 2p (Franks & King 2000: 67). There are dialects in the North of Italy in which negation appears to the right of (lower than) first and second person subject clitics while preceding third person subject clitics (Zanuttini 1997), but no dialect displays the order 1p-neg and neg-2p/3p. As in Bulgarian, this suggests that the first and second person clitics move above negation, while the third person ones remain below it. A similar state of affairs can be discerned in Hebrew, where 1p and 2p precede the negative head *eyn* and 3p follows it (Shlonsky 2000). The structural split between the +participant persons 1 and 2 and the -participant 3p most likely also extends to weak pronominal objects, as Belletti (2017) suggests, observing that Italian past participle agreement is obligatory with third person (clitic) objects, but only optional with first and second person ones. It remains to be seen whether this structural hypothesis can play an explanatory role in other empirical corners.

Auxiliary selection, *have* vs. *be*, is keyed to person in many central and southern Italian varieties, requiring *be* with first and second person and *have* with third person, (D'Alessandro 2017). The well-attested pattern of split ergativity, cutting across the person domain such that first and second person pronouns pattern differently from third person ones, (Coon & Preminger 2017 and references) is yet another area in which a more fine-grained cartography of person, separating 1p and 2p from 3p, may turn out to have explanatory value.

Since 3p in (13) is non-overt, I refer to it as 3P. VP moves to its specifier and must remain there to satisfy EV. Gender[masculine] *i* is then merged, but rather than attracting 3pP to its Spec, Number is merged and GenderP moves to Spec/NumberP. If 3pP were to move to Spec/GenderP, it would have to vacate it (by NC) and move on to Spec/NumberP. Ultimately, this would derive *dawa-i*, with a suffix, and not the correct *i-dawa*. There is clearly some local morpheme-specific or feature-specific constraint that blocks this derivation. My suggestion is that it is an EPP-like condition on NUMBER (non-overt Number), as stated in (14). We shall see that this also holds for NUMBER in Hebrew.

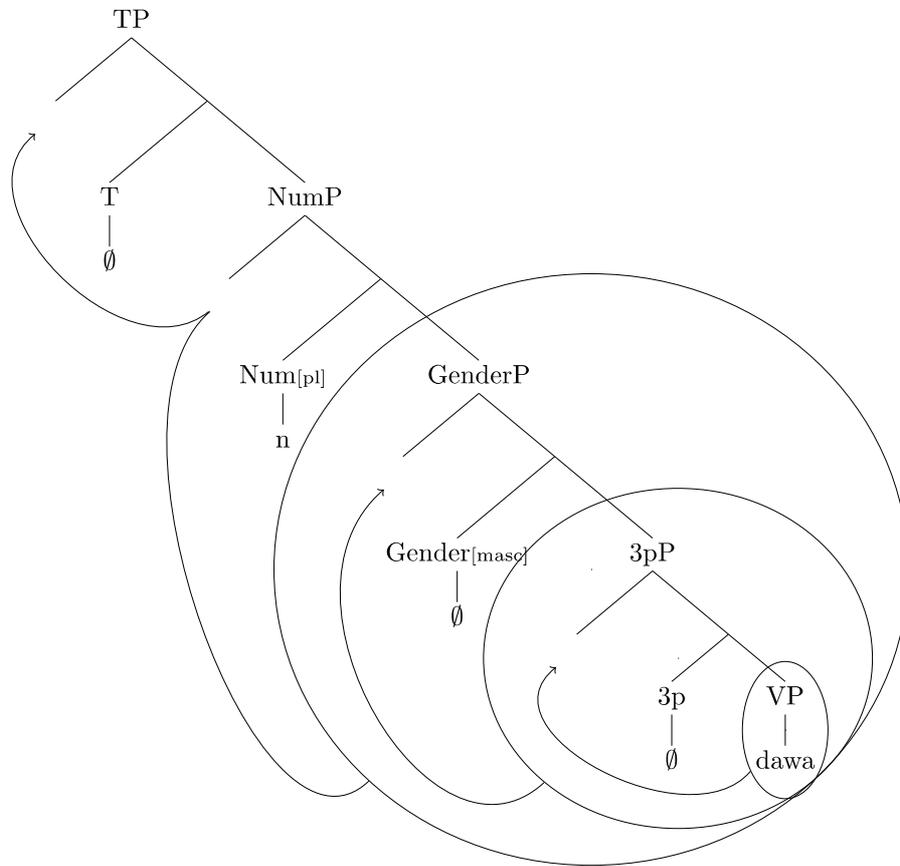(14)   NUMBER attracts GenderP (to its specifier).

The derivation of the feminine *t-dawa* follows the same path as the derivation of the masculine, as shown in (15).

(15)   Derivation of Tamazight 3fs *t-dawa*
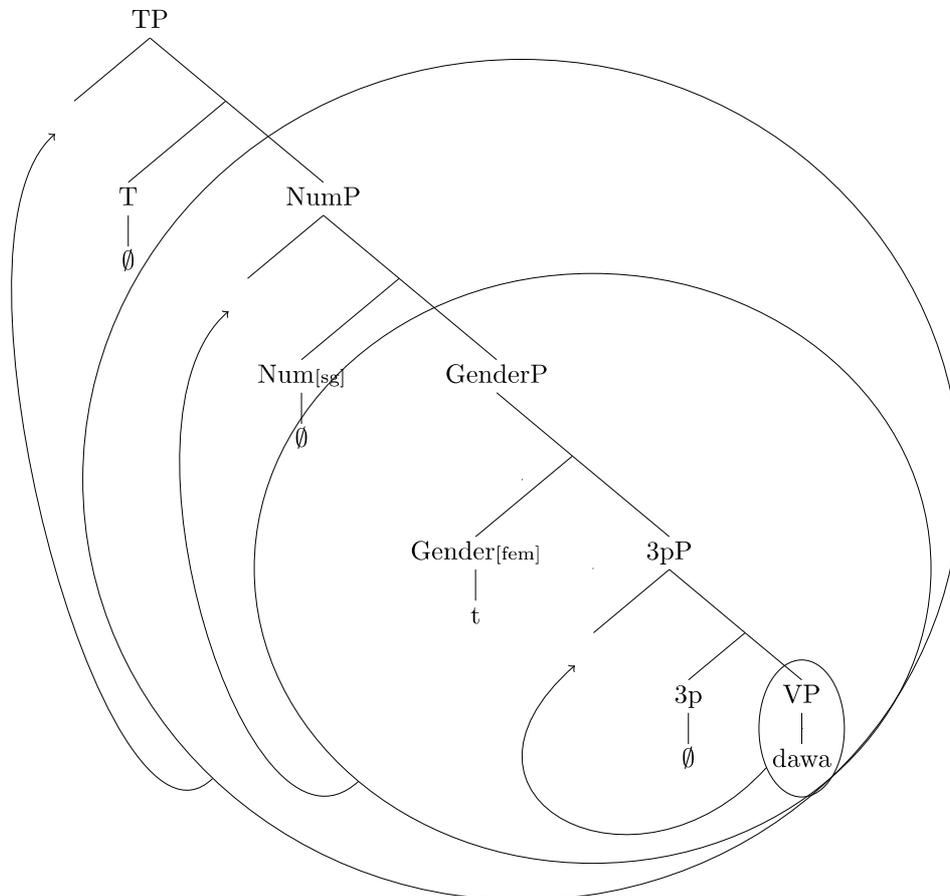
The derivation of the third person masculine plural form *dawa-n* is in (16).

(16)   Derivation of Tamazight 3mpl *dawa-n*

The plural morpheme here is *n*, just as it is in the feminine form *dawa-n-t*. We observe that *n* 'goes with' third person, while *m* 'goes with' second person (and similarly, Gender[masc] *i* 'goes with' with third-person while *ø* 'goes with' second-person). The 'goes with' relation or, what is traditionally called allomorphy, should be expressed in terms of the syntactic licensing conditions of the morphemes involved. These are detailed in 3.4.

The derivation of the third person feminine plural form *dawa-n-t* is in (17).

(17)   Derivation of Tamazight 3fpl *dawa-n-t*
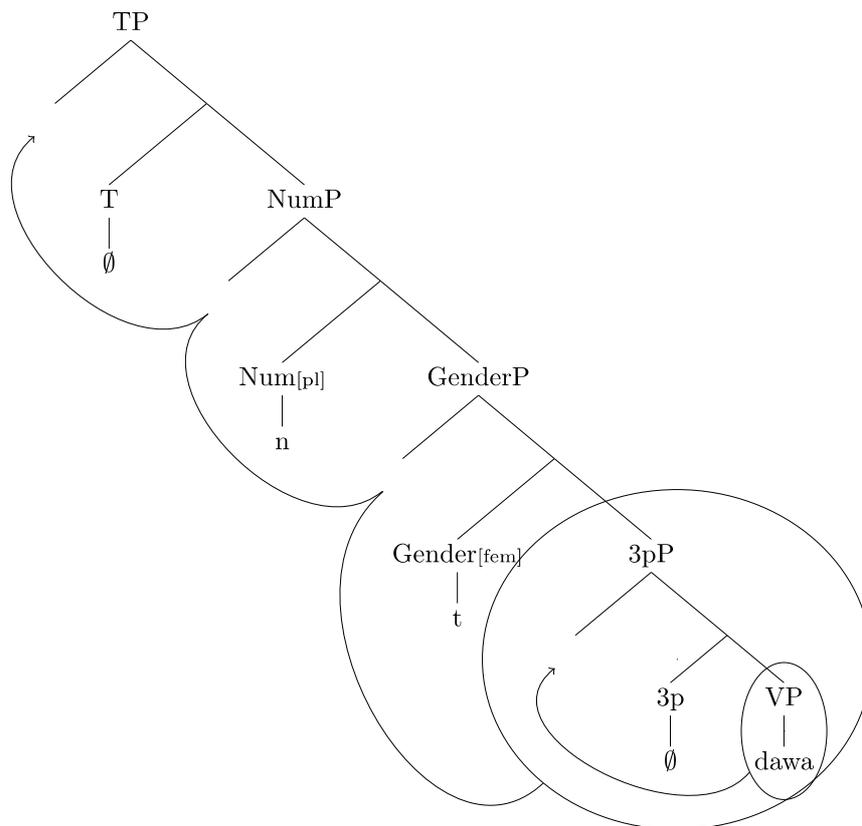
One difference between this form and the 3fs *t-dawa* is the placement of Gender[feminine] *t*: It is a suffix in *dawa-n-t* and a prefix in *t-dawa*. I derive this from the fact that Number is overt in *dawa-n-t* while it is non-overt in *t-dawa*, triggering movement of GenderP to its specifier, as per (14). In the derivation of *dawa-n-t*, 3pP moves all the way up to Spec/TenseP. As the reader can surmise, prefixhood and suffixhood are not intrinsic properties in Tamazight inflection but depend on other elements in the derivation.

3.3. Tamazight first person forms

I take first person to be encoded by the feature Author, which merges and projects a category above PartP. In Tamazight and in Hebrew, as we shall see, the Author feature, or head, is sometimes overt and sometimes non-overt. In both cases it selects Participant (which may also be non-overt).

First person forms in both languages and across much of Afroasiatic do not manifest gender distinctions in either pronouns or verbal inflection. Gender distinctions on the first person are, in fact, crosslinguistically rare, perhaps reflecting a functional/pragmatic constraint, (Siewierska 2004) or a markedness constraint (Arregi & Nevins 2012). The question here is how such cognitive principles are implemented in the computational system.

I tentatively propose that this incompatibility of features, namely Author → ¬Gender, translates into the sort of heaviness constraints or complexity filters that play an important

role in restricting the size of specifiers in Hungarian and Dutch in Koopman & Szabolsci (2000, chapters 5 and 8 in particular,) and Koopman (2002; 2014).[10] I suggest that the "upper limit" as it were, on the complexity of the specifiers of the speech-act participant projections AuthorP and ParticipantP is attained by the non-projection of Gender.

(18)   Gender is not projected under Author.

One consequence of (18) is that NUMBER cannot be licensed since it attracts GenderP, as stated in (14). The first person singular in Tamazight, I therefore contend, is bereft of both gender and number specifications.

The first-person singular form displays the morpheme ʁ. Since ʁ is a suffix, TP, which contains the stem *dawa*, must occur in a hierarchically superior position. However, if ʁ were merged in Author, NC would rule out TP in its specifier. I conclude that ʁ is not the head of AuthorP but lexicalizes Participant. Author is nonovert. The derivation of *dawa-ʁ* proceeds

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[10] As Koopman (2002) notes, a similar constraint is at work in English, restricting the heaviness of prenominal modifiers such as relative clauses, reduced relative clauses and adjectives with complements. The 'head-initiality' of English requires the head noun to precede (or move above, Cinque (2020)), a 'heavy' or complex specifier.

i.   *A readable book*
ii.   **A that is easy to read book*
iii.   *A book that is easy to read*

iv.   *A recently passed bill*
v.   **A recent ly passed by the Senate bill*
vi.   *A bill recently passed by the Senate*

vii.   *A proud father*
viii.   **A proud of his daughter father*
ix.   *A father proud of his daughter*

as in (19), where VP moves to Spec/TP, TP moves to Spec/AuthorP, via Spec/PartP. EV is satisfied both at the TP and the AuthorP levels.

(19)   Derivation of Tamazight 1s *dawa-ʁ*
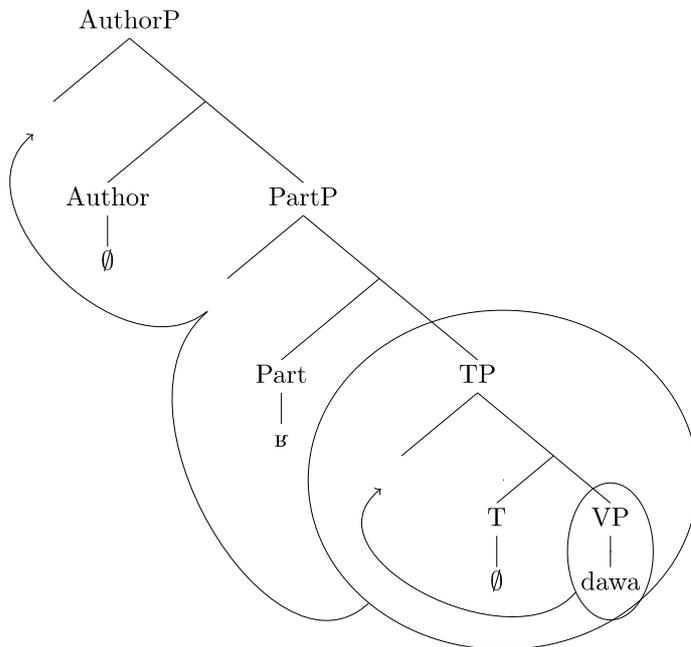
In the first person plural *n-dawa*, I take *n* to be the plural morpheme that also appears in the third person plural forms *dawa-n* in (16) and *dawa-n-t* in (17). The fact that *n* is a suffix in these forms, while it is a prefix in the first-person plural *n-dawa*, once again demonstrates that the position of an affix with respect to the stem is not and cannot be an intrinsic property of the affix.[11]

Consider the mechanics of the derivation of *n-dawa* in (20) and observe that VP movement above Number[plural] *n* to Spec/TP fails to occur. Rather, VP is carried along by NumberP movement, pied-piped, as it were, by Number[plural] following the *pictures of who(m)* pied-piping format.

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[11] In a bundling approach, the *n* of *dawa-n* could be taken to expone 3p together with Plural while the *n* of *n-dawa* would expone Author and Plural. Thinking along the lines of Harbour (2008a), the linear position of the two *n* morphemes relative to the stem might be derived in the morphology, as a consequence of, say, the position of the person features in the phi bundle. Since I am assuming that there are no morphological operations and no feature bundles, this line of reasoning is not open to me. In my approach, the positional difference between the two *n*'s turns on the syntactic differences between third and first-person plurals, developed in the following text paragraphs.

(20)   Derivation of Tamazight 1pl *n-dawa*

AuthorP

Author
∅

PartP

Part
∅

TP

T
∅

NumP

Num[pl]
n

VP
dawa
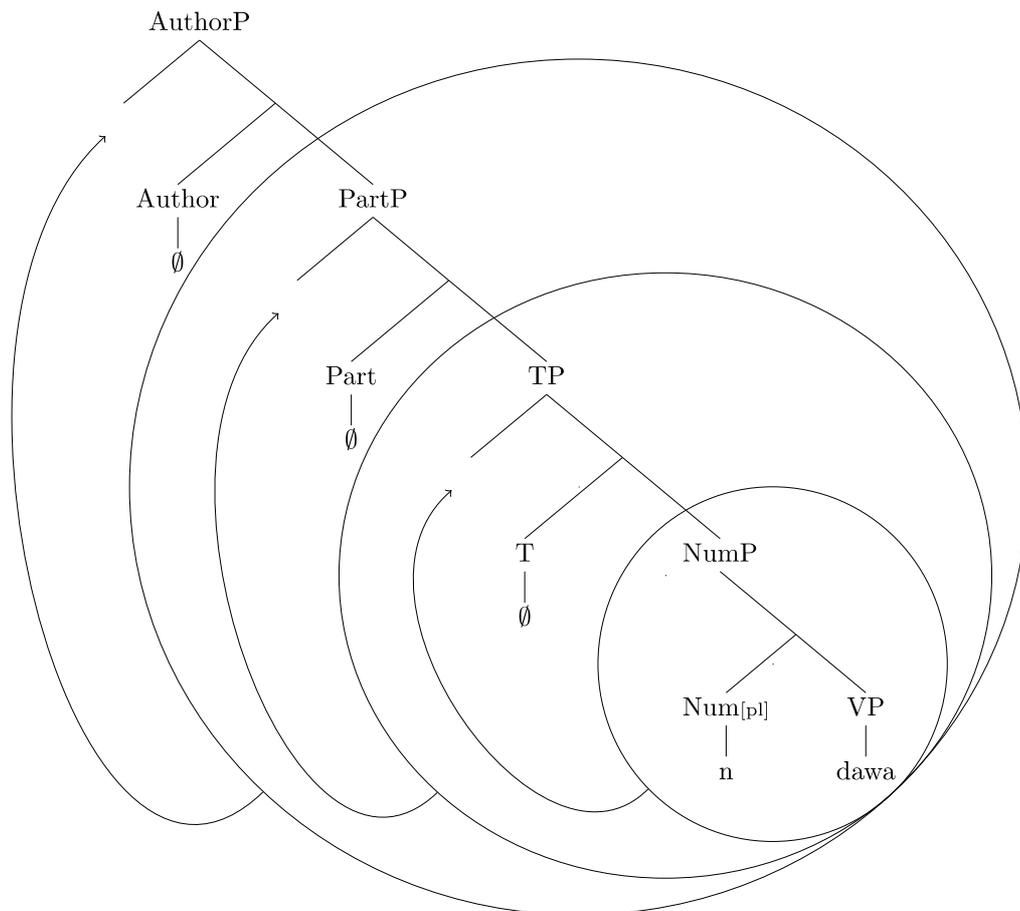
The derivation in (20) ensures that *n* is a prefix. One wonders, however, what prevents VP from moving to Spec/NumberP (and from there on to Spec/TP) precisely in the derivation of the first person.

At the outset of this subsection, I tentatively proposed that the structural restrictions on the material that may appear in Spec/Author resemble the complexity filters that govern the size or the 'heaviness' of specifiers.

Pursuing this analogy, consider the examples in (21).

(21)   a.   a book recently published
        b.   a book published recently
        c.   a recently published book
        d.   *a published recently book

While both *recently published* and *published recently* are possible to the right of the NP containing *book*, only *recently published* is possible to the left of this NP. In other words, *published*, the head of the modifier must be adjacent to NP when it appears to its left.

19

I suggest that, similarly, VP moved above Author, must be adjacent to it and cannot be separated from it by lexical material. This is stated in (22). If VP moved above Number[plural] *n*, it would fail to meet this condition.

(22)   VP must be adjacent to Author° and cannot be separated from it by lexical material.

3.4. The inventory of inflectional morphemes in Tamazight.

This subsection, and its Hebrew parallel §4.4, deal with allomorphy, construed as syntactic licensing conditions. The following table lists the inflectional morphemes encountered in Tamazight along with the conditions under which they appear. These are rooted in selectional relations between morphemes, akin to subcategorization frames of predicates, and constitute part of the lexical entries of these morphemes. For example, the feature Number[singular] is realized by the formative *d* when it is selected (c-commanded) by the Participant morpheme *t*. In other contexts ("elsewhere"), it is *ø*. Both *d* and *ø* select Gender, thus expressing the fact that they cannot appear in first person forms. Number[plural] is *m* when c-commanded by participant *t* and *n* elsewhere. The selectional constraint on Participant *ø*, "selects Number[plural] *n*" may, thus, be redundant, as the same result is obtained from the elsewhere principle. Some morphemes, e.g., Number[plural] *n* and Gender[feminine] *t* impose no selectional restrictions (the cells in the Selection column to their right are empty). For *n*, this means that it can be followed by GenderP or VP and for the feminine *t*, this means that it can be followed by either 3pP or VP (differently from Gender[feminine], one form of which selects V and the other 3p.)

(23)   Selectional properties of Tamazight inflectional morphemes

Feature	phonological form	Selection
Singular	*d*	Selects Gender
	ø	Selects Gender
Plural	*m*	Selects Gender
	n	
Masculine	*ø*	selects V
	i	selects 3p
Feminine	*t*	
Author	*ø*	selects Part ʁ and *ø*
Participant	*t*	selects Number[sing] *d* and Number[plural] *m*
	ø	selects Number[plural] *n*
	ʁ	Selects V
3p	*ø*	Selects V

To conclude this subsection, note that in the syntactic structure, TP is merged between NumberP and PartP, yet its presence does not interfere with the locality of selection. For example, Participant *t* selects Number[sing] *d across* T. The same is true in the Hebrew future tense forms. In Hebrew, we shall see, the choice of tense impacts the form of morphemes as well as their position with respect to the stem. At the same time, tense is transparent to the selectional constraints that hold between the PNG heads, see note 23.

4. Modern Hebrew

I now show how these ingredients come together in the derivation of the Hebrew tensed verb forms. Hebrew is representative of the Semitic branch of Afroasiatic in having two tensed inflectional templates.[12] Differently from the Amazigh languages, the position of inflectional morphemes with respect to the stem in Semitic is keyed to tense/aspect. The suffixal paradigm is in (24) and the paradigm that contains both prefixes and suffixes, referred to in the literature as the prefixal one, is in (25). In Modern Hebrew, the suffixal paradigm corresponds to the past tense and the prefixal one to future tense (or, perhaps more precisely, to irrealis, since the prefixal stem is the basis on which the jussive, imperative and subjunctive forms are constructed, see Faust (This volume)) In other Semitic languages, the suffixal template goes with perfective aspect and/or past tense and the prefixal one with imperfective aspect and/or non-past tense.

(24)   Hebrew past tense paradigm: √sdr 'arrange, put in order'[13]

	Singular	Plural
3m	sider	sidr-u
3f	sidr-a	sidr-u
2m	sidar-ta	sidar-t-m
2f	sidar-t	sidar-t-m/n
1	sidar-ti	sidar-nu

(25)   Hebrew future tense paradigm: √sdr 'arrange, put in order'[14]

	Singular	Plural
3m	y-sader	y-sadr-u / t-sader-na
3f	t-sader	t-sader-na
2m	t-sader	t-sadr-u
2f	t-sadr-i	t-sadr-u / t-sader-na
1	ʔ-sader	n-sader

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[12] I only discuss the future and past tense paradigms in this paper and eschew the present tense or *benoni* forms, on the properties of which see Shlonsky (1997). Benoni inflection is nominal/adjectival in form and manifests no person distinctions.

[13] The verbs in (24) and (25) are in the *pi'el* binyan. This is not relevant to the discussion because inflection in Hebrew is by and large binyan-blind, see Kastner (2020). I put aside the formation of the different stems (their templates and vowels) and provide only their surface forms. Note also that the underlying forms of the inflectional morphemes are probably full syllables and not bare consonants or vowels. I ignore this to facilitate the exposition.

[14] The specifically feminine forms *t-sader-na* in 2pl and 3pl are formal, even pedantic forms, practically nonexistent in the contemporary language (although see note 19 for the correlation with the feminine plural pronouns.) I include them because they are useful illustrations of the workings of the inflectional system developed here.

Note also that the first person *ʔ-* is a carry-over from Biblical Hebrew, retained in modern orthography. In contemporary speech, the first-person singular prefix is *a* or *e* (with the initial glottal stop unpronounced or deleted) or, for many speakers, *y*, leading to neutralization with the third person singular prefix. I retain the fictional *ʔ* here, for the sake of coherence with many standard descriptions of Modern Hebrew and, aside from a speculative remark in note 21, will have nothing to say about the source of the first-person *y*.

The analysis of Hebrew, like that of Tamazight, is rooted in an explicit cartography of the functional sequence, central to which is the idea that PastP and FutureP occupy distinct positions in the clausal hierarchy, as proposed in Cinque (1999) (see §4.2 for a summary of Cinque's motivations for this proposal.)

There are no prefixes in the Hebrew past tense forms because PastP is merged higher than the PNG heads in (24). Since Participant and Author are merged above FutureP, it becomes possible to derive the fact that first and second-person morphemes are prefixes in (25). The prefixal third-person is derived by a specific rule, according to which VP pied-pipes 3pP above FutureP. The specific derivations proposed below rely on some morpheme-specific rules, such as that NUMBER attracts GenderP (as in Tamazight) or that plural *u* precludes Gender. These rules are listed in summary form in §5.

The following two sections are devoted to the analysis of the second and third person forms in the past and future. I present the syntactic derivation of all the forms, one by one. The first-person forms in both paradigms are discussed together in an independent section. The discussion of Hebrew terminates with a synoptic presentation of the inflectional morphemes and their licensing conditions.

4.1. Hebrew past tense (suffixal) paradigm

My point of departure is that the syntactic representation contains a PastP (see Cinque 1999), configured higher in the tree than the categories that encode person, number, and gender. As in Tamazight, VP generally ends up in the specifier of the tense category, alone or as a sub-constituent of a category that pied-pipes it or that it pied-pipes. Given the different hierarchical position of the tense category in the Hebrew past tense and in Tamazight, the position of the stem relative to PNG is predictably different. I begin with a discussion of the third person forms.

4.1.1. Hebrew past tense third person

The forms considered in this subsection are tabulated in (26).

(26)   Hebrew past tense third person forms

	singular	plural
3m	sider	sidr-u
3f	sidr-a	sidr-u

Unlike the first and second persons, which I discuss in later subsections, the third person lacks an overt person suffix in the Past. Nevertheless, I assume that there is a syntactic category corresponding to "non-first, non-second" person. This is 3pP, introduced in the discussion of Tamazight. 3pP is merged above V(oice)P. The tense category PastP is merged above it.

(27)   [PastP [3pP [VP]]]

The third-person forms in Hebrew exhibit gender and number oppositions. As in Tamazight, the cartography of inflectional features should be augmented to include a NumberP and a GenderP, merged above 3pP.

(28)   [PastP [NumberP [GenderP [3pP [VP]]]]]

In all the past tense third-person forms, VP moves to Spec/3pP, since 3p° is non-overt, and by so moving, EV is satisfied at the level of 3pP. In the 3ms form *sider*, GenderP, NumP and PastP also contain non-overt heads, so we have a classic snowballing derivation, as illustrated in (29).

(29)   Derivation of Hebrew Past 3ms *sider*
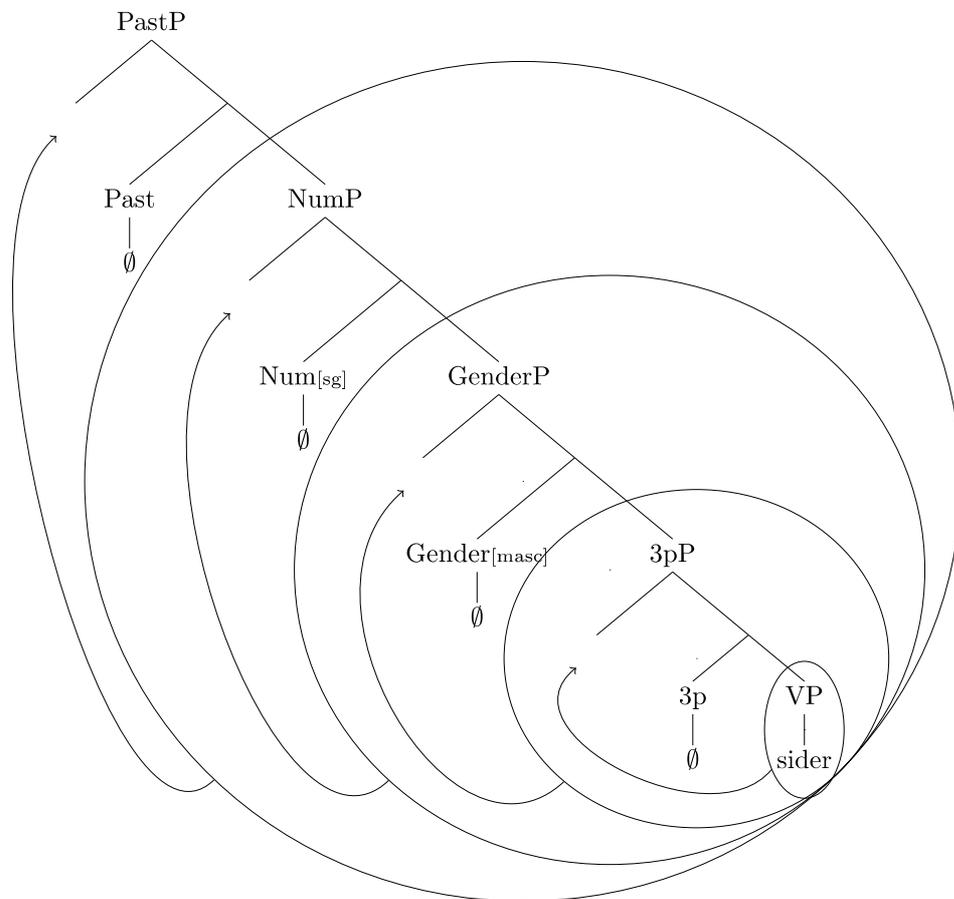
The plural form *sidr-u* is composed of the voice stem *sidr* and the plural suffix *u*. I take *u* to lexicalize Number[plural]. This terminal is merged as the head of NumP.

Gender is neutralized in the 3pl forms of the Hebrew Past tense so that we get *sidr-u* for both 3mpl and 3fpl. I would like to suggest that the neutralization process here results from the c-selectional properties of the plural morpheme *u* which directly selects 3p and not a Gender head.

(30)   Number[plural] *u* selects 3p. (Revised in (43))

Number[plural] *u* silences gender in the verbal inflection of Levantine, Egyptian and Moroccan Arabic as well as in Amharic, though not in Standard Arabic, Yemeni Arabic, Tigre and Tigrinya. It is, I stress, not Number[plural] that silences gender but the morpheme *u.* GenderP is predictably licensed under a plural morpheme other than *u* in verbal inflection*.* In Tamazight, for example, the plural morpheme is *n*, and it is followed by the feminine *t.* (30) is a morpheme-specific rule, a listed lexical exception.

Here is my proposal for the derivation of *sidr-u*.

(31)   Derivation of Hebrew Past 3pl *sidr-u*
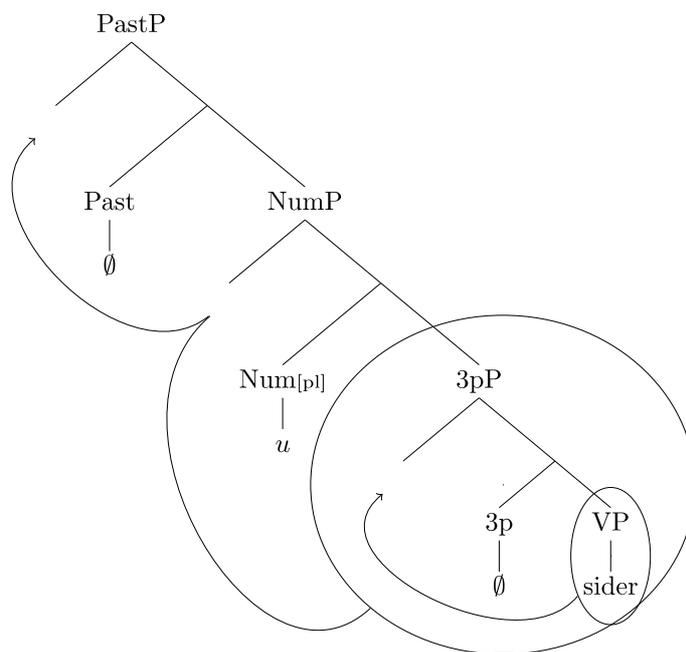
What about the feminine singular *sidr-a*? *a,* or perhaps *at* - given the ubiquity of *t* as an exponent of feminine gender - lexicalizes the Gender[feminine] head. We also have the non-overt singular number head NUMBER[singular]. The derivation could be as straightforward as in (32).

(32)   Possible (but incorrect) derivation of Hebrew Past 3fs *sidr-a*
      a.   VP → Spec/3pP
      b.   3P → Spec/NumP, via Spec/GenP
      c.   NumP → Spec/PastP
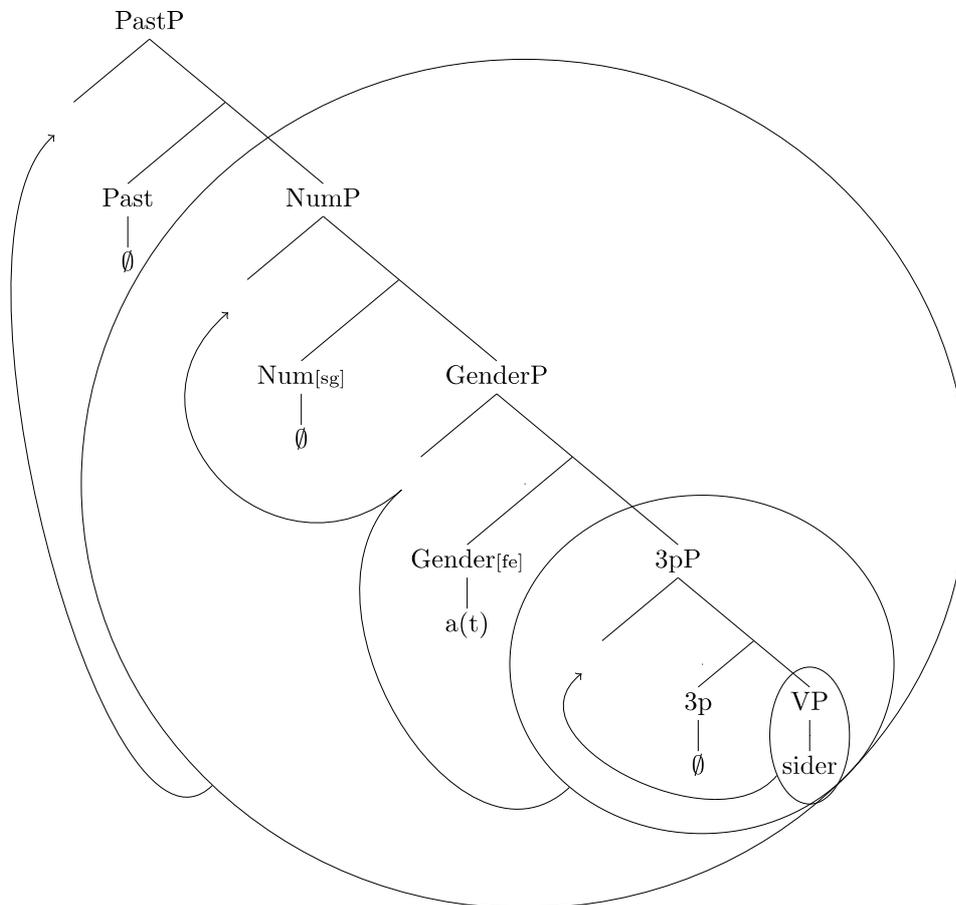
As stated, I believe that *sidr-a* is actually not derived as in (32). The alternative derivation sketched out below is not only possible – illustrating a formal option extensively exploited in the recent literature on linearization (e.g., Cinque 2022) – but, given the derivation of past tense 2ms *sidar-t-a*, to be discussed shortly (see (39)), it is required.

Recall condition (14) on NUMBER in Tamazight:

(14)   NUMBER attracts GenderP (to its specifier).

Suppose (14) holds for Hebrew as well. Upon the merge of NUMBER, it is therefore not 3pP that moves from Spec/GenderP to its spec, as in (32), but rather the entire GenderP. This is schematized in (33):

(33)   First steps in an alternative derivation of Hebrew past 3fs *sidr-a*
      a.   VP→Spec/3pP
      b.   3pP→Spec/GenderP
      c.   GenderP → Spec/NumP.
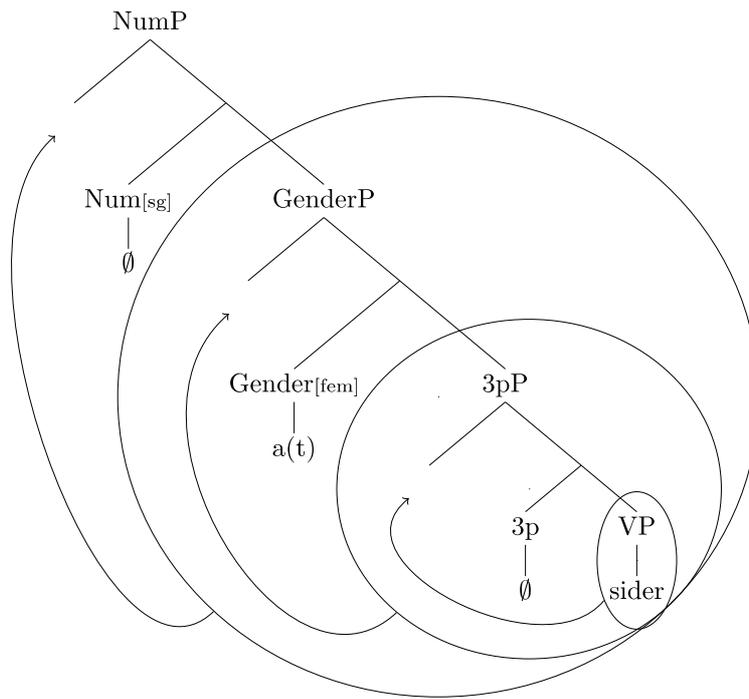
There is a violation of NC at the level of GenderP, because Gender° is overt, and its specifier also contains an overt morpheme. But 3pP does not remain in Spec/GenderP. Upon merge of Past°, it splits and moves to Spec/Past, carrying along the VP in its spec. This is shown in (34).

(34)   Final step in the derivation of Hebrew Past 3fs *sidr-a*
        3pP→Spec/PastP
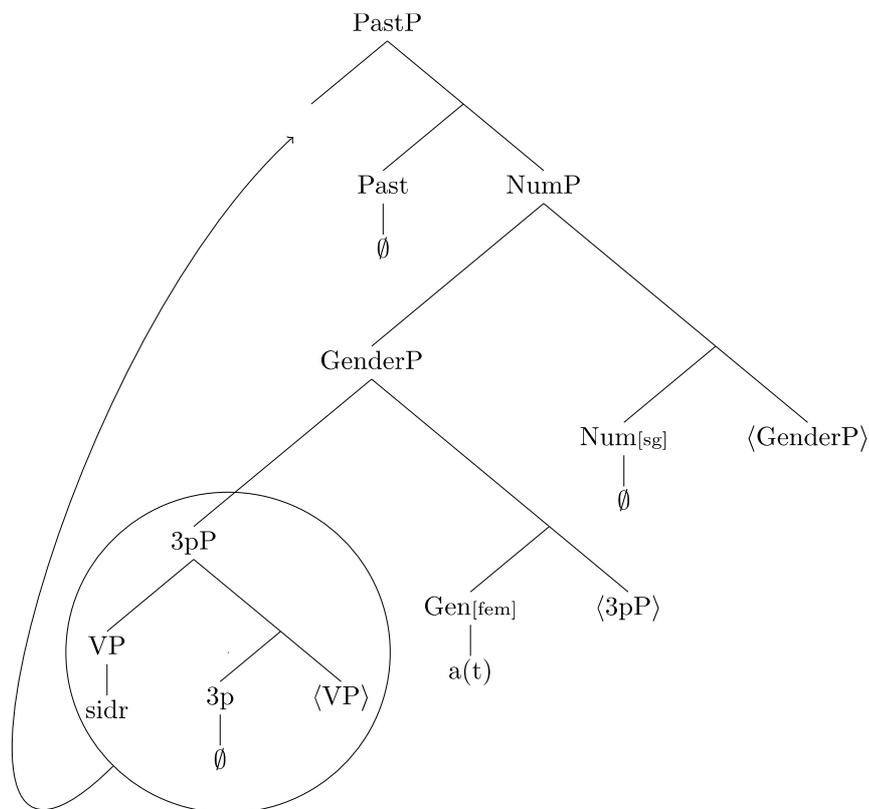
NC is a representational constraint, not a derivational one: An overt head cannot have an overt spec at Spellout, but an overt category can move to its spec *en route* to a higher spec. Hebrew, unlike Tamazight, allows a category in the specifier of a moved category to split and move further, with some morpheme-specific restrictions (on the *t* of future tense 3fs *t-sader*, for example, see (51) and (52).)

Under the alternative derivation of *sidr-a* in (34), the difference between Tamazight 3fs *t-dawa* in (15) and Hebrew boils down to whether 3pP splits and moves alone or whether it doesn't. In Tamazight, splitting does not take place and so the feminine morpheme ends up as a prefix. In Hebrew, splitting takes place and this yields a feminine suffix.

The decision as to whether *sidr-a* is derived as in (32) or as in (34) is not arbitrary but depends, to a large degree on whether condition (14) constrains movement in Hebrew, as it does in Tamazight. As noted, the derivation of past 2ms *sidar-t-a* will show that it does.

4.1.2. Hebrew past tense second person

(35)   Hebrew past tense second person forms

	singular	plural
2m	sidar-ta	sidar-t-m
2f	sidar-t	sidar-t-m/n

There are two suffixes in the second person masculine plural *sidar-t-m*: *-t* and *-m*. The *t* morpheme, as we shall see, occurs in a variety of other environments involving the 2nd person, and I posit it as the head of Part(icipant)P. The *m* morpheme is a plural morpheme.

The main issue that arises in a non-bundling and non-fission approach to these facts is how to account for the fact that plural *m* is restricted to second person, without saying that it bears second person features as well. To accomplish this, I posit that Number[plural] *m* selects Gender in the past tense and direct the reader to the synoptic discussion of the licensing conditions of the inflectional morphemes in §4.4.

VP moves to Spec/GenderP in the derivation of *sidar-t-m* and satisfies EV. Then, GenderP carries it along as it moves to Spec/PastP via NumberP and ParticipantP. The syntactic derivation is in (36).

(36)   Derivation of Hebrew Past 2mpl *sidar-t-m*
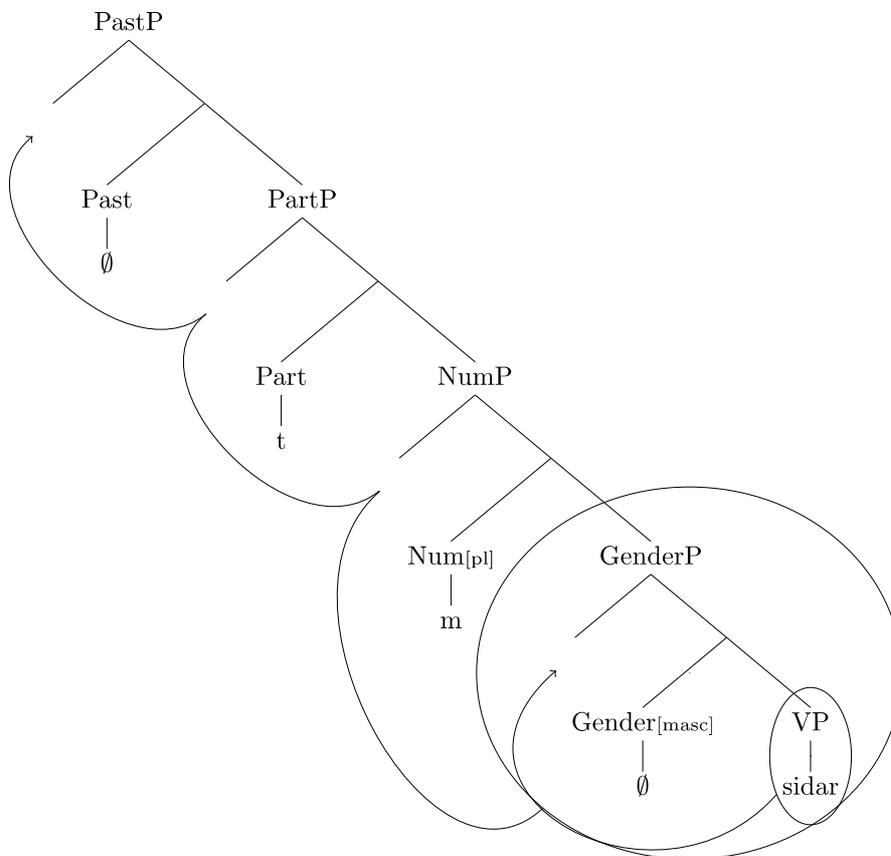
The second person feminine plural is either identical to the masculine form just discussed, namely *sidar-t-m* or manifests a different suffix namely *-n*. I suggest that this form derives from an underlying sequence *sidar-t-m-t*, where the final *t* is the feminine head of Gender.[15] The derivation of the *sidar-t-n*, under this view, is in (37).

(37)   Derivation of Hebrew Past 2fpl *sidar-t-n*
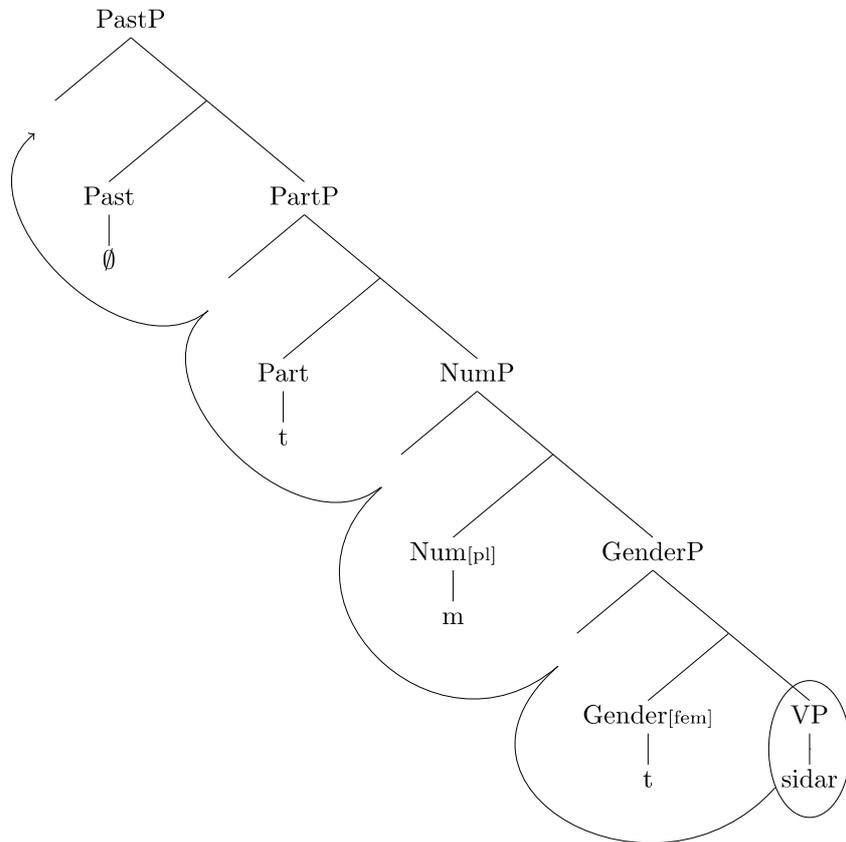
The idea here is that the sequence *m-t* in Hebrew is realized in one of two ways: it can either become *n*, by nasal place assimilation plus *t* deletion, see (38), or it can remain *m*, with *t* deletion alone. This latter outcome is characteristic of colloquial speech, in which *m* is employed for both masculine and feminine plural addressees. The non-application of nasal assimilation in colloquial Hebrew explains the neutralization of gender in the second person plural in this register.

In Tamazight, *t* deletion is restricted to haplology (the second singular feminine surface form *t-dawa-d* is thus derived from the underlying *t-dawa-d-t* (see (12)). The feminine *t* morpheme is retained when preceded by Number[plural] *m*. In the Hebrew inflectional system, the feminine *t* morpheme is systematically elided word-finally, in a process akin to

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[15] In both Tamazight and Hebrew, as in much of Afroasiatic, *t* lexicalizes both Gender[feminine] and Participant. Halle (2000) expressed the homophony of *t* by taking it to be the elsewhere form. Blix (2018) derives the homophony in Standard Arabic by post-syntactic rules. I subscribe to what Harbour (2008b) calls the nonhomophonopobic perspective: There are simply two *t*'s in Hebrew, one lexicalizes Gender[feminine] and the other Participant. See also the discussion of the second person singular future form *t-sader* in §4.2.1.

word-final feminine *t* deletion in regular nouns and adjectives, e.g., *yald-at* → *yalda* 'girl' (see Faust (2013), Harbour (2008b) and references therein.[16])

(38)   Gender[feminine] *t* is elided word-finally.[17]

What happens in the second person singular? Consider the masculine form *sidar-t-a* first. NumP contains a non-overt NUMBER[singular] morpheme, but the masculine gender morpheme is *a*, restricted to occur in the past tense singular.

The derivation of *sidar-t-a* demonstrates that condition (14) is not specific to Tamazight, as it is active also in the syntax of Hebrew. Just as importantly, the derivation of *sidar-t-a* demonstrates that movement followed by splitting is not a mere theoretical option in Hebrew; recall the discussion of *sidr-a* in (33) and (34). The order of the suffixes -*t* and -*a* is a direct consequence of the splitting step.

Consider what happens after VP moves to Spec/GenderP. If VP then moves on to Spec/NUMBERP and then pied-pipes NumberP to Spec/PastP, via Spec/PartP, we derive the incorrect **sidar-a-t*.

However, if NUMBER (non-overt Number) attracts GenderP in *both* Hebrew and Tamazight, the correct morpheme order is straightforwardly derived. After movement of GenderP to Spec/NumberP, VP splits, as it cannot remain in Spec/GenderP because of NC. VP moves to Spec/PastP, via Spec/PartP. This has the consequence of stranding, as it were, the Gender[masculine] *a* below Participant *t*, thus yielding the desirable order of affixes. The derivation is shown in (39).

---

[16] Some vagueness remains as to whether *t*-deletion effects the phoneme *t* (as in the nominal, adjectival and, if the underlying form of Gender(feminine) in the past tense third person singular is *at* – see (32) - in the verbal system as well), or the morpheme *t* as in (38). Perhaps there is a single process here.

[17] A reviewer correctly points out that the feminine *t* of *sidar-t-m-t* would surface preceding another suffix. This prediction cannot easily be tested because object pronouns (or clitics, see Shlonsky (1997, ch. 9.)) cannot be suffixed to verbs in Modern Hebrew.

(39)   Derivation of Hebrew Past 2ms *sidar-t-a*
    a.   VP→Spec/GenderP
    b.   GenderP→Spec/NumberP
    c.   VP→ Spec/PastP via Spec/PartP
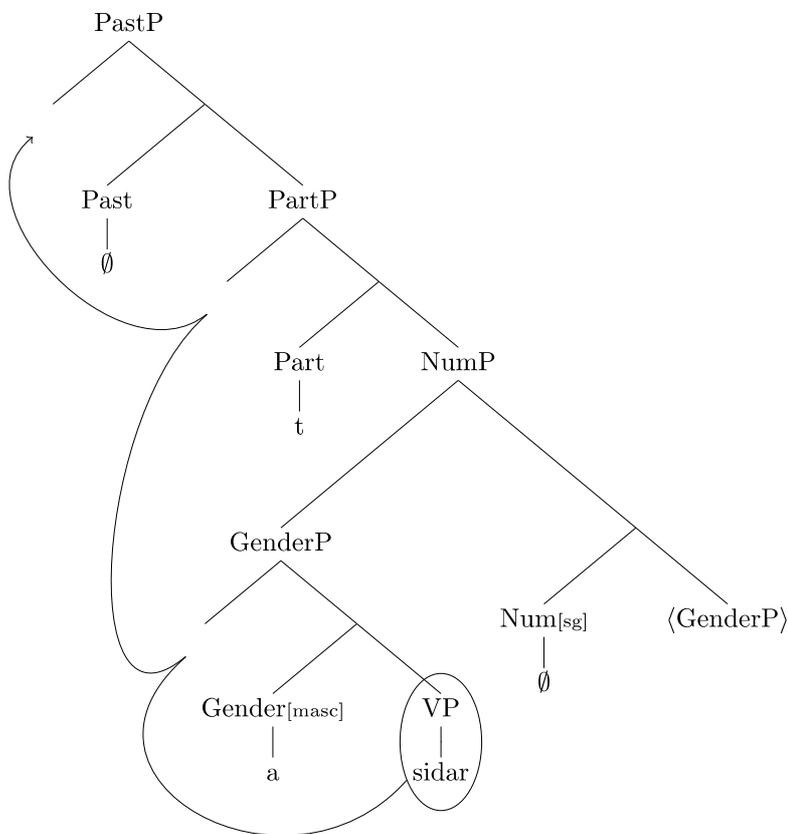
Note that VP splitting must take place *after* GenderP moves to Spec/NumP. If merge of Participant *t* were followed by movement of NumberP to Spec/PartP and VP splitting at that point, NC would be technically violated since Participant is overt and Gender[masculine] *a* would remain embedded in its spec.

What about the feminine singular? The form *sidar-t,* I posit, is underlyingly *sidar-t-t*, with the second *t* - the Gender(feminine) head - deleted in accordance with (38). The derivation of *sidar-t* is shown in (40).

(40)   Derivation of Hebrew Past 2fs *sidar-t*
  a. VP→Spec/GenderP
  b. GenderP→Spec/NumP
  c. VP→ Spec/PastP, via SpecPartP
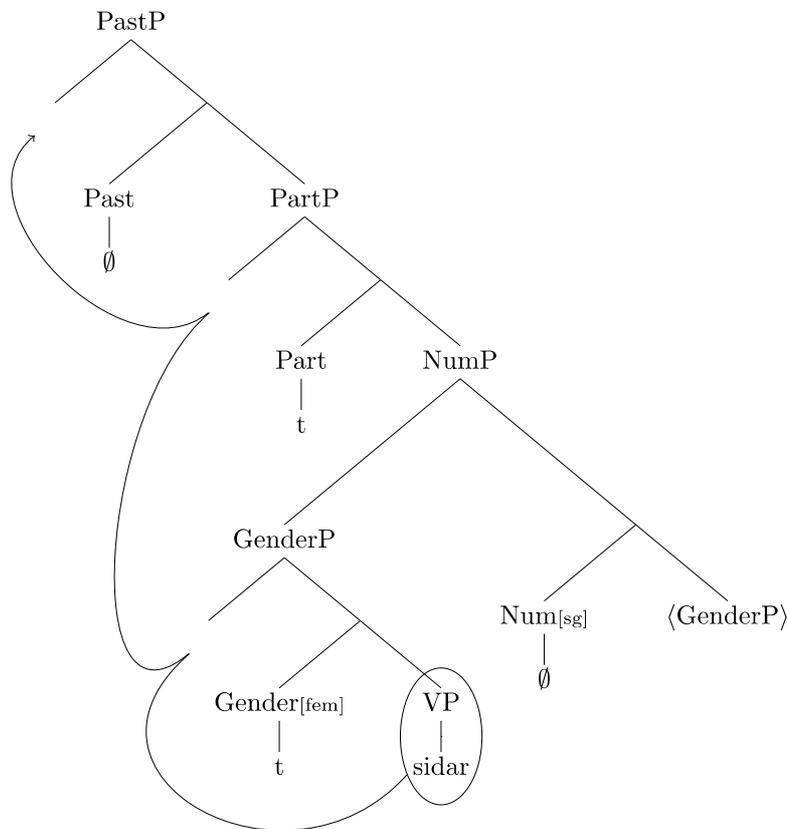
4.2. Hebrew Future tense (prefixal) paradigm

In the past tense, I argued, the verb, or a category that contains it, moves to Spec/PastP. Future tense is encoded by a different category, FutureP, merged lower. Cinque (1999: 72-73) provides converging evidence for this order from the corresponding particles in several Creoles, the mirror-image order of suffixes in diverse head-final languages and the different positions of Past and Future particles relative to negation in a number of Bantu languages.[18] I hypothesize that FutureP is configured immediately above NumberP and therefore below ParticipantP and AuthorP. In this paradigm, movement of VP or of a category containing it, targets Spec/FutureP. This simple syntax yields the fact that the morphemes that are merged higher in the tree, namely, the first and second person morphemes, will end up to the left of VP, as prefixes. For expository reasons, I begin with a discussion of the second person forms.

---

[18] As already mentioned, the Hebrew future tense paradigm corresponds to the Arabic (and Ethiosemitic) imperfective. See Aoun, Benmamoun and Choueiri (2010), Benmamoun (2000) and Shlonsky (1997) where it is argued that the imperfective head in Arabic is merged lower than the perfective head.

4.2.1. Hebrew future tense second person

There are four second person forms and all four share the same prefix, namely *t-*. This is the second person morpheme that we have already encountered in the past tense forms. It is merged as the head of PartP.

(41)　Hebrew future second person forms

	singular	plural
2m	t-sader	t-sadr-u
2f	t-sadr-i	t-sadr-u / t-sader-na

To get a better grasp of the derivation of these forms, let us start with 2ms *t-sader*. Here we have a snowballing derivation, all the way up to Spec/FutureP, as diagrammed in (42).

(42)　Derivation of Hebrew Future 2ms *t-sader*
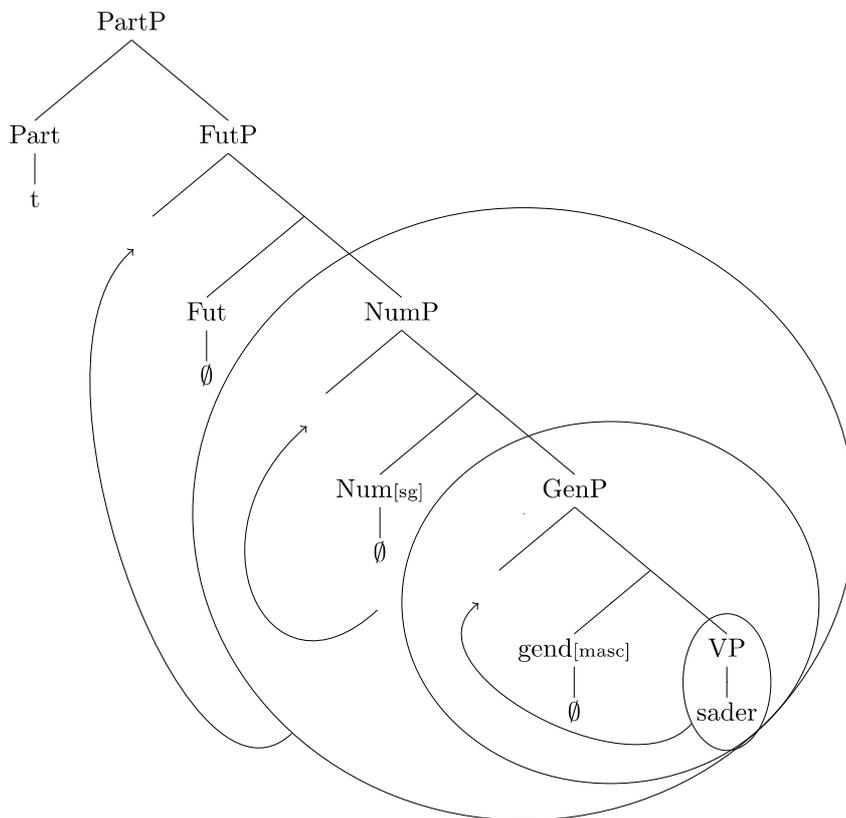
In the plural form *t-sadr-u*, *u* is merged as the head of NumberP. To account for gender neutralization in the past tense third person plural form *sidr-u*, I proposed in (30) that *u* c-selects 3p and not Gender. To explain the gender neutralization observed in *t-sadr-u*, (30) must be revised to (43).

(43)　Number[plural] *u* selects 3p or VP.

In the derivation of *t-sadr-u*, VP raises to Spec/Fut via Spec/NumP. (44) yields the gender-neutral form of colloquial Hebrew.

(44)　　Derivation of Hebrew Future 2pl *t-sadr-u*
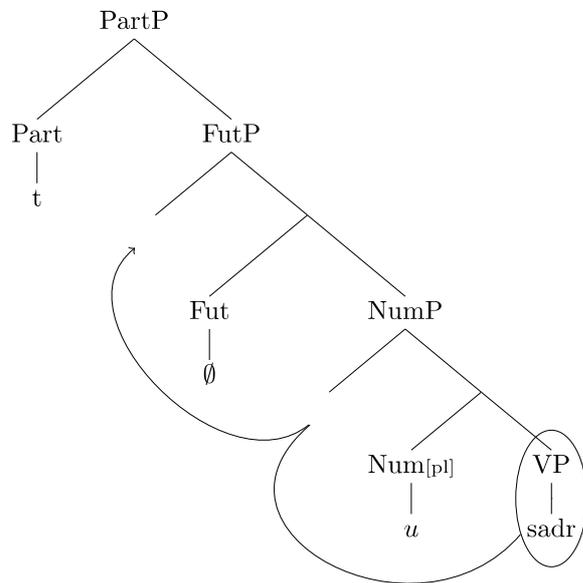
The specific feminine form, *t-sader-na* is more formal (or pedantic) and is obligatory only when the subject is the (also formal) feminine pronoun *ʔaten* (a fact with which a BJALL reviewer disagrees).[19] The absence of plural *u* here is predicted, since Gender is not projected under *u*. I suggest that Number[plural] here is *na* and feminine gender is realized by *t*. The *t* is phonologically deleted as do all final feminine gender *t's*, (38). The underlying form is therefore *t-sader-na-t*.

---

[19] When the pronoun is obligatorily absent, as it is in imperatives formed with future tense morphology, the gender-neutral *t-sadr-u* is the only option.
The restriction of *t-sader-na* to sentences with the specific second person feminine plural pronoun indicates the tight connection between the verbal forms and the subject pronouns, a connection alluded to in the introduction, but left unexplored in this contribution.
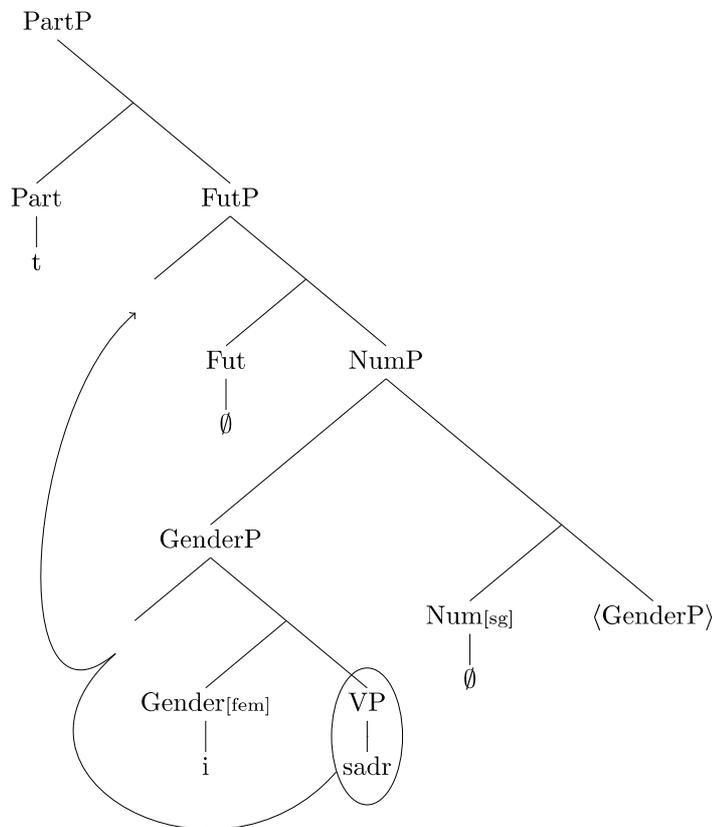
(45)   Derivation of Hebrew Future 2fpl *t-sader-na*

PartP
Part — FutP
t
Fut — NumP
∅
Num[pl] — GenderP
na
Gender[fem] — VP
t   sadr
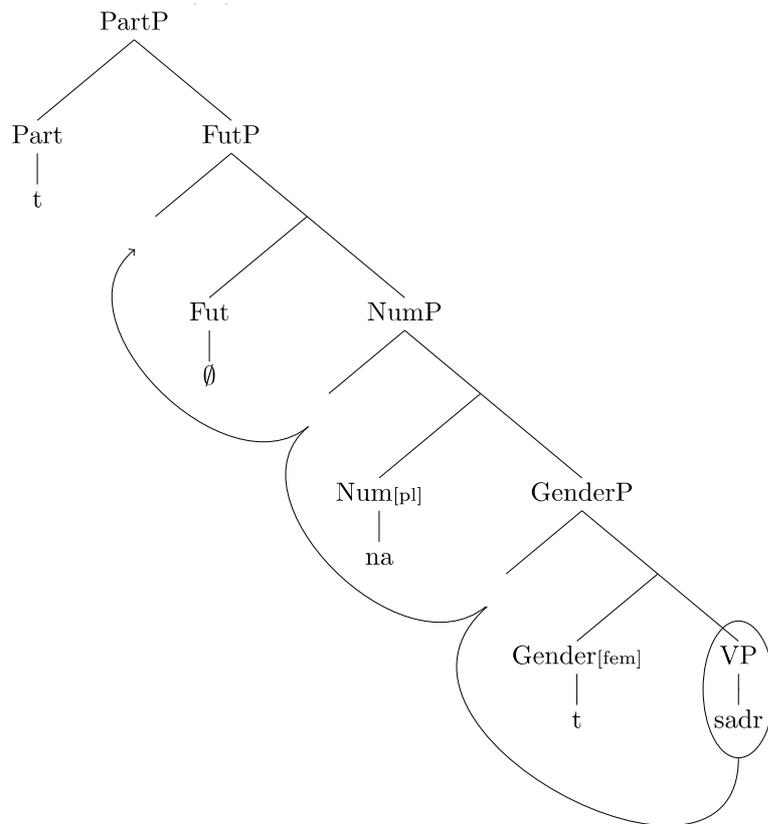
The final form to be discussed in this subsection is the feminine singular *t-sadr-i*. The *-i* is a Gender[feminine] head and Number[singular] is non-overt. NUMBER attracts GenderP and not VP, recall (14), so GenderP moves to Spec/NumberP and then VP splits, moving to Spec/FutP. This is shown in (46).

(46)   Derivation of Hebrew Future 2fs *t-sadr-i*.
    a.   VP➔Spec/GenderP
    b.   GenderP➔Spec/NumP
    c.   VP➔Spec/FutP

PartP

Part   FutP
  |
  t
            Fut   NumP
             |
             ∅
          GenderP
                        Num[sg]   ⟨GenderP⟩
                           |
                           ∅
          Gender[fem]   VP
               | |
               i   sadr

4.2.2. Hebrew future tense third person

Four forms need to be considered here, the singular *y-sader*, *t-sader*, and the plural *y-sadr-u* and *t-sader-na*.

(47)   Hebrew future tense third person paradigm

|	singular	plural
3m	y-sader	y-sadr-u
3f	t-sader	y-sadr-u / t-sader-na

I take the *y* of *y-sader* and *y-sadr-u* to lexicalize 3p and observe that VP never moves above it. If VP were to move to Spec/3pP when 3p is *y*, it could then pied-pipe 3pP and would split from 3pP at a later stage, so as to satisfy NC. Such a derivation would incorrectly yield a suffixal *y*. What we actually find is that *y* pied-pipes its complement VP so that, at no stage is VP in Spec/3pP.

(48)   3p *y* pied-pipes its complement.

The derivation of *y-sader* is in (49), and that of *y-sadr-u* is in (50). Recall that the plural *u* does not have a GenderP complement, expressed in (43) as a selectional restriction. This is the reason why *y-sadr-u* is compatible with both masculine and feminine subjects.

(49)   Derivation of Hebrew Future 3ms *y-sader*
        a.   3pP → Spec/GenderP
        b.   GenderP → Spec/NumP
   c.   NumP → Spec/Fut
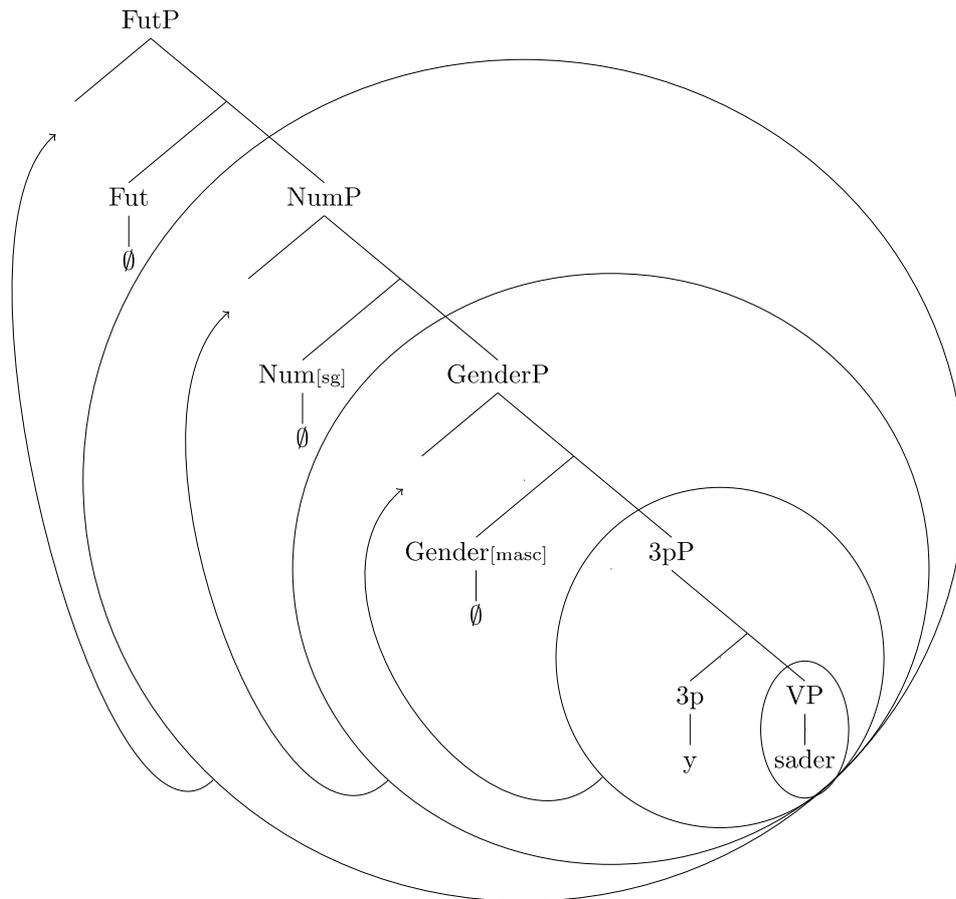
(50)   Derivation of Hebrew Future 3mpl *y-sadr-u*
        3pP → Spec/NumberP→Spec/FutP
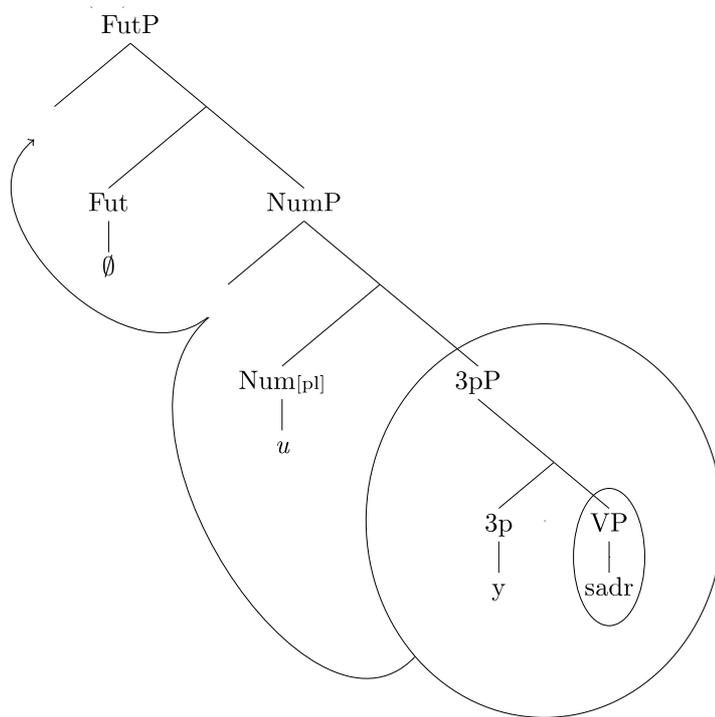
Consider now the 3fs form *t-sader* and note that it is identical to the 2ms form in (42). In the second-person form, *t* lexicalizes Participant. The *t* of the 3fs form, however, is an exponent of feminine gender, as it is in the 3fpl *t-sader-na*, discussed below.

Here is my proposal for 3fs *t-sader*.

(51)   Derivation of Hebrew Future 3fs *t-sader*

FutP

Fut
|
∅

NumP

Num[sg]
|
∅

GenderP

Gender[fem]
|
t

3pP

3p
|
∅

VP
|
sader
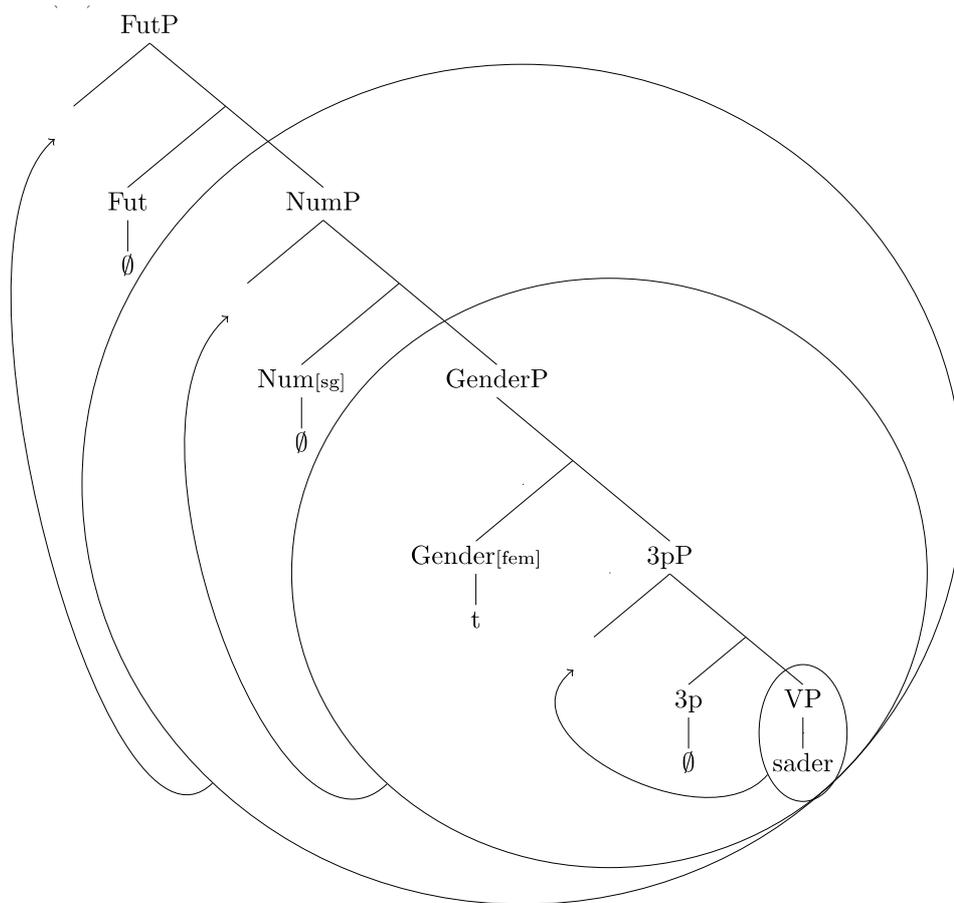
There is another seemingly licit derivation of *t-sader*: 3pP moves to Spec/GenderP, GenderP moves to Spec/NumberP and 3pP then splits and moves to Spec/FutureP. This derivation would not yield a prefixal *t* here; *t* would follow the stem and get deleted by (38).

It looks like Gender[feminine] *t* must pied-pipe its complement here in the same way that 3p *y* does (cf. (48)). Differently from *y*, however, Gender[feminine] *t* must pied-pipe only a 3pP complement, while *y* pied-pipes any complement. When the complement of Gender[feminine] *t* is VP, pied piping does not occur, cf. future 2fpl *t-sader-na* in (45).

(52)   Gender[feminine] *t* pied-pipes a 3pP complement.

The 3fpl form, *t-sader-na,* is surface-identical to the 2fpl form. However, the word-initial *t* in the 3fpl lexicalizes Gender[feminine], as in 3fs *t-sader*, while in the 2fpl form, the word-initial *t* lexicalizes Participant. Like the 2fpl form, this specific 3fpl form is more formal and gives way to *y-sadr-u* in the spoken idiom. As in 3fs *t-sader*, 3pP is pied-piped by Gender[feminine] *t* and remains in the position of its complement.

(53)   Derivation of Hebrew Future 3fpl *t-sader-na*
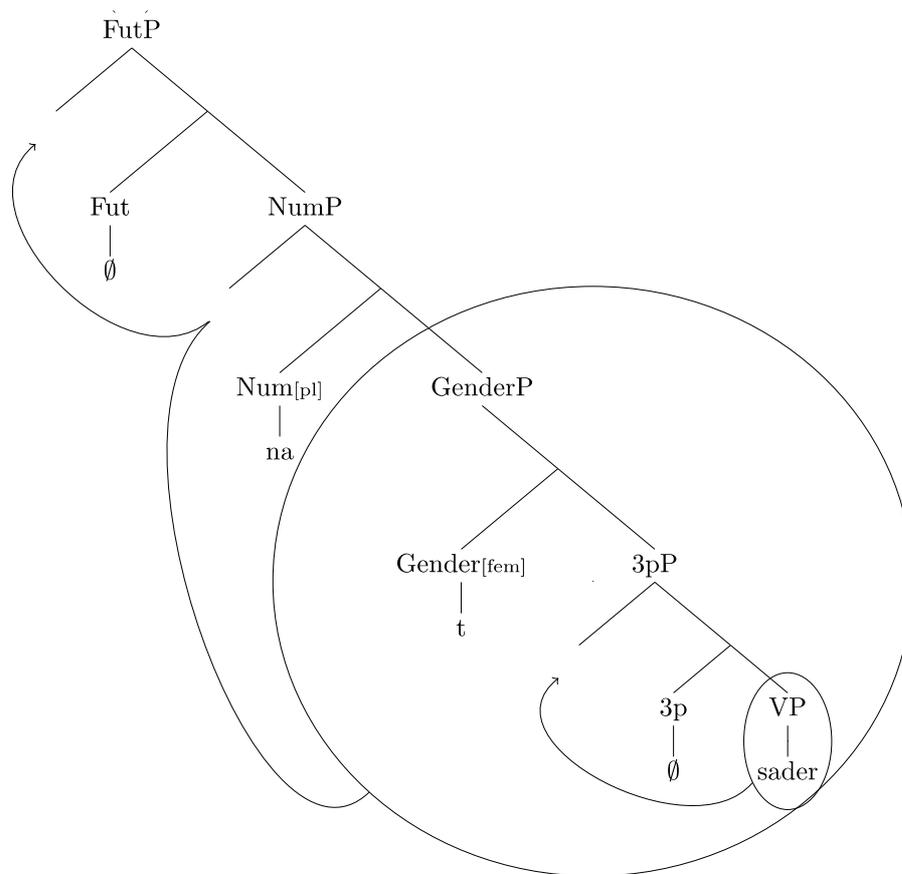
4.3. Hebrew first person

The forms to be considered here are the following:

(54)   Hebrew first person forms (Past and Future)[20]

	Singular	Plural
Past	sidar-ti	sidar-n-u
Future	ʔ-sader	n-sader

I assume that the representation of first person depends on a further projection above PartP, namely AuthorP, as in Tamazight. I also carry over the reasoning that underlies condition (18), repeated as (55). The speech act participant categories, PartP and AuthorP are subject to a heaviness constraint or complexity filter, implemented by silencing Gender. Note also that first person pronouns in Hebrew also lack a gender distinction, unlike second and third person ones.

(55)   Gender is not projected under Author.

As for number, recall that NUMBER (non-overt Number) attracts GenderP to its spec in both Tamazight (14) and Hebrew (33). Since GenderP is not projected under Author, NUMBER must also be unprojected. Since NUMBER in Hebrew is singular, it is predicted that the first-person singular forms in Hebrew lack both Number and Gender.

The first form I discuss is the past singular form *sidar-t-i*. The morpheme *t* is merged in Part(icipant)°, as in the second person forms *sidar-t-a, sidar-t-m*, etc. It follows that Author is lexicalized by *i*. However, if Author is merged above Participant, as I assume, the order of morphemes should be Author-Participant, or *i-t*, rather than the *t-i* that surfaces.

In principle, the correct morpheme order could be obtained by moving PartP, with VP in its specifier, to Spec/Author, as in (56). Note that while such a derivation would result in the correct order of morphemes in *sidar-t-i*, it would do so at the price of violating NC at AuthorP, since both the head and the specifier of AuthorP contain a morpheme. Further movement of PartP to Spec/PastP, as in (56), would also run afoul of NC since VP would remain in Spec/PartP. Movement of VP alone to Spec/PastP would not resolve this NC problem either because the *t* of Part would remain in Spec/AuthorP.

(56)   Incorrect partial derivation of Hebrew Past 1s *sidar-t-i*
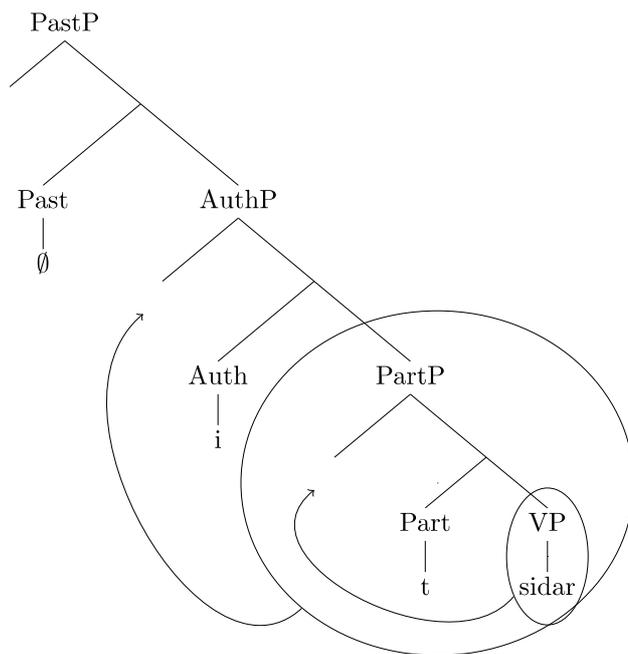
My proposal is that the order *t-i* results from (very local) head movement of Part° to Author°. Adjunction of Part° to Author° has the consequence of reversing the linear order of the two morphemes. The derivation of *sidar-t-i* is in (57).

(57)   Derivation of Hebrew Past 1s *sidar-t-i*
        a.   VP → Spec/ParticipantP
        b.   Part° → Author°
        c.   ParticipantP → Spec/PastP, via Spec/AuthorP
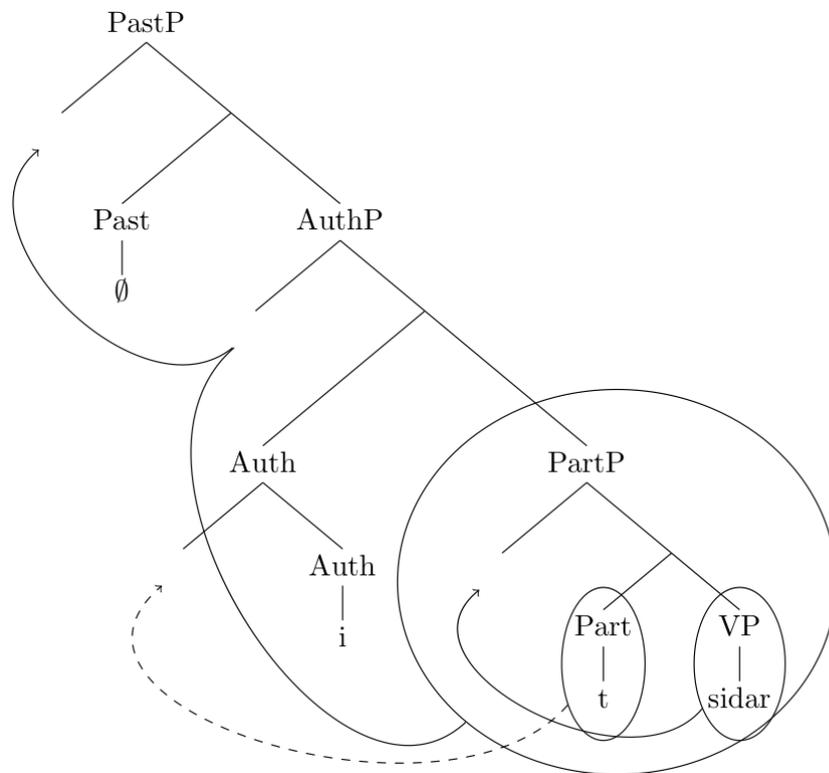
The absence of Number[singular] is expected in *sidar-t-i*, as per the discussion above. The question arises as to why there is no 1pl *sidar-t-i-u* with a *u* plural, alongside the 1s *sidar-t-i*.
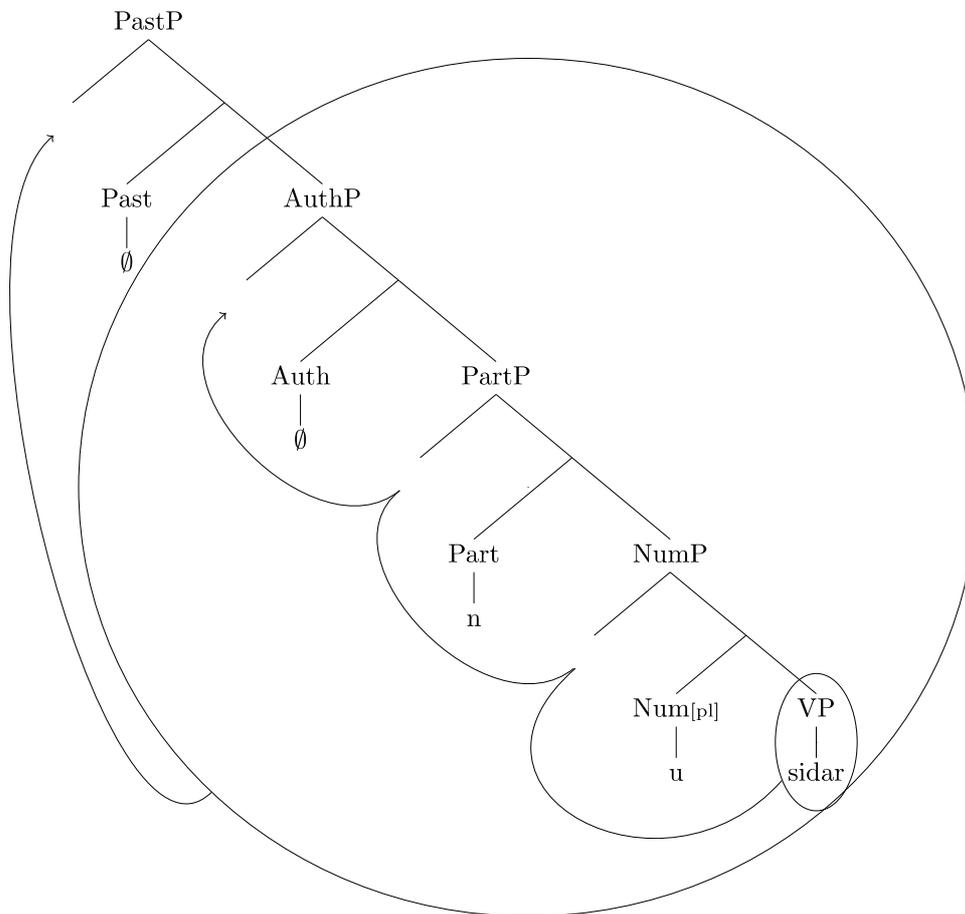
Note that the first-person morphemes in the singular and the plural are distinct. This is not what we find in the second and third persons, where, on the contrary, the morphemes that code for Participant and 3p are the same in the singular and in the plural. A formal difference between the first-person forms in the singular and plural is found in Tamazight and is fairly common across Semitic – Maghrebi Arabic being an exception. This might suggest that the Author feature is bundled together with a number feature (lexically or as a result of postsyntactic operations, see Harbour (2016), Hewett (This volume)). Since my working hypotheses are that there are no lexical portmanteaus and no sui generis morphological operations, I express the unavailability of a pluralized *sidar-t-i* in the past first-person as a selectional restriction on Participant *t* c-commanded (selected) by Author *i.* This restriction, given in (58), can be thought of as an idiom in the domain of inflection.

(58)   Participant *t* selected by Author *i* selects VP.

The past tense plural form is *sidar-n-u.* Here we see *n* and there is also a plural *u*, which, to recall from (43), requires a VP (or 3pP) complement, rendering GenderP unavailable in this context. The *n* of *sidar-n-u* lexicalizes Part and is selected by AUTHOR. The derivation proceeds as follows:

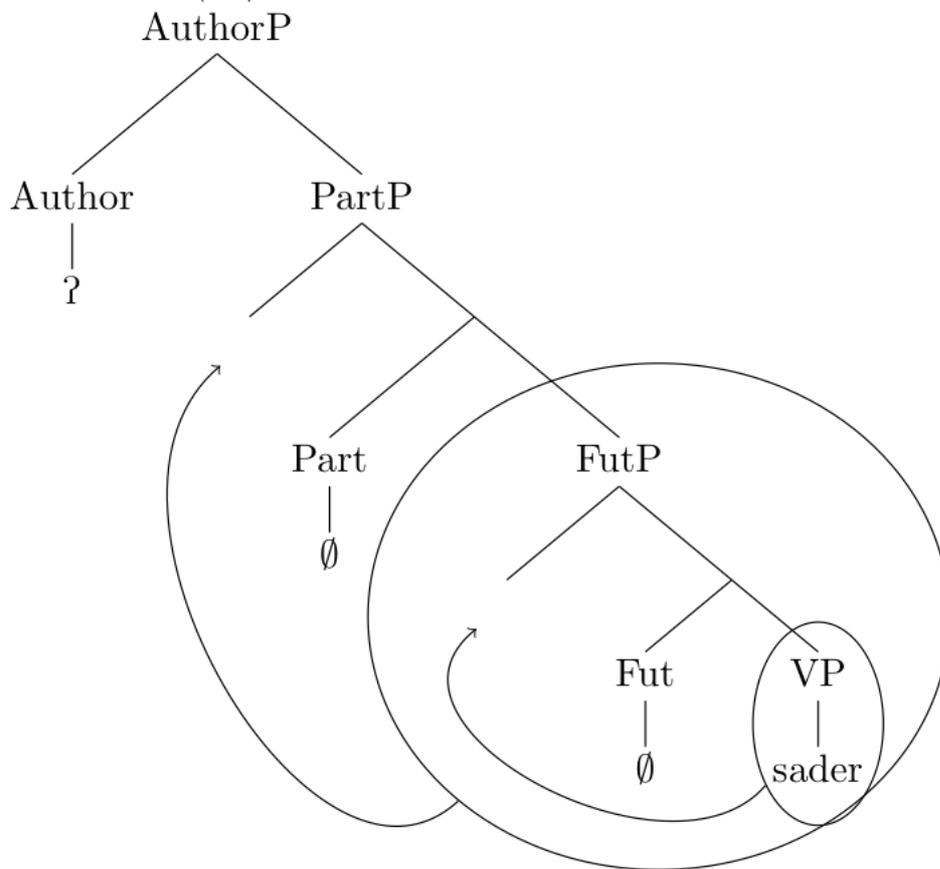(59)   Derivation of Hebrew Past 1pl *sidar-n-u*
    a.   VP → Spec/AuthorP, via Spec/NumberP and Spec/PartP
    b.   AuthorP→Spec/PastP

Consider, now, the future form *ʔ-sader*. I propose that *ʔ* lexicalizes Author and selects a silent participant head.[21]

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(60) Derivation of Hebrew Future 1s *ʔ-sader*
   a.   VP → Spec/FutureP
   b.   FutureP → ParticipantP

The future plural *n-sader* is the last form to be considered. Its derivation might appear to be identical to that of *ʔ-sader*, but it is interpreted as 'we' and not 'I'. From a Spanning/Nanosyntax angle, one could claim that *n* lexicalizes the subtree containing Author, Future and Plural (and *ʔ*, Author, Future and Singular). In my approach, however, formatives lexicalize syntactic heads, not spans of trees. I propose that the *n* does not lexicalize Author, or Participant, as in the past tense *sidar-n-u*, but Number[plural]. Indeed, Hebrew *n-sader* is exactly like Tamazight *n-dawa* and in both, VP is pied-piped by NumberP (rather than moved alone), for reasons expressed in (22). As a reviewer notes, *n* in this system is ambiguous: it lexicalizes Participant in the past tense and Number[plural] in the future tense.[22]

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[22] The derivations of the future tense first-person forms *ʔ-sader* and *n-sader* involve movement above FutureP. This is due to EV: These are the only forms that have nonovert inflectional heads higher than the tense head.

(61)   Derivation of Hebrew Future 1pl *n-sader*

AuthorP

Author
∅

PartP

Part
∅

FutureP

Fut
∅

NumP

Num[pl]   VP

n   sader
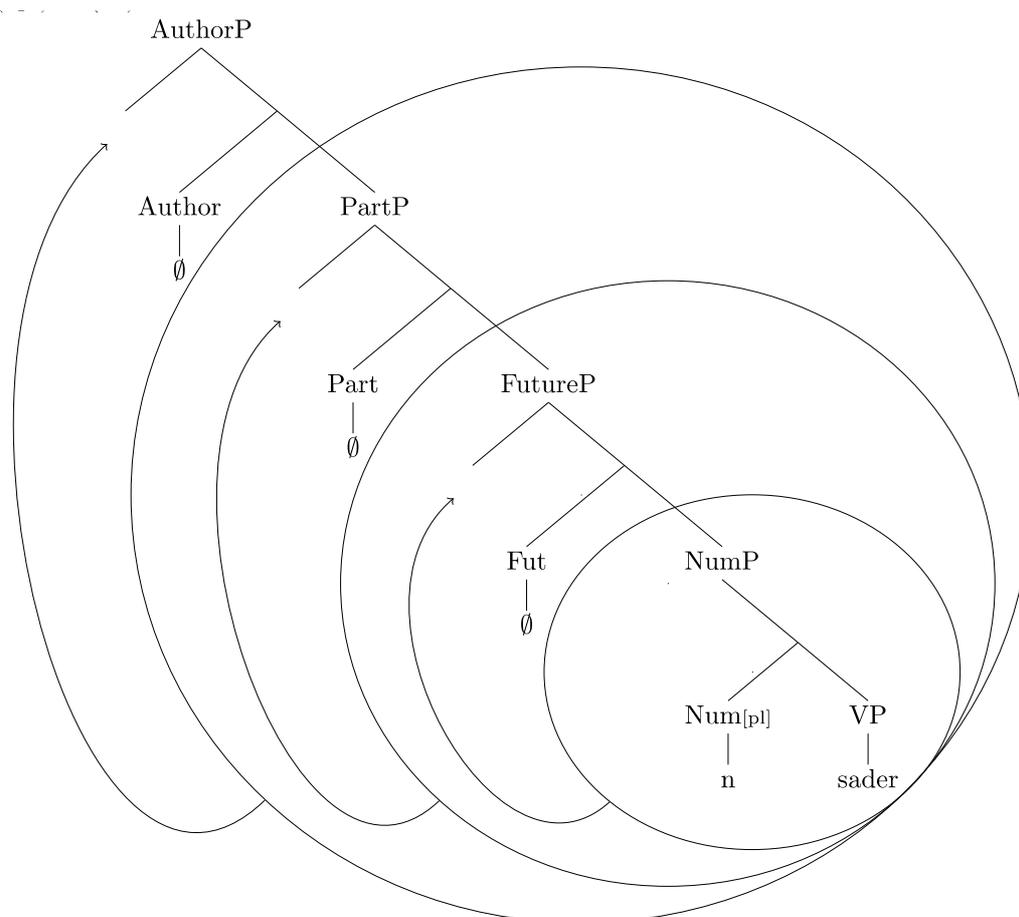
4.4. The inventory of inflectional morphemes in Hebrew and their licensing conditions

The morphemes that realize the inflectional features are selected for lexical insertion based on two factors, (i) association with Past or Future and (ii) the complements they select. Like subcategorization conditions on verbs, morphemes typically select a category (c-selection) and in some cases, they require a specific morpheme as the head of their complement, similarly to verbs that select for specific prepositions.[23]

The inventory of inflectional morphemes and their selectional properties are described in prose in the bullet points below. A synoptic table is provided in in (62).

- There are three morphemes that realize the feature Gender[feminine]: *a(t)*, *t* and *i*.
  - *a* must be c-commanded by Past and selects 3p.
  - *t* is licensed in the scope of Past and Future and in the Future it selects 3p.

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[23] It should be noted that while c-selection is local, so that a head c-selects the head of its sister, an intervening FutureP (in the selection of Number by Participant, for example) is ignored. We find this kind of seemingly non-local selection in myriad other areas. For example, Tense or Fin c-select V over intervening adverbial, modal and aspectual categories, a verb in subjunctive mood is selected by a predicate in the matrix, over a nontrivial span of categories, on which see Rizzi (2017) and Shlonsky (2021).

- - *i* occurs under Future and selects VP.

- Gender[masculine] is nonovert everywhere except in the past second person masculine singular *sidar-t-a*, where it is realized as *a*.

- Number[singular] is non-overt.

- Number[plural] has three forms, *u, m,* and *na*.
  - *u* selects 3p in both the Past and the Future and VP only in the Past.
  - *m* selects Gender in the Past.
  - *na*, licensed under Future, requires the specific Gender[feminine] morpheme *t.*
  - *n* selects VP in the Future.

- 3p is expressed by two morphemes, *y* and *ø*.
  - *y* appears under Future and selects VP.
  - *ø* is licensed in the Past and selects VP.

- Participant has three realizations, *t*, *n* and *ø*.
  - *t* selects Number in both Past and Future and VP in the Past when it, itself is selected by Author *i.*
  - *n* selects Number[plural] *u*.
  - *ø* is restricted to Future and selects VP and NumberP

- Author has three variants, *i, ʔ* and *ø*.
  - *i* selects (and attracts) participant *t*.
  - *ʔ* selects participant *ø*.
  - *ø* selects participant *n* in the past and participant *ø* in the future.

(62) Hebrew inflectional morphemes, their licensing conditions and their selectional properties

Feature	Morpheme	C-selection	Example
feminine	a	Past: selects 3p	sidr-a(t) (P3fs)
	t	Past	sidart-t-t (P2fs)
		Fut: selects 3p	t-sader (F3fs)
	i	Fut: selects VP	t-sadr-i (F2fs)
masculine	ø	Past, Fut: selects 3P.	sider (P3ms)
		Fut: selects VP	t-sader (F2ms)
	a	Past: selects VP	*sidar-t-a* (P2ms)
singular	ø		
plural	u	Past, Fut: selects 3p.	sidr-u (P3ms)
		Past: selects VP	sidar-n-u (P1pl)
	m	Past: selects Gender	sidar-t-m (P2plf)
	n	Fut: selects VP	n-sader (F1pl)
	na	Fut: selects Gender(fem) *t*	t-sader-na (F2plf, F3plf)
3p	y	Fut	y-sader (F3ms)
	ø	Past	sider (P3ms)
participant	t	Past, Fut: Selects Num.	t-sadr-u (F2pl)
		Past: selects VP	sidar-t-i (P1)
	n	selects Number[plural] *u*	sidar-n-u (P1pl)
	ø	Fut: Selects VP and NumberP	?-sader (F1s)
			n-sader (F1pl)
author	i	Selects (and attracts) Participant *t*	sidar-t-i (P1s)
	?	selects Part ø	?-sader (F1s)
	ø	selects Part *n*	sidar-n-u (P1pl)

5. Summary of the Tools

The tools used in my analysis of Tamazight and Hebrew inflectional morphology are:

(63) a. A cartography of functional heads: (4) and a single tense node in Tamazight.
   b. C-selectional constraints: (23) for Tamazight and (62) for Hebrew.
   c. Movement to specifier positions, including two types of pied piping.
   d. Splitting, i.e., movement out of a pied-piped constituent.
   e. Morpheme-specific rules:
      (i) Non-overt Number attracts GenderP (to its specifier).
      (ii) Plural *u* precludes Gender: Hebrew
      (iii) 3p *y* pied-pipes its complement: Hebrew
      (iv) Gender[feminine] *t* pied-pipes a 3pP complement: Hebrew
      (v) Participant *t* selected by Author *i* selects VP.
   f. Feature-specific rules:
      (i) Author precludes Gender (Heaviness)
   g. Phonological rules:
      (i) *t* is elided by haplology: Tamazight
      (ii) Gender[feminine] *t* is elided word-finally: Hebrew

6. General conclusion and perspectives for further research

In this paper I have first demonstrated how the Tamazight system (which has only one conjugation with both prefixes and suffixes) can be derived using movement of the VP to specific clausal positions, sometimes with pied piping. I have accounted for morpheme placement with respect to the verbal stem - the status of the morpheme as a prefix or a suffix - within the syntax, as opposed to via post-syntactic linearization. I then extended that analysis to the two Hebrew conjugations. The research agenda, at this point, is to extend the approach to other Semitic and Afroasiatic languages so as to better understand the formal system that underlies inflection and its limits.

Consider a different area, that of proclisis vs. enclisis – an empirical domain in which many dyed-in-the-wool DM proponents would prefer to "distribute" the division of labor within syntax proper, as opposed to stating the generalizations in purely morphological or post-syntactic terms.[24] Indeed, the suffixing and prefixing conjugations in Afroasiatic show consistent tense/aspect-related regularities, recalling those that correlate proclisis and enclisis with finiteness in Spanish, Italian, Catalan and Greek (cf. Shlonsky (2004)). To simply list prefixing and suffixing as an idiosyncratic property of each affix, as in Halle (1997/2000), would seem to miss a number of generalizations about what is a prefix and what is a suffix and in how that interacts with tense/aspect.

In addition to the morpheme-placement question, I have also proposed what may be a useful direction to explore in the modeling of neutralization, typically handled via impoverishment in DM. The idea is that cases of neutralization involving multiple marked categories (e.g., gender impoverishment in the first person) can be handled by Heaviness restrictions on specifiers, likening these to extant restrictions on prenominal adjectives with complements (e.g., *a [proud of her daughter] mother) and complex verb constructions studied in Koopman & Szabolsci (2000) and Koopman (2002; 2014). If indeed each of these more complex categories adds a layer of structure to the cartography (i.e., there is an explicit AuthorP, GenderP), then restrictions on the size/complexity/heaviness of specifiers are a way to begin modeling these restrictions. That the Greenbergian neutralizations may be fruitfully implemented this way does not, of course, imply that *all* cases of impoverishment should be handled this way (e.g., the spurious *se* of Spanish may not involve a heaviness requirement).

This paper has been largely a proof of concept that many mechanisms within syntax proper can be employed to account for the morphological patterns of the Afroasiatic verbal paradigms, thus calling into question the extent to which the language faculty has postsyntactic operations.

The paper is prolegomenan, and nothing better stresses the tentative nature of the exploration than the absence of a discussion of what the system *cannot* achieve. That must await the exploration of a greater range of cases, including the first plural variation found within Semitic (on which, see Hewett (This issue)), as well as infinitives, imperatives, and duals. Strong pronouns are another domain to explore as there is clearly great overlap with the PNG projections.

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[24] Mesoclisis and other highly variable phenomena, however, sometimes look like they require post-syntactic constraints and repairs (cf. Arregi & Nevins 2018).

One of the main issues problematized at the outset is "the Bundle" of phi-features located on T within the syntax, which is then undone by a host of postsyntactic mechanisms that fission, linearize, metathesize and impoverish features into up to three different affixal slots. I opposed the bundling model to a rescaffolding one that directly generates these morphemes as separate formatives and accounts for their relative placement with syntactic movement of the stem. One possible advantage of the Bundle model is that it greatly simplifies the Agree mechanism: there is one instance of Agree between the T head and the nominal agreement trigger and everything is exchanged in one transaction. But if each PNG feature expressed on the verb is localized on a distinct head in the clause, the mechanism for Agreement might require several probing operations, and probably more structure. I leave this as yet another open issue.

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