

Early Tzeltal Verbs: Argument Structure and Argument Representation

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1.0 Introduction

The recent surge of research focusing on children's acquisition of verbs (see Tomasello and Merriman 1995) brings to the foreground of theoretical debate some important questions about the early stages of verb learning: Are verbs 'harder' to learn than nouns? How variable across languages, and across individual children, is the process of verb learning? How specific are arguments to particular verbs in early child language? How does the grammatical category 'verb' develop? These and other questions are currently the focus of intense interest and debate (e.g., Tomasello 1992; Choi, 1996, in press; Gentner and Boroditsky, in press; Lieven, Pine, and Baldwin, in press.) A distinct but related set of issues about how children learn to relate verbs to their arguments pragmatically - when and how, for example, they learn to represent arguments appropriately in relation to the information structure of their utterances in context (Preferred Argument Structure, or PAS (Dubois 1987) - has also come to the forefront of recent attention (Allen, in press, Allen and Schröder in press; Clancy 1993, in press).

In this paper I bring data from children learning the Mayan language Tzeltal to bear on these issues, addressing the following questions:

- How do Tzeltal children learn the argument structure of verbs, given massive NP ellipsis in Tzeltal speech? Do they make special use of 'light verbs' to lead into argument structure?
- How do children begin combining verbs with arguments, given the different forms of argument representation available (verbal cross-referencing, independent pronouns, and lexical arguments)? Are children attuned to PAS at this early one- to two-word stage?

The data examined here are drawn from monthly audiotaped recordings and six-weekly videotaped sessions for two Tzeltal children, a boy I call Mik and a girl Xan, from the beginning of the one-word stage through the period

of their early morpheme combinations. The children were recorded in their homes, during natural interaction with their normal interlocutors. For the current analysis I have examined all the children's utterances in these production samples up through the session in which the first 500 morpheme combination types occur (for Xan this corresponds to age 1;3-2;3, for Mik 1;5-2;5, with their *mlu.s* reaching 1.76 and 1.77, respectively). Supplementary data from a third child Lus, sampled at age 1;6; 2;0, and 2;6, is also discussed.¹

2.0 Verb vs. Noun learning in Tzeltal

In prior work (see Brown 1997, 1997ms, for details) I have established that Tzeltal children acquire verbs early, as measured by their natural production. In the children's production vocabulary verbs and nouns initially emerge together, in roughly equivalent numbers, but new verb types soon outnumber new noun types in the children's speech (by 23-24 months, well before their *mlu.s* reach 2.0). Similarly, utterances with verbs outnumber utterances with nouns: at the point where the children have produced 200 morpheme combinations in the samples, nearly 50% more of these combinations contain verbs than nouns for Xan, and more than three times as many for Mik. At the one-word stage the children's verbs mostly have the form of a root stripped of affixes, despite structural difficulties in isolating the root. There is quite early evidence (before the *mlu*=2.0 point) of a degree of productivity of some grammatical markers cross-referencing core arguments on verbs (although these are still not always present), as well as of the complete/incomplete aspectual distinction.

These facts place Tzeltal in the camp of 'verb friendly' languages like Korean (Choi 1996, in press), from the point of view of the language-learning child. In view of the relative rarity of such languages (at least as reported to date), and in view of the presumption that there is something natural about 'nouns first' in child language development (Gentner 1982), some explanation is called for. Tzeltal is a VOS language which allows free NP ellipsis. Therefore, although the verb is normally utterance-initial (i.e., not in the most preferred slot - utterance final - for verb salience), a verb with its associated obligatory morphology (minimally ergative/absolute inflections cross-referencing core arguments, and aspect marking) in fact very often constitutes the entire utterance. This of course elevates the percentage of verbs (as opposed to nouns) in Tzeltal speech; perhaps this helps to make Tzeltal a verb-friendly language for learners (see Gentner and

¹ This paper is based on fieldwork in the Tzeltal Mayan community of Tenejapa, Chiapas, in southern Mexico. The data are drawn from a much larger longitudinal data base collected over three and a half years, consisting of over 600 hours of tape-recorded and/or videotaped natural interaction of 5 focal children ranging in age from about 1;6 to 5;0. Data is still being collected and analyzed; this is work in progress.

Boroditsky, in press). In addition, another factor may promote early verb learning. Verbs and nouns receive the same morphological marking of core arguments: ergative prefixes mark both subject of transitive verbs (A) and possessor on nouns, while absolutive suffixes are used in general for predication, marking arguments on nouns and adjectives used as predicates, as well as marking the subject (S) of intransitive and the object (O) of transitive verbs. These ergative and absolutive affixes are thus abstract 1st/2nd/3rd person markers which treat nouns and verbs alike in this respect. Distinguishing verbs from nouns as a class are other grammatical properties: aspect marking, valence-changing derivational morphology, and collocational possibilities (for example, only nouns take determiners, only verbs have obligatory aspect). Still, the 1st/2nd/3rd person marking applicable across these major word classes may be a factor in the early acquisition of ergative and absolutive marking.

These facts suggest that a look at Tzeltal children's early word and morpheme combinations to ascertain the semantic nature of these early verbs, as well as how children begin to represent verb arguments, might help us to understand why verbs are so early dominant in their speech at the one-to two-word stage.

3.0 Verbs in children's early morpheme combinations

3.1 Types of combinations

Three periods of lexical development are distinguished in the data under examination: I, with less than 50 words in each child's vocabulary, is the early one-word stage, II, marked by a dramatic increase in new vocabulary, is the beginning of morpheme combinations, and III, marked again by a leap in new vocabulary, is the beginning of prolific combinations.

Table 1 shows the percentage of different types of combinations at each of the three Periods. In Period I, there are few combinations and these are predominantly intransitive. Transitive verb types dominate from period II on. For the most part these display the properties of 'verb islands' (Tomasello 1992), occurring only in limited constructions and many only with one particular argument (for example the verb "want" occurs only with first person A). But by about age 26 months, both children have a number of productive verbs that occur with two or more different arguments.

3.2 'Light' or 'general-purpose' verbs

Many people have observed that children at first rely largely on semantically 'light' or general-purpose verbs like *do*, *make*, *get*, and *go* in their first year of talking. The over-use of these general verbs is gradually displaced by more specific verbs as children add them to their repertoire (Clark 1993:30). Ninio (1996) argues further, on the basis of English and Hebrew data, that

Table 1: Morpheme combination types in two children's first 500+ mu.s [based on semantic type as used by child, not on overt representation of arguments.]

Age in months + (mlu)	2-arg. Verbs	1-arg. Verbs	Nouns	Other*	TOTAL
MIK:					
I. 17-21 (1.0)	1 (13%)	3 (38%)	0	4 (50%)	8
II. 22-24 (1.07)	26 (52%)	10 (20%)	8 (16%)	6 (12%)	50
III. 25-27 (1.76)	182 (39%)	136 (30%)	51 (11%)	92 (20%)	461
				MIK TOTAL 519	
XAN:					
I. 17-25 (1.15)	4 (18%)	11 (50%)	3 (14%)	4 (18%)	22
II. 26 (1.50)	78 (39%)	58 (29%)	40 (20%)	22 (11%)	198
III. 27 (1.76)	125 (40%)	96 (30%)	55 (17%)	39 (12%)	315
				XAN TOTAL 535	

*Other-combinations with neither V nor N - with adjectives, deictics, pronouns, etc.

these kinds of semantically light verbs are the first to initiate syntactic learning, since their meanings involve little more than highly general relations between arguments. These are thus 'pathbreaking verbs' that surface whenever there is a significant advance in verb syntax, leading the way 'precociously' with a significant time lag until other verbs are used in the pattern. New syntactic learning, she argues, is initially item-based and 'lexical': "pathbreaking verbs are the verbs undergoing item-based, lexically-specific syntactic learning; later categorical knowledge is based on a generalization from these few pathbreaking verbs".

Tzeltal children, however, do not display this reliance on semantically light verbs to break into argument structure, at least not for transitive verbs. Most intransitive roots in Tzeltal are general, in the sense that they do not restrict the nature of the referents of arguments that can occur with them. But transitive roots in the children's vocabularies at the one- to two-word stage are predominantly highly specific, with, for example, different verbs for eating depending on what is being eaten, and different carrying verbs depending on what is being carried (and how). This specificity is a characteristic of most basic-level transitive and positional verbs in the language. Furthermore, the few light verbs used early by the children do not appear to be leading the way either in their word combinations as a whole or in specific constructions (Brown, 1997ms). Indeed, it is semantically 'heavy'

verbs (in particular, the specific verbs for eating) which these children seem to rely on for launching into combinations with transitive argument structure. In the children's first productive transitive constructions (productive in the sense of occurring with a range of different lexical arguments), for neither child do semantically general verbs have a special place.

As Table 1 shows, transitive verb types outnumber intransitives in Periods II and III, but transitives do not dominate in terms of tokens. There are many more transitive than intransitive roots in Tzeltal, but the intransitive verbs are used with higher frequency. The picture of children starting to talk predominantly about transitive action scenes (e.g. in Korean, Choi, 1996) does not seem to be so markedly the case in Tzeltal. This is obviously related to cultural and situational factors: in the relatively toyless and bookless world of Tzeltal children, what people (and other animates) are doing is of more interest generally than the manipulation of objects.

4.0 Argument representation in children's early combinations

Tzeltal offers three ways to represent core arguments: (i) lexically, with a full NP; (ii) with a independent pronominal stand-in for an NP (either a personal or a demonstrative pronoun); (iii) with obligatory ergative/absolutive verbal cross-referencing. A fourth theoretical possibility (not marking the argument at all) is ungrammatical in adult Tzeltal.

Children begin combining morphemes together using almost no cross-referencing, although it is always present in the input. They show, indeed, a remarkable ability to isolate the verb root and to strip off prefixes and suffixes when repeating an adult utterance (Brown 1997). There are two distinct sets of ergative cross-referencing prefixes which mark Agent arguments: one set for vowel-initial roots, one for consonant-initial roots. The acoustically more salient vowel-initial set develops first in the children's speech; the consonant-initial set lags behind. By the end of period III, before the age of 2;6 and before the *mlu* 2.0 point, both children show productivity of the vowel-initial ergative prefixes and of the absolutive suffixes, with both nouns and verbs (Brown 1997ms). These are productive in the sense that children use them appropriately, demonstrate understanding of their contrasting meanings, and make the appropriate deictic switches across turns.

An overview of how children represent the different kinds of core arguments in their early combinations is summarized in Table 2, which includes all clausal utterances, including repetitions, in the children's samples for this period. Although Mik lags behind Xan about two months in the samples, their *mlu*'s are analogous and the picture of argument representation for the two children is remarkably similar. Null representation (no lexical, pronominal, or cross-referencing) of arguments is the rule, applying to over half of the arguments of each type. Inflectional representation - obligatory for adults - is still usually missing, and appears

most often for the A argument (due largely to the vowel-initial ergative prefixes). In lexical representation, O out-numbers A, as expected by the PAS constraint that overt arguments appear predominantly in positions which encode new information: O and S but not A. Three types of single-argument predicates are distinguished in these data. In line with PAS, lexical representation of Si (the subject of intransitive verbs) and Sx (the subject of the locative/existence verb *ay*), like O, outnumber A. But lexically represented Sa arguments (the subject of adjectival predicates like *tek'el* 'standing') are rare, probably because such predicates rarely introduce new information. The pronominal picture corresponds straightforwardly to PAS: in the handful of pronominally represented arguments, O outnumbers A two to one for Xan, and three to one for Mik.

The one notable discrepancy between the picture of argument representation presented here and that discussed for other child language data is that, in this Tzeltal data, null representation is almost equally frequent for A, O, and S arguments, A being only slightly in advance. This contrasts with the general picture of PAS which has emerged for child data in Inuktitut (Allen, in press, Allen and Schröder, in press) and in Korean (Clancy, in press), where A arguments are much more likely than O or S to be null. A number of possible explanations need to be assessed in future work. The first is that these children are still in the one- to two-word stage, and are not yet representing O arguments in an adultlike way in relation to the information status of their utterance. A second undeniable factor is that the inflectional representation of O arguments is underreported here, since 3rd person singular Absolute is a zero morpheme, and it does not seem warranted at this early stage to code the absence of 3rd person marking as the presence of this zero morpheme. A third possibility is that the semantic specificity of Tzeltal transitive verbs makes specification of O arguments unnecessary more often than in other languages. In order to assess the relative contributions of each of these factors, we need to: (i) ascertain the degree of conformity to PAS constraints in adult speech, in analogous conversational settings, (ii) look at these children's argument representation at a somewhat later age, 2;6 - 3;0, (iii) check the proportion of 3rd person participants (and hence underreported) in the O role in these and later samples, and (iv) test whether semantically specific verbs do indeed receive less O marking than general verbs in Tzeltal.

5.0 Creative (nonadultlike) marking of arguments

In the data presented in Table 2 there are only two instances, for each child, of both inflectional and lexical representation of an A argument in the same clause. During this period, then, these are mutually exclusive ways of representing arguments. Two creative strategies are used by the children, to mark core arguments. These proliferate during the period when the children

Table 2: Distribution of core arguments represented in the period of the first 500 mmu.s

XAN: Age 2;0-2;3, mlu 1.15 - 1.77

Total Xan utterances in the sample: 2045

Total verbal utterances: 694 (including conversational and self-repeats)

% = percent of each type of argument

	O	A	Si	Sx	Sa	Totals
null	161 (61%)	163 (65%)	131 (58%)	30 (42%)	54 (74%)	539
inflectional ²	3 (1%)	66 (26%)	31 (14%)	0	10 (14%)	110
lexical	99 (38%)	23 (9%)	65 (29%)	42 (58%)	9 (12%)	238
pronominal ³	8	4	0	0	0	12]
TOTALS	271	256	227	72	73	899

MIK: Age 2;3-2;5, mlu to 1.76

Total Mik utterances in the sample: 2462

Total verbal utterances: 639 (including conversational and self-repeats)

% = percent of each type of argument

	O	A	Si	Sx	Sa	Totals
null	138 (57%)	147 (60%)	138 (64%)	38 (75%)	70 (71%)	531
inflectional	19 (8%)	69 (28%)	40 (19%)	0	10 (10%)	138
lexical	45 (19%)	16 (7%)	25 (12%)	10 (20%)	7 (7%)	103
pronominal	41 (17%)	14 (6%)	11 (5%)	3 (6%)	11 (11%)	80
TOTALS	243	246	214	51	98	852

KEY:

O=Object of transitive verb

A=Agent of transitive verb

Si=Subject of intransitive verb

Sx=Subject of existence/locative *ay*

Sa=Subject of adjectival predicate

² S and O (Absolutive marking) is zero in the 3rd person, so inflectional counts for these arguments represent only 1st and 2nd person

³ Pronominal marking is by independent personal (1st and 2nd person) or demonstrative (3rd person) pronouns.

are not yet reliably marking core arguments with ergative/absolutive affixes. These two inventions stand out in the children's early combinations, both because they are frequent and because they are not modelled in adult speech, at least not in the way that children use them.

5.1 Independent pronouns as arguments

For adults the independent pronouns *jo'on* "I", and *ja'at* "you", are used to emphasize the A of transitive or S of intransitive verbs; they usually *precede* the verb (focus position). Third person *ja'* "he/she/it" has a special preverbal Focus function. Children use these independent pronouns not only, like adults, for emphasis, but also to mark arguments. They use them (as adults also do), but with unadultlike word order, for the following kinds of arguments: [examples from MIK (2;2-2;4) and XAN (1;9-2;3)]

A of transitive verb:

mal ja'at "you spill(ed) (it)"

k'an jo'on "I want (it)"

puk' ja'at "you mix" [corngruel]

TARGET (ASP Erg-Verb):

la a'-mal

ya j-k'an

ya a'-puk'

S of intransitive verb:

ja'at laj "you finished"

TARGET (ASP Verb-Abs):

laj-at [or more naturally: laj

a'wo'tan "your heart has finished"]

Focus on Nouns :

ja' waj "it (is) tortilla" (that I want)

ja' papatik "it (is) father" (that I'm referring to)

But children also use independent pronouns *unlike* adults to mark:

Imperative

uch'a ja'at "you drink (it)"

pasa ja'at "you do (it)"

TARGET:

uch'a~xa'-w-uch'

pasa ~ xa'-pas

DO of transitive verbs:

tes ja'at "lit: you comb" ERROR: Mik means "I comb you"]

Target: ya j-tes-at "I comb you"

lutz' jo'on "you cuddle me" [target: ya a'-lutz'-on]

Possessor on nouns:

(instead of the independent possessive pronouns *k-u'un*, *a'w-u'un*, *y-u'un*)

chik ja'at "sweets you" (i.e., "you (r) sweets")

ja'at nuk' "you neck" ("you(r) neck")

yan we'el a ja'at "different food you(rs)"

ya jel tzek ja'at "you change your skirt"

jo'on k-ixtab "I my-toy"

me'tik jo'on "Grandmother I" (my GrMo)

TARGET:

a'-chikle

a'-nuk'

yan a'-we'el

ya a'-jel a'-tzek

k-ixtab

j-me'tik ku'un

Predication on nouns:

nopjun jo'on "pupil I" [I'm a pupil (lit: a 'learn-book')]
 pontzo ja'at "Pontzo you" [you are Póntzo]

TARGET:

nopjun-on
 pontzo-at

Children are thus using independent pronouns to mark arguments of both nouns and verbs distinctively: with verbs, predominantly the O of transitives; with Ns, both possession and focus. For some children, for example a third child Lus, this non-adult pronoun usage is highly stable, lasting for well over a year:

LUS:

<1> (2;0) jo'on ja' ini ku'un. "I it's this mine." (as for me, this is mine)

<2> (2;6)

y-uch' ja' kawayu jo'on "He-drinks water horse I" (my horse)

ba-on ta jobel jo'on "I-go to Jobel I" (emphasis)

<3> (2;7)

li' ay kanika jo'on "Here is marble I" [my marble]

k-ala pelota jo'on "my-little ball I" [my ball]

pisikleta jo'on i "bicycle I this" [this (is) my bicycle]

It seems probable that the stability of Lus's usage is related to the fact that there are four children in her extended household under the age of five, all of whom use this locution.

5.2 Argument marking with *ja'-ni* "it-this"

A second creative strategy for argument marking involves the expression *ja'ni* "it this" (from *ja'*, the focus pronoun and *ini* "this"), which is used canonically when pointing out something someone has just asked about, often accompanied by a finger pointing to the queried object. Children use this expression alone for this function as one of their earliest expressions. But in this period of early combinations they also use it, in a way no adult models for them, to mark the O argument of transitive verbs. Table 3 gives Mik's examples in this data of *ja'ni* argument marking for nouns and verbs.

Table 3: Mik's argument marking with *ja'-ni*, "it-this", on verbs and nouns: _ marks his placement of *ja'-ni*, almost always in the correct O slot for transitive verbs, variable for nouns. Normal usage of adults omits the *ja'* with verbs, and splits *ja'-ni* with the noun in the middle, for focus on nouns.

	Verbs + <i>ja'-ni</i>		Nouns + <i>ja'-ni</i>	Other
MIK	extinguish _ want _ do/make _ get _ kill _ we-listen _	I see _ drive car _ steal-from him I _ gather together _ we-give-him _ cover (it) thus _	anus _ _chicken _car candle _ pee _	standing _ _whatever-pl.

Xan and Lus use *ja' ni* in analogous ways. Lus again continues for a long time: at 2;6, with relatively sophisticated syntax, and with the deictic distinction *ja' ini* alternating with *ja' mene* "it-that", she still uses it sometimes in place of, or in addition to, a lexical O:

LUS: (2;6)

- <4> *ja' ini tzakix tal ch'i'emix k'u' ja' ini.*
 it-this (I) grasp coming torn shirt it-this
 "(I) have taken down the torn shirt it-this (one). [shirt, off line]
- <5> *lok'ix bel t'omix ya'tik ja' mene.*
 exit-IX away explode-IX now it-that
 "(It) has gone out away (it) has exploded now it-that." [balloon]

LUS 2;7

- <6> *chukbenix me'tik ja' ini.*
 tie-for_me-IX Mrs. it-this
 "Mrs. has tie(d) it-this for me." [re toy animal which came untied]
- <7> *k'ej-ben to xan ja' ini.*
 "Put-away-for-me again it-this." [toy dog]
- <8> *tilp'un-ben y-eal ja' ini.*
 untie-me its-string it-this
 "Untie for me the string of it-this." [holding out bag of beans to be untied]

There are several intriguing things about this creative representation of arguments: (1) The children treat nouns and verbs alike, not only in the ways adults do (with ergative and absolutive marking on both classes of words), but in these novel uses as well. The emergence of a distinction between the two word classes is signalled at this point only by a distinction in word order: with transitives it is always post-verbal, in the O slot, whereas with nouns it sometimes precedes the noun (as the *ja'* would for focus-marking by adults), and sometimes follows the noun. (2) These pronouns, for a short while, take the place of ergative/absolutive marking in disambiguating referents. (3) The form of the absolutive suffix: *-on* "I", *-at* "you", and null for third person, is identical to the form of the last syllable of the independent pronouns. Since these occur directly following the verb, they provide an easy way to slide into absolutive suffixes: from *lutz jo'on* "(you) cuddle me" it is but a short step to the adult transitive form: (*ya'*) *lutz-on* "you cuddle me." It may be that the children's interim pronoun strategy is instrumental in helping them to early productivity - by the end of the period under examination here - of the absolutive suffixes.

The children's novel use of pronouns seems to indicate an awareness of the kinds of participant roles that correspond to different kinds of verbs, as

well as awareness that, in the absence of ergative and absolutive marking, what core referents you are talking about are potentially unclear, and need to be specified. As lexical specification of the referent would normally be inappropriate in contexts where it is given information, pronoun stand-ins (for first and second person) and the canonical linguistic pointing expression (for third person) are supplied. The children rely on this ad hoc interim strategy for indicating these arguments until their ergative/absolutive cross-referencing is fully intact, and in Lus's case, even beyond.

6.0 Summary: Tzeltal verbs and argument structure

Summarizing the findings from this preliminary examination of Tzeltal children's early combinations:

- Verbs dominate in the children's morpheme combinations from early on.
- 'Light' verbs do not seem to play a central role in early argument structure, at least for transitive verbs; many first verbs are semantically specific, and these enter early into productive combinations.
- Tzeltal children at first treat Nouns and Verbs alike in representing their arguments, including using the same novel strategies for both to disambiguate or mark referents: independent pronouns for actor/possessor marking, and "it-this" for object marking on verbs, and Focus on nouns.
- There is early productivity - by around age 2;3-2;5, prior to a mlu of 2.0 for both children - of some cross-referencing affixes marking A, S, and O arguments (although there are systematic omissions). These, and the independent pronouns, are by the end of this period productive syntactic symbols for indicating participant roles. The children by this time are constructing novel utterances, and they are beginning to differentiate verbs and nouns morphologically with aspect on verbs, deictic particles on nouns.
- Children's argument representation in general corresponds to the Preferred Argument Structure constraints, although the elevated null representation of O and S arguments in relation to A awaits further explication.

We may end with a hypothesis to be explored in future research, arising from these data, from the typological nature of Tzeltal, and the contrasts with a language like English. The acquisition task for verb learning may be different for languages like Tzeltal and English. In Tzeltal, an appropriate strategy is this: Pay attention to the lexical semantics of verbs, as that will tell you what the arguments are. Hence, Tzeltal children launch early into verb learning. In English, the strategy, however, is (arguably) this: Pay attention to the argument structure, as that will tell you what the verb means. And hence, syntactic boot-strapping is a plausible starting point.

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