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Learning to Constrain Verb Transitivity

The acquisition of verb argument structure is the **sine qua non** of language acquisition. Children must learn how many arguments each verb can possess as well as the way in which the verb's arguments may express different semantic relations. Knowledge of verb argument structure enables children to 'project' the syntactic structure of the basic clause as well as detect the absence of 'missing' NPs and reconstruct their referent. The two previous papers have presented some of the difficulties children face in acquiring verb argument structure. I will discuss the problem in the context of how children acquire the causative construction, focusing on the Mayan language K'iche', which is spoken by approximately 1 million people living in the western highland region of Guatemala.

K'iche' has an agglutinating morphology which reflects the distinction between transitive and intransitive verbs in several respects. The language has an ergative cross-referencing system on the verb, so intransitive verb subjects are marked with an absolutive marker and transitive verb subjects are marked with an ergative marker. Many verbs also require a special clause-final termination which distinguishes between transitive and intransitive verbs. (1) on the handout shows how these features mark transitivity in K'iche'.

(1) Transitive verbs	Intransitive verbs
a. k-at-inw-il-oh	c. k-at-b'e:-ik
INCOMP-2A-1E-see-TV	INCOMP-2A-go-IV
'I see you.'	'You are going.'
b. k-Ø-a-kuw-i:j	d. k-Ø-taq'en-ik
INCOMP-3A-2E-hurry-TV	INCOMP-3A-PROGRESSIVE-IV
'You are hurrying.'	'It is.'

As you are well aware by now, the problem of acquiring verb argument structure is complicated by the verbs which can alternate between different argument structures. One of the ways this alternation is accomplished in K'iche' is through the addition of the causative suffix /-*is*/ to the verb. The causative suffix changes an intransitive verb stem to a transitive verb stem. In K'iche' the causative suffix can only be added to intransitive verb stems, unlike

Berber, Japanese and Korean where it is also possible to add a causative affix to transitive verb stems. Examples of the K'iche' causative construction are shown in (2).

(2) K'iche' causative verbs

a. k-Ø-a-poqow-is-a:j
INCOMP-3A-2E-boil-CAUSE-TV

'You are boiling it.' (= cause to boil)

b. k-Ø-in-q'alaj-is-a:j
INCOMP-3A-1E-clear-CAUSE-TV

'I will clarify things.' (= cause to become clear)

Although the causative construction is very productive in K'iche' it is not completely so, and thereby learnability issues creep in. There are two classes of intransitive verbs in K'iche' which do not take the causative affix. The first of these irregular classes uses another means of deriving a transitive verb stem. I will refer to this class of verbs collectively as the 'zero class' although you can see from the examples in (3) that this set of verbs uses several different derivational processes. They have in common the feature of alternating between intransitive and transitive verb forms by some means other than the regular causative derivational process.

(3) K'iche' zero class verbs

Transitive verbs	Intransitive verbs
a. k-Ø-in-qas-a:j INCOMP-3A-1E-go_down-TV	k-in-qas-ik INCOMP-1A-go_down-IV
'I am taking it down.'	'I am going down.'
b. x-Ø-in-tzaq-oh COMP-3A-1E-drop-TV	x-in-tzaq-ik COMP-1A-fall-IV
'I dropped/lost it.'	'I fell.'
c. x-Ø-a-sut-i:j COMP-3A-2E-turn-TV 'You turned it.'	x-at-sutin-ik COMP-2A-turn-IV 'You turned.'

The other set of irregular intransitive verbs I will dub the periphrastic class. This set of verbs does not permit any derivational process to produce a simple transitive verb stem. The only way to express a transitive notion with the members of this set is to use a periphrastic construction. Examples of such verbs are shown in (4).

(4) K'iche' periphrastic verbs

Intransitive verbs	Periphrastic construction	
a. k-in-pet-ik	k-Ø-in-b'an	k-at-pet-ik
INCOMP-1A-come-IV	INCOMP-3A-1E-do	INCOMP-2A-come-IV
'I am coming.'	'I will make you come.'	
b. k-in-muxan-ik	k-Ø-in-b'an	k-at-muxan-ik
INCOMP-1A-swim-IV	INCOMP-3A-1E-do	INCOMP-2A-swim-IV
'I am swimming.'	'I will make you swim.'	

To put it mildly, the combination of a productive causative derivational affix plus a good number of lexical exceptions should create considerable problems for any child so unfortunate as to be faced with the prospect of learning K'iche'.

My K'iche' acquisition data comes from two sources. For my dissertation research I recorded longitudinal samples from three children between the ages of 2;0 and 3;0. I transcribed and translated these samples with the help of Augustin Huix Huix and Pedro Quixtan Poz, who also assisted in encouraging the children to talk when we visited them. The spontaneous language samples suggest that the causative derivation is a fairly late acquisition for K'iche' children, especially compared to the passive and antipassive constructions which they produce approximately 6 months earlier. I have found that by 2;10 the children are beginning to produce examples of causativized verbs (Pye 1990). Their causativized verbs alternate with the intransitive verb forms, sometimes in the same session, so there is some indication that the children have recognized that the derivation is productive. However, I have not found any overgeneralizations of the causative affix in this data set. The children are using verbs from the irregular class of intransitives, however they never added the causative affix to them. Neither did they add the causative affix to transitive verb stems.

This result appears to contradict acquisition data from other languages in which causative overgeneralizations appear to be more

frequent. Bowerman (1974) has provided many examples of such overgeneralizations in English, and Berman (1982) has noted examples in Hebrew. I do not think the difference can be attributed to differences between the ages of the subjects or the formal properties of the causative affix. Bowerman and Berman have noted many examples of causative overgeneralizations from children younger than 3;0. The causative is also marked with a verbal affix in Hebrew, albeit a prefix rather than a suffix.

Needless to say I was curious about this apparent discrepancy between the spontaneous language samples from K'iche', English and Hebrew so I decided to see if I could elicit any causative overgeneralizations from K'iche' children. Since I was in Guatemala this summer anyway testing the children's knowledge of passive and antipassive constructions I put together a test of their ability to form causatives. We used verbs from all three groups in our test. The verbs are shown in (5).

(5) K'iche' verbs from causative elicitation study

Causative verbs	Zero-derivation verbs	Periphrastic verbs
xojow-is dance-CAUSE	qas-ik go_down-IV	muxan-ik swim-IV
aq'an-is climb-CAUSE	sutin-ik turn-IV	wakat-ik walk-IV
ch'aqt-is wet-CAUSE	el-ik leave-IV	pet-ik come-IV
noj-is full-CAUSE	wul-ik destroy-IV	
atin-is bathe-CAUSE		

Our initial pilot testing had shown that we could induce children to produce more causative forms if we began with some familiar causativized verbs. Therefore, we began the test by eliciting the causative forms for the verbs *xojow* 'dance' and *aq'an* 'climb'. Thereafter we alternated between the different classes of verbs. We used the same order for each child. We used a set of plastic farm animals as our stimulus items, primarily a mother pig and two baby pigs. For example, our protocol for the verb *xojow* 'dance' went:

'This baby pig is dancing. See it dance? It's dancing. The other baby pig is not dancing. Its mother wants her baby to dance so she goes like this. What is she doing to her baby?'

If a child failed to respond we would repeat the action and again ask what the mother was doing to her baby. If a child responded that the baby was dancing, we would draw their attention to the mother's action and again ask what the mother was doing to her baby. If the child still could not say what the mother was doing, we would record the

response as a refusal and go on to the next item. It was surprising to me to find that we had very little difficulty eliciting transitive verbs from our even our youngest subjects in this manner. We experienced the most trouble trying to elicit a transitive counterpart for the verb *petik* 'come' so we dropped this item from our test. While one of us manipulated the animals and delivered the monologue, the other would transcribe the children's responses. In addition, all sessions were audio-recorded.

As you might expect, we elicited quite a range of responses from our subjects. Besides the expected (adult) responses, the children used other transitive verbs, other causativized verbs, periphrastic responses, the intransitive verb form or another intransitive verb. Their responses are shown in Table 1.

Table 1. Causative Data (Summer 1990)

4-, 5-, 6-, 7-year-olds

	Cause	Trans	Other Cause	Other TV	Other IV	Other IV	Peri	Refuse
Causatives								
xojowisa:j	11							
aq'anisa:j	11							
ch'aqtisa:j	1		5	5				
nojisa:j	8		2				1	
atinisa:j	11							
Zero class								
qasa:j	3	4		3	1			
suti:j		11						
esa:j		8		3				
wuli:j		3		8				
Periphrastic								
muxanik	1	7	1	1			1	
wakatik	1		7	3				
petik				3				

8-, 9-, 10-, 11-year-olds

	Cause	Trans	Other Cause	TV	IV	IV	Peri	Refuse
Causatives								
xojowisa:j	58			3		1		
aq'anisa:j	42		5	12	2	1		
ch'aqtisa:j	32		12	14		3	1	
nojisa:j	36		2	16	2	1		3
atinisa:j	55		1	6				
Zero class								
qasa:j	12	31	6	10	2			1
suti:j	4	55	1	2				
esa:j		46	1	15				
wuli:j		16	1	44				
Periphrastic								
muxanik	1	28	23	4		3	2	1
wakatik	3	1	41	14				3
petik			2	21				

12-, 13-year-olds

	Cause	Trans	Other Cause	TV	IV	IV	Peri	Refuse
Causatives								
xojowisa:j	7							
aq'anisa:j	4			2				1
ch'aqtisa:j	3		1	3				
nojisa:j	6			1				
atinisa:j	6			1				
Zero class								
qasa:j	1	4		2				
suti:j	1	6						
esa:j		2	1	4				

wuli:j		1		6			
Periphrastic							
muxanik	1	1		1	3	1	
wakatik		1		4	1		1
petik				1	3		

This data is rather intimidating, so I'll take you through it bit by bit. There aren't any linguistically significant differences between the age groups so I'll ignore that dimension for now. Focusing on the youngest age group, I found that first of all there was a significant difference in our success at eliciting transitive versions of individual verbs. The children were quite happy to supply causativized versions of the verbs *xojow* 'dance', *aq'an* 'climb', and *atin* 'bathe', but had real trouble finding a way to causativize *ch'aq* 'wet' and to a lesser extent *noj* 'full'. I used the proportion of 'other verb' responses as a rough estimate of our success in eliciting transitive forms of the verbs. This is a fact of life for any experimental investigation, and one which we can deal with, hopefully, in future investigations.

The next significant feature of note, I suppose, is that we did actually succeed in eliciting some causative overgeneralizations from the children. Some children added the causative affix to the zero class verbs *qasik* 'go down' and *sutinik* 'turn' as well as the periphrastic class verbs *muxanik* 'swim' and *wakatik* 'walk'. It was also a surprise to see that the children applied the zero derivation to verbs in the periphrastic class as well as the regular causative derivation. For *muxanik* 'swim' their favorite zero derivation was *muxa:j*, while their zero derivation for *wakatik* 'walk' was *wakati:j*. I calculated a proportion of overgeneralization by dividing the number of overgeneralizations by the number of overgeneralizations plus the number of legitimate transitive forms. These proportions are shown in Table 2.

Table 2. Proportion of causative overgeneralizations

	Age Groups		
	4,5,6,7	8,9,10,11	12,13
Causatives	0 (11)*	0 (62)*	0 (7)*
Zero class	.10	.10	.13

qasik	.43	.28	.20
Periphrastics	.35	.24	.18
muxanik	.73	.47	.33

* The number in parentheses indicates the number of subjects in each group.

These figures suggest that there may be significant differences between the verbs in each class in terms of the children's willingness to overgeneralize a transitivity alternation to the verbs. I hope to investigate this aspect at some future time. I've also provided the proportion of overgeneralizations for the most frequently overgeneralized verbs in each class. These verbs are responsible for the class differences, and demonstrate the same pattern. However, I was not prepared to find the children overgeneralizing these verbs so frequently. For comparison, the 2- to 4-year-old subjects in Braine et al's study of the English causative alternation overgeneralized intransitive verbs 39%. Maratsos et al. (1987) report a mean overgeneralization rate of 26%, while Pinker (1989.29) reports a rate of overgeneralization between 55 and 66%. Further investigation is necessary to discover whether the K'iche' figure translates to the proportion of times individual subjects overgeneralize individual verbs. I am assuming that a high proportion of overgeneralization (anything over 70%) implies that the children have actually added the overgeneralized form to their lexicon. This hypothesis makes the older children's performance all the more mysterious, since they seem to be better at resisting the temptation to use the overgeneralized forms. This, of course, raises the learnability issue of exactly what mechanism the older children use to unlearn lexical forms.

Another interesting finding was that the children did not overgeneralize the intransitive verb forms to transitive contexts. The classic observation from Bowerman is that children use intransitive forms in transitive contexts e.g. Christy (2;9) 'I come it closer so it won't fall.' In fact, this is the phenomenon that Braine and Maratsos succeeded in eliciting from their subjects. We never elicited a single example of this sort from our K'iche' subjects. We did elicit a few intransitive verbs from the children, but in these cases it is clear that the children were using the verbs as intransitives. The verbs have an intransitive morphology, and more telling, the children only used these verbs with one argument.

One last observation to be made about our findings is that we succeeded in eliciting causative overgeneralizations from 13-year-olds. Pinker (1989.289) states that Christy made such overgeneralizations over a period of six years, from 2;1 to 7;11.

Braine et al. only tested 2- and 4-year-olds besides adults. An assumption has crept into the literature on the acquisition of English that all the interesting developments in the causative occur before 5;0. The K'iche' data shows that the acquisition of lexical alternations is not completed in all languages by 8;0. Needless to say, someone should try eliciting causatives from older children who speak English to check on this anomaly.

It's always gratifying to see that what started as a way of gainfully employing the older siblings of 3- and 4-year-old test subjects turned out some interesting findings. Of course, I believe the findings have direct implications for current theoretical explanations of how children acquire the causative alternation. Pinker (1989) attributes children's acquisition of the constraints on which verbs undergo the causative to the existence of semantically restricted verb subclasses. Verbs which specify an extrinsic change of physical state (open, close, melt, shrink), and verbs which encode 'contained' motion in a particular manner (slide, skid, roll) will causativize. Verbs which describe motion in a lexically specified direction (go, come, fall), and verbs describing volitionally caused actions (eat, jump, sing) do not alternate.

I chose my K'iche' verbs with Pinker's theory in mind. The verbs *ch'aq* 'wet' and *noj* 'full' don't seem to fit any of Pinker's categories. The verbs *el* 'leave' and *wulik* 'destroy' fit categories that Pinker predicts don't alternate. Then there is the pair *aq'an* 'climb' and *qasik* 'go down' which describe motion in lexically specified directions, and so should not alternate, but do. Not only do they alternate in K'iche', but they do so along two distinct patterns. The moral is that Pinker's semantic subclasses of verbs do not have cross-linguistic validity, so his dependence on them is illegitimate.

Braine et al. propose accounting for causative overgeneralizations in terms of a competition between the verbs' argument structure and canonical sentence schemas. Braine claims that when children cannot access a verb's argument structure they will fall back upon a canonical sentence schema. If they put an intransitive verb into a Agent-Action-Object sentence schema they will have produced a causative overgeneralization. Braine proposes extending this idea to the morphological causative system of Hebrew. Thus, not only do Hebrew children form canonical sentence schemas, they also have canonical morphological forms for transitive and intransitive verbs.

Braine doesn't address the issue of how such schemas relate to the rest of the children's grammar. If they are not a part of the linguistic system then the relations between transitive and intransitive verbs is just accidental. There is also the problem of

deciding which schema to activate in any given context. Presumably there will be more than just the transitive and intransitive schemas. Braine mentions the locative and dative alternations as having their own schemas. Picking the right schema would seem to create as many problems as accessing the right verb argument structure. Braine needs to explain why schema accessing would be easier than argument structure accessing.

I believe Braine is on the right track in proposing that children take a conservative approach to entering verb argument structures into their lexicons. However, the number of overgeneralizations we elicited and the length of time children are willing to produce such overgeneralizations seriously undermine conservative accounts of causative acquisition. It could be the case that children get some verbs right, but have trouble with others.

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