

The Acquisition of Ergative Agreement in Mayan Languages*

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1. Introduction

Languages with ergative alignments pose an immediate challenge to cartographic accounts of argument structure and agreement (Cinque 1999). The cartographic approach connects each argument with a specific functional projection. Nominative case is assigned to subjects through the Tense projection. Accusative case is assigned to direct objects by the verb. The uniform treatment of subjects provides an explanation for nominative case and agreement in languages with accusative alignment systems, but it does not predict ergative alignments (1).

(1) K'iche' Maya

a. *Intransitive*

k-at num-ik.¹
INC-ABS2 hunger-RIV
You are hungry.

b. *Transitive*

k-at in-tzuku:-j.
INC-ABS2 ERG1-look_for-DTV
I am looking for you.

* **Error! Main Document Only.** Our initial joint research on Mayan language acquisition was done in collaboration with Penelope Brown and Lourdes de León. Pedro Mateo Pedro participated in later stages of our research. Data collection for Chol, Mam and Q'anjob'al was funded by grants from the National Science Foundation (BCS-0613120 and BCS-0515120) and the University of Kansas. Data collection for Teenek and Yucatec was funded by grants from the Consejo Nacional de Ciencia y Tecnología of Mexico (4639-H). Research on the acquisition of these languages would not have been possible without the efforts of the team of Mam investigators: Ana Elizabeth López Ramirez, Juana Isabel López Morales, Sheny Ortiz García and Luis Hernandez López Ramirez and Q'anjob'al investigators: Flora García, Diego Martínez Esteban, Francisco Pedro Mateo, Pedro Martínez Esteban, Efraín Ramón de León, Basilio Luin Bernabé, Basilio Sebastian Basilio. We also thank the Yucatec collaborators: Neifi Vermont, Andrés Dzib and Carlos Carrillo.

¹ We use the following abbreviations: COM=completive aspect, DTV=derived transitive verb termination, ERG=ergative, INC=incompletive aspect, P=plural, RIV=root intransitive verb termination, 1=first person, 2=second person, 3=third person.

Generative linguists are finally discovering the challenge of ergativity and have tried to extend the accusative syntactic structure to ergative structures with limited success (Aldridge 2005, Baker 2001, Bittner & Hale 1989, 1993, Bobaljik & Branigan 2006, Chomsky 1995, Johns et al. 2006, Laka 2006, Legate 2008, Merchant 2006, Murasugi 1992, Preminger 2012, Rezac 2003, Ritter & Rosen 2000, Shklovsky 2010, Woolford 2000, etc.).

The stipulative nature of such attempts converts the cartographic approach to a descriptive enterprise which lacks independently motivated constraints. We will demonstrate the use of acquisition data to test such proposals and show how acquisition data probes the structure of agreement in the adult languages. Acquisition is sensitive to the stage of grammaticalization present in the adult language which is missing in simple structural representations. Our main conclusion, in the spirit of Chomsky's original conception of explanatory adequacy, is that acquisition data provide an essential test of linguistic theory, and therefore research on language acquisition remains a vital part of the linguistic enterprise.

2. Two Accounts of Mayan Ergative Agreement

2.1. Woolford (2000)

Woolford (2000) distinguishes languages with ergative case, like Hindi, from languages with ergative agreement, like Jakalteq (Popti'). She attributes ergative agreement in Jakalteq to the clitic status of the absolutive markers. She links ergative agreement to nominative agreement marking. We summarize Woolford's predictions in (2).

(2) Acquisition predictions from Woolford (2000)

- a. Children will acquire the ergative agreement markers as nominative agreement markers.
- b. Children will acquire the absolutive clitics as object clitics.
- c. Children will restrict ergative agreement to finite clauses.

2.2. Shklovsky (2010)

Shklovsky (2010) takes the opposite tack and analyzes the absolutive markers as nominative agreement, while assuming that the ergative markers derive from inherent case marking. We summarize the predictions for the acquisition of Mayan languages from Shklovsky's model in (3).

(3) Acquisition predictions from Shklovsky (2010)

- a. Children will acquire the ergative markers on a verb-by-verb basis consistent with the lexical restriction of inherent case.
- b. Children will acquire the absolutive markers as nominative agreement markers.
- c. Children will restrict absolutive markers to finite clauses.

For our purpose, it is enough to observe that both Woolford and Shklovsky equate the ergative and absolutive agreement forms respectively to the nominative agreement of

European languages. According to theory nominative agreement is tied to the projection for tense. This connection predicts that nominative agreement will only surface in finite clauses because tense is only available in finite clauses to check nominative agreement. Language acquisition researchers have also used this connection to predict that children will only produce nominative agreement in finite clauses and that so-called 'root infinitive' clauses lack both tense and nominative agreement. The fundamental assumption made by all such proposals is the idea that universal objects such as nominative agreement and tense are identical in every language. We will test this assumption with acquisition data. To summarize, we arrive at the tests in (4) based on acquisition data from European languages.

(4) Predictions for the Acquisition of Mayan Languages

- a. Children will display similar ergative profiles across the Mayan languages.
- b. Mayan children will display an early production of nominative morphemes tied to tense marking (80% or more of verbs at 2;6).
- c. Mayan children will display an intermediate production of nominative pronouns (40% of verbs at 2;6).
- d. Mayan children will display a late production of subject clitic morphemes (22% of verbs at 2;6).

3. The Acquisition of Agreement in European Languages

European languages have three different systems for cross-referencing person. English uses independent pronouns to cross-reference subjects and objects, while Italian and Spanish use agreement suffixes on verbs to indicate the person of the subject and pronominal clitics to indicate the person of the object (5). The agreement suffixes can co-occur with overt subject arguments, but object clitics only co-occur with overt object arguments in languages that permit clitic doubling.

(5) Person Marking in Spanish and English

- a. *Spanish*
Te am-o.
La am-as.
Me am-a.
- b. *English*
I love you.
You love him/her.
S/he love-s me.

3.1. The acquisition of verb suffixes in European languages

Hoekstra and Hyams (1998) reviewed the published research on the acquisition of agreement in European languages and published the results shown in Table 1. These data display a striking difference in the use of verb suffixes between children acquiring

Romance and Germanic languages. Children produce high levels of verb inflections in Italian, Spanish, Catalan, whereas children produce medium levels of verb inflections in French, Swedish, German, Dutch and Icelandic. Children acquiring English produce the lowest levels of verb inflection.

Table 1. Inflected verbs in child languages (based on Hoekstra & Hyams 1998)

Language	Child	Age	% infl	Language	Child	Age	% infl	
Italian (Guasti)	Diana	2;0	100%	French (Pierce)	Nathalie	1;9-2;3	51%	
	Martina	1;11	84%		Philippe	1;9-2;6	80%	
	(Schaeffer)	Paola	2;1	96%		Daniel	1;8-1;11	57%
		Daniele	2;0-2;5	93%	Swedish (Platzack)	Freja	1;11-2;0	62%
		Massimo	1;7-2;6	92%		Tor	1;11-2;2	44%
		Gabriele	1;7-2;6	94%		Embla	1;8-1;10	39%
		Orietta	1;7-2;6	93%	German (Weissenborn)	S	2;1	54%
		Elisabeta	1;7-2;5	90%				2;2
		Francesco	1;9-2;5	95%	Dutch Weverink	Laura	1;8-2;1	64%
		Damariz	2;6-2;8	95%		Tobias	1;10-1;11	64%
Spanish (Grinstead)	Juan	1;7-2;0	88%		Fedra	1;10-2;1	74%	
		2;1-2;4	90%	English	Eve	1;6-1;10	22%	
Catalan	Guillem				Adam	2;3-3;0	19%	
			1;11-2;6		97%	Nina	2;4-2;5	25%

3.2. The acquisition of pronominals in European languages

Pronoun use is more difficult to analyze because of the language-specific factors that govern pronoun usage. Linguists distinguish between strong and weak pronouns where strong pronouns can be used by themselves (the ‘stand alone’ test) whereas weak pronouns require a host. Various researchers have proposed treating the weak pronouns as clitics (e.g. Hamann 2002:23). English uses strong pronouns to mark the person of subjects and objects that have been previously established in the discourse. Spanish only requires a pronoun to mark a change in topic or focus for previously established discourse referents. Unfortunately, researchers have paid more attention to children’s use of subjects than objects. We make the assumption that children use null arguments in place of personal pronouns, and therefore an analysis of subject and object omission provides an indirect assessment of children’s ability to produce strong pronouns. Table 2 provides cross-linguistic data on subject and object omission for two-year-old speakers.

Table 2. Percentage of children's subject and object omission in eight languages.

Language	Subject omission	Object omission
English (P. Bloom 1990)	55%	9%
French (Hamann 2002)	35%	
Catalan (Grinstead 2004)	74%	
Spanish (Grinstead 2004)	90%	
Italian (Grinstead 2004)	86%	
Chinese (Wang et al. 1992)	56%	23%
Korean (Kim 2000)	77%	51%
K'iche' (Pye 1992)	92%	67%

Less information is available on children's production of weak pronouns and pronominal clitics. Haegeman (1998) and Hamann (2002) used acquisition data to analyze the position of clitics in the adult grammars of Dutch and French respectively. Research on the acquisition of French has been complicated by the uncertain status of French pronouns. They have been analyzed as 'weak' pronouns, clitics and agreement markers. Hamann (2002:23) suggests treating unstressed pronouns in French as clitics. Hamann's data on Augustin's use of subject and object clitics in French is provided in Table 3.

Table 3. Augustin's production of French subject and object clitics

Age	VERBAL UTTERANCES	SUBJECT CLITICS		OBJECT CLITICS	
		n	%	n	%
2;0.2	57	17	29.8		
2;0.23	30	4	13.3		
2;1.15	22	4	18.2		
2;2.13	55	16	29.1	1	1.8
2;3.10	45	12	26.6		
2;4.1	62	10	16.1		
2;4.22	54	11	20.4	1	1.9
2;6.16	116	25	21.6	2	1.7
2;9.2	175	80	45.7	10	5.7
2;9.30	115	99	63.4	22	14.2

Augustin's data demonstrate a clear difference between his production of subject and object clitics. Hamann and Haegeman used the difference between the production of subject and object clitics in French and Dutch to argue for a different syntactic analysis of subject and object clitics. Comparing Augustin's clitic production in Table 3 with the French data on verb inflection in Table 1 from (Pierce 1992) suggests that children's production of subject clitics may be delayed relative to the production of the verb suffixes. This comparison is indirect because Hamann does not provide a measure of subject clitic use relative to obligatory contexts. The data suggest that French children at 2;6 produce verb affixes in 80% of contexts, while they produce subject and object clitics in 22% and 2% of verb contexts respectively. As shown in (6), we will use these results to probe the acquisition of ergative marking in the Mayan languages.

- (6) Production of person marking in European languages between 2;0 and 2;6
- a. Children produce nominative agreement on 80% or more of verbs at 2;0
 - b. Children produce nominative pronouns in 40% of obligatory contexts at 2;0
 - c. Children produce accusative pronouns in 80% of obligatory contexts at 2;0
 - d. Children produce subject clitics with 22% of verbs at 2;6
 - e. Children produce object clitics with 2% of verbs at 2;6

4. The Acquisition of Ergative Marking in Mayan Languages

4.1. Method

Before going further, we need to make a quick observation about a methodological assumption we make – the idea that we can use acquisition data as a probe for agreement. This assumption is based on the cartographic assumption that syntactic structure has consequences for child language. Language acquisition researchers have proposed tying children's verb inflection to syntactic structure. Object clitics are assumed to be more difficult for children to produce because they require movement from the verb phrase to a pre-verbal host. Subject clitics do not require this movement, and should therefore be easier for children to produce (Haegeman 1998, Hamann 2002).

Our use of acquisition data to probe the nature of ergative agreement in Mayan languages is simultaneously a test of the general cartographic approach to agreement. This approach assumes that languages make use of linguistic units such as 'agreement', 'clitic', 'pronoun' and 'subject' that have a universal identity. The cartographic approach is supported to the extent that we find that children treat these elements in the same manner across languages. The cartographic approach will be disconfirmed if we find that children treat these elements in a language-specific fashion. It is possible to maintain a theory by rejecting empirical tests, but then we are no longer doing science.

4.2. Ergative Marking in Mayan Languages

The Mayan verb complex has the general structure shown in (7). Mayan linguists have long noted the clitic nature of both the ergative and absolutive markers in different Mayan languages (e.g. Craig 1977, Larsen 1988). There are remarkable differences between the Mayan languages concerning the clitic status of both the ergative and

absolute markers. The absolute markers occur in a preverbal position in K'iche' and Mam, and in a postverbal position in Chol and Yucatec. Absolute markers occur in both preverbal and postverbal position in Tzotzil. The absolute markers are similar to independent pronouns in most Mayan languages, and would pass the stand alone test. Some Mayan languages insert adverbs and directional verbs between the preverbal absolute and ergative morphemes. Adverbs can be inserted between ergative markers and the verb in Teenek and Yucatec, but not in K'iche'. We use acquisition data to examine the status of ergative agreement markers in Teenek, Yucatec, Chol, Tzeltal, Tzotzil, Q'anjob'al, Mam and K'iche'.

(7) Mayan verb complexes

Teenek	Abs/Erg/Portmanteau-V-Aspect-(Plural)
Yucatec	Aspect-Erg Adverb V-Mood/Abs-(Plural)
Chol	Aspect Erg-V-ThemeVowel-Abs-(Plural)
Tzeltal	(Aspect) Erg-V-Abs-(Plural)
Tzotzil	(Aspect) Abs1 Erg-V-Abs2-(Plural)
Q'anjob'al	Aspect Abs Erg V-Mood
Mam	Aspect Abs Move Erg-V-Mood=enclitic
K'iche'	Aspect-Abs (Move) Erg-V-Mood

The ergative markers have similar forms across the languages with a few noticeable differences (Table 4). Some Mayan languages have prevocalic allomorphs in addition to the preconsonantal forms shown in Table 4. The ergative markers in Teenek swapped the first person and third person forms found in the other languages. The first person allomorph /j-/ in Chol is only used before verbs that begin with /k/. Different dialects of Q'anjob'al use the third person forms /s-/ or zero. Mam uses an enclitic to mark the difference between third person and the other two persons. The ergative markers are generally syllabic with the exception of the first person forms in Chol and all three person forms in Mam.

Table 4. First, second and third person preconsonantal ergative markers

	FIRST PERSON	SECOND PERSON	THIRD PERSON
Teenek	‘u	‘a	‘in
Yucatec	iN	a	u
Chol	k-/j-	a-	i-
Tzeltal	j-	a’-	s-
Tzotzil	j-	a-	s-
Q’anjob’al	in-	a-	s-/∅-
Mam	n- ... = a	t- ... = a	t-
K’iche’	iN-	a-	u-

4.3. Acquisition of Mayan ergative marking

The acquisition data that we analyzed come from recordings of children between the ages of 2;0 and 3;0 in each language. Pfeiler supervised the recording of children acquiring Teenek and Yucatec, while Mateo was responsible for recording the Q’anjob’al children. Pye directed the recording of children acquiring Chol, Mam and K’iche’. Brown recorded children acquiring Tzeltal and de León recorded children acquiring Tzotzil (Brown et al. in press). Table 5 provides general language measures for the children in each language.

The main difference between the child and adult grammars of the Mayan languages is that the children omit the verb prefixes, including the ergative markers. Examples of the children’s ergative omissions are shown in (8). We use asterisks to show morpheme omission.

Table 5. General language measures

LANGUAGE	CHILD	AGE	NO. OF UTTERANCES	NO. OF VERBAL UTTERANCES
Teenek	ELV	2;4.9	648	366 (.56)
	VLA	2;2.6	578	196 (.34)
Yucatec	SAN	2;0	380	109 (.29)
	ARM	2;0	327	100 (.31)
	DAV	2;0	429	99 (.23)
Chol	MA	1;8	506	
	MAR	2;0.21	263	
	EMA	2;1.30	583	261 (.45)
Tzeltal	LUS	2;0.14	405	
	XAN	2;2	557	
Tzotzil	MAL	2;1	411	
	XUN	2;2	555	
Q'anjob'al	XHUW	1;9-2;4	5413	322 (.06)
	XHIM	2;3-2;9	4881	397 (.08)
	TUM	2;7-3;1	5350	472 (.09)
Mam	WEN	2;0-2;1	3026	399 (.13)
	CRU	2;5.2	619	82 (.13)
	JOS	2;6.14	607	130 (.21)
K'iche'	TIY	2;1	1801	90 (.05)
	LIN	2;0	445	98 (.22)
	CHA	2;9	945	227 (.24)

(8) Examples of children's ergative omissions

- a. VLA (2;3.23) Teenek
 jeee k'echena' .
 = teje' *u k'etsena'.
 here ERG3 trample
 'Here he trampled it.'

- b. SAN (2;0) Yucatec
 kaxtik
 = *k-*u kaxt-ik-0
 INC-ERG3 find-NOMTV-ABS3
 ‘She finds it.’
- c. EMA (2;3.10) Chol
 cha’ante joty.
 = chon *i-ch’äte *y-otyoty.
 PROG ERG3-carry ERG3-casa
 ‘He is carrying his house.’
- d. LUS 3;6 Tzeltal
 ya kuchotik bel
 = ya *s-kuch-otik bel
 now ERG3-carry-P away
 ‘(He) carries us away’
- e. XHUW (2;1) Q’anjob’al
 pulu.
 = *x-0-*in-pul-u’.
 COM-ABS3-ERG1-pour-RTV
 ‘She poured it out.’
- f. WEN (2;1.7) Mam
 ku’ tzun.
 = *i *t-kub’ *n-tzyuu-n=*a.
 so ERG3-down ERG1-grab-DEP=ENC
 ‘So that I grab it.’
- g. TIY 3;0 K’iche’
 ay !nu-w-a’l ya taj.
 = ay *!e: w-al *ma *k-0-*in-ya’ taj.
 EXC DET ERG1-child NEG INC-ABS3-ERG1-give NEG
 ‘Oh my child, I did not give it (food).’

We find evidence in these examples that while the children generally omit the verb prefixes, they generally produce the appropriate verb suffixes. These suffixes include thematic vowels in the Teenek and Chol examples as well as the modal suffixes seen in Yucatec and Q’anjob’al. The Mam example shows that WEN omitted the prefixes, but produced the movement verb as well as the dependent suffix /-n/. She generally omitted the enclitic marker.

Table 6 shows the children's ergative production and gives the number of ergative forms the children produced at 2;0 and 2;6 as well as the frequency of ergative production on transitive verbs. There are major differences between the number of ergative markers that the children produced. At 2;0 the K'iche' child TIY only produced one ergative marker, while the Tzotzil child XUN produced 51 ergative markers. The percentages indicate that the children produced many transitive verbs in which the ergative marker was not present.

Table 6. Children's ergative production on transitive verbs

Language	Child	2;0		2;6	
		number	percent	number	percent
Teenek	VLA	21	48%	12	57%
	ELV	11	20%	18	29%
Yucatec	ARM	4	14%	38	62%
	SAN	2	25%	33	45%
Chol	MA	8	15%	5	71%
	EMA	8	19%	4	33%
Tzeltal	LUS	5	5%	35	61%
	XAN	8	9%	25	32%
Tzotzil	XUN	51	52%	79	71%
	MAL	7	12%	53	73%
Q'anjob'al	XHUW	14	93%	4	100%
	XHIM	5	83%	4	67%
Mam	WEN	17	49%	13	62%
	JOS			13	48%
K'iche'	TIY	1	4%	13	15%
	LIN	6	17%		
	CHA			9	5%

We present a graphical form of these data in Figures 1 and 2. Figure 1 contains the data from all of the children, while Figure 2 displays an average produced by averaging the frequencies of the children's ergative production in each language.

Figure 1. Children's ergative production on verbs

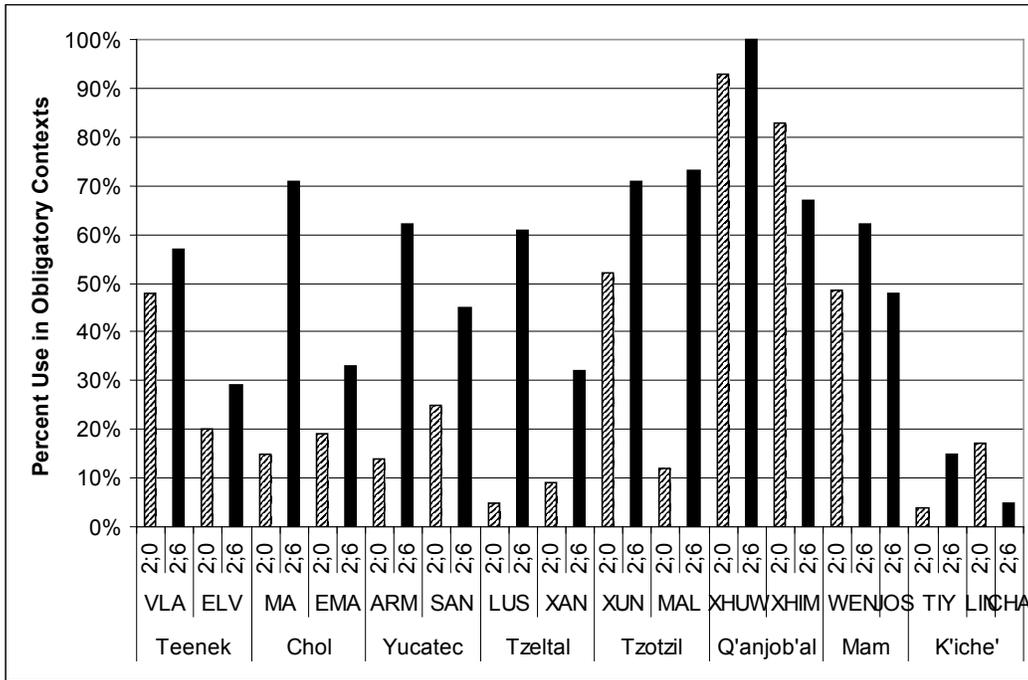
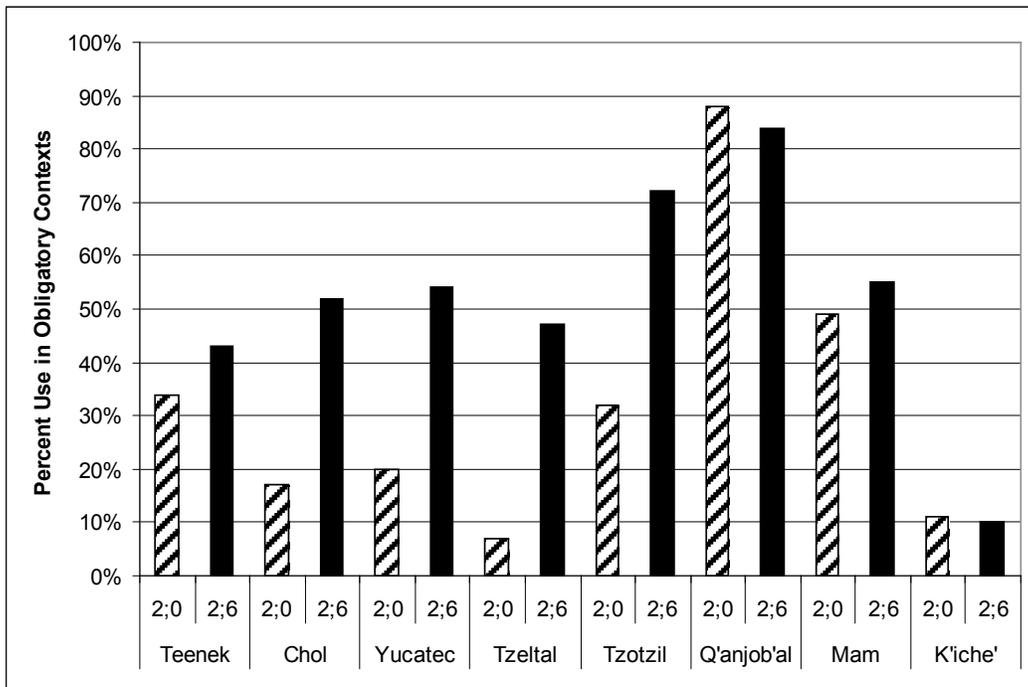


Figure 2. Average ergative production



The average ergative production shown in Figure 2 suggest that there are major divisions between the languages. The children acquiring Yucatec, Chol, Tzeltal and Tzotzil display a significant increase in ergative production between the ages of 2;0 and 2;6. The children acquiring the other languages maintain a similar ergative production at 2;0 and 2;6. Among these children, the children acquiring K'iche' produced the lowest number of ergative markers, while the children acquiring Q'anjob'al and Mam produced ergative markers at much higher rates. These groupings are shown in (9).

(9) Patterns of ergative production

a.	<i>No change</i>	Percent
	K'iche'	10%
	Teenek	34-43%
	Q'anjob'al, Mam	50-85%
b.	<i>Change</i>	
	Chol, Yucatec, Tzeltal, Tzotzil	
	2;0	20%
	2;6	50%

5. Discussion

We made the predictions in (6), repeated as (10), based on acquisition data from European languages. We compare the Mayan results in (10) with these predictions. Table 7 provides a comparison based on the results from one child in each language. (We used two children for Dutch.) We first note that we generally find a low level of ergative marker production among two-year-old children in most of the Mayan languages with the possible exception of Q'anjob'al. The generally low levels of ergative production suggest that Mayan children are not influenced by the rich inflectional paradigm of the Mayan languages and do not acquire the ergative markers as nominative agreement affixes. This result disconfirms the strong version of the ergative as nominative hypothesis.

(10) Predictions for the Acquisition of Mayan Languages

- Mayan children will display an early production of nominative morphemes tied to tense marking (80% or more of verbs at 2;6).
- Mayan children will produce a moderate number of subject pronouns (40% of verbs at 2;6).
- Mayan children will display a late production of subject clitic morphemes (22% of verbs at 2;6).
- Mayan children will display similar profiles across the different Mayan languages.

Table 7. Comparison of agreement marking in five languages

SPANISH	JUAN	1;7-2;0	88%	2;1-2;4	90%
DUTCH	LAURA	1;8-2;1	64%	2;4-3;1	84%
YUCATEC	ARM	2;0	14%	2;6	62%
MAM	WEN	2;0	49%	2;6	62%
K'ICHE'	TIY	2;0	4%	2;6	15%

The Mayan children's production of ergative markers with the possible exception of the K'iche' children is greater than would be expected if the children were acquiring the European type of pronominal clitic. These results suggest that Mayan children acquire the ergative markers in styles that are very different from the acquisition of person marking on European languages. The Mayan profiles do not match either the acquisition of verb inflection in Spanish and Italian, nor the acquisition of subject clitics in French.

One finding that stands above the rest for the Mayan languages is the noticeable differences we find in ergative production between children acquiring different Mayan languages (see 10 above). A cartographic approach that ties ergative production to the same functional projection does not predict such cross-linguistic differences. If we are looking for a theory of language acquisition, the cartographic approach is not it. We must look beyond simple tree structures for factors that account for the differences in the expression of ergative agreement in Mayan languages.

In her cross-linguistic survey of person marking Siewierska (2004:14) states:

'They [person markers CP] have much to tell us about the human conceptual system and how it is organized. They provide important information about the relationship between the structure of language and the sociocultural and discourse conditions in which it is used. They offer significant insights into the processes of grammaticalization, that is the development, change and disappearance of grammatical categories and grammatical distinctions.'

The different structures of the verb complexes in the Mayan languages are clearly the result of on-going grammaticalization processes. The current adult grammars resulted from these processes and continue to change. The children's grammars provide additional insights into grammaticalization, and demonstrate significant differences in the psycholinguistic status of the ergative markers for the children. The case of Ch'orti' is especially interesting in this respect because the person markers in Ch'orti' also mark the difference between completive and incompletive aspect. Person marking in Ch'ol and Yucatec show incipient signs of moving in the direction of the Ch'orti' system.

From Siewierska's survey we conclude that person marking is not just about person marking. Spanish and other European languages use person markers to convey social distance and respect in addition to the fusion of person marking and tense. Hale (1966) noted that the Australian aboriginal language Lardil used person marking to contrast the difference between participants who belong to the same generation and different generations. This evidence shows that languages are unwilling to stop at simply marking person. Person markers provide the ideal base for marking other sociocultural and discourse features. Surprisingly, children appear to have little difficulty learning the language-specific combination of features that person markers realize in adult grammars.

We assume that child grammars function under their own particular interface constraints. Just as the adult Mayan languages exhibit unique trade offs between aspect, person, direction and modal marking, Mayan child languages demonstrate the trade offs that children make in expressing events and participants. Children take the elements they find in the adult language and reinterpret them for their own expressive needs. The most obvious feature of Mayan children's grammar are the edge effects. The children are more likely to produce syllables at the right edge of the verb complex than the left. These edge effects interact with the structure of the verb complex in the adult languages with the result that children acquiring different Mayan languages produce ergative markers at different rates. The cartographic approach follows the usual analytical procedure of dividing language into its various components. Children are not analytical. Children acquire all of the language components at the same time. A grammar based on grammaticalization processes is more likely to account for the forms of both the child and adult grammars.

The emergentist approach provides an alternative to the cartographic analysis of language (Bybee 2010, O'Grady 2005). Rather than linking grammar to a functional structure, emergentist approaches rely upon a process of accretion to build up a grammar over time. Children are slowly gathering a set of words and phrases over time and practicing their production. This process builds different structures in analytic and synthetic languages. In an analytic language like English, children fuse separate words together to produce clitic-like combinations. In synthetic languages like K'iche', children break up the verb complexes.

The accretion process accounts for the language-specific nature of children's grammars. Children produce ergative markers in Mayan languages in accordance with their left edge status in each language. Syllable structure rather than functional projections guides children's construction of Mayan verb complexes. Acquisition is guided by the adult structures, but built by accretion. The accretion process results in adult structures that can be described by functional projections, but the acquisition process follows its own set of principles.

If such language-specific factors explain the children's production of the ergative markers then we must conclude that the acquisition of agreement is determined by language-specific surface features rather than language universal factors. This result suggests that the structure of the verb complex in the adult languages is best described in terms of surface features rather than simple syntactic structures.

6. Conclusion

The Mayan data show that Mayan children have a Mayan pattern of argument production whether they acquire languages with a uniform ergative system (K'iche' and Wastek) or languages with extended ergativity (Chol, Mam and Yucatec). Mayan children show an early awareness of verb transitivity and the contexts of use for absolutive and ergative markers. They produce absolutive markers for subject and object at similar rates, but produce ergative allomorphs for consonant-initial and vowel-initial verbs at different rates. Production of agreement markers in Mayan languages reflects surface phenomena such as the position of the affix, syllable structure and stress. The acquisition data do not support proposals that derive ergative agreement through structural differences in the ergative and absolutive markers.

7. References

- Aldridge, E. (2004). *Ergativity and Word Order in Austronesian Languages*. Doctoral Dissertation, Cornell University.
- Bittner, Maria. & Hale, Ken. (1996). The structural determination of Case and Agreement. *Linguistic Inquiry* 27:531-604.
- Bloom, Paul. (1990). Subjectless sentences in child language. *Linguistic Inquiry* 21:491-504.
- Bobaljik, J. & Branigan, P. (2006). Eccentric agreement and multiple case checking. In Johns et al. (Eds.), *Ergativity: Emerging Issues*, Dordrecht: Springer, pp. 47-78.
- Brown, Penelope, Pfeiler, Barbara, de León, Lourdes & Pye, Clifton. In press. The Acquisition of Agreement in Four Mayan Languages. In Edith Bavin & Sabine Stoll (Eds.), *The Acquisition of Ergativity*, John Benjamins: Amsterdam.
- Bybee, Joan. (2010). *Language Usage and Cognition*. Cambridge: Cambridge University Press.
- Chomsky, Noam. (1995). *The Minimalist Program*. Cambridge, MA: MIT Press.
- Cinque, G. (1999). *Adverbs and Functional Heads: A Cross-linguistic Perspective*. Oxford: Oxford University Press.
- Craig, Collete. G. (1977). *Jacaltec: The Structure of Jacaltec*. Austin, TX: University of Texas Press.
- Grinstead, John. (2004). Subjects and interface delay in child Spanish and Catalan. *Language* 80:40-72.
- Guasti, Maria-T., 1994. Verb syntax in Italian child grammar: Finite and non-finite verbs. *Language Acquisition* 3(1), 1-40.
- Haegeman, Liliane. (1998). Root infinitives, clitics and truncated structures. In H. Clahsen (ed.), *Generative Perspectives on Language Acquisition*, Amsterdam: John Benjamins, pp. 271-307.
- Hale, Ken. (1966). Kinship reflections in syntax. *Word* 22:318-324.
- Hamann, Cornelia. (2002). *From Syntax to Discourse: Pronominal Clitics, Null Subjects and Infinitives in Child Language*. Dordrecht: Kluwer.
- Hamann, C., Rizzi, L. & Frauenfelder, U. H. (1996). On the acquisition of subject and object clitics in French. In H. Clahsen (ed.), *Generative Perspectives on Language Acquisition*, Amsterdam: John Benjamins, pp. 309-334.
- Hoekstra, T. and Hyams, Nina. (1998). Aspects of root infinitives. *Lingua* 106: 81-112.

- Johns, A., Massam, D. & Ndayiragije, J. (Eds.). (2006). *Ergativity: Emerging Issues*. Dordrecht: Springer.
- Kim, Y.-J. (2000). Subject/object drop in the acquisition of Korean: A cross-linguistic comparison. *Journal of East Asian Linguistics* 9(4): 325-351.
- Larsen, T. W. (1988). *Manifestations of Ergativity in Quiche Grammar*. Doctoral Dissertation, University of California, Berkeley.
- Murasugi, K. (1992). *Crossing and Nested Paths: NP-Movement in Accusative and Ergative Languages*. Doctoral Dissertation, MIT.
- O'Grady, William. (2005). *Syntactic Carpentry: An Emergentist Approach to Syntax*. Mahwah, NJ: Lawrence Erlbaum.
- Pierce, Amy. (1992). *Language Acquisition and Syntactic Theory: A Comparative Analysis of French and English Child Grammars*. Dordrecht: Kluwer.
- Platzack, C. (1992). Functional categories and early Swedish. In J. Meisel (Ed.), *The Acquisition of Verb Placement: Functional Categories and V2 Phenomena in Language Acquisition*, pp. 63-82. Dordrecht: Kluwer.
- Pye, Clifton. (1992). The acquisition of K'iche' Maya. In D. I. Slobin (Ed.), *The Crosslinguistic Study of Language Acquisition, Vol. 3*, pp. 221-308. Hillsdale, NJ: Lawrence Erlbaum.
- Pye, Clifton, Pfeiler, Barbara & Mateo Pedro, Pedro. In press. The Acquisition of Extended Ergativity in Mam, Q'anjob'al and Yucatec. In Edith Bavin & Sabine Stoll (Eds.), *The Acquisition of Ergativity*, John Benjamins: Amsterdam.
- Pye, Clifton, Pfeiler, Barbara, de León, Lourdes, Brown, Penelope & Mateo, Pedro. (2007). Roots or edges? Explaining variation in children's early verb forms across five Mayan languages. In Barbara Pfeiler (Ed.), *Learning Indigenous Languages: Child Language Acquisition in Mesoamerica*, Berlin: Mouton de Gruyter, pp. 15-46.
- Ritter, Elizabeth. & Rosen, Sara. (2000). Event structure and ergativity. In C. Tenny and J. Pustejovsky (Eds.), *Events as Grammatical Objects*, Stanford, CA: CSLI Publications, pp. 187-238.
- Schaeffer, J., (1990). *The Syntax of the Subject in Child Language: Italian Compared to Dutch*. M.A. thesis, University of Utrecht.
- Shklovsky, K. (2010). Person-case effects in Tzeltal: What PCC in ergative languages looks like. Presentation at the First Formal Approaches to Mayan Linguistics (FAMLi). MIT, Cambridge, MA, April 23-25, 2010.
- Siewierska, Anna. 2004. *Person*. Cambridge: Cambridge University Press.
- Spencer, Andrew & Luís, A. R. (2012). *Clitics: An Introduction*. Cambridge: Cambridge University Press.
- Wang, Q., Lillo-Martin, D., Best, C. T. and Levitt, A. (1992). Null subject versus null object: Some evidence from the acquisition of Chinese and English. *Language Acquisition* 2: 221-254.
- Weissenbom, J., (1991). Functional categories and verb movement: The acquisition of German syntax reconsidered. In M. Rothweiler (Ed.), *Spracherwerb und Grammatik. Linguistische Untersuchungen zum Erwerb von Syntax und Morphologie*. Linguistische Berichte, Sonderheft 3, 190-224.
- Weverink, M., (1989). *The Subject in Relation to Inflection in Child Language*. M.A. thesis, University of Utrecht.

Woolford, E. (2000). Ergative agreement systems. *The University of Maryland Working Papers in Linguistics* 10:157-191.

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