PF FACTORS IN PRONOMINAL CLITIC SELECTION IN TZOTZIL

Ellen Woolford
University of Massachusetts
woolford@linguist.umass.edu

Aissen’s work on agreement in Tzotzil helps shed light on current theoretical questions involving the relative roles of syntax and PF in cross-referencing systems. Tzotzil shows that a language can have two distinct series of pronominal clitics, in different positions, which cross-reference the same argument. Under the account proposed here, both series are generated in syntax, and at the syntax/PF interface the decision is made to spell-out one or the other, or both, based partially on constraints involving phonology and prosodic structure.

1. Introduction

This paper was stimulated by the complex and puzzling facts about agreement in the Mayan language Tzotzil described in Aissen 1987. This book, like Aissen’s entire body of research over the past thirty years, continues to be extremely important for addressing current theoretical questions and stimulating new questions. This paper builds on the generalizations concerning agreement in Tzotzil in Aissen 1987 to explore the question of the relative roles of syntax and PF in producing complex surface cross-referencing patterns.

The central problem involves an interesting difference between Tzotzil and other Mayan languages. The other Mayan languages fall into two groups with respect to the position of the Set B series which cross-references objects in transitive constructions (Bricker 1977). In languages such as Jacaltec (Craig 1977) Set B forms precede the verb as in (1), but in languages such as Yucatec Maya (Bricker 1981) Set B forms are suffixed to the verb, as shown in (2).

(1) Ch -ach w- ila. [Jicaltec]
    ASPECT 2nd SetB 1st SetA see ‘I see you.’ (Craig 1977:90)

(2) T- inw- il -ah -eč. [Yucatec Maya]
    COMPLETIVE- 1st SetA see PERFECTIVE 2nd SetB
    ‘I saw you.’ (Bricker 1981 (2))
Tzotzil differs from both groups in that it has two series/subsets of Set B forms, one in each position. The prefixed series is shown in (3), while the suffixed series is shown in (4):¹

(3) Ch- a- s- mil. \[Tzotzil\]  
   INCOMPLETIVE 2\textsuperscript{nd}SetB 3\textsuperscript{rd}SetA kill  
   ‘He is going to kill you.’  
   (Aissen 1987:62 (3a))

(4) J- mala -oj -oxuk. \[Tzotzil\]  
   1\textsuperscript{st}SetA wait PERFECT 2\textsuperscript{nd}plSetB  
   ‘I have waited for you(pl).’  
   (Aissen 1987:48 (20b))

This is surprising if one thinks of Set B forms as the same element located in different positions in the different Mayan languages. Aissen (1987) refers to the prefixed and suffixed forms in Tzotzil as subsets of Set B forms. While that makes sense as a way of identifying the function of these forms, their formal properties are consistent with two distinct series. Not only do they occur in different positions, but they have morphologically distinct forms and they encode different features. The prefixed forms encode only person, while the suffixed forms encode both person and number. Moreover, unlike the prefixed series, forms from the suffixed series can be used to (help) cross-reference the subject or the object of a transitive clause:

(5) Mi a- man -ik?  
   Q 2\textsuperscript{nd}SetA buy PLURAL  
   ‘Did you(pl) buy it?’  
   (Aissen 1987:48 (21b))

(6) Ch- a- j- mil -ik.  
   INCOMPLETIVE 2\textsuperscript{nd}SetB 1\textsuperscript{st}SetA kill PLURAL  
   ‘I am going to kill you(pl).’  
   (Aissen 1987:49 (24b))

The primary question addressed in this paper is what determines which of the two Set B series/subsets will be used in any particular clause, and why. We begin with the descriptive generalization in Aissen 1987:44-45: Tzotzil uses a prefixed Set B form if an aspect prefix is present, as in (3), with one exception, and a suffixed form otherwise, as in (4). This is not an aspect split of the familiar sort, where something different happens in the perfective versus the imperfect aspect; instead, it is the mere presence of an aspect prefix that matters. Given this, we want to know why an aspect prefix is necessary in order for a prefixed Set B form to occur. A related question is why the presence of an aspect prefix is usually sufficient for a Set B prefix to occur, and why there is one kind of exception. We also want to know why there is double cross-referencing of the same argument in some clauses, even when the prefixed Set B form is entirely redundant:

¹ J is a voiceless glottal spirant.
In the analysis presented here, the answers to these questions involve both syntax and PF. The two Set B series are distinct series of pronominal clitics, generated in different positions in syntax. The prefixed series is adjoined to the VP (a phrasal clitic, in the terminology of Marantz 1988), while the suffixed series is adjoined to the verb (a head clitic in Marantz’s terminology). In syntax, these are only feature bundles (Chomsky 2000, Halle and Marantz 1993). At PF, the determination is made as to which bundle(s) will be spelled out, and this decision involves phonological and prosodic constraints, in addition to the need to spell out features.

The presence of the aspect head matters, I argue, because this allows the phrasal clitic to be suffixed to that head, in the configuration in (8).

(8) \((\text{pwd} \text{ aspect-clitic} (\text{pwd} \text{ SetA-verb}))\)

This is preferable to suffixing the head clitic to the verb, as in (9), because a clitic in that position interferes with the desired alignment of the right edge of the verb stem with the right edge of the prosodic word; nevertheless that is the only choice when there is no aspect head:

(9) \((\text{pwd} \text{ SetA-verb-clitic})\)

The configuration in (9) is also used even when an aspect head is present in the one exceptional case where the configuration in (8) would produce a vowel vowel sequence.

An important point is that undesirable prosodic configurations involving a clitic can be avoided by simply not spelling out that clitic, but this option is limited by the fact that certain features must be spelled out (first and second person and plural). However, it is not necessary to spell out both clitics in Tzotzil if these features can be spelled out on one clitic.

There is an interesting generalization pointed out in this paper that needs to be accounted for, involving an asymmetric pattern of redundancy avoidance in Tzotzil.

(10) The choice of which features to spell on the suffixed Set B form depends on what features are spelled out in the prefixed Set B form, but not vice versa.

I show that this asymmetry is expected under the hypothesis that morphemes are spelled out one at a time at PF (as in Wolf 2008), if the prefixed form is spelled out first in Tzotzil.

These complex Tzotzil facts from Aissen’s work are theoretically important in that they show that a language can have two series of clitics in different positions which cross-reference the same argument, and that decisions about which of these clitics will surface cannot be made until the syntax/PF interface because phonological and prosodic considerations are involved.

\[\text{I follow Klavens 1995 in assuming that pronominal clitics are adjoined syntax, but this assumption is not crucial.}\]
This paper is organized as follows. In section 2, the Set A forms of Tzotzil, which cross-reference transitive subjects, are briefly discussed as background to the analysis of the Set B forms. Section 3 focuses on the choice between the prefixed and suffixed series of Set B forms, and the role of phonology and prosody in that choice. Section 4 turns to situations in which both the prefixed and suffixed Set B forms are spelled out in the same clause. This section focuses on the puzzle of why the prefixed form is used even when it is entirely redundant, and shows how the asymmetrical redundancy pattern of these data support Wolf’s (2008) hypothesis that in the decision as to which morpheme to insert from the lexicon, there is no ‘look ahead’ to morphemes not yet spelled out, but there is ‘look back’ to consider features already spelled out by a morpheme already inserted.

2. Set A Variants

Although the focus of this paper is on the process of selecting Set B forms in Tzotzil, we begin with a brief look at the Set A forms as background. The Set A prefixes, which are used to cross-reference transitive subjects in Tzotzil, attach to the left edge of the verb stem (Aissen 1987:43)3. The Set A forms are inside the same prosodic word as the verb, by the evidence that syllabification is possible across the morpheme boundary. There are two sets of Set A allomorphs, and the choice depends on the initial sound of the verb stem. One Set A allomorph series attaches to a vowel initial stem, and the other to a consonant initial stem.4

(11) Set A Prefixes (Aissen 1987:43)

<table>
<thead>
<tr>
<th></th>
<th>Prevocalic Forms</th>
<th>Preconsonantal Forms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>k-</td>
<td>j-</td>
</tr>
<tr>
<td>2nd</td>
<td>av-</td>
<td>a-</td>
</tr>
<tr>
<td>3rd</td>
<td>y-</td>
<td>s-</td>
</tr>
</tbody>
</table>

Aissen (1987:43) gives the following examples to illustrate the use of these forms. In these examples, the object is third person and is thus not (overtly) cross-referenced. In the first set of examples, we see the prevocalic subset of Set A forms:

(12) K- il -oj.
    1st SetA see PERFECT
    ‘I/we have seen it.’

(13) Av- il -oj.
    2nd SetA see PERFECT
    ‘You have seen it.’

---

3 I follow Aissen (1987) in using the traditional labels, Set A and Set B, for the cross-referencing forms of Tzotzil.
4 According to Aissen (1987:43), “all verb stems have an underlying initial consonant.” The vowel initial stems have an underlying initial glottal stop which deletes after a Set A form.
We see in these examples that the consonant of the Set A form becomes the onset of the syllable whose vowel is initial in the verb root.

The examples below show the preconsonantal variants of the Set A forms:

(15) J- man -oj.
    1stSetA buy PERFECT
    ‘I/we have bought it.’

    2ndSetA buy PERFECT
    ‘You have bought it.’

(17) S man -oj.
    3rdSetA buy PERFECT
    He/she/they have bought it.’

I follow the standard assumption of the Minimalist Program (Chomsky 2000), incorporated from Distributed Morphology (e.g. Halle & Marantz 1993) that cross-referencing elements are present in syntax, but only in the form of a feature bundle. The selection of an allomorph to insert to spell-out a Set A form cannot take place until the verb stem has been spelled out at PF, given that the choice of Set A allomorph depends on the initial sound of the verb stem.

Let us now turn to the selection of Set B forms in Tzotzil, where the decision involves something more dramatic than choosing an allomorph to fill one particular slot.

3. Phonology and the Selection of a Set B Series

The forms used to cross-reference objects and intransitive subjects are labeled Set B in Tzotzil, as in other Mayan languages, although as noted in the introduction to this paper, Tzotzil is different in having two Set B series which occupy different positions in the verbal complex. One precedes the Set A form, which precedes the verb stem, while the other Set B series suffixes to the verb stem.

(18) aspect-SetB-SetA-verb-perfect-SetB

Reasons for considering the two Set B series as distinct series (rather than the same series spelled out in two different places at PF) include the fact that the forms in each series are morphologically distinct, and the fact that they encode different features. The prefixed series marks only person, while the suffixed series marks both person and number. An additional motivation behind this assumption is a conservative view of the abilities of PF, limiting it to
spelling out (and in some cases linearizing) what is present in syntax. The morphemes in the two Tzotzil Set B series are listed in (19).

(19) The Set B Cross-referencing Forms in Tzotzil (from Aissen 1987:44)

<table>
<thead>
<tr>
<th>Prefix Series</th>
<th>Suffix Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>1sg</td>
</tr>
<tr>
<td>-i-</td>
<td>-on</td>
</tr>
<tr>
<td>2nd</td>
<td>2sg</td>
</tr>
<tr>
<td>-a-</td>
<td>-ot</td>
</tr>
<tr>
<td>1pl.incl</td>
<td>1pl.excl</td>
</tr>
<tr>
<td>-otik</td>
<td>-otikotik</td>
</tr>
<tr>
<td>1pl.excl</td>
<td>2pl</td>
</tr>
<tr>
<td>-otikotik</td>
<td>-oxuk</td>
</tr>
<tr>
<td>pl</td>
<td>-ik</td>
</tr>
</tbody>
</table>


3.1. Selecting a Set B Series

Aissen (1987:44-45) gives us the descriptive generalization governing which Set B series is used in any particular clause:

(20) The prefixed forms are used when an aspect prefix is present; otherwise the suffixed forms are used with one exception.

(This exception is discussed below in section 3.2).

Although the choice of a series depends on aspect, this is not an aspect split in the typological sense (where one form is used in the perfective and another in the imperfective). In Tzotzil, what matters is the presence of an aspect prefix, not its meaning. The prefixed Set B forms must follow an aspect prefix, as in the examples in (21), while the suffixed Set B forms can occur in clauses with no aspect prefix, as in (22):

(21) a. Stak’ ch-\[\text{can}\] a-\[\text{INCOMPLETIVE}\] j-\[\text{2ndSetB}\] kolta.
    ‘I can help you.’
    (Aissen 1987:15 (63), from Laughlin 1977)

    b. L-\[\text{COMPLETIVE}\] i-\[\text{1stSetB}\] s-\[\text{3rdSetA}\] chanubtas.
    ‘He taught me.’
    (Aissen 1987:61 (2a))

(22) a. J-\[\text{1stSetA}\] mala -oj -oxuk.
    ‘I have waited for you(pl).’
    (Aissen 1987:48 (20b))
b. Tal -em -on.\textsuperscript{5} 
\hspace{2.1cm} \text{come PERFECT 1sgSetB} 
\hspace{2.1cm} \text{‘I have come.’} 
(Aissen 1987:44 (9d))

Why does the presence of an aspect suffix matter? Aissen (1987) gives us a clue in the way she lists these Set B morphemes, as -i- and -a-. That is, she essentially lists these morphemes as prefixes with additional subcategorization information indicating that they must be preceded by another morpheme. But why? I suggest that the answer involves phonology and prosodic structure. These Set B forms are prohibited in the initial position of a prosodic word. There are two possible reasons for this prohibition. One is related to the fact that both of the morphemes in the prefixed series of Set B forms are vowels; without a preceding aspect morpheme the result would be a prosodic word that begins in a vowel. We can see this in the ungrammatical version of the (b) example in (22), shown below:

\begin{equation}
\begin{array}{c}
(Pwd \text{ i-tal -em }) \\
1^{st}\text{SetB come PERFECT} \\
\text{‘I have come’} \\
\end{array}
\end{equation}

This violates the phonological constraint known at Onset, which prohibits syllables that lack an onset consonant. Although this constraint is violable in Tzotzil, it is better if there is an alternate morpheme to use that does not produce this violation in the first place (following Wolf 2008). There is an alternative morpheme to use in Tzotzil, although it is in a different position: the suffixed Set B form. Using only the suffixed Set B form produces a prosodic word that begins with the verb stem, which is always a consonant initial form in Tzotzil, as in the grammatical version of the (b) example in (22), repeated below:

\begin{equation}
\begin{array}{c}
(Pwd tal -em -on ) \\
\text{come PERFECT} \\
1^{st}\text{SetB} \\
\text{‘I have come’} \\
\end{array}
\end{equation}

The second possible reason for the prohibition against beginning a prosodic word with a Set B form holds if the forms in this series are prosodic clitics, elements that are not parsed as independent prosodic words. The prosodic clitic would need to be parsed inside the prosodic word associated with the verb. However, this violates a prosodic constraint that requires the left edge of the verb stem to align with the left edge of a prosodic word (McCarthy and Prince 1993, Selkirk (in press)):

\begin{equation}
\begin{array}{c}
(Pwd \text{ clitic-verb stem}) \\
\end{array}
\end{equation}

The left edges of the verb stem and the prosodic word can be aligned if Tzotzil spells out a suffixed form of Set B instead of a prefixed form, as in (26):

\begin{equation}
\begin{array}{c}
(Pwd tal -em -on) \\
\text{come PERFECT} \\
1^{st}\text{SetB} \\
\text{‘I have come’} \\
\end{array}
\end{equation}

\textsuperscript{5} The morphological form of the perfect suffix differs for transitive and intransitive stems (Aissen 1987:42).
The presence of an aspect head changes things because it provides something for the phrasal clitic to suffix to, outside the prosodic word that surrounds the verb stem, allowing both edges of the verb stem to be aligned with a prosodic word.  

To show this more formally, we need to state and rank these constraints, and show how the candidates compete to satisfy them. The constraint that requires the left edge of the verb stem align to the left edge of a prosodic word is formulated below:

$$\text{LEFT ALIGN-STEM} \quad \text{Align (Stem, L, PrWd, L)}$$

Align the left edge of every verb stem to the left edge of a prosodic word.

The stricter alignment constraint that requires both edges of a verb stem to be aligned to a prosodic word is formulated here as a Match constraint, following Selkirk (to appear):

$$\text{MATCH (VSTEM, PRWD)} \quad \text{The left and right edges of a verb stem must correspond to the left and right edges of a prosodic word.}$$

I will assume that the stricter match constraint is ranked below the left alignment constraint in Tzotzil, but the results actually follow regardless of the relative ranking of these two constraints.

$$\text{Tzotzil ranking: LEFT ALIGN-STEM >> MATCH (VSTEM, PRWD)}$$

The tableau below shows the competition that occurs when no aspect head is present in syntax. The input from syntax contains both Set B clitics, one preceding the verb stem and one following. The (a) candidate in this tableau spells out just the suffixed Set B form, while (b) spells out only the prefixed Set B form, and (c) spells out both. The left alignment constraint eliminates candidates (b) and (c) leaving candidate (a) as the winner.

---

6 Note that the choice of whether or not to use a prefixed form of the Set B series is not determined by the phonological properties of the preceding aspect morpheme. In fact, the reverse is true. There are allomorphs of the completive aspect prefix $l-$ and $7i$ ($7$ is a glottal stop) and the choice of which one to insert is determined by the following environment (Aissen 1987:41-42).

7 I assume here that the verb stem is the material under the V node from syntax, including any prefixes and suffixes that spell out features contained in that node. Here, these include the Set A agreement features and the aspect suffix.
A more complete picture would show why a (d) candidate that spells out neither clitic does not win. In fact, that candidate does win when the clitics are third singular. I assume here that a higher ranked constraint requires the spell out of a local (first or second person) cross-referencing feature on some clitic. A complete picture also needs to account for why both clitics are not spelled out here; we postpone that discussion until section 4.

Now let us turn to the competition that occurs when the input from syntax contains an aspect head. Here we consider not only which clitic is spelled out, but differences in the prosodic structure of the candidates. The candidates in (a) and (b) have a flat prosodic structure, and differ only in which of the two clitics is spelled out. The candidates in (c) and (d) have a recursive prosodic word structure, and differ in which clitic is spelled out. Both constraints find fault with both flat candidates in (a) and (b); in neither is the verb stem left aligned to the edge of the prosodic word. But the left alignment constraint is satisfied by both candidates (c) and (d) where the recursive structure provides a left edge for the verb stem to align to. It is the match constraint that makes the decision here, penalizing candidate (c) for the fact that the right edge of the verb stem does not align with a prosodic word.

In the next section, we turn to the exception noted by Aissen (1987) to the generalization that the prefixed form of Set B is used if an aspect prefix is present.

3.2. The Exception and its Phonological Cause

We now turn to the exception to the generalization in (20) that a prefixed form of Set B is used whenever an aspect prefix is present. Aissen (1987:45) tells us that the exceptional examples

8 A more complete picture would also include an account of why a candidate with a recursive prosodic word structure such as \((\text{Pwd} \text{ clitic} \text{ (Pwd verb stem)})\) does not win in tableau (31). Given that the prefixed Set B clitics are single vowels, this would produce a vowel initial word, violating ONSET. It might also be barred by other constraints on prosodic structure. See Werle 2009 for a detailed discussion of the constraints and constraint rankings that determine how clitics will be treated in the prosodic structure in Selkirk’s framework.
have a second person subject and a first person object; in this configuration, no prefixed Set B form is used even though an aspect prefix is present:

(33)   Ch-   a- mil -on.
       INCOMPLETIVE  2\textsuperscript{nd}SetA kill 1sgSetB
   ‘You are going to kill me.’  

(Aissen 1987:45 (10a))

At first glance, one might suspect that this exception is a person hierarchy effect. That is, the ungrammaticality of the version with a prefixed form of Set B, shown in (34) below might appear to be due to the fact that the second person Set A form is closer to the left edge of the verb than is the first person Set B form:

(34)   *Ch- i- a- mil
       INCOMPLETIVE  1\textsuperscript{st}SetB  2\textsuperscript{nd}SetA kill

Such a person alignment violation is disallowed in some languages, e.g. Yimas, where a first person form must align the left edge of the verb (Foley 1991, Woolford 2003). However, we can exclude the person alignment hypothesis for Tzotzil because of examples such as the following, where a third person Set A form intervenes between the first person Set B form and the left edge of the verb:

(35)   L- i- s- maj a-tot.
       COMPLETIVE  1\textsuperscript{st}SetB  3\textsuperscript{rd}SetA hit 2\textsuperscript{nd}-father
   ‘Your father hit me.’  

(Aissen 1987:40)

Instead, I argue that the ungrammaticality of (34) is actually due to phonology, specifically to the need to avoid the VV sequence. The grammatical version in (33) can be syllabified without any vowel initial syllables, as in (a) below, and thus incurs no violations of the ONSET constraint which requires all syllables to begin with a consonant. The ungrammatical version cannot be syllabified without an onset violation, as shown in (b) below.

(36)   a. Ch-a-.mil-on  
       b. Ch-i-.a-.mil  

The reason that the exceptional examples are only those with a second person subject is an accident of the fact that only the second person Set A forms are vowel initial. The reason that all the exceptional examples have a first person object is that a third person object would be cross-referenced by a zero form, and a configuration of a second person object with a second person subject would require a reflexive construction. Thus, this just happens to be the only person combination that would produce a VV sequence and a consequent ONSET violation.

Now, one might ask why Tzotzil does not simply ‘repair’ such onset violations, instead of selecting a suffixed Set B form. Wolf (2008) argues that the grammar prefers to insert a morpheme that avoids a phonological problem (when such a morpheme is available), rather than
inserting a form that causes a problem and requires subsequent repair. Moreover, Wolf points out that there are languages where the relevant faithfulness constraints are ranked higher than the onset constraint, with the result that ONSET violations cannot be repaired. In that situation, avoiding the creation of the problem is the only option. In fact, Tzotzil tolerates onset violations when there is no alternate morpheme to insert to avoid the violation. This occurs, for example in (37), involving a transitive verb with a second person subject, a third person singular object (not overtly cross-referenced) and no aspect prefix. Since both allomorphs of the second person Set A form are vowel initial, and a Set A form must prefix to the verb in a transitive, there is no alternative that avoids the ONSET violation:

(37)  \[ \text{Av-il -oj.} \]
     \( ^{2\text{ndSetA}} \text{see PERFECT} \)
     ‘You have seen it.’

4. Co-occurrence of the two Set B Series

We now turn to the analysis of examples where both the prefixed and suffixed Set B series are spelled out in the same clause:

(38)  \[ \text{L-i-s-pet -otik.} \]
     \( \text{COMPLETIVE}^{1\text{stSetB}} \text{ 3\text{rdSetA} carry 1PL.INCLUSIVESetB} \)
     ‘He carried us(inclusive).’
     (Aissen 1987:1 (2))

(39)  \[ \text{Ch-i-s-mil -otikotik.} \]
     \( \text{INCOMPLETIVE}^{1\text{stSetB}} \text{ 3\text{rdSetA} kill 1PL.EXCLUSIVESetB} \)
     ‘He is going to kill us(exclusive).’
     (Aissen 1087:47 (18b))

When does this double cross-referencing occur, and why? An important factor is that the prefixed Set B forms do not encode number; thus, in order to mark number, a suffixed form must be used. That much seems straightforward. But why is the prefixed form also used in the above examples, given that it is redundant? That is, the prefixed Set B form in these examples encodes only person, but person is also encoded in the suffixed Set B forms. The answer cannot be that the prefixed form is obligatory, because, as we have seen above, there are examples where only the suffixed series of Set B is used. Moreover, the prefixed form is not obligatory even in examples where the suffixed form is needed to encode number; the following example has a plural suffixed form and no prefixed form of Set B:

(40)  \[ \text{S-mala -oj -otikotik.} \]
     \( ^{3\text{rdSetA}} \text{wait PERFECT 1PL.EXCLUSIVESetB} \)
     ‘He has waited for us(exclusive).’
     (Aissen 1987:47 (19b))

Aissen gives us a descriptive generalization as to when the prefixed form cooccurs with a suffixed form of Set B.
“In those contexts where set B prefixes are required (i.e., on forms with an aspectual prefix), the suffix cooccurs with the appropriate set B prefix. Otherwise (i.e. on forms without an aspect prefix), the suffix occurs alone.” (Aissen 1987:47)

At first, this might not seem to tell us much, since the above generalization could be rephrased as ‘use Set B prefixed forms when they are required’. But Aissen is actually telling us something extremely significant: the conditions that determine when a prefixed form of Set B must be used are independent of whether or not a Set B suffix is also used.

The decision as to whether to spell-out the prefixed series of Set B is made completely independently of whether or not the suffixed series of Set B will also be spelled-out.

It is as if the grammar first determines whether to spell-out the prefixed Set B form, and then only later makes a determination as to whether to also spell-out the suffixed Set B form. Interestingly, this is the kind of situation one expects to find given the hypothesis explored in Wolf 2008 that morphemes are inserted/spelled-out one by one, and that there is no ‘look-ahead’ to consider what features will be spelled out by morphemes that have not yet been inserted. If the prefixed Set B form is spelled out first, it encodes all the features it can, with no ‘knowledge’ of what features might be spelled out later on the suffixed Set B form.

There is ‘look-back’, however, as Wolf’s account predicts. If the suffixed Set B form is spelled out second, it can ‘see’ what cross-referencing features have already been spelled out by the prefixed form spelled out first. In example (43) below, which lacks a prefixed form of Set B, the suffixed form spells out all the features it can, both the 2nd person and plural number features of the object. In contrast, in example (44), where there is a prefixed Set B form which encodes 2nd person, the suffixed morpheme that is selected encodes only number. Redundant encoding of person is avoided.

(43) J- mala -oj -oxuk.
    1stSetA wait PERFECT 2ndSetB
    ‘I have waited for you(pl).’ (Aissen 1987:48 (20b))

(44) Ch- a- j mil -ik.
    INCOMPLETIVE 2ndSetB 1stSetA kill pluralSetB
    ‘I’m going to kill you (pl).’ (Aissen 1987:49 (24b))

Note that this plural suffixed form –ik does not encode second person, as we can see from the fact that it can be used to mark number on third person objects (where the Set B prefix is zero):

(45) 7i- j- mil -ik.
    COMPLETIVE 1stSetA kill PLURAL
    ‘I killed them’ (Aissen 1987:49 (24a))
The example in (44) above shows that the choice of a suffixed form is informed by the knowledge of which features, if any, have already been spelled out in the prefix ‘slot’. This is what Wolf (2008) means when he says that ‘look back’ is allowed by the grammar.

The situation is different in examples involving a first person plural object because there is a feature besides person and number that needs to be encoded: the inclusive/exclusive distinction. The prefixed Set B form only spells out person, while the suffixed Set B form -ik only spells out number, so that combination would fail to spell out the inclusive or exclusive feature. However, the lexicon does not (and perhaps logically cannot) contain a suffixed Set B form that encodes the inclusive/exclusive distinction without also encoding the first person feature. Thus redundancy in spelling out the first person feature is inevitable:

(46)  L- i- s- pet -otik.        
COMPLETIVE 1stSetB 3rdSetA carry 1PL.INCLUSIVESetB
‘He carried us (inclusive).’  (Aissen 1987:1 (2))

Redundancy is avoided in examples where all of the features of the object have already been encoded in a prefixed form of SetB, by simply not spelling out any suffixed form of Set B.

(47)  L- i- s- chanubtas.       
COMPLETIVE 1stSetB 3rdSetA teach
‘He taught me.’  (Aissen 1987:61 (2a))

The intuitive idea of this approach seems clear and appealing, but an apparent paradox arises when we try to construct a formal account of this data within Wolf’s 2008 approach, where morphemes are inserted one by one. The paradox is this:

(48)  Tzotzil Paradox

The aspect head must be present in order for the prefixed Set B form to be spelled out, but the prefixed Set B form must be spelled out before the aspect head is, because the choice of allomorph for spelling out the completive aspect head depends on what follows it.

Building on a suggestion by Selkirk (personal communication) that the answer might involve syntax and the consequent mapping to prosodic structure under her Match approach, plus a suggestion from Wolf (personal communication) that the grammar must be able to see the aspect head or its prosodic boundary at the point at which the decision is made as to which clitic to spell out, I offer the following speculation as to one line of thought for solving this apparent paradox: At the syntax/PF interface, before any morphemes have been spelled out, idealized prosodic structure is constructed obeying Selkirk’s (to appear) Match constraints, so that each head maps to a prosodic word, and each phrase maps to a phonological phrase, etc. In this initial interface structure, the prosodic structure surrounds only feature bundles, and so the grammar
cannot yet evaluate whether this prosodic structure will need to be revised once individual morphemes are spelled out. This structure is the input to the spell-out process.

For an example such as (49) below, this initial interface structure looks something like (50), with prosodic words around the two heads, aspect and V, and no prosodic structure around the two clitics.

(49) \[ \text{Ch} - \ a - \ j - \ mil - ik. \]
\[ \text{INCOMPLETIVE} \ 2^{\text{nd}}\text{SetB} \ 1^{\text{st}}\text{SetA} \ \text{kill} \ plural\text{SetB} \]
\[ \text{‘I ’am going to kill you(pl).’} \] (Aissen 1987:49 (24b))

(50) Initial Interface Structure: \((pwd \ \text{aspect } \ clitic \ (pwd \ V) \ clitic)\)

At the first step of spell-out, the input contains this prosodic structure, although it may be altered as morphemes are spelled out. After the verb stem is spelled out, the next step is to move outwards from it to spell out one of the clitics. We might expect the tableau for this step to look something like (51), where the English words stand for feature bundles not yet spelled out. (I will ignore candidates here where clitics remain stranded outside prosodic words, but constraints barring that can be found in Werle 2009.) In candidate (a), the second person prefixed Set B clitic has been spelled out, as \(a\), and this clitic has been tucked into the prosodic word surrounding the aspect head. In candidate (b), that same clitic is spelled out, but it is tucked into the beginning of the following prosodic word surrounding the verb. In candidate (c), the suffixed 2\(^{\text{nd}}\) plural Set B clitic has been fully spelled out, as \(oxuk\), and it has been tucked into the prosodic word surrounding the verb:

(51) Speculative Tableau

<table>
<thead>
<tr>
<th>input:</th>
<th>((pwd \ \text{aspect } \ clitic \ (pwd \ j-mil) \ clitic))</th>
<th>LEFT ALIGN-STEM</th>
<th>MATCH ((VSTEM, PRWD))</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\rightarrow a. \ (pwd \ \text{aspect-}a) \ (pwd \ j-mil) \ clitic)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ((pwd \ \text{aspect } \ (pwd \ a \ j-mil) \ clitic))</td>
<td>*!</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. ((pwd \ \text{aspect } \ clitic \ (pwd \ j-mil-oxuk))</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These candidates are evaluated by the same two alignment constraints we used above in section 3. The (b) candidate violates both alignment constraints because the \(a\) clitic lies between the verb stem and the left edge of the prosodic word. The (c) candidate violates Match because the \(oxuk\) clitic intervenes between the right edge of the verb stem and the right edge of the prosodic word. This leaves candidate (a) as the winner. This winner becomes the input to the next step, where another morpheme will be spelled out. When the aspect morpheme is finally spelled out, it can ‘see’ the spelled out phonetic material following it, and the appropriate allomorph can be inserted. As noted above, this is one speculative approach to how the above paradox might be solved; at the point at which the prefixed clitic is spelled out, the grammar can ‘see’ that there is

\[\text{In OT-CC (McCarthy 2007), the framework within which Wolf’s (2008) hypothesis is formulated, alterations in prosodic structure do not count as separate derivational steps.}\]
an aspect head, with its associated prosodic word, but not the morpheme that will eventually spell out that aspect head.

5. Conclusion

In this paper, we have seen several ways in which the complex Tzotzil agreement patterns described in Aissen 1987 are extremely relevant to current research questions involving the relative roles of syntax and PF in the morphology of agreement, the effect of prosodic structure on the spell-out of morphemes, and the influence of phonology on morpheme spell out. Tzotzil is unusual among the Mayan languages in having two distinct series of pronominal clitics generated in syntax which are sometimes both spelled out at PF. We have seen evidence in this paper that the decision as to which of the two series of Set B of cross-referencing forms to use is actually a decision as to which to spell out at PF, and phonology and prosodic structure play an important role in that choice. Another important conclusion is that the interesting asymmetric redundancy pattern of Tzotzil provides additional support for the idea explored in Wolf 2008 that morphemes are inserted/spelled-out at PF one by one, with no ‘look ahead’ to morphemes not yet spelled out. In Tzotzil, the prefixed series of Set B is inserted without regard to whether or not the suffixed series is also present. In contrast, both the presence of, and the form of, the suffixed Set B series are affected by what features the prefixed series has already spelled out.

References