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MAYAN MORPHOSYNTAX*

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Abstract: This paper uses data from the Mayan languages to evaluate expanded INFL theories derived from the work of Pollock (1989) and Chomsky (1995). The combination of ergative agreement with subject agreement closer to the verb than object agreement pose interesting problems for this framework. The real challenge, however, is to account for the variation in verbal agreement that occur across this family of languages. The languages exhibit several forms of functional interaction that are not predicted within the expanded INFL framework. Structural configurations must be augmented with something like a feature matrix to capture significant interactions that take place between functional heads in the world's languages.

Languages typically make use of word order, case morphology and/or agreement morphology to express basic syntactic relations. Recently, linguists have proposed elaborated functional projections that attempt to capture these morphosyntactic relations (Abney 1987; Chomsky 1989; Fukui & Speas 1985). The structure that appears in (1) provides an example of such a structure for English (c.f., Belletti 1990; Chomsky 1995; Pollock 1989).

(1) An exploded inflectional structure for English (after Chomsky 1995:60)[1]
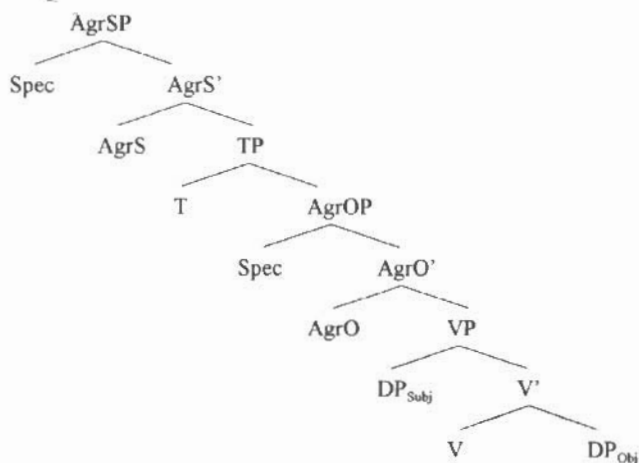
Such trees offer something for everyone, or, should I say, every inflection. The basic idea is to check noun and verb features against the 'functional projections' for subject agreement, etc. at some point in the derivation. One way to check the 'D-feature' of the subject in both Tns and AgrS is by moving the subject phrase to the Specifier position in the Tns and AgrS phrases. The verb's features may be checked by moving the verb to the head of the corresponding functional projections Thus, inflectional morphology not only expresses basic syntactic relations, but also participates in the derivation of sentences. The most appealing attribute of the model is the use of the syntactic structure to constrain the checking process through the Spec-Head system of agreement. The verb moves to the head of the functional projection while the nominal categories move to the specifier position of the functional projection. The movement of the major lexical elements within the structure determines sentence word orders while agreement is assigned by the functional projections for agreement. Case can be checked independently of agreement; the Tense head checking the Nominative Case of the noun phrase in [Spec, IP], while the head of AgrO checks the Accusative Case of the direct object in VP. The syntactic structure restricts the types of possible movements, and hence limits the possible types of inflectional systems.

While this model has a certain elegance, it also has definite shortcomings The evidence for an AgrO functional projection is meager at best for English. The model offers no explanation for the overt realization of Case and agreement inflection in languages that captures the generalizations that exist across this domain. For example, the model provides no explanation of why agreement is only marked in English for the third person, present tense forms of verbs or more broadly, how syntactic movement interacts with the overt realization of morphosyntactic features. These concerns are relegated to Spell-out at PF. It is ironic that current linguistic theory cannot account for the common morphosyntactic elements of the world's languages.
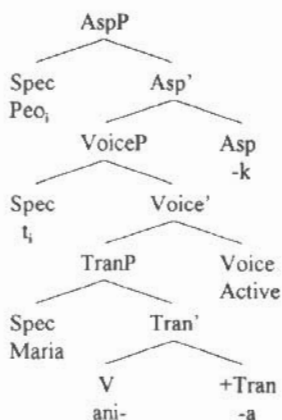
At least some linguists have begun to apply this framework to describe other languages. Eloise Jelinek (1998) proposes the structure shown in (2) for Yaqui, a Uto-Aztecan language spoken in Arizona and northern Sonora. The Yaqui subject is inserted in [Spec, Voice] and raises to the subject position [Spec, Asp]. The verb raises via head-to-head movement to Aspect and collects the inflections for voice and aspect. Aspect assigns Nominative Case to the argument in [Spec, Aspect] while the objective receives Accusative Case in [Spec, Tran].

Jelinek's structure neatly accounts for the word orders and verbal inflections in Yaqui at the cost of departing from the supposedly universal structure in (1). She ascribes these differences to the overt differences in morphology between English and Yaqui. This may well be the case, but the current situation leaves us without a theory that constrains the distribution of functional projections across

languages. Why is the projection of aspect so high in Yaqui while being one of the lowest projections in English?

   In the context of this research, the Mayan family of languages provides a critical test of theoretical relationships between word order, Case and agreement. Mayan languages are well known for possessing a linguistically interesting array of distinct morphosyntactic types. The languages have a generally agglutinative

(2) The morphosyntactic structure of Yaqui

```
                AspP
              /      \
        Spec          Asp'
        Peo_i        /    \
               VoiceP      Asp
              /     \      -k
         Spec        Voice'
         t_i        /     \
               TranP       Voice
              /    \       Active
         Spec       Tran'
         Maria     /    \
                  V      +Tran
                 ani-    -a
```

Peo-Maria-ta   'ani-a-k
Peo Mary-ACC help-TRAN-PERF
'Pete helped Mary.'

morphology with overt agreement for subject, object, indirect object and instruments. The languages display the usual pro-drop characteristics of languages with a rich verbal morphology. Mayan languages have an ergative type of agreement with a variety of ergative 'splits' along the dimensions of person, aspect and clause type. Many Mayan languages also display idiosyncratic constraints in their agreement systems. The morphosyntax of any single Mayan language posses many challenges for current syntactic theory, while a comparative study of the all the languages not only reveals fundamental limitations in syntactic theory, but also points the way to a better understanding of the way morphology integrates with syntax.

   The Mayan language family contains some 30 different languages with an historical depth that is roughly similar to that of the Romance languages. The Mayan languages fall into four main subdivisions: a. Huastekan, b. Yukatekan, c

Western and d. Eastern. The first three branches are located primarily in Mexico while the Eastern branch is located in Guatemala. I will begin with the Eastern Mayan language that I know the best, K'iche', and gradually bring the other languages into my discussion where they become relevant. K'iche' verbs have the inflectional template shown in (3).

(3) Aspect + Absolutive + (Motion) + (Ergative) + Root + Derivation + Status

The ergative prefixes mark agreement with the subjects of transitive verbs while the absolutive prefixes mark agreement with the direct objects of transitive verbs and the subjects of intransitive verbs. The aspect markers distinguish between incompletive and completive aspect as well as the imperative mood. The status suffixes are the most complex part of the verbal inflectional system. They run against the agglutinative grain of the language in that they simultaneously mark aspect, transitivity, and phrasal position. I provide examples of K'iche' verbs in (4).

(4) Intransitive verbs   Transitive verbs

a. katpetik   b. xatriloh
   k-at-pet-ik   x-at-r-il-oh
   INCOMP-2ABS-come-STATUS   COMP-2ABS-3ERG-see-STATUS
   'You are coming.'   'S/he saw you.'

c. ma xb'e: taj   d. ma katoj taj
   ma x-0-b'e: taj   ma k-0-a-toj taj
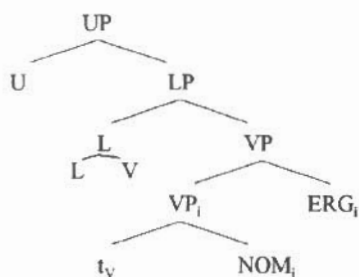   NEG COMP-3ABS-go NEG   NEG INCOMP-3ABS-2ERG-pay NEG
   'S/he did not come.'   'You do not pay him/her.'

   Ken Hale (ms.) proposed the morphosyntactic structure in (5) to describe K'iche'. Hale assumes that U assigns nominative agreement and aspect. The lower functional head, L, is responsible for assigning ergative agreement as well as ergative Case. He relies on the framework of Bittner and Hale (1996) for the constraints needed to restrict ergative agreement and Case. In their model, Case-binding between a head and an argument only occurs in the presence of a 'Case Competitor'. The nominative argument can fill the role of Case Competitor since they assume it is a bare DP that lacks Case. Since L governs a small-clause containing the ergative argument, and since the nominative Case Competitor becomes visible to L once the verb moves to L, L can assign the ergative Case to the subject argument.
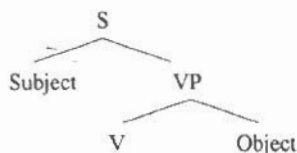
(5) Hale's structural analysis of K'iche' (ms , Figure 12)

```
              UP
           /      \
         U          LP
                  /    \
               L          VP
             /  \        /    \
            L    V    VP_i      ERG_i
                     /    \
                   t_V      NOM_j
```
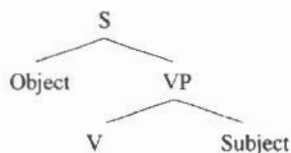
Hale discusses the possibility of an ergative syntactic analysis for K'iche'. This could come about through raising the nominative argument to [Spec, L]. The result would be what Dixon (1979) terms a syntactically ergative language in that the normal syntactic relations are reversed (see 6).

(6) Accusative and ergative syntactic configurations (Dixon 1979; Johnson 1977; Manning 1995)

a. Accusative syntax

```
            S
         /     \
   Subject       VP
               /    \
              V      Object
```

b. Ergative syntax

```
            S
         /     \
   Object        VP
               /    \
              V      Subject
```

Although linguists such as Tom Larsen (1987) and Christopher Manning (1995) have proposed treating K'iche' as a syntactically ergative language, these analyses face certain difficulties (c.f. Pye 1990). Languages with accusative syntax restrict reflexive pronouns to the object position as shown in (7). We would predict that languages with ergative syntax would demonstrate the opposite restriction, but this is not the case for K'iche' as shown in (8).

(7) a. I scared myself.
    b. *Myself scared me.

(8) a. xinxe'j wi:b'
       x-∅-in-xe'-j w-i:b'
       COMP-3ABS-1ERG-scare-STATUS 1ERG-self
       'I was afraid.' (lit. 'I scared myself.')

The difficulties inherent in acquiring syntactically ergative languages pose another problem for this approach. The typical hallmarks of syntactic ergativity are found in complex sentences in control and coordination structures. Children acquiring such languages would set the basic syntactic parameter for the language on the basis of simple sentences long before they encounter evidence for syntactic ergativity in more complex sentences. This situation should lead to a massive unlearning problem unlike anything that exists in the acquisition literature. For these reasons, syntactic ergativity fails to offer a viable analysis for verbal inflection in K'iche'.

Hale also rejects the syntactic ergative analysis for K'iche' and proposes an alternative morphological ergative analysis. In this analysis, the nominative argument is licensed *in situ* through the transparent LP. When the verb raises to L in the syntax, its dominating VP ceases to be a barrier to government. Verb raising allows the nominative to become visible to L and thus fill its role as a Case Competitor to the ergative argument. Further raising of L to U allows U to assign nominative Case to the object through the transparent LP and VP nodes without requiring the direct object to move to a SpecIP position.

Hale's analysis provides an elegant description of K'iche' morphosyntax in that it places the absolutive agreement prefix (assigned by U) before the ergative agreement prefix (assigned by L). At the same time the model produces a VOS word order that is typical for K'iche'. Hale notes that his model makes possible a simple rearrangement of nodes as shown in (9) that would account for a common alternative VSO word order that K'iche' displays when both the subject and object are definite.

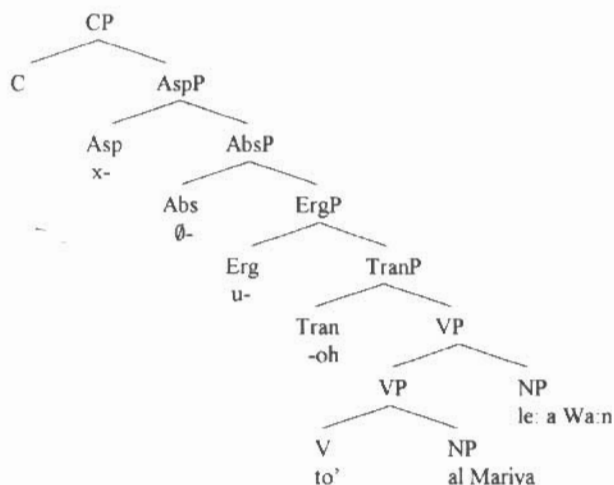(9) Alternative VSO structure (Hale, Figure 7 with verb raised to L)
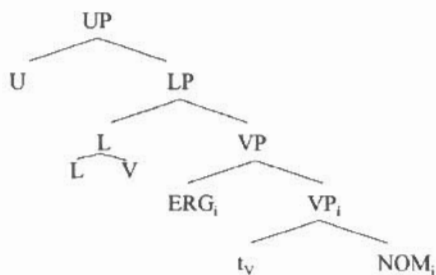
Despite all of these advantages, I remain unsatisfied with Hale's model. The use of U and L rather than more familiar functional projections such as C and I obscures any structural similarities that might exist between K'iche' and other

languages. While Hale states that U contains C and L contains I, he does not address the problem of accounting for the realization of aspect inflection under C rather than under I that his model requires. The structure in (5) also does not provide a projection for the status suffixes on K'iche' verbs. These are a prominent part of verbal inflection in K'iche' and their omission raises serious concerns about the adequacy of Hale's description.

I have tried to develop an analysis of K'iche' that seeks to account for the full range of morphosyntactic features in the language. The most obvious omission from Hale's model is a place for the status suffixes. I start with the assumption that the primary function of these suffixes is to indicate verb transitivity. I therefore propose adding a functional projection for transitivity to the K'iche' structure as shown in (10).

(10) Basic K'iche' morphosyntactic structure

```
           CP
         /    \
        C      AspP
             /    \
          Asp      AbsP
          x-      /    \
               Abs      ErgP
               0-      /    \
                    Erg      TranP
                    u-      /    \
                         Tran    VP
                         -oh    /   \
                              VP     NP
                             /  \    le: a Wa:n
                            V    NP
                          to'   al Mariya
```

xuto' al Mari'y le: a Wa:n
x-0-u-to' al Mari'y le: a Wa:n
ASP-ABS3-ERG3-help FAM Mary the FAM John
'John helped Mary.'

I assume that Tran, the head of the functional projection for transitivity has a feature with a plus or minus value for transitivity. When the feature is plus, Tran will project the Ergative phrase, while with the minus feature the ergative phrase is

not projected. I follow Hale in assuming that verb raising to the head of the Aspect phrase makes both arguments visible to the higher functional projections. This allows the functional projections for agreement to cross-reference the verb arguments. I do not follow Bittner and Hale in their reference to a Case Competitor. I assume Case is assigned structurally in the usual way with the exception that the subject is not forced to move since it is visible to the functional projection for aspect. This would mark a major difference between English and K'iche' in that English subjects are forced to move to Spec IP for Case while K'iche' subjects can receive Nominative Case in SpecVP.

This configuration suggests that the status and ergative inflections are more closely associated with the verb than the aspect and absolutive inflections. The structure allows the agreement projections to become disassociated from the underlying syntactic relations in that intransitive verbs will not project the ergative phrase and thus will assign absolutive agreement to the subject, while transitive verbs that project the ergative phrase will assign ergative agreement to the subject.

Western Mayan

We can gain a better perspective on the structural configuration of K'iche' by examining other Mayan languages. I turn next to a language in the Western branch of the Mayan language family–Tzeltal. Tzeltal verbs have the configuration shown in (11). I provide examples of Tzeltal verbs in (12).

(11) Tzeltal verb structure

        Aspect + Ergative + Root + Status + Absolutive + (Plural)

(12) Examples of Tzeltal verb inflection (Penny Brown, pc)

a. Plain Intransitive
  ma ?-och-at
  NEG COMP-enter-2ABS
  'You did not come in.'

b. Imperative Intransitive
  och-an-ik tal
  enter-STATUS-PL DIR
  'You all come in!'

c. Plain Transitive
   ma s-pet-at-ik ix
   NEG 3ERG-hug-2ABS-PL DIR
   'They are not hugging you still.'

Tzeltal differs from K'iche' in placing the absolutive agreement markers after the status markers at the end of the verb stem. The ergative agreement markers remain in front of the verb (12c). Tzeltal also has a separate plural agreement marker that follows the absolutive agreement marker, but which marks plural subjects whether they are absolutive (12b) or ergative (12c). The aspect morphology of Tzeltal is much reduced in comparison to the K'iche' aspectual system, but is still visible on imperative and perfect verbs.

Once again we see that the ergative agreement markers are closer to the verb than the absolutive markers. Tzeltal provides direct confirmation that the (much reduced) status markers are also positioned closer to the verb root than the absolutive markers. We can alter the inflectional structure in (10) to account for Tzeltal by simply changing the absolutive prefix to a suffix (see 13).

(13) Structural configuration for Tzeltal
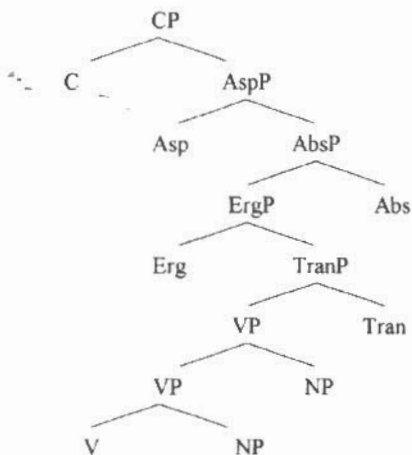
Unfortunately, this configuration fails to predict several features of Tzeltal verb inflection–notably the use of a separate plural suffix for subjects of transitive verbs. It is easy to add a functional projection for the plural. The question is how to account for the connection between this plural suffix and the ergative subjects.

Tzeltal's plural projection may be tied to another feature of its inflectional system—the distinctive aspect prefixes for transitive and intransitive verbs (see 14).

(14) Tzeltal aspect paradigm

	Trans	Intrans
Incompletive	ya-	yax-
Completive	la-	?-

The presence of a transitivity distinction in the Tzeltalan aspect paradigm suggests that verb transitivity is more important to Tzeltal than K'iche'. I try to capture this observation by projecting a secondary transitivity node in Tzeltal that intervenes between the complementizer and aspectual phrases (see 15). This transitivity node also has plus and minus transitivity values. Plus values produce the plural suffixes and select the transitive aspectual prefixes, while the minus values select the intransitive aspectual prefixes. Tzeltal, like K'iche', typically displays a VOS word order (Kaufman 1971).

(15) Structural configuration for Tzeltal with plural projection
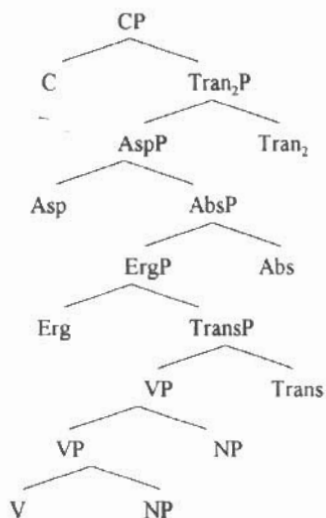
The discussion of the Tzeltalan inflectional structure highlights an important feature of Mayan morphosyntax—the degree to which we find an interaction

between functional projections. While current models of morphsyntactic structure describe the distribution of functional elements fairly successfully, they fail to predict the ways in which these elements may interact. The structure in (15) does not account for the interaction between the functional projections for transitivity and ergativity or the lack of interaction between aspect and absolutivity. I will propose that we take this interaction seriously as a natural result of the immediate association between functional projections. In a configuration, such as the one shown in (16), we may expect features of the head Y to interact with those for X. The idea is that if YP has to attach to an XP then features in Y may limit features in X.

(16)

```
        XP
       /  \
      X    YP
          /  \
         Y    ZP
             /
            Z
```
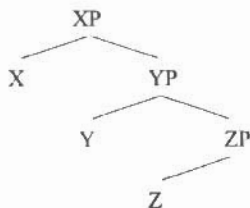
Given something like this mechanism for functional interaction, we might expect functional elements to interact with their immediate superiors as the default case. I am assuming that the lack of an interaction is the marked case, and requires an explanation. The models for K'iche' (10) and Tzeltal (15) place the ergative projection next to the absolutive projection, so we would expect these projections to interact at some level. While the K'iche' focus antipassive construction discussed by Hale may provide some evidence for such an interaction, I will not pursue this topic any further at this point.

Yukatek

Instead, I now wish to turn to the Yukatek branch of Mayan. Yukatek verbs have the inflectional template shown in (17). I provide some examples of Yukatek verbs in (18).

(17) Yukatek verb structure

Aspect (Ergative) (Adverb) Root + Status + Absolutive + Plural

(18) Examples of Yukatek verb inflection (Barbara Pfeiler, pc)

a. Incompletive Intransitive
k aw ʔok-ol
INCOMP 2ERG enter-STATUS
'You enter.'

b. Completive Intransitive
maʔ (h) ʔok-∅-eč-iʔ
NEG (COMP) enter-STATUS-2ABS-NEG
'You did not come in.'

c. Incompletive Transitive
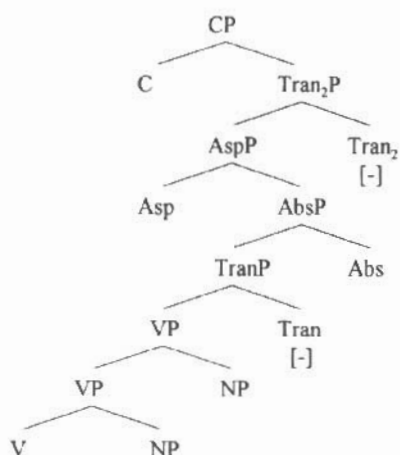maʔ táan u+ka méek'-eč-óʔob'-iʔ
NEG PROG 3ERG+again hug-2ABS-3PL-NEG
'They are not hugging you again.'

The Yukatek inflectional structure is not terribly different from that of Tzeltal Thus, we may assume a morphosyntactic configuration like the Tzeltalan structure shown in (15). Yukatek, like Tzeltal has a separate plural suffix for ergative subjects, and like Tzeltal, the Yukatek plural follows the absolutive agreement suffix (see 18c). Yukatek also resembles Tzeltal in the use of distinct aspectual prefixes for transitive and intransitive verbs, although in Yukatek the transitivity distinction only occurs for the completive aspect.

The novel feature in Yukatek is, of course, its split ergative agreement system. The split occurs on intransitive verbs in the incompletive aspect as shown in (18a). These verbs use the ergative set of agreement prefixes with intransitive subjects rather than using the regular absolutive set of agreement suffixes as shown in (18b) for intransitive verbs in the completive aspect. The question is whether our configurational structure can provide any insight into this form of split ergativity.
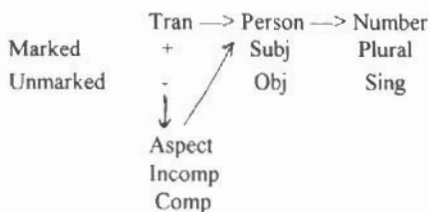
The approach that I have taken so far would assign a structural configuration like that in (19) to Yukatekan intransitive verbs. I assume that Tran and Tran$_2$ have minus values for transitivity since the verb is intransitive. This configuration is unsatisfactory in that it provides no explanation for Yukatek's ergative split. The analytic approach to functional structure that I have followed to this point insists on separating the functional categories This approach can only describe the interaction that takes place between functional categories in terms of projection and selection. Neither of these mechanisms is strong enough to constrain the interaction between functional categories to any degree.

(19) Structural configuration for Yukatekan intransitive verbs

```
                    CP
              _____|_____
             C           Tran₂P
                      _____|_____
                   AspP         Tran₂
                 ___|___         [-]
               Asp     AbsP
                     ___|___
                  TranP      Abs
                 ___|___
               VP      Tran
            ___|___     [-]
          VP     NP
        __|__
       V    NP
```

We lack a calculus of functional categories that would allow such features to surface in separately marked inflections while also accounting for the fundamental interaction that occurs between such categories in the world's languages. The Mayan language family provides a wealth of data that is essential to the development of this calculus. The easiest way to capture the interactions that I have discussed so far is through an implicational matrix (see 20).

(20) Mayan feature matrix (c f. Silverstein 1976)

```
            Tran —> Person —> Number
Marked       +    ↗  Subj      Plural
Unmarked     -   /   Obj       Sing
             ↓  /
          Aspect
          Incomp
          Comp
```

I organized the features in (20) along the lines of the interactions that we have seen so far. Transitivity affects the selection of Person features in determining whether or not to mark object agreement as well as selecting an ergative or accusative form of agreement. We have also seen that Transitivity can affect the realization of Aspect features through separate aspect forms for transitive and intransitive verbs. Yukatek demonstrates the possibility that Aspect can affect

Person selection that is realized as split ergativity in Yukatek. Finally, Tzeltal and Yukatek demonstrate that Person selection may also affect the realization of Number since both languages have plural suffixes for ergative subjects.

In addition to describing the interaction between features, the matrix in (20) can be used to predict ways in which the features coalesce across languages. Thus, many languages merge features for Person and Number into a single affix, and many languages take this process a step further and merge the features for Transitivity, Aspect, Person and Number into a single affix.

It is interesting to add a distinction between marked and unmarked values to the features in the matrix as a way of constraining the possible interactions between features. I have tried to arrange the features with the idea that only marked values select other features. Thus, only the positive value of Transitivity selects for Object Agreement and Ergative Case, only Incompletive Aspect selects for Ergative Case, and only Subjects (i.e., Ergative Case) select for Plural.

Although this matrix fails to account for all of the feature interactions we have looked so far (it does not explain why the ergative split in Yukatek is limited to intransitive verbs), it has obvious advantages over the structural configuration approach. All that remains is to add a linearization algorithm that captures the structural relations between the features. The syntactic Spell Out will reflect language-specific functional categories and hierarchies.

Meanwhile, we are far from exhausting the functional interactions that surface in the Mayan languages. The examples in (21) come from Mocho, another Western Mayan language.

(21) Split ergativity in Mocho (Larsen & Norman 1979)

a. ii-muq-u-∅
1ERG-bury-STATUS-3ABS
'I buried it.'

b. ii-maaq-i
1ERG-go_up-STATUS
'I went up.'

c. x-muq-u-∅
3ERG-bury-STATUS-3ABS
'He buried it.'

d. maaq-i-∅
go_up-STATUS-3ABS
'He went up.'

Mocho demonstrates an ergative split by person. Intransitive verbs with first and second person subjects take Ergative agreement while intransitive verbs in the third person use the Absolutive agreement markers. The close association of Transitivity and Person in our feature matrix suggests that such splits might be expected, while the Mocho split between first and second person and third person

suggests that the first and second person values have a more marked status than the third person. This hierarchy is supported by the zero marking for third person absolutive affixes across the Mayan languages, as well as in many other of the world's languages.

Acquisition

Now that we have examined some of the ways in which functional categories can interact across the Mayan languages, we can begin to use this model to make predictions about the acquisition of functional categories (see 22). I derive these predictions from the implicational nature of the interactions that the model captures. Since verb transitivity determines so many of the other features, I take transitivity as a starting point for acquisition. Since aspect also constrains the realization of subject markers, the model would also predict an early acquisition of aspect. The model puts the marked and unmarked values for each category on the same level, so it would predict that children would acquire such values at the same point. The main prediction here would be that children would acquire the ergative and absolutive agreement markers around the same time. Finally, children should use the singular forms of the ergative markers before using the plural suffixes.

(22) Acquisition predictions

    a. Children will acquire transitivity inflections first
    b. Children will acquire aspect inflections next
    c. Children will acquire ergative and absolutive inflections at the same time
    d. Children may first restrict ergative use to verbs in the incompletive aspect
    e. Children will use ergative singular forms before using the separate plural inflections

Summary

The Mayan languages demonstrate several deficiencies in current conceptions of morphosyntactic projection. These include the necessity of distinguishing between Case and Agreement in morphologically ergative languages, the close association between subject agreement and the verb, and the projection of transitivity/modality phrase. Structural configurations must be augmented with something like a feature matrix to capture significant interactions that take place between functional heads in the world's languages. These interactions become especially noticeable when comparing feature projections across languages within the same family. The comparative method offers syntacticians a heretofore little used, but extremely powerful technique for developing structural descriptions that extend well beyond a single language. The resulting descriptions lead to specific predictions about the acquisition of

functional categories.

NOTES

* I have discussed the ideas in this paper with many people and have benefitted from their suggestions. I began this project in conjunction with the comparative Mayan acquisition project that includes Penelope Brown, Lourdes de León and Barbara Pfeiler. I also had the privilege of discussing these ideas with Ken Hale. My proposals owe most of their original inspiration to Hale's work on K'iche' and other languages. I would also like to thank the participants at the University of Kansas Linguistics Colloquy for their suggestions.

[1] I use the following abbreviations throughout the paper:

AgrS	subject agreement	AgrO	object agreement
Spec	specifier	T	Tense
COMP	completive aspect	NEG	negation
INCOMP	incompletive aspect	PROG	progressive
ASP	aspect	NOM	nominative agreement
Tran	transitive	ABS	absolutive agreement
1	first person singular	ERG	ergative agreement
2	second person singular	STATUS	the status suffix
3	third person singular	PERF	perfective
PL	plural	DIR	directional particle
FAM	familiar particle		

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