LOCAL VERSUS LONG-DISTANCE FISSION IN DISTRIBUTED MORPHOLOGY[*]

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The literature on Distributed Morphology has devoted considerable attention to the notion of Fission, an operation allowing a single syntactic node to be realized in two or more morphological positions. Recent work has cast doubt on whether the grammar contains such an operation. We argue that Fission does exist, but that its scope is more limited than originally proposed. That is, Fission can produce only adjacent morphological positions.

The evidence for our conclusions comes from Yucatec Maya, a polysynthetic language with an ergative/nominative case system. We begin with an overview and some theoretical background on Distributed Morphology. We then present the arguments for local Fission, showing that a Fission analysis of verbal agreement suffixes in Yucatec captures some otherwise puzzling phenomena. Finally, we review arguments against long-distance Fission, and provide a new argument from Yucatec.

1. Overview

We argue below that Yucatec has local, but not long-distance Fission. Example (1) shows the imperfect auxiliary in Yucatec with its ergative subject-agreement suffix (-*u*), followed by the main verb. The verb has an ergative agreement prefix (*j-*), then the verb root, then an aspectual suffix (-*ik*), and finally an agreement suffix (-*oʔob*). Our discussion of local Fission will focus on the position following the aspectual suffix. In (1), it is occupied by a third-person plural nominative object-agreement suffix, -*oʔob*. In (2), however, the same item is used as an ergative suffix, and preceded by the second-person plural nominative suffix -*éːš*. Evidence is presented below that these two adjacent suffix positions arise from the Fission of a single syntactic node that agrees with both the ergative subject and the nominative object.

(1) k   -u   j-   áːnt   -ik   <u>-oʔob</u>
     IMPERF   3ERG   3ERG   help   INCOMPL   3NOMpl
     'They help them'

(2) k   -u   j-   áːnt   -ik   <u>-éːš</u>   <u>-oʔob</u>
     IMPERF   3ERG   3ERG   help   INCOMPL   2NOMpl   3ERGpl
     'They help you (pl)'

On the other hand, we propose that, despite initial appearances, Yucatec does not have long-distance Fission. In (3) and (4), the person and number of a first-person ergative subject are realized by the auxiliary suffix (singular -*in* or plural -*k*).

(3) k   <u>-in</u>   w-   ok   -ol
     IMPERF   1ERGsg   PSE.ERG   enter   INCOMPL
     'I enter'

(4) k   <u>-k</u>   ok   -ol
     IMPERF   1ERGpl   enter   INCOMPL
     'We enter'

However, (5) and (6) show for a second-person ergative subject, person is marked on the auxiliary (-*a*), while number is marked by a verbal suffix (-*éːš*).

(5) k   <u>-a</u>   w-   ok   -ol
     IMPERF   2ERG   PSE.ERG   enter   INCOMPL
     'You (sg) enter'

(6) k   <u>-a</u>   w-   ok   -ol   <u>-éːš</u>
     IMPERF   2ERG   PSE.ERG   enter   INCOMPL   2ERGpl
     'You (pl) enter'

The same is true for a third-person ergative subject: person is marked on the auxiliary (-*u*), and number by a verbal suffix (-*oʔob*):

(7) k   <u>-u</u>   y-   ok   -ol
     IMPERF   3ERG   3ERG   enter   INCOMPL
     'He/she enters'

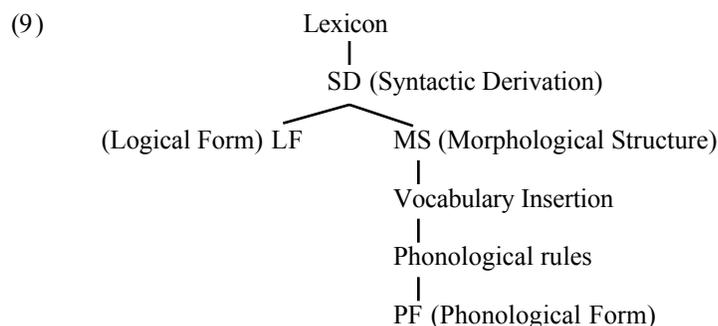(8) k   <u>-u</u>   y-   ok   -ol   <u>-oʔob</u>
     IMPERF   3ERG   3ERG   enter   INCOMPL   3ERGpl
     'They enter'

Similar facts in other languages have been attributed to long-distance Fission. We argue below that such an analysis is not available for Yucatec, and is therefore unmotivated in general. We propose that such cases instead provide independent evidence for a novel treatment of first person plural, as proposed by Harley and Ritter (2002).

2.   Theoretical background

We begin with a brief review of Distributed Morphology. Halle and Marantz's (1993) proposed model of the grammar is given in (9). A key aspect of this model is that morphophonological Vocabulary items are inserted post-syntactically. The syntax performs operations on bundles of syntactic/semantic features from the Lexicon, which lack phonological content. Syntactic derivations are then subject to LF operations that affect semantic interpretation

but not pronunciation, as well as to MS operations that affect pronunciation but not interpretation. All of these operations are subject to syntactic hierarchical principles and locality conditions.

(9)   Lexicon
           |
         SD (Syntactic Derivation)
        ⎯⎯⎯⎯⎯⎯⎯⎯
(Logical Form) LF   MS (Morphological Structure)
                                |
                        Vocabulary Insertion
                                |
                        Phonological rules
                                |
                        PF (Phonological Form)

In Distributed Morphology, a morpheme is an abstract terminal node of the syntactic tree, as schematized in (10), which is subject to Vocabulary insertion after syntactic operations such as Move and Agree have taken place.

(10)   X
          ⎯⎯⎯⎯⎯⎯⎯
        YP   X
                   [F1 F2 F3]

Vocabulary items (VIs), shown schematically in (11), consist of phonological strings (Ph1, Ph2…) paired with syntactic/semantic features (F1, F2…). These features can be underspecified, since semantic interpretation applies to the fully specified syntactic derivation, not to the VIs. VIs of a given syntactic category compete for insertion into a functional terminal node of the same category. Competition is governed by the Subset Principle, such that the winning item is the most highly specified one that matches the features of the terminal node.
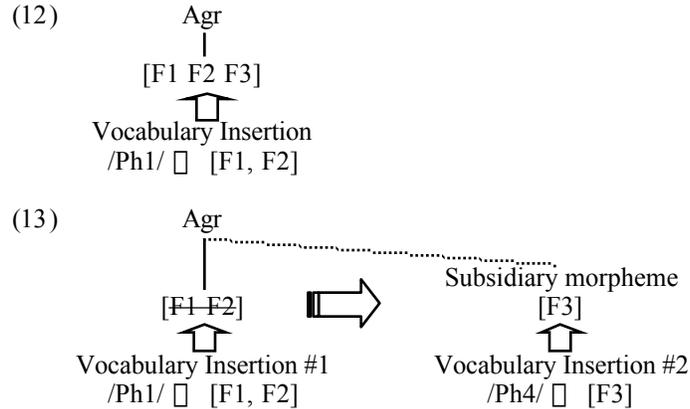
(11)   /Ph1/   ↔   [F1, F2]
       /Ph2/   ↔   [F2, F3]
       NULL   ↔   [F1]
       /Ph4/   ↔   [F3]
       /Ph5/   ↔   [   ]

According to Halle (1997), the morphological operation of Fission works as follows.[1] An underspecified VI is inserted into a terminal node, but only some of the node's features are morphologically discharged, as shown in (12). Any remaining features then fission off to form a subsidiary morpheme, into

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[1] Noyer (1992) and Halle (1997) convincingly argue that Fission depends in part on the VIs involved. We adopt this approach, rather than that of Halle and Marantz (1993), in which Fission precedes Vocabulary insertion. It is not yet known why Fission applies to some nodes and not others.
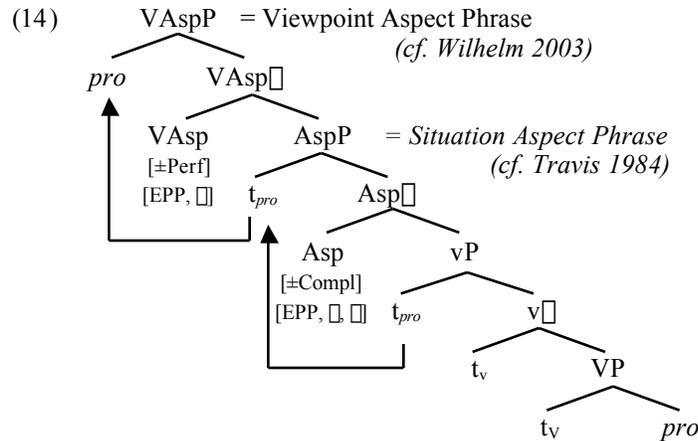
which another VI from the same list is inserted, as in (13). As a result, one syntactic terminal node yields two morphological positions.

(12)   Agr
           |
      [F1 F2 F3]
          ⇧
   Vocabulary Insertion
   /Ph1/ ⇔ [F1, F2]

(13)   Agr ···
           | Subsidiary morpheme
      [F1 F2]   ▣⇨   [F3]
          ⇧   ⇧
   Vocabulary Insertion #1   Vocabulary Insertion #2
   /Ph1/ ⇔ [F1, F2]   /Ph4/ ⇔ [F3]

We propose that this Fission operation applies to verbal agreement suffixes in Yucatec.
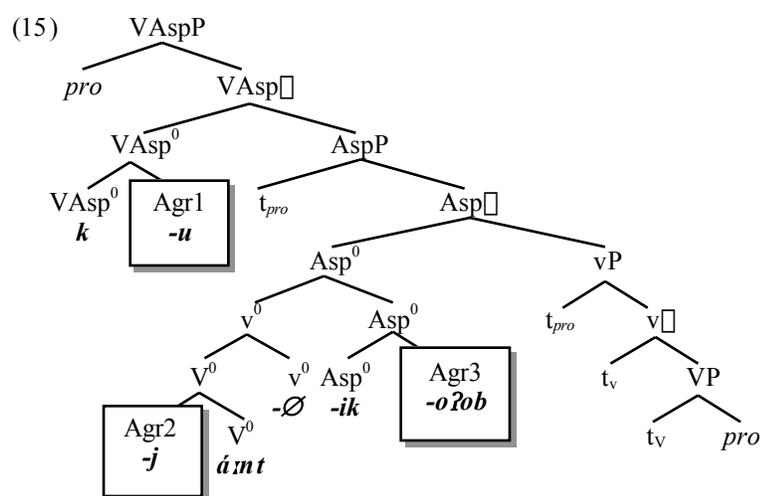
3.   Yucatec clause structure and agreement morphology

We assume the structure in (14) for Yucatec transitive clauses:

(14)   VAspP   = Viewpoint Aspect Phrase
                              (cf. Wilhelm 2003)
       pro   VAsp′
           VAsp   AspP   = *Situation Aspect Phrase*
           [±Perf]   *(cf. Travis 1984)*
           [EPP, φ] t_{pro} Asp′
                       Asp   vP
                       [±Compl]
                       [EPP, φ, φ] t_{pro} v′
                                           t_v VP
                                               t_v *pro*

Following Bohnemeyer (2002), we assume that Yucatec is a tenseless language, since the only pieces of verbal morphology that could potentially be interpreted as tense markers — glossed here as aspectual markers — are not sensitive to any distinctions of deictic and anaphoric reference, temporally speaking. We propose that in Yucatec the semantic concept of temporality is configured through the syntactic projection of two aspectual phrases, Viewpoint Aspect and Situation Aspect (Wilhelm 2003), plus the additional use of adverbial phrases.

We assume that both the external and internal arguments of the verb are *pro*, not phonologically realized but fully specified for ϕ and Case features. The external argument of the verb, base-generated in the Spec position of vP (Chomsky 1995), moves out of its original site up to Spec of Viewpoint Aspect Phrase not only due to an EPP feature on VAsp°, but also to allow local Case checking and ϕ-agreement between Asp° and the internal argument, which remains in situ throughout the entire derivation. As suggested by the two sets of ϕ-features under Asp°, this head establishes syntactic agreement relations not only with the internal but also with the external argument.

Following Halle and Marantz (1993), we assume that agreement morphemes are inserted at MS into the corresponding functional heads, after the verb raises via head movement up to Asp°:

(15)

```
              VAspP
             /     \
          pro       VAsp′
                   /      \
              VAsp⁰        AspP
             /     \      /     \
        VAsp⁰  Agr1  t_pro      Asp′
          k     -u          /        \
                        Asp⁰           vP
                       /    \         /   \
                     v⁰     Asp⁰   t_pro   v′
                    /  \    /   \         /  \
                  V⁰   v⁰  Asp⁰ Agr3    t_v   VP
                 /  \  -Ø   -ik  -oʔob        /  \
             Agr2   V⁰                      t_V   pro
              -j    áːnt
```

In a Yucatec transitive clause, Agr1 agrees in person — but not in number — with the external argument, while Agr2 copies all the features of Agr1 via concord. Unlike Agr1 and Agr2, Agr3 can reflect the features of both the external and the internal arguments: as illustrated in (14) above, its sister node, Asp°, enters syntactic agreement relations with both arguments.

The agreement relationships just described are manifested via the two sets of markers introduced in (16) and (17), along with some illustrative data:

(16)   Yucatec nominative markers (Agr3)[2]

	Singular	*Plural*
First person	-en	-oʔon
Second person	-etš	-éːš
Third person	-Ø	-oʔob

Ex.:   k   -u   j-   áːnt   -ik   <u>-en</u>
       IMPERF 3ERG   3ERG   help   INCOMPL 1NOMsg
       'S/he helps <u>me</u>'

(17)   Yucatec ergative markers (Agr1 Agr2, and Agr3)[3]

	Singular	*Plural*
First person	-in (w-)	-k
Second person	-a (w-)	-a (w-)…-éːš
Third person	-u (j-)	-u (j-)…-oʔob

Ex.:   k   <u>-u</u>   <u>j-</u>   áːnt   -ik   -éːš   <u>-oʔob</u>
       IMPERF 3ERG   3ERG   help   INCOMPL 2NOMpl 3ERGpl
       '<u>They</u> help you (pl)'

The Yucatec nominative markers listed in (16) are all verbal suffixes; the ergative markers listed in (17), on the other hand, include a set of suffixes attached to the auxiliary (*-in*, *-a*, and *-u*), a set of verbal prefixes (*w-* and *j-*), and a set of verbal suffixes (*-éːš* and *-oʔob*). The ergative verbal prefixes are parenthesized to indicate the fact that they do not surface before consonant-initial Yucatec verb roots, since this language disallows consonant clusters in general. Comparison of (16) and (17) reveals that the second plural (*-éːš*) and third plural (*-oʔob*) verbal suffixes are identical in the nominative and ergative sets.

        The distribution of agreement morphology just described is traditionally represented by a template for Yucatec transitive verbs, illustrated in (18) (see Krämer and Wunderlich 1999, inter alia):
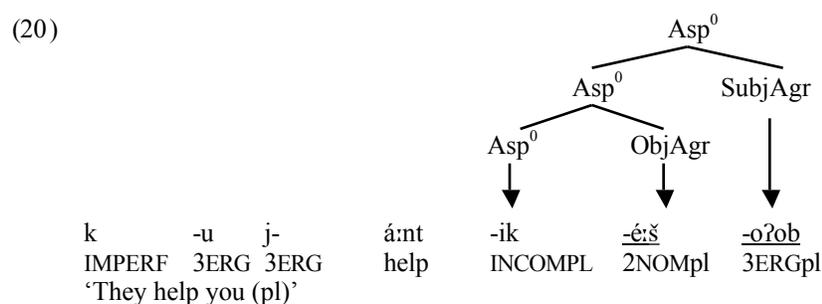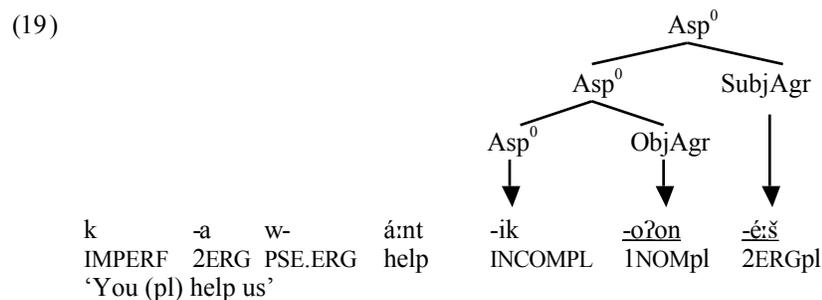
(18)   [Aux-AGR$_{SUBJ}$ [[[[[Verb] Voice] Aspect] AGR$_{OBJ}$] AGR$_{SUBJ}$]]

Crucially, this template assumes the presence of two different agreement heads: one for object agreement and another for subject agreement. Furthermore, this template assumes the existence of a fixed order between verbal agreement suffixes, in which object agreement precedes subject agreement. The data in (19)
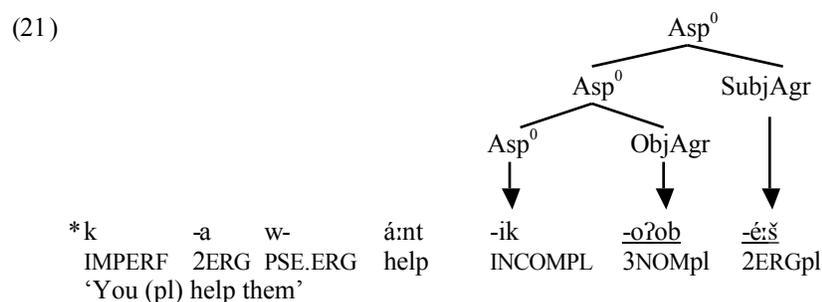
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[2] In traditional and structuralist grammars, these markers are referred to as *B Set pronouns* (Hanks 1984), *Peripheral set* (Blair and Salas 1995), *Juego Absolutivo* 'Absolutive set' (Ayres 1991), *Pronombres sufijados* 'Suffix pronouns' (Briceño 1990), or *Bound pronouns set B* (Bohnemeyer 2002).

[3] This set of agreement markers is referred to in the relevant literature as *A set pronouns* (Hanks 1984), *Dependent pronouns* (Blair and Salas 1995), *Juego Ergativo* 'Ergative set' (Ayres 1991), *Pronombres dependientes* 'Dependent pronouns' (Briceño 1990), and *Bound pronouns set A* (Bohnemeyer 2002).
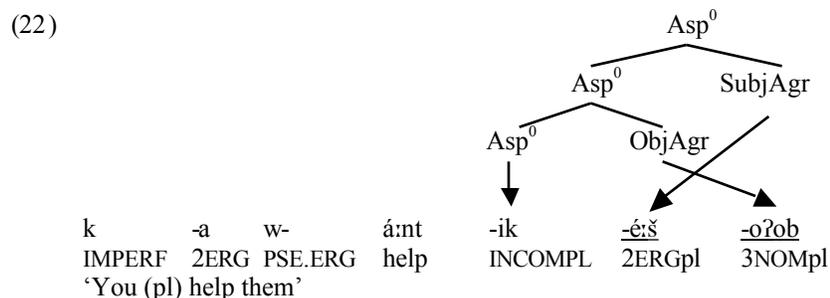
and (20) instantiate faithful satisfaction of (18); the templatic analysis correctly predicts that the object agreement marker must precede the subject agreement marker in both Yucatec sentences:

(19)

Asp^0

Asp^0 SubjAgr

Asp^0 ObjAgr

k	-a	w-	á:nt	-ik	-oʔon	-é:š
IMPERF	2ERG	PSE.ERG	help	INCOMPL	1NOMpl	2ERGpl

'You (pl) help us'

(20)

Asp^0

Asp^0 SubjAgr

Asp^0 ObjAgr

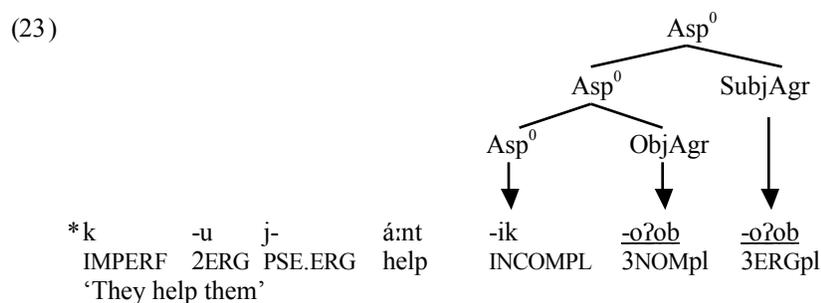| k	-u	j-	á:nt	-ik	-é:š	-oʔob
IMPERF	3ERG	3ERG	help	INCOMPL	2NOMpl	3ERGpl

'They help you (pl)'

However, the data in (21-24) challenge a templatic analysis. (21) is an ungrammatical Yucatec sentence precisely because it satisfies the object-subject order of verbal agreement suffixes imposed by the template in (18):

(21)

Asp^0

Asp^0 SubjAgr

Asp^0 ObjAgr

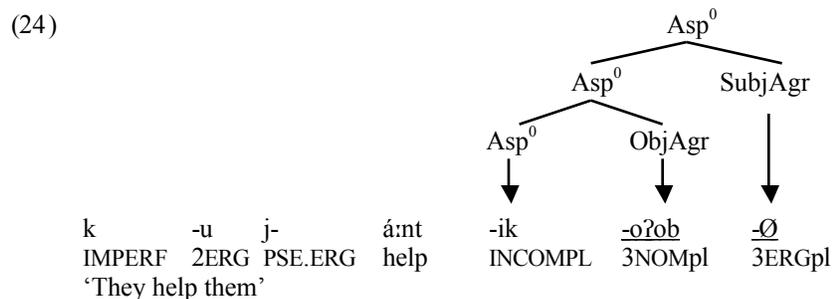| *k	-a	w-	á:nt	-ik	-oʔob	-é:š
IMPERF	2ERG	PSE.ERG	help	INCOMPL	3NOMpl	2ERGpl

'You (pl) help them'

On the other hand, (22) is a grammatical Yucatec sentence in spite of the fact that the expected relative order among agreement verbal suffixes is reversed; that is, we find subject agreement before object agreement:

(22)

$$Asp^0$$

$$Asp^0 \quad SubjAgr$$

$$Asp^0 \quad ObjAgr$$

k	-a	w-	á:nt	-ik	-é:š	-oʔob
IMPERF	2ERG	PSE.ERG	help	INCOMPL	2ERGpl	3NOMpl

'You (pl) help them'

The ungrammaticality of (23) below is also puzzling under a templatic analysis, since we would expect overt agreement morphology for both verbal arguments:

(23)

$$Asp^0$$

$$Asp^0 \quad SubjAgr$$

$$Asp^0 \quad ObjAgr$$

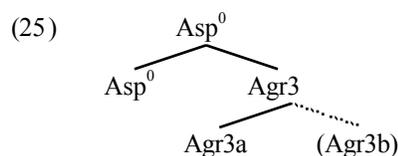| *k	-u	j-	á:nt	-ik	-oʔob	-oʔob
IMPERF	2ERG	PSE.ERG	help	INCOMPL	3NOMpl	3ERGpl

'They help them'

Once more, the validity of the template in (18) is questioned, given that only one of the verbal arguments can be overtly realized, as suggested by the grammaticality of (24):

(24)

$$Asp^0$$

$$Asp^0 \quad SubjAgr$$

$$Asp^0 \quad ObjAgr$$

k	-u	j-	á:nt	-ik	-oʔob	-Ø
IMPERF	2ERG	PSE.ERG	help	INCOMPL	3NOMpl	3ERGpl

'They help them'

Given the ungrammaticality of (21) and (23), a new account for these data is required. We propose that the distribution of Yucatec verbal agreement suffixes observed in grammatical (22) and (24) can be captured by assuming that Agr3 fissions locally into two separate nodes.

4.   Local Fission in Yucatec

As illustrated in (25), our analysis of Yucatec verbal agreement suffixes assumes the presence of a single agreement head, Agr3, unlike the two-headed analysis implicit in the template in (18):

(25)

$$\text{Asp}^0$$

$$\text{Asp}^0 \qquad \text{Agr3}$$

$$\text{Agr3a} \qquad \text{(Agr3b)}$$

Agr3 is marked as being subject to Fission, which will result in the projection of a subsidiary node at MS. Fissioning the single Agr3 head creates a second morphological position, here labelled Agr3b. This analysis correctly captures the marking of object and subject agreement in Yucatec transitive clauses.

Our analysis assumes the set of grammatical person features illustrated in (26) (see Noyer 1992, and especially Halle 1997):[4]

(26)

	1	2	3
Participant in Speech Event (PSE)	+	+	-
Author of Speech Event (Auth)	+	-	-

We treat number distinctions as values of the feature Plural: a negative value stands for a set containing a single member, whereas a positive value stands for a set containing more than one member.[5]

The set of VIs competing for insertion under Agr3 is presented in (27):

(27)   Agr3 Vocabulary Items

/-oʔon/	↔	[+PSE, +Auth, NOM]	*1plNOM*
/-etš/	↔	[+PSE, -Pl, NOM]	*2sg NOM*
/-en/	↔	[+Auth, NOM]	*1sg NOM*
/-éːš/	↔	[+PSE, +Pl]	*2pl*
/-oʔob/	↔	[+Pl]	*3pl*
-∅	↔	[ ]	*elsewhere*

Our analysis introduces a null elsewhere morpheme in this list, which is inserted in a variety of feature matrices lacking a common denominator. A crucial departure from previous treatments of Yucatec verbal suffixes is reflected in the feature matrices characterizing /-éːš/ and /-oʔob/. We propose that the isomorphism found between second and third person plural object and subject
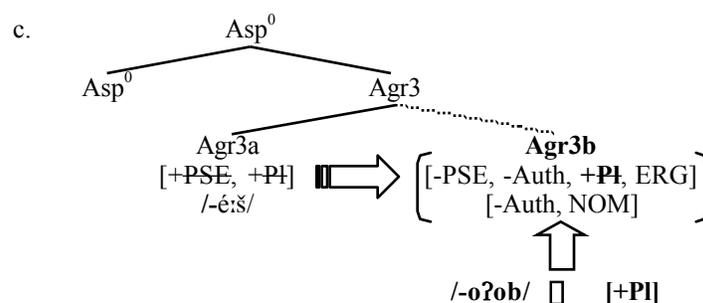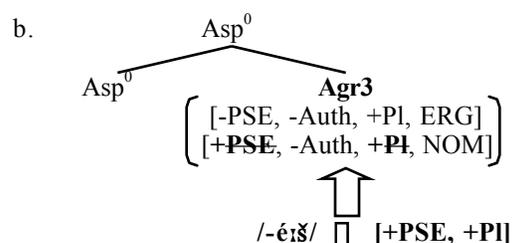
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[4] See the Appendix for a different featural implementation.

[5] In Section 5 we argue that Yucatec number distinctions in first person are related not to the feature Plural, but to the feature PSE. First person singular has a positive value for PSE, while first person plural is unvalued for PSE. See also the Appendix.

markers is formally captured through the absence of a case feature in the matrices of these two verbal suffixes. Being unspecified for case, /-éːš/ and /-oʔob/ can be inserted into Agr3 nodes specified for either NOM or ERG case.
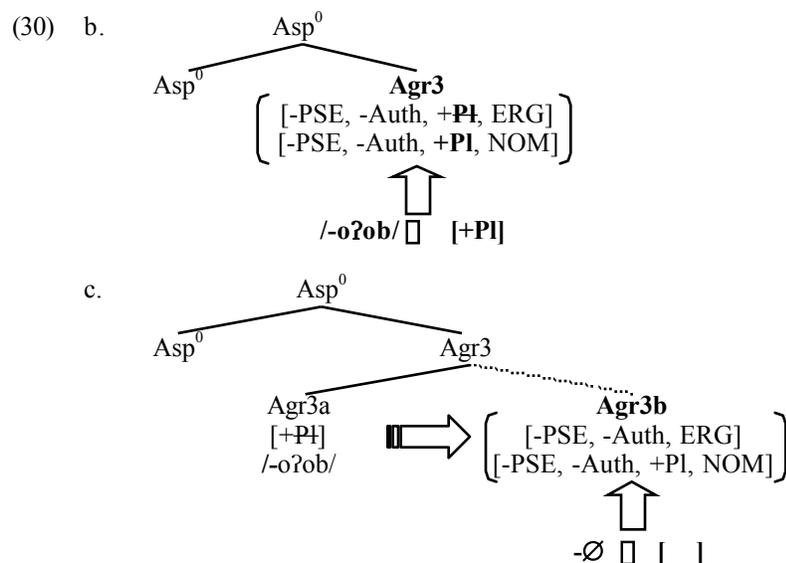
The examples below show insertion of the relevant VIs under Agr3 nodes with different matrices. (28a) provides an example of Agr3 in a transitive clause where the more frequent object-subject relative order of suffixes is preserved. The Agr3 node in (28b) starts scanning the list in (27) from top to bottom. The list contains three candidates for insertion: /-éːš/, /-oʔob/, and /-Ø/. Recall that the VI with the richest feature matrix wins the competition for insertion, hence /-éːš/ is inserted, as illustrated in (28b). Agr3 then fissions off the remaining features into a separate node. Scansion of (27) continues in search of a VI that matches some or all of the features in the fissioned matrix. The scanning process then selects /-oʔob/, as illustrated in (28c).

(28) a.

k	-u	j-	áːnt	-ik	-éːš	-oʔob
IMPERF	3ERG	3ERG	help	INCOMPL	2NOMpl	3ERGpl

'They help you (pl)'

b.

$$Asp^0$$

$$Asp^0 \qquad \textbf{Agr3}$$

$$\begin{bmatrix} \text{[-PSE, -Auth, +Pl, ERG]} \\ \text{[+\sout{PSE}, -Auth, +\sout{Pl}, NOM]} \end{bmatrix}$$

⇧

/-éːš/ ↔ [+PSE, +Pl]

c.

$$Asp^0$$

$$Asp^0 \qquad\qquad Agr3$$

Agr3a **Agr3b**

[+~~PSE~~, +~~Pl~~] ⟹ $$\begin{bmatrix} \text{[-PSE, -Auth, +\sout{Pl}, ERG]} \\ \text{[-Auth, NOM]} \end{bmatrix}$$

/-éːš/

⇧

/-oʔob/ ↔ [+Pl]

In principle, fission of the unmatched features could take place again; in this case, the null VI in (27) would be inserted, since its featureless matrix is the only remaining matrix that is a subset of the features under the fissioned node.

By contrast with (28), the translation of the Yucatec sentence in (29a) indicates that second plural suffix is associated with the ergative argument, and the third plural suffix with the nominative argument. Under a templatic analysis, we would expect the object marker to come before the subject marker, which is not the case here. However, a Fission analysis successfully accounts for the order of verbal suffixes in (29a). As in (28), the Agr3 node in (29b) scans the list in (27), a process that results in the selection of /-éːs/, which has a richer feature matrix than /-oʔob/ or /-Ø/ (29b). The remaining features under Agr3 are
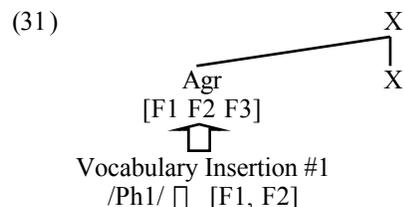
fissioned off into a separate node, which allows continued scansion of the list in (27). This results in the selection and insertion of /-oʔob/, as illustrated in (29c).

(29) a. k   -a   w-   áːnt   -ik   <u>-éːš</u>   <u>-oʔob</u>
          IMPERF   2ERG   PSE.ERG   help   INCOMPL   2ERGpl   3NOMpl
          'You (pl) help them'

      b.   Asp⁰

            Asp⁰   **Agr3**
                               $\begin{bmatrix} \text{[+}\textbf{PSE}\text{, -Auth, +}\textbf{Pl}\text{, ERG]} \\ \text{[-PSE, -Auth, +Pl, NOM]} \end{bmatrix}$

                                    ⇧
                         /-éːš/ ↔ [+PSE, +Pl]

      c.   Asp⁰

            Asp⁰   Agr3

                   Agr3a   **Agr3b**
                [+PSE**, +**Pl**]** ⇨ $\begin{bmatrix} \text{[-Auth, ERG]} \\ \text{[-PSE, -Auth, +}\textbf{Pl}\text{, NOM]} \end{bmatrix}$
                    /-éːš/

                                          ⇧
                         /-oʔob/ ↔   [+Pl]

The fixed ranking among the second and third plural VIs, derived from the richer featural specification of /-éːs/ over /-oʔob/, as well as case underspecification in the feature matrices of both VIs, explains the identical surface order of verbal suffixes in both (28a) and (29a).

     Finally, the same principles that account for the surface order of suffixes in the data above, also account for the presence of a single suffix in (30a). Either of the two third-person plural feature matrices under Agr3 can be satisfied by /-oʔob/; accordingly, insertion of this suffix takes place, as illustrated in (30b). Regardless of which matrix is satisfied first, the remaining features are fissioned off into an additional terminal node that continues to scan the remainder of the list in (27). As illustrated in (30c) bellow, this process results in the insertion of the elsewhere morpheme, which does not modify the phonological realization of the fissioned node, given its null phonological status.

(30) a. k   -u   j-   áːnt   -ik   <u>-oʔob</u>   <u>-Ø</u>
          IMPERF   2ERG   PSE.ERG   help   INCOMPL   3NOMpl   3ERGpl
          'They help them'

(30) b.

Asp^0

Asp^0 **Agr3**

$$\begin{bmatrix} \text{[-PSE, -Auth, +} \cancel{\textbf{Pl}} \text{, ERG]} \\ \text{[-PSE, -Auth, +} \textbf{Pl} \text{, NOM]} \end{bmatrix}$$

⇧

/-oʔob/ ↔ [+Pl]

c.

Asp^0

Asp^0 Agr3

Agr3a   **Agr3b**

[+~~Pl~~]   ▮⇨ $\begin{bmatrix} \text{[-PSE, -Auth, ERG]} \\ \text{[-PSE, -Auth, +Pl, NOM]} \end{bmatrix}$

/-oʔob/

⇧

-∅ ↔ [ ]

     The impossibility of inserting **/-oʔob/** a second time follows from a strict version of scansion. A list of VIs is scanned from top to bottom, and once an item has been selected, it is no longer subject to scansion. Scansion can continue downwards, in case the list contains any remaining VIs that match the feature(s) left unmatched in the relevant terminal node. Once the bottom of the list has been reached, scansion comes to a halt. The impossibility of scanning the list further renders vacuous any subsequent fissioning of nodes.[6]

     The evidence presented so far argues strongly in favor of a local Fission analysis over a templatic analysis of Yucatec verbal suffixes.

5.   Against Long-Distance Fission

Yucatec also provides evidence against long-distance Fission. Long-distance Fission is said to yield the discontinuous realization of a single morpheme: when a VI discharges only some features of a node, as in (31), the remaining features fission off to a subsidiary node on the other side of the stem, as in (32).

(31)

X

Agr   X

[F1 F2 F3]

⇧

Vocabulary Insertion #1

/Ph1/ ↔ [F1, F2]

---

[6] This version of scansion differs from that in Halle 1997, where scansion restarts at the top of the list after each fission. To block infinite fission and insertion of an elsewhere item, Halle stipulates that nodes subject to elsewhere-insertion undergo Fission only once. The analysis proposed here eliminates the need for a stipulation.

(32)

For example, this analysis has been given for Semitic conjugations with both suffixes and prefixes (Noyer 1992, Halle 1997), as in (33), which we will discuss further in a moment.

(33) Biblical Hebrew

ʔe-zroq	'I will throw'	ni-zroq	'we will throw'
ti-zroq	'you (m.sg) will throw'	ti-zrəq-u:	'you (m.pl) will throw'
ti-zrəq-i:	'you (f.sg) will throw'	ti-zroq-na:	'you (f.pl) will throw''
yi-zroq	'he will throw'	yi-zrəq-u:	'they (m) will throw'
ti-zroq	'she will throw'	ti-zroq-na:	'they (f) will throw'

Several arguments can be made against long-distance Fission. First, it creates a ternary-branching structure. If morphological operations follow syntactic principles, Fission should logically be the inverse of Merge, dividing one node into two daughters. This restriction would allow only local Fission.

A second argument is that each supposedly fissioned position realizes characteristic features. For example, prefixes may realize person, while suffixes realize number and/or gender. Such generalizations are expected if prefixes and suffixes realize different syntactic nodes, but on a Fission analysis they are pure coincidence (Tourabi 2002, Nevins 2002a).

A third argument is that agreement correlates with other morphosyntactic properties. For example, in Semitic languages, the present-tense participial (*Benoni*) form shows no person agreement or tense marking, only number marking, as shown for Modern Hebrew below (Shlonsky 1997, Nevins 2002a):

(34) a.   Ani/At/Hi   šomer<u>et</u>   ʔal ha-xacilim.
            I/You/She   guard/are guarding (f.sg) on the-eggplants

      b.   Anaxnu/Atem/Hem šom(e)r<u>im</u>   ʔal ha-xacilim.
            We/Y'all/They   guard/are guarding (m.pl) on the-eggplants

However, both tense-marked and Benoni verbs inflect for number and gender, which suggests that these components of agreement are associated with a syntactic position separate from that associated with person agreement. Nevins argues that a tensed verb moves to T and a Person head, while the Benoni verb moves only to a Number head below T. Evidence for this analysis comes from word order in Palestinian Arabic: the tensed verb precedes the negative suffix (35a), while the Benoni verb follows it (35b).

(35) a.   Ma-<u>fhimt</u>-š   l-qissa.[7]   *non-Benoni: V above NEG*
               Cl-understood-**NEG**   the-story
               'I did not understand the story.'

        b.   Mi-š   <u>faahim</u>   l-qissa.   *Benoni: V below NEG*
               Cl-**NEG** understand   the-story
               '{I do/He does} not understand the story. / '{I am/He is} not understanding the story.'

Given this correlation between agreement and word order, the separation of person agreement from number and gender agreement in the tensed forms seems to result, not from morphological Fission, but rather from the separate syntactic origins of the two clusters of agreement. In fact, Nevins argues that Fission never takes place; we believe this conclusion is too strong, as argued above.

       A fourth argument against long-distance Fission is that the core cases *fission off number in second and third persons, but not in first*. This striking generalization has been observed across several disparate languages, with examples from Biblical Hebrew agreement (36) (Halle 1997), Basque pronouns and agreement (37) (Arregi 2001), and Georgian dative agreement (38) (Aronson 1990:332-345; Halle and Marantz 1993; McGinnis 1996). In each case, first singular and plural have different prefixes and no suffix; all second person forms use the same prefix, with or without a plural suffix, and all third person forms do likewise. Fission provides no account of this cross-linguistic generalization.

(36)

	sg	*pl*
1	ʔe-	ni-
2m	ti-	ti- … -uː
2f	ti- … -iː	ti- … naː
3m	yi-	yi- … -uː
3f	ti-	ti- … -naː

(37)   Ni-k   sue-k   atrapa   <u>s</u>-atxu-<u>e</u>-t.
           I-ERG   you-PL.ABS   caught   2-AUX-PL-1SG.ERG
           'I caught <u>you (pl)</u>.'

	sg	*pl*
1	n-[8]	g-
2	s-	s- … -e
3	Ø-	Ø- … -e

(38)   Ga-g-e-gzavneb-a-<u>t</u>.
       PV-2-APPL.NAct-send-PRES-PL
       'To <u>you (pl)</u> is sent (something).'

---

[7] Thanks to Abderrezzak Tourabi for discussion of these data.

[8] This is absolutive; first singular is marked /-t/ for ergative and dative agreement.
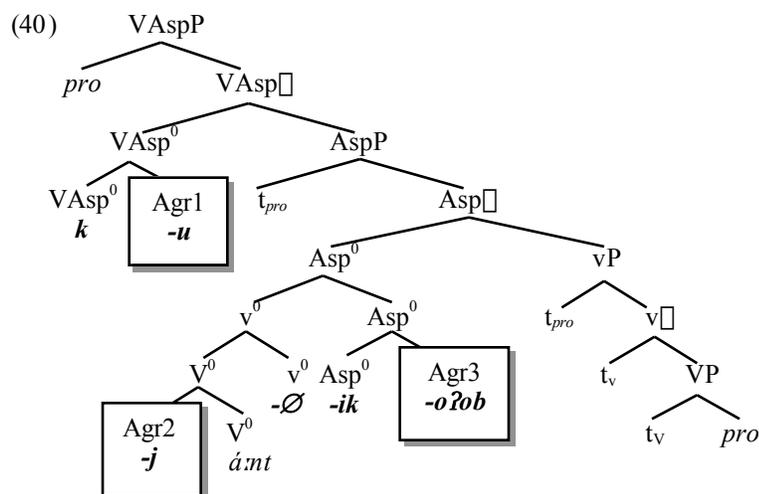
(38) *cont'd.*

	sg	*pl*
1	m-	gv-
2	g-	g- … -t
3	Ø-	Ø- … -t

Before addressing this point, we add a further argument against long-distance Fission: ergative agreement in Yucatec shows the same distribution as that just described, but does not submit to a Fission analysis. In (39), the aspectual auxiliary suffix shows ergative person and number distinctions in first person, but only person distinctions in second and third persons. A verbal suffix marks ergative plural in second and third persons, but not first. This distribution is exactly the same as that in (36)-(38).

(39) k   -u   j-   á:nt   -ik   -oʔob
      IMPERF   3ERG   3ERG   help   INCOMPL   3ERGpl
      'They help you (sg)'

	sg	*pl*
1	-in (w-)	-k
2	-a (w-)	-a (w-) … -é:š
3	-u (j-)	-u (j-) … -oʔob

In Yucatec, however, this distribution of agreement cannot be captured by Fission. In (39), the auxiliary suffix is Agr1 and the verbal suffix is Agr3 (40). Not only are these suffixes separated by the verb stem — they are not even part of the same morphophonological word. Even with ternary branching, Agr1 and Agr3 cannot be sisters of the same stem. So Yucatec provides crucial evidence that long-distance interactions between person and number affixes do not arise from Fission.

(40)

```
                      VAspP
                    /      \
                 pro       VAsp′
                          /      \
                     VAsp⁰        AspP
                    /    \       /    \
                VAsp⁰  [Agr1   t_pro   Asp′
                  k     -u ]         /      \
                               Asp⁰          vP
                              /    \        /    \
                          v⁰      Asp⁰    t_pro   v′
                         /  \    /   \          /   \
                       V⁰   v⁰ Asp⁰ [Agr3     t_v    VP
                      / \   -Ø  -ik  -oʔob ]        /  \
                [Agr2  V⁰                        t_V   pro
                 -j ]  áːnt
```

VAspP
— *pro*
— VAsp′
 — VAsp⁰
  — VAsp⁰ **k**
  — [Agr1 **-u**]
 — AspP
  — t*pro*
  — Asp′
   — Asp⁰
    — v⁰
     — V⁰
      — [Agr2 **-j**]
      — V⁰ *áːnt*
     — v⁰ **-Ø**
    — Asp⁰
     — Asp⁰ **-ik**
     — [Agr3 **-oʔob**]
   — vP
    — t*pro*
    — v′
     — t_v
     — VP
      — t_V
      — *pro*

We propose that such interactions arise from the featural representation of number (Ritter 1997, Nevins 2002b). Harley and Ritter (2002) note that some pronoun systems distinguish number only in first person, as illustrated in (41). They propose that in such systems, first person is not formally plural; person rather than number specifications distinguish first singular and plural.[9]

(41) Maxakalí pronouns (Popovich 1986:352)

	sg	*pl*	*incl*
1	('ũ)g / ('ũ)k	yũmũg	-('ũ)mũg
2	'ã		
3	('ũ)		

We adopt this approach for Yucatec, where, we propose, first person lacks number specifications. First-person number distinctions are instead encoded by the specification of the PSE feature, as shown in (42). The VIs in (43) then give correct results for the ergative auxiliary suffix.

(42)

	sg	*pl*
1	+Auth, +PSE	+Auth
2	-Auth, +PSE, -Pl	-Auth, +PSE, +Pl
3	-Auth, -PSE, -Pl	-Auth, -PSE, +Pl

---

[9] Harley and Ritter claim that number is entirely lacking in such languages. However, Cowper and Hall (2005) note that verb suppletion registers number contrasts in Maxakalí (Popovich 1986), and that in Kwakwala (Kwakiutl), another language cited by Harley and Ritter in this regard, number contrasts are marked in second and third person (Boas 1900:171). Notwithstanding these caveats, the morphological evidence cited here supports Harley and Ritter's view that the first person singular/plural distinction sometimes involves person, rather than number features.

(43) Agr1 Vocabulary Items

/-in/	⟷	[+PSE, +Auth]	*1sg*
/-k/	⟷	[+Auth]	*1pl*
/-a/	⟷	[+PSE]	*2*
/-u/	⟷	[ ]	*3*

The underspecification analysis in (42) is partly motivated by the parenthesized verbal prefix shown in (39). This prefix reflects the PSE value of the ergative argument, with /w-/ for [+PSE], and /j-/ for [-PSE]. Since the prefix is absent in first plural, we posit that PSE is absent here too. VIs for this prefix can be given as follows:

(44) Agr2 Vocabulary Items

/w-/	⟷	[+PSE]	*2, 1sg*
/j-/	⟷	[-PSE]	*3*
∅-	⟷	[ ]	*1pl*

We conclude that agreement morphology in Yucatec Maya provides evidence for local Fission, but against long-distance Fission. Yucatec provides new evidence that in some languages, first person number contrasts are featurally encoded as person distinctions. A similar analysis can be given for other languages, capturing the cross-linguistic generalization that a number of languages treat first person singular/plural distinctions as person rather than number contrasts. If this approach is adopted, the empirical motivation for long-distance Fission is virtually eliminated.

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Appendix

The person and number features assumed above are taken from the literature on Fission. Below we sketch an analysis of first person pronouns in Yucatec using Harley and Ritter's (2002) privative feature geometry. In this system, first and

second person pronouns have the feature [Participant], while third person pronouns do not. First person also has the feature [Speaker], while second person may have the feature [Addressee]. [Speaker] and [Addressee] are dependents of the [Participant] node, and therefore more specific than the feature [Participant]. Plural pronouns have the feature [Group], while singular ones lack this feature.

In a language that distinguishes first person singular and plural via person, rather than number specifications, Harley and Ritter assume that the first person lacks number specifications entirely, and that first person singular also lacks the [Speaker] feature. Accordingly, we propose the specifications in (A1) for Yucatec pronouns.

(A1) Yucatec number/Speaker underspecification in first person

	sg	*pl*
1	Participant	Participant, Speaker
2	Participant, Addressee	Participant, Addressee, Group
3		Group

This analysis requires some reconfiguration of the Agr Vocabulary lists, since no reference can now be made to negative feature values. Note, for example, that the null Agr2 item is taken to indicate, not the absence of a [Participant] feature, but rather the presence of a more specific feature, [Speaker].

(A2) Agr1 Vocabulary Items

/-k/	↔	[Speaker]	*1pl*
/-a/	↔	[Addressee]	*2*
/-in/	↔	[Participant]	*1sg*
/-u/	↔	[ ]	*3*

(A3) Agr2 Vocabulary Items

∅-	↔	[Speaker]	*1pl*
/w-/	↔	[Participant]	*1sg, 2*
/j-/	↔	[ ]	*3*

(A4) Agr3 Vocabulary Items

/-éːš/	↔	[Addressee, Group]	*2pl*
/-etš/	↔	[Addressee, NOM]	*2sg NOM*
/-oʔon/	↔	[Speaker, NOM]	*1pl NOM*
/-en/	↔	[Participant, NOM]	*1sg NOM*
/-oʔob/	↔	[Group]	*3pl*
-∅	↔	[ ]	*elsewhere*

Note that the Agr3 item /-éːš/, specified as [Addressee, Group] must be ordered before the item /-etš/, specified as [Addressee, NOM], in order to ensure

that **/-éːš/**, not **/-etš/**, is used for second plural nominative arguments. Harley and Ritter's feature geometry does not explicitly encode case features, but it seems natural to conclude that a semantically contentful feature like [Group] would take precedence over a semantically vacuous feature like [NOM]. Other semantically vacuous features, such as arbitrary noun class features, are ranked below number features in Harley and Ritter's system.

This analysis makes a new prediction, which is tentatively confirmed. The [Addressee] feature must be specified in order to ensure that the Agr1 item used for second person is **/-a/**, not **/-in/**, and that the Agr3 items for second person are **/-éːš/** and **/-etš/**, not **/-en/**. McGinnis (2005) argues that the specification of an [Addressee] feature predicts the existence of a inclusive [Speaker, Addressee] category. According to the first author's field notes, this prediction is partly supported: some speakers distinguish morphologically between first person inclusive and exclusive.