

The Acquisition of Word Order and Its Constraints in Kaqchikel: A Preliminary Study

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1. Introduction

The acquisition of word order has been one of the central issues in the study of child language, and a matter of considerable interest with regard to this issue has been an example of languages characterized by relatively free ordering of constituents. These languages raised the question of whether children have access to all the permitted orders from the earliest observable stages, and also the question of whether children are sensitive to the constraints on the use of various orders. For example, in the acquisition of Japanese, a free word-order language that allows both the SOV order as in (1a) and the scrambled OSV order as in (1b), it has been observed at least since Hayashibe (1975) that even five-year-old Japanese-speaking children tend to misinterpret OSV sentences, by taking the first NP as the Agent of the action denoted by the verb, and the second NP as the Theme.

- (1) a. SOV: Kamesan-ga ahirusan-o osimashita.
 turtle-NOM duck-ACC pushed
 b. OSV: Ahirusan-o kamesan-ga osimashita.
 duck-ACC turtle-NOM pushed
 ‘A/The turtle pushed a/the duck.’

However, a later study by Otsu (1994) demonstrated that the purported difficulty children have when comprehending scrambled sentences is an experimental artifact. Building on the observation by Masunaga (1983), Otsu pointed out that the scrambled NP must have been established as a discourse topic in order to make the use of scrambled sentences natural. Otsu’s experiment took this constraint into consideration, and presented OSV sentences with another sentence that was designed to establish the scrambled object of the test sentence as the discourse topic. When presented with such a lead-in sentence, children around the age of three showed virtually no difficulty in interpreting OSV sentences.

- (2) Lead-in: Koen-ni ahirusan-ga imashita.
 park-in duck-NOM was
 OSV: Sono ahirusan-o kamesan-ga osimashita.
 the duck-ACC turtle-NOM pushed
 ‘There was a duck in a park. A turtle pushed the duck.’

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These findings from the acquisition of Japanese not only suggest that three-year-olds already have knowledge of word-order variations, but also that they are highly sensitive to the subtle discourse constraints on the use of the scrambled order.

In light of this background, this study attempts to address the question of whether the early acquisition of word-order constraints can be observed in the acquisition of Kaqchikel, a Mayan language that is argued to have the basic order of VOS but still exhibits flexible word order. The results of our experiment, even though quite preliminary, suggest that Kaqchikel-speaking four-year-olds are subject to the constraints imposed on the V-initial sentences.

2. Verb-initial Sentences and their Constraints in Kaqchikel

Kaqchikel is one of the 22 Mayan languages spoken in Guatemala. It is mainly used in the highland west of Guatemala City, the capital. Kaqchikel has approximately 450,000 speakers, and is one of the principal Mayan languages along with K'ichee', Q'eqchi', and Mam (Lewis 2009).

Like other languages in the Mayan family, Kaqchikel is a head-marking language: There is no overt case-marking on subjects or objects, and person and number agreement for both of these NPs is expressed on the verb (Kaufman 1990). Again, along with other Mayan languages, Kaqchikel verb agreement works on an ergative-absolutive basis. The following sentences illustrate these properties (“ \emptyset ” indicates a phonologically empty exponent).¹

- (3) TRANSITIVE (Preminger 2011:26):
- a. rat x- \emptyset -aw-axa-j ri achin
 you(sg.) PRFV-3sg.ABS-2sg.ERG-hear-ACT the man
 ‘You(sg.) heard the man.’
- b. ri achin x-a-r-axa-j rat
 the man PRFV-2sg.ABS-3sg.ERG-hear-ACT you(sg.)
 ‘The man heard you (sg.).’
- (4) INTRANSITIVE (Preminger 2011:26):
- a. ri achin x- \emptyset -uk'lun
 the man PRFV-3sg.ABS-arrive
 ‘The man arrived.’
- b. rat x-at-uk'lun
 you(sg.) PRFV-2sg.ABS-arrive
 ‘You (sg.) arrived.’

As shown in (3) and (4), the single argument of the unaccusative receives the same marking as the object of the transitive: \emptyset (empty) for 3sg arguments, “-a(t)-” for 2sg ones. In contrast, the subject of the transitive receives a different marking: “-r(u)/u-” for 3sg arguments, “-a(w)-” for 2sg ones.

Kaqchikel has the property of flexible word order, and permits (at least) VOS, VSO, and SVO orders, as exemplified in (5).

- (5) a. VOS/VSO:
 X- \emptyset -u-b'a' ri tz'i' ri me's
 PRFV-3sg.ABS-3sg.ERG-bite the dog the cat
 ‘The cat bit the dog.’ (VOS) / ‘The dog bit the cat.’ (VSO)
- b. SVO:
 Ri tz'i' x- \emptyset -u-b'a' ri me's
 the dog PRFV-3sg.ABS-3sg.ERG-bite the cat
 ‘The dog bit the cat.’

1. Abbreviations used in the glosses are: NOM (= Nominative), ACC (= Accusative), ABS (= Absolutive), ERG (= Ergative), sg (= Singular), pl (= Plural), PRFV (= Perfective), IMPF (= Imperfective), ACT (= Active), DIR (= Directional).

3.2. Subjects and Method

The subjects of our preliminary experiment were 10 children acquiring Kaqchikel as their native language, ranging in age from 3;09 to 5;05 (mean age 4;07). They were tested individually by an adult native speaker of Kaqchikel.

The task for children was a simplified version of the truth-value judgment task (Crain & Thornton 1998). In this task, a puppet told a child brief stories, each of which consisted of two sentences (a lead-in sentence and a test sentence) and was accompanied by two pictures presented on a laptop computer. The task for the child was to judge whether the puppet's description of the pictures was correct or wrong, by pointing at one of the cards the puppet had in her hands: a strawberry (which means 'correct') or a hot pepper (which means 'wrong'). Sample trials are given in (11) and in (12). For example, in the case of (11), an experimenter told a child a brief story, in which a kangaroo and a tiger were standing near a pond (the lead-in part), and then the kangaroo bit the tiger (the test-sentence part). Since both of the animals (a kangaroo and a tiger) were introduced in the lead-in sentence, they should be referred to by using definite NPs in the test sentence. The test sentence in (11) has the V-initial order with two definite NPs and hence is ambiguous between the VOS interpretation and the VSO interpretation. If children have the knowledge of the definiteness restrictions in (7), they should allow the subject NP ('the kangaroo') to precede the object NP ('the tiger') and thus should judge the test sentence to be true in this situation.

- (11) Pictures: 1. A kangaroo and a tiger are standing near a pond.
 2. The kangaroo is biting the tiger.



Lead-in Sentence:	E-k'ò 3pl.ABS-there.are ri k'òjlib'äl ya'. the pond 'There are a kangaroo and a tiger near a pond.'	jun kanguro a kangaroo	chuqa' and	jun b'alam a tiger	chuchi' side
Test Sentence:	N-ø-u-k'apij IMPF-3sg.ABS-3sg.ERG-bite	ri kanguro the kangaroo	ri b'alam. the tiger	(OKVSO, Expected Answer: <u>TRUE</u>)	

In contrast, in the case of (12), only one of the two animals was introduced in the lead-in sentence: In this story, a hippo was standing near the pond (the lead-in part), and a lion bit the hippo (the test-sentence part). Then, only the animal that was already mentioned in the lead-in part (in this case, a hippo) can naturally be expressed with a definite NP in the test sentence. Since one of the two NPs is definite while the other is indefinite, the constraint in (7a) imposes a certain order on V-initial sentences, namely the order in which the definite NP follows the indefinite NP. However, the constraint in (7b) forces the definite NP to be interpreted as the subject of the V-initial sentence, which leads to the unambiguous VOS interpretation. Since the action depicted in the picture only matches that of the VSO interpretation, children with the knowledge of the constraints in (7) should judge the test sentence to be false in this situation.

- (12) Pictures: 1. A hippo is standing near a pond.
 2. A lion is biting the hippo.



Lead-in Sentence: \emptyset -k'o jun hipopotamo chuchi' ri k'ojlib'al ya'.
 3sg.ABS-there.is a hippo side the pond
 'There is a hippo near a pond.'

Test Sentence: N- \emptyset -u-k'apij jun le'on ri hipopótamo.
 IMPF-3sg.ABS-3sg.ERG-bite a lion the hippo
 (*VSO, Expected Answer: FALSE)

The experiment consisted of two practice items, two trials with a sentence in which both NPs were definite (as in (11)), and two trials with a sentence in which one of the NPs was indefinite (as in (12)). The list of the test sentences is given in the appendix.

3.3. Results and Discussion

The overall results are summarized in Table 1.

Word Order	V - NP _{def} - NP _{def}		V - NP _{indef} - NP _{def}	
Assigned Interpretation	VSO	VOS	VSO	VOS
Number of Responses	19/20	1/20	11/20	9/20
% of Responses	95%	5%	55%	45%

Table 1: Summary of the Results

Even though the results are still preliminary, we found a contrast between children's responses to the V-initial sentences with two definite NPs and their responses to those involving an indefinite NP. When children were presented with the V-initial sentences with two definite NPs, along with the context in which only the VSO interpretation was true, they accepted those sentences 95% of the time. In contrast, when children were presented with the V-initial sentences in which the verb was followed by two NPs involving the indefinite NP – definite NP order, along with the context in which only the VSO interpretation was true, they accepted those sentences only 55% of the time. The latter results in turn suggest that children interpreted the V-NP_{indef}-NP_{def} sentences as having the VOS order 45% of the time. These results, even though far from conclusive at this point, suggest that children are sensitive to the definiteness restrictions in (7) which together forces the V-NP_{indef}-NP_{def} sentences to have the VOS interpretation.

4. Conclusion

Even though the results are quite preliminary in that the number of children and test items are very small, it is encouraging to see the finding that Kaqchikel-speaking children appear to have knowledge of the constraints on V-initial sentences given in (7), which give rise to the situation in which only the VOS order is permitted. This finding suggests that Kaqchikel-speaking children know that the VOS

order is permitted in wider environments than the VSO order, and hence that the former is more basic than the latter. While a far more comprehensive study is available for the acquisition of K'iche' (Pye 1991), few studies have so far looked at the acquisition of Kaqchikel. We hope that our future research of this topic provides an important step toward understanding children's acquisition of Kaqchikel, thereby contributing to understanding the nature of children's acquisition of Mayan languages.

Appendix 1: List of Test Sentences

[1] Practice Trials:

- (A) Lead-in Sentence: E-k'o jun kanguro chuqa' jun b'alam pak'ichelaj
3pl.ABS-there.were a kangaroo and a tiger in forest
'There were a kangaroo and a tiger in a forest.'
- Test Sentence: Ri kanguro x-ø-tzok'in-el pa ruwi' ri ch'ich'
the kangaroo PRFV-3sg.ABS-jump-DIR on top.of the fence
'The kangaroo jumped over the fence.'
- (B) Lead-in Sentence: E-k'o jun hipopotamo chuqa' jun le'on
3pl.ABS-there.are a hippo and a lion
chuchi' ri k'ojlib'al ya'
near the pond
'There are a hippo and a lion near the pond.'
- Test Sentence: Ri le'on n-ø-atin pa ri k'ojlib'al ya
the lion IMPF-3sg.ABS-bathe in the pond
'The lion is swimming in the pond.'

[2] Test Trials:

- (C) Lead-in Sentence: Jun aq chuqa' jun sebra e-k'o pa k'ichelaj
a pig and a zebra 3pl.ABS-there.are in forest
'There are a pig and a zebra in the forest.'
- Test Sentence: N-ø-r-oqotaj ri aq ri sebra.
IMPF-3sg.ABS-3sg.ERG-chase the pig the zebra
'The pig is chasing the zebra.' (VSO) / 'The zebra is chasing the pig.' (VOS)
- (D) Lead-in Sentence: E-k'o jun kanguro chuqa' jun b'alam chuchi'
3pl.ABS-there.are a kangaroo and a tiger side
ri k'ojlib'al ya'.
the pond
'There are a kangaroo and a tiger near a pond.'
- Test Sentence: N-ø-u-k'apij ri kanguro ri b'alam
IMPF-3sg.ABS-3sg.ERG-bite the kangaroo the tiger
'The kangaroo is biting the tiger.' (VSO) /
'The tiger is biting the kangaroo.' (VOS)
- (E) Lead-in Sentence: Jun wakx ø-k'o pa k'ichelaj
a cow 3sg.ABS-there.is in forest.
'There is a cow in a forest.'
- Test Sentence: N-ø-u-k'apij jun karnel ri wakx
IMPF-3sg.ABS-3sg.ERG-bite a sheep the cow
'The cow is chasing a sheep.' (VOS)
- (F) Lead-in Sentence: ø-k'o jun hipopotamo chuchi' ri k'ojlib'al ya'
3sg.ABS-there.is a hippo side the pond
'There was a hippo near the pond.'
- Test Sentence: N-ø-u-k'apij jun le'on ri hipopótamo.
IMPF-3sg.ABS-3sg.ERG-bite a lion the hippo
'The hippo is biting a lion.' (VOS)

Appendix 2: Individual Responses

	Age	Practice Sentences		Test Sentences			
				V - NP _{definite} - NP _{definite}		V - NP _{indefinite} - NP _{definite}	
		Expected Answer: TRUE	Expected Answer: FALSE	Expected Answer: TRUE		Expected Answer: FALSE	
		(A)	(B)	(C)	(D)	(E)	(F)
1	3;09	TRUE	FALSE	TRUE	TRUE	TRUE	TRUE
2	4;00	TRUE	FALSE	TRUE	TRUE	TRUE	TRUE
3	4;01	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE
4	4;02	TRUE	FALSE	TRUE	TRUE	TRUE	FALSE
5	4;03	TRUE	FALSE	TRUE	TRUE	FALSE	FALSE
6	4;05	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE
7	4;05	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE
8	5;03	TRUE	FALSE	TRUE	TRUE	TRUE	FALSE
9	5;04	TRUE	FALSE	TRUE	TRUE	TRUE	TRUE
10	5;05	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE

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Selected Proceedings of the 5th Conference on Generative Approaches to Language Acquisition North America (GALANA 2012)

edited by Chia-Ying Chu,
Caitlin E. Coughlin, Beatriz Lopez Prego,
Utako Minai, and Annie Tremblay

Cascadilla Proceedings Project Somerville, MA 2014

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to Language Acquisition North America (GALANA 2012)
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Sugisaki, Koji, Koichi Otaki, Noriaki Yusa, and Masatoshi Koizumi. 2014. The Acquisition of Word Order and Its Constraints in Kaqchikel: A Preliminary Study. In *Selected Proceedings of the 5th Conference on Generative Approaches to Language Acquisition North America (GALANA 2012)*, ed. Chia-Ying Chu et al., 72-78. Somerville, MA: Cascadilla Proceedings Project. www.lingref.com, document #3068.