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The Acquisition of V<sup>0</sup> Movement\*

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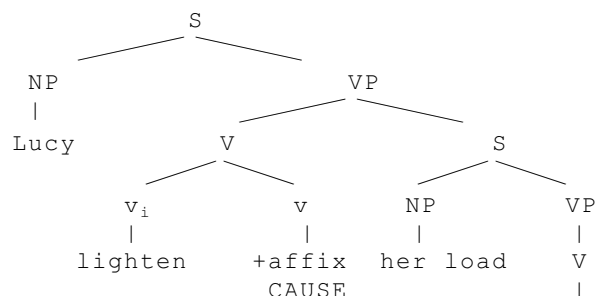
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The hallmark of Government and Binding Theory (Chomsky 1981) has been its search for grammatical generalizations. The most spectacular of these generalizations is the rule Move  $\alpha$ . This rule eliminates the myriad transformational rules that complicated life for the so-called Standard Theory of transformational grammar. In their place, GB substitutes 1 rule - Move  $\alpha$ , which simply says 'move anything anywhere.' To prevent chaos from breaking out, GB Theory also includes a set of constraints on phrase structures, which insure that ill-formed derivations are eliminated.

Mark Baker has proposed making the Move  $\alpha$  rule even more general. Everyone else had assumed that the Move  $\alpha$  rule only applied to whole phrases - as in Wh-questions. Baker pointed out that in noun-incorporation structures only the head of a noun phrase might be moved to (or incorporated into) the verb. This operation can leave the rest of the noun phrase stranded in its original position. Baker extended this idea by proposing that the head of any phrase may be moved (by an extension of the Move  $\alpha$  rule) to become incorporated into the head of any phrase which properly governs the phrase where the incorporating head originated. This is a sweeping proposal and one which presents interesting implications for language acquisition. In this paper, I will focus on some of the theory's implications regarding the acquisition of verb, or  $V^0$ , movement.

The tree structure in (1) provides an example of how Baker's hypothesis would apply to causative constructions. Many languages derive causativized verbs by adding a causative affix to a regular verb. Baker assumes that such constructions originate as bi-clausal d-structures in which the causative affix serves as the main verb in the main clause. He bases this proposal on his Uniformity of Theta Assignment Hypothesis, which states, 'Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure' (46). Baker assumes that the causative affix is thematically equivalent to an abstract verb CAUSE which assigns both agent and object theme roles. Then Move  $\alpha$  may apply to the verb in the lower clause and adjoin it to the verb (the causative affix) in the main clause. If this movement did not take place, the causative affix would be left stranded. This would violate the Stray Affix Filter. Although this filter might appear to be just a gimmick to patch up Baker's version of Move  $\alpha$ , but it applies to all affixes - not just the causative.

(1) Simplified Causative S-structure



Lucy lightened her load.

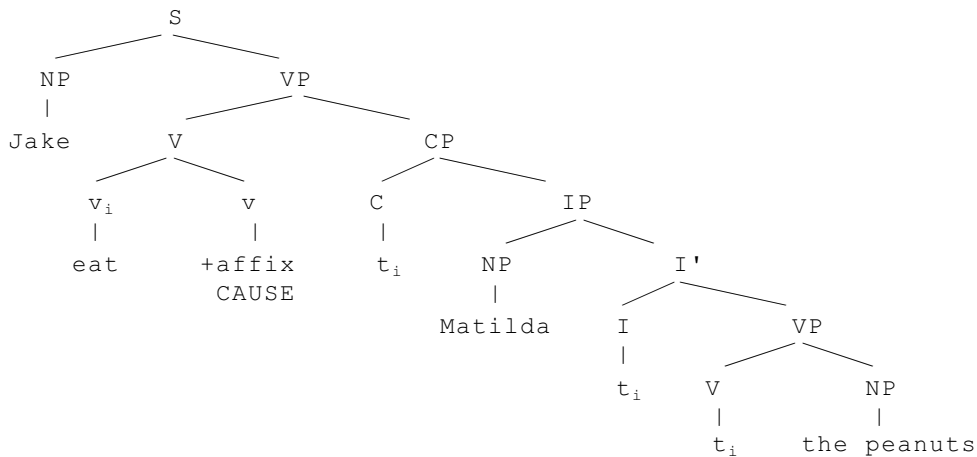
I have simplified this example to provide a clearer idea how the basic process works. The tree structure in (2) shows how the process might apply to a verb that is already transitive. Note that the lower clause contains both subject and object NPs. I have added complementizer and inflectional phrases as well to fill out more of the complete structure.

Here the verb in the lower clause moves first to I (under INFL) and then to the complementizer position. Each time the verb moves it leaves behind a trace that is indexed with the verb. Finally, the verb moves from the complementizer position to adjoin to the causative affix in the main clause. If English had a causative affix that attached to transitive verbs, the result might appear like that shown in (2). I have used a suppletive verb as an illustration of how this process might work. This sentence might be paraphrased as 'Jake caused Matilda to eat the peanuts.'

Many languages, like English, do not allow the causative to apply to transitive verbs. Baker claims this is because the resulting sentences would violate the Case Frame Preservation Principle, which states, 'A complex X<sup>0</sup> (head) of category A in a given language can have at most the maximal Case assigning properties allowed to a morphologically simple item of category A in that language' (122). This principle captures another generalization that seems to hold across languages. If the language permits verbs to have double object NPs, then it is also possible to causativize transitive verbs. Since the causative affix is a verb according to Baker's hypothesis, the resulting complex verb cannot take more NPs than an ordinary, noncausativized verb. English would be a prime candidate for such a process since it contains dative constructions like:

(3) Rose would not give Mortimer the time of day.

(2) Full Causative S-structure with transitive verb



Jake fed Matilda the peanuts.

I will use longitudinal data that I collected for 4 children acquiring the Mayan language K'iche' to test Baker's theory. A general summary of the language samples for three of the children appears in Table 1. I am in the process of putting this data into the computer, which has allowed me to analyze data from the older siblings of my primary subjects. I have included data from Al Se'p, Al Tiya:n's older sister. Al Se'p was approximately Al Cha:y's age.

Table 1. Ages, number of utterances and MLUs across the K'iche' language samples.

Samples	Al Tiya:n			Al Cha:y			A Carlos		
	age	number	MLU	age	number	MLU	age	number	MLU
1-3	2;1.17	732	1.2	2;9.8	945	1.6	3;1.5	735	1.8
4-6	2;2.6	1069	1.4	2;10.6	1348	2.1	3;1.25	963	2.4
7-9	2;3.19	1155	1.8	2;10.27	1160	2.2	3;4.2	1760	2.8
10-12	2;7.21	844	2.1	3;0.16	1197	2.7	3;4.23	1272	2.8
13-15	2;10.5	1026	2.8	3;1.5	1159	2.7	3;6.26	1333	3.1
16-18				3;2.28	1103	3.0	3;8.5	1508	3.3
19-21				3;4.10	794	3.2			

The sentence in (4) provides an example of the causative construction in K'iche'. K'iche' adds the causative suffix *-isa* to many intransitive verb stems to produce causativized verbs. K'iche' lacks a double object construction, and as Baker predicts, the use of the causative affix on transitive verb stems is unacceptable. The causative is a highly productive construction in K'iche', but there are a number of intransitive verb stems which do not take it. These lexical exceptions include the verbs *pe:t* 'come', *b'e:* 'go', and *ul* 'arrive here'.

(4) x-0-r-oq'-isa-j                      u-lo:ch'    le: ixoq  
 COMP-3A-3E-criy-CAUSE-DER her-baby    the woman

'The woman cried over her baby.'

K'iche' lacks a double object construction, and as Baker predicts, the use of the causative affix on transitive verbs produces ill-formed constructions in K'iche'. The causative can be used with a wide variety of intransitive verbs, although there are lexical exceptions.

I provide the causative constructions the K'iche' children produced in (5). There is no evidence that either Al Tiya:n or Al Se'p had acquired the causative since they produced so few examples. I think the fact that they also produced these examples in their later language samples is consistent with a late acquisition for the causative. On the basis of their data, I conclude that K'iche' children begin using the causative around 2;10. For comparison, Al Tiya:n began producing the passive at 2;3.

(5) Causative Constructions in the K'iche' data

**Al Tiya:n**

Active Forms

T15-30 b'isaj win. 'travel'                      (= b'in-isa-j, travel-CAUSE-DER)

**Al Se'p**

S12-23 kukamisaj kan la. (= kam-isa-j, die-CAUSE-DER)  
 S15-30 xa ximb'inisaj (= b'in-isa-j, travel-CAUSE-DER)

#### Al Cha:y

R1-55 chat, ix, xa:j. (= k'at-isa-j, shine-CAUSE-DER)  
 R6-33 lij in. (= walij-isa-j, rise-CAUSE-DER)  
 R6-35 paq'ixaj chik. (= paqal-isa-j, rise-CAUSE-DER)  
       paqixaj in chik. (= paqal-isa-j, rise-CAUSE-DER)  
 R7-39 katixaj chaya. (= k'at-isa-j, shine-CAUSE-DER)  
 R8-11 ay pich warli. (= chup-isa-j, go out-CAUSE-DER)  
 R12-21 k'utisaj raya. (= k'at-isa-j, shine-CAUSE-DER)  
       ma karaj taj chupixaj jun che. (= chup-isa-j, go out-CAUSE-DER)  
 R13-18 q'etixaj. (= qet-isa-j, come close-CAUSE-DER)  
 R13-18 pelipe q'etixaj. (= qet-isa-j, come close-CAUSE-DER)  
 R17-28 no, chupisaj taj q'eq. (= chup-isa-j, go out-CAUSE-DER)  
 R18-37 k'o chiri, kamixan chah. (= kam-isa-m, die-CAUSE-PERF)  
 R18-46 k'atixaj warih. (= k'at-isa-j, shine-CAUSE-DER)  
 R18-47 waq'a xaj chika. (= aq'an-isa-j, climb-CAUSE-DER)  
 R19-15 qana7 kinchupixaj. (= chup-isa-j, go out-CAUSE-DER)  
 R19-23 kam kamixaj jun qak7. (= kam-isa-j, die-CAUSE-DER)  
 R22-21 chupisaj chik juna. (= chup-isa-j, go out-CAUSE-DER)  
 R24-8 no7, kak'atisaj. (= k'at-isa-j, shine-CAUSE-DER)

#### A Carlos

C7-52 ki te k'atisaj jun che lee keb'e. (= k'at-isa-j, shine-CAUSE-DER)  
 C12-23 chab'inisaj. (= b'in-isa-j, travel-CAUSE-DER)  
 C12-58 inkaqtisaj. (= ch'aq-isa-j, wet-CAUSE-DER)  
       inkaqisaj apantalón. (= ch'aq-isa-j, wet-CAUSE-DER)  
 C15-25 kokusaj wa naj. (= ok-isa-j, enter-CAUSE-DER)  
 C18-1 ixim poqisaj. (= poq'-isa-j, explode-CAUSE-DER)  
 C18-1 xa'in xin poq'isaj. (= poq'-isa-j, explode-CAUSE-DER)  
 C18-29 m, xaq kimpoq'isaj. (= poq'-isa-j, explode-CAUSE-DER)

The older children, Al Cha:y and A Carlos, show better evidence of having acquired the causative. Al Cha:y's first production was a rather hesitant, syllable by syllable imitation of her older sister - a classic example of what Braine (1976) refers to as a 'groping pattern'. Thereafter Al Cha:y produced 15 tokens of the causative on 7 different verb stems. A Carlos produced 8 tokens on 5 different verb stems.

The children also used the plain counterparts of the causativized verbs at this time. Al Tiya:n used the plain intransitive stem *b'in* 'travel' 5 times. Al Cha:y used the plain intransitive verb *aq'an* 'climb' once, *kam* 'die' 18 times, *paqal* 'high' 3 times, and the verb *walij* 'rise' 4 times. She also used plain transitive verb counterparts for the stems *chup* 'extinguish' and *qet* 'cut'. These verbs have a zero derivation that derives transitive verb stems from intransitive verbs in addition to the causative derivation. A Carlos used the intransitive verb stems *b'in* 'travel' 14 times, *k'at* 'shine' 2 times, and *ok* 'enter' 24 times.

I believe the frequency of the causative constructions as well as the use of intransitive and plain transitive counterparts to the causativized verbs shows that Al Cha:y and A Carlos had generalized the notion of adding the causative suffix to any intransitive verb. They did not overgeneralize the causative suffix to any intransitive verbs where its use would be unacceptable to adults, nor did they use the causative affix with any transitive verbs. Thus, by 2;10 K'iche' children seem to have acquired one construction involving V<sup>0</sup> movement.

I wanted to know whether the children had acquired a more general principle of  $V^0$  movement. K'iche' contains a verb incorporation construction shown in (6).

(6) k-in-e-ka'y-a  
INCOMP-1A-GO-look-DEP

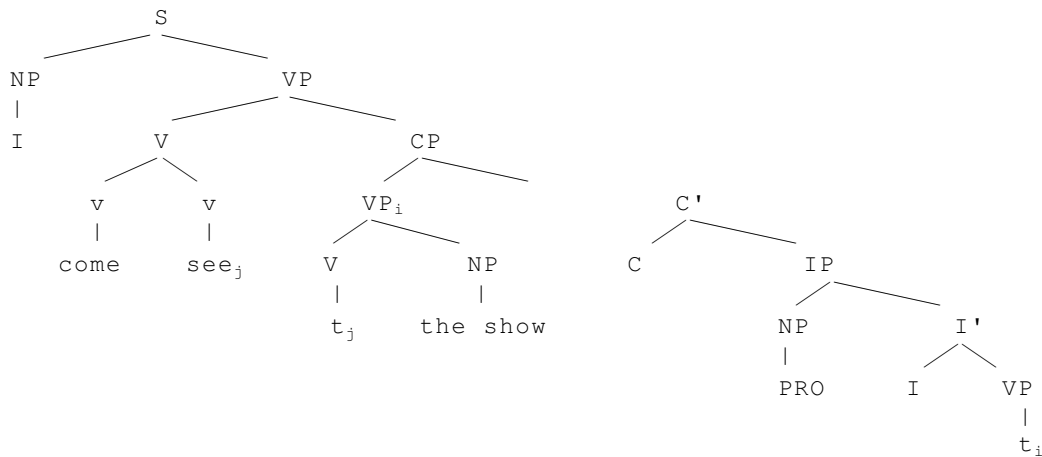
'I will go look.'

k-at-ul-inw-il-a  
INCOMP-2A-COME-1E-see-DEP

'I will come see you.'

K'iche' allows reduced forms of three verbs of motion (*b'e:* 'go', *ul* 'arrive here', and *ikow* 'pass') to incorporate into transitive and intransitive verb stems. This would appear to violate the Case Frame Preservation Principle, but note that the subject of the incorporated motion verb is identical to the subject of the verb in the lower clause. This is shown in the following tree structure which uses PRO to identify the subject of the lower clause.

(7) S-structure for verb incorporation



I'll come see the show.

This structure demonstrates another way of incorporating verbs. Here, the entire VP first moves to the complementizer position. Then the verb continues by itself to adjoin with the motion verb, stranding the object NP ('the show') in COMP. I have used this process to demonstrate the flexibility of Baker's theory rather than to claim that verb incorporation uses a different derivational process than the causative. Baker discusses the differences between these derivations and their implications for the structure of adult languages.

In K'iche', verb incorporation also changes the termination suffix on the verb to the so called 'dependent suffix'. This suffix is used when the verb is in the imperative or when the verb contains an incorporated motion verb. K'iche' children often produced only the final part of the verb, including the dependent suffix. I have relied on my assistants' interpretation of the children's utterances in these cases, as well as noting that an imperative interpretation is much

more likely with second person subjects than with first or third person subjects.

If the children had acquired a general rule of  $V^0$  movement, I would expect them to apply it to both the causative and verb incorporation constructions simultaneously. I provide their data on verb incorporation in (8).

(8) Incorporated motion constructions in the K'iche' data

**Al Tiya:n**

T14-19 enma chu loq 'bring' (= k-0-e-in-k'am-a)  
 T15-5 ju:n len nk'ama 'bring' (= k-0-e-in-k'am-a)

**Al Se'p**

S6-29 kensik'ij kamik. 'call' (= k-0-e-in-sik'i-j)  
 -57 xa puro kensik'a 'smoke' (= k-0-e-in-sik'-a)  
 S13-13 jatama la at e. 'bring' (= je-0-a-k'am-a)  
 S14-12 xa ikem xekila wi cha. 'see' (= x-0-e-k-il-a)  
 -13 xeqila uj ruk' e: wa:tz 'see' (= x-0-e-q-il-a)  
 S15-19 kenweqaj chi le: we: li. 'carry' (= k-0-e-w-eqa-j)  
 -28 ay xekich'ay ki:b'. 'hit' (= x-0-e-ki-ch'ay-a)

**Al Cha:y**

R5-1 wixtaj pe'l wixtaj na. 'see' (= k-0-e-inw-il-xta-j)  
 -1 wixtaj na. 'see' (= k-0-e-inw-il-xta-j)  
 R6-51 kinwixtaj na. 'see' (= k-0-e-inw-il-xta-j)  
 R7-39 no', ana, chul. 'do' (= k-0-e-in-'an-a)  
 -45 na chak. 'do' (= x-0-e-u-'an-a)  
 R8-4 mak'a wa' ri'. 'cut' (= k-0-e-in-mak'-a)  
 R9-1 Felip, xika la. 'call' (= k-0-e-in-sik-a)  
 -1 xika la. 'call' (= k-0-e-in-sik-a)

**A Carlos**

C5-39 enk'ama nuwuj a wan 'carry' (= k-0-e-in-k'am-a)  
 C6-1 tija lajalom 'eat' (= x-0-e-in-tij-a)  
 C8-66 ana kan jun nuchul 'do' (= k-0-e-in-'an-a)  
 C9-29 enkojo uk' uko'al 'use' (= k-0-e-in-koj-o)  
 -45 \* jo qila le: k'ik' 'see' (= je-0-q-il-a')  
 C16-29 xeqaloq'o mayisena 'buy' (= x-0-e-qa-loq'-o)  
 C18-15 kekesaj 'take out' (= k-0-e-k-esa-j)  
 C20-12 jatawila pe' 'see' (= je-0-aw-il-a)  
 -12 \* jo'eqatzukuj 'look for' (= je-0-qa-tzuku-j)

Al Tiya:n lags behind the other children on this construction. The two examples she produced are from her last samples. Her sister, Al Se'p, has produced quite a range of verb incorporation constructions, as have A Carlos and Al Cha:y.

How did the children do on verb incorporation in comparison to the causative construction? Al Tiya:n's data matches perfectly and A Carlos' data is not far off. Al Se'p has one early use of the verb incorporation construction, but I may have missed recording any of her causative constructions by chance. More interesting is the children's use of verb incorporation with transitive verbs. They had not overgeneralized the causative morpheme to transitive verbs, so they seem to be sensitive to the constraints on the use of both the

causative and verb incorporation. This data seems to support Baker's incorporation account fairly well.

There is one other test of the theory that I carried out with the K'iche' data. The verb incorporation constructions that I have discussed so far involve moving a verb from a lower clause into a higher clause. Verb incorporation requires complex underlying structures, and this would imply that children would have to possess the ability to produce complex sentences before they could produce verb incorporation structures. With this test in mind, I extracted the children's complex sentences. This data is shown in (9).

(9) Complex Sentences in the K'iche' data

**Al Tiya:n**

T7-50 /an taj /chi'. 'Do not do it, she said.'  
T11-13 kar/aj k/oq'ik. 'She wants to cry.'  
T15-4 < > nw/il ne' /ek. 'I saw him leave.'

**Al Se'p**

S1-31 /tija kal/cha' 'Eat it you say.'  
S6-13 kin/ch'ob' taj /k'o wi le chikop. 'I don't know where the animal is.'  
S6-15 xinw/il ta ne jun /k'o chupam. 'I didn't see the one that's inside.'  
S7-23 /tajin ki/tij taj e aq e. 'The pigs aren't eating.'  
S11-11 ma ka'/an ta k'ut we x/t'ukinik. 'Don't do it, it might peck.'  
S12-23 we x/pe le: winaq ki/ch'ay kib'. 'If the people that hit each other come.'  
S13-7 wa kar/aj ta chi ka/'ek. 'It doesn't want to leave.'  
S13-27 kin/k'ut chuwa lentat we x/ulik. 'I'll show my dad if he arrives.'  
S14-22 /k'o: jun wech /chupu. 'There's one of mine that went out.'  
S15-11 ay kar/aj x/tzaq loq e. 'It wants to fall down.'

**Al Cha:y**

R1-16 /tijo /cha. 'He's eating he says.'  
R2-48 ay /'ax /'an. 'It is hard to do.'  
R5-10 /lij kab'ato /chaq e. 'There's the tie that fell.'  
R7-45 /'an /jo'n. 'She's doing the washing.'  
R8-11 no /b'ij chaj /chupxaj warli. 'You say she puts it out.'  
R8-13 te ka/loh /ek na. 'He sees that it left.'  
R10-17 no' /an /chapanik. 'He's doing the grabbing.'  
R12-21 ma kar/aj taj /chupixaj juN che'. 'He doesn't want to chop the tree.'  
-28 kar/aj taj ak' /xu' cham. 'The chicken doesn't want to wipe his nose.'  
R12-45 /kowinik w/il wakax. 'I can see the cow.'  
-46 w/aj taj /tij taj maxan. 'I don't want not to eat the apple.'  
-46 w/aj in /ch'aya' mex. 'I want to hit the cat.'  
-67 kol at /chaq ale' 'It's you that fell there.'

**A Carlos**

C7-10 xa /kam ku ne le: at /cha'. 'You just carry it yourself he said.'  
-16 k/aj ta /chapik. 'They do not want to grab.'  
-60 w/il /kik. 'I saw him enter.'  
C9-34 m aw/ilo le: jun /k'o:lik e. 'You see the one that is there.'  
C10-33 l/aj in/walij taj. 'You want me to not get up.'  
C13-29 w/ila le: pe l/ano le'. 'Look what you are doing.'  
-60 inaw/aj /walik. 'I want to sleep.'



C14-59 jat at ak'ala jela le'. 'Go stand over there.'  
 C15-25 xaq kim/b'i:j in/kojo. 'Only I say I will do it.'  
 C17-23 /e: cha /utij e: me's e'. 'He went to tie up the cat.'  
 -28 /tajan ke/tzizon luk' le: mul. 'They are talking with the rabbit.'  
 -67 x'/an x/qaj b'a' lit. 'He did the going down.'  
 C18-12 ay /tajan k/utoqaj chik 'He's taking it again.'  
 -22 /o: jun q'ajom ka'/an walal li' 'There is a marimba you do here.'  
 -33 ki/b'an /anik lit. 'They do it's doing.'  
 -36 ma kal/aj taj /jikik ale' 'He doesn't want to tie it there.'  
 C20-4 xa/b'i:j ya'a /o: inaj lale' 'You said there is a little one.'

This data is complicated by the fact that K'iche' input to the children contains frequent use of a 'he/she says X' routine. These routines add the verb *cha* 'say' at the end of the sentence. K'iche' children begin using these forms very early. I have only included the children's first use of *cha* utterances in (9). Counting these utterances as complex sentences would support Baker's theory in a trivial way. However, the children might have simply added *cha* as part of an unanalyzed routine and not have constructed true complex sentences. For this reason, I felt a more conservative test was in order. Therefore, I extracted more traditional examples of complex sentences from the children's data. These make up the remainder of the utterances shown in (9). Only the 2 verb incorporation examples from A Carlos contradict this more conservative test of Baker's Incorporation Theory.

I am pushing the K'iche' data to the limit in using it to test Incorporation Theory. At this time it can only provide a tentative confirmation for Baker's theory. Fortunately, I do not have to rely upon the K'iche' data exclusively. A number of researchers have reported on the acquisition of causative constructions in other languages. In the interest of provoking further study of the connection between causatives and complex sentences I will briefly review some of these studies.

Melissa Bowerman (1974) compared her data on the acquisition of causatives in English with predictions from the theory of Generative Semantics, which was current at the time (Lakoff 1971). Generative Semantics also analyzed causative constructions as being derived from complex underlying structures. It assumed that the separate clauses combined at a semantic level as opposed to Baker's purely syntactic treatment.

It seems counterintuitive to maintain that children's use of verbs like *break* and *open* in English requires a complex structure for their analysis. Bowerman's daughter used such verbs about 5 months before producing her first complex sentences. However, Bowerman argues that the onset of overgeneralizations of the causative, such as 'Daddy go me around' (= make me go around) and 'I come it closer so it won't fall' (= make it come closer) suggest the child's earlier utterances did not contain fully analyzed causative verbs. Bowerman observed that these causative overgeneralizations coincided with the development of complex sentences in her daughter's speech, e.g. 'See Kendall crying' and 'Watch me swinging.' The causative errors also coincided with the development of periphrastic causatives, e.g. 'I made back wet.' (p. 162). So even in English, a language which lacks an overt causative affix, there is still developmental evidence of a link between causatives and complex sentences.

There is some information available on the acquisition of causatives in Turkish. Aksu-Koc & Slobin (1985:848) supply an example of causative usage in Turkish by 2;3. They state that Turkish children both overuse and underuse the causative until 3;0. Turkish has a highly agglutinative morphology, and Aksu-Koc & Slobin report

that the children seem to be using most of the morphemes productively by 2;2. Thus, the problems Turkish children experience with the causative stand out in marked contrast to their effortless acquisition of case marking and tense inflections.

Complex sentences create more difficulties for Turkish children because the verb in the embedded clause must be nominalized in various ways. Aksu-Koc & Slobin say the children use the wrong participial forms from age 3 on, but they do not state when Turkish children first produce complex sentences with or without correct verb forms. Their late use of well-formed causatives appears to coincide with the onset of complex sentences in Turkish, but more information is required about the complex sentences before this can be determined.

Finally, Clancy (1985:382) states that two-and-a-half year old children learning Japanese begin producing conjoined sentences and relative clauses, while they do not use the causative affix until 3;0. So this data also appears to conform with Baker's predictions.

I have just tested a few of the implications for language acquisition contained in Baker's Incorporation Theory. While these tests provide confirmation for the theory, there are many more details of the incorporation process that can be turned into predictions about language acquisition. Baker notes that the causativization of transitive verbs is a highly marked process. This would imply that children might only use the causative with intransitive verbs when acquiring languages that allow the causativization of transitive verbs. The causativization of transitive verbs should also occur after the children have used double object NP constructions. The causative construction also requires the use of verb traces, so children's data might be examined for other evidence of their use of traces. Finally, the verb incorporation constructions use PRO, so children's data might be examined for other evidence that they are aware of the constraints that apply to control structures.

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