THE EMERGENCE OF THE INDEFINITE NULL COMPLEMENT

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Since Bowerman's (1974) seminal paper on novel lexical causatives in child language, developmental psycholinguistics has tended to view lexically subcategorized alternations in argument structure as restructurings of either a semantic or syntactic nature (Lord 1979; Pinker 1989). A recent example of this general view is found in Pinker (1989), who proposed "when a verb's meaning changes, its argument structure changes as an automatic consequence" (p 63). This hypothesis is not without problems. One problem is defining exactly what constitutes a semantic transformation. A second problem is that the hypothesis ignores the fact that there are argument structure alternations which have discourse-pragmatic licensing as well as semantic licensing.

Let us take as an example the various subclasses of English transitive verbs that can be used with omitted undergoers. The theoretical construct "undergoer" is taken from Role and Reference Grammar (RRG) (Foley & Van Valin 1984; Van Valin 1990, in press). I use it here because it signifies a relationship between an NP and a clause that is intermediate between the fine-grained thematic roles (patient, theme, effector) and abstract grammatical relations. Sentences 1a-f contain examples of three classes of transitive verbs that can optionally omit their undergoers. The three classes are the shave, win and read type verbs. These classes differ in the way the missing undergoer influences our interpretation of the surface intransitive forms. The paired sentences of 2a-c capture these differing interpretations in everyday language.

1. a. William dressed / shaved Tom.
   b. The Cubs won / lost the game.
   c. Tom read the book / ate the steak.
   d. William dressed / shaved.
   e. The Cubs won / lost.
   f. Tom read / ate.

2. a. William shaved --> William shaved himself.
   b. The Cubs won --> The Cubs won the game.
   c. Tom read ---> Tom read something or other.

Problematic is the fact that for the shave and the win type verbs, the surface intransitive forms do not seem to effect a change in the predicate type, so much as a narrowing of the range of possible referents for the implicit undergoer.
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This is not the case for read type verbs, where there is evidence that the omission of the undergoer reflects a change of predicate type from accomplishment to activity predicates (Vendler 1967; Dowty 1979). With undergoers of specific quantity, the verbs of this class enter into accomplishments as can be seen in 3.

3. a. He read the entire dissertation in five minutes.
   b. He ate all the spagetti in five minutes.
   c. *He read the entire dissertation for five minutes.
   d. *He ate all the spagetti for five minutes.

In contrast, the surface intransitive form of read and eat are usually construed as activities, as can be seen in 4.

4. a. He read for five minutes.
   b. He ate for five minutes.
   c. *He read in five minutes.
   d. ? He ate in five minutes.

Even this generalization, however, has problems. Sentence 4c is clearly ungrammatical, but sentence 4d is grammatical if the omitted undergoer is construed as meaning something like a meal. Sentence 5 makes this construal clearer, and is a grammatical sentence.

5. We stopped at a McDonald's, ate in five minutes, and were back on the road again.

It would seem that the predicate type of eat in its surface intransitive form is dependent on the interpretation of the missing element.

This brings us to the second problem, one which I think has real implications for acquisition, the relationship between the discourse-pragmatic status of the missing undergoer and predicate type. Consider the specificity of the implied undergoer in the surface intransitive form. Specificity refers to whether a speaker believes that they know the actual identity of the referent of an NP (Kuno 1973:39-40). In the surface intransitive form, the status of the implicit undergoers of shave and win types verbs is specific. The absurdity of the non-specific reading is reflected in the unacceptability of sentences 6a and 6b.

6a. *When I peeked into John's room he was dressing, now I wonder whom he was dressing.

6b. *When I turned on the T.V. the Mets were winning, now I wonder what they were winning.
In contrast, with read type verbs the identity of the referent of the missing undergoer can be non-specific, literally unknown to the speaker. As a result the sentences in 7 make sense.

7a. When I peeked into John's room he was reading, now I wonder what he was reading.

7b. I saw John eating, but I don't know what he was eating.

Consider how discourse-pragmatics control the use of the alternate argument structures. The surface intransitive form of the shave type verbs and the win type verbs can be used when the reference for the undergoer is given in discourse or presupposed, as can be seen in 8 and 9.

8. A. How did the game turn out?
   B. The Royals won / lost.

9. A. Can you be ready in an hour?
   B. Sure, all I have to do is shave.

The discourse contexts licensing read type verbs are radically different from those for the win and shave type verbs. For read type verbs undergoer omission is permissible when the identity of the referent for the missing undergoer is either unknown or a matter of indifference, what Fillmore (1986) termed the Indefinite Null Complement. Compare the dialogue in 8 with the dialogue in 10. The omitted undergoer with win in 8 is permissible because it is the topic of the question - response pair. The omitted undergoer is extremely odd with eat in 10B precisely because it is the topic of the question - response pair.

10. A: What happened to my sandwich?
    B: *The dog ate.

As Fillmore points out, the INC "is markedly indefinite...it is obligatorily disjoint in reference with anything saliently present in the pragmatic context" (1986:97). In dialogue 11 the surface intransitive form of eat sounds weird because the conversations call for the maintenance of a definite undergoer referent. The INC would have to be disjoint in reference, and so throws the conversation out of kilter.

11. A: Did you eat your peas?
    B: *Yes I ate.

In contrast, dialogue 12 is quite natural. When speaker A first uses the surface intransitive form of the verb eat, the speaker is expressing a desire to satisfy hunger. The actual identity of what is to be eaten is a matter of indifference.
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   B: What would you like to eat?
   A: Doesn't matter, anything, I'm just so hungry.

To summarize, the main problem with saying that undergoer omission reflects a semantic transformation is that it ignores the discourse-pragmatic licensing of undergoer omission. For the *read* type verbs the alternation typically does reflect a semantic difference between accomplishment predicates and activity predicates. However, the omitted undergoer of the *read* type verbs concomitantly has a special discourse-pragmatic status. In short, the Aktionsart of the surface intransitive form is intimately, if not inseparably bound up with the interpretation of the omitted undergoer. This paper examines the acquisition of one INC taking verb, *eat*.

SUBJECTS AND DATA

The subjects were 40 children from the Kansas City area. (Hart & Risley 1989). The children were audiotaped at home for an hour every month from 1;0 to 3;0. Fifteen of the children were black, 25 white, 18 were boys, 22 were girls. The average income of the families was $28,000 (range $4,000-$68,000). The first language of all the children was English.

The transcripts made from these audiotapes are composed of utterances, at minimum one isolated interjection and at maximum a grammatical sentence. The utterances were grouped into episodes and turns. An episode boundary was defined as a five second or longer gap between utterances. A turn was defined as an uninterrupted string of utterances by one speaker that fell within a single episode.

A reliability check was performed for 180 one hour tapes, four for every child, two from the first year and two from the second year of observation. A second observer checked every word, utterance and episode boundary in the transcript. In these 180 hours of audiotape, there was an average 98% confirmation rate for words, utterances and episode boundaries (range 97-99%).

The MLU for each monthly sample was calculated following procedures outlined in Brown (1973:54). A lexicon was compiled containing every word on the audiotapes and the date of the word's first appearance in each child's lexicon.

METHODS

The verb *eat* was chosen for this study because (1) according
to the adult grammar *eat* takes the INC, and (2) all 40 children used this verb. No other INC taking verb was used as early, and with such frequency. Examples of *eat up* were not used in this study, since the INC is not permissable with *eat up* in the adult grammar.

Sentences with the verb *eat* that were clearly not spontaneous were eliminated. This included immediate word for word imitations, the child's own self-repetitions and parts of poems or routines. Sentences used in the analyses were all completely comprehensible.

The children's sentences were coded for the presence of an overt undergoer. Food items and meal names were assumed to be undergoers. Demonstratives, anaphoric pronouns and quantifiers found in post-verb position were also automatically coded as an undergoers.

Two contrasting discourse contexts were defined, a context in which the undergoer was expected (Undergoer Expected context), and another which was open to undergoer omission (Open context). The contrast in discourse context was applied only to Response Sentences, that is, children's sentences which responded to another speaker's immediately prior utterance within a single episode. Sentences that either initiated an episode or continued a child's turn were not coded for discourse context.

The Undergoer Expected context was defined by characteristics of what was said in the preceding discourse. Contexts were considered Undergoer Expected if, in the preceding discourse, either the interlocutor or child produced an utterance containing either of the following two criteria: (1) the verb *eat* with an overt undergoer NP, or (2) a food item or meal name NP.

The two criteria for the Undergoer Expected context had to be found within a delimited stretch of discourse preceding a child's response sentence. Preceding discourse was divided into two sections: (1) the immediately prior interlocutor turn (prior turn), and (2) an extended segment of discourse (extended segment). Examples 13 and 14 were classified as a Undergoer Expected Context because at least one of the criteria was found in the prior turn (P = parent, C = child).

13. Child 22 (2;6, CVL = 145, MLU = 2.76)

P: Oh I want something to eat.
C: Eat that!
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14. Child 35 (2;7, CVL = 123, MLU = 2.71)

P: We got whole lot of bacon.
C: Can I eat it?

If neither of the two criteria were found in the prior turn, the search for the criteria proceeded into the extended segment of preceding discourse. The extended segment ended with the prior turn and began at an initiation point. The initiation point was a lexical, inanimate NP. This initiation point was chosen for two reasons. First, the conventional undergoer of eat is a food item, always a lexical inanimate NP. Second, lexical NPs are discourse prominent, that is, they can be focal or contrastive, whereas unstressed anaphors cannot be focal or contrastive (Lambrecht 1987; Chafe 1976). When the most recently lexicalized inanimate NP in a conversation is a food item, it is reasonable to assume that the item has some discourse prominence. Example 15 was classified as Undergoer Expected because a food item was the initiation point of the extended segment.

15. Child 28 (2;11, CVL = 258, MLU = 3.41)

P: Does that look like a candycane?
C: Yeah.
P: Yeah.
C: Here.
P: It does.
C: Eat it.
P: You can eat it, but it won’t taste very good.

If the initiation point was formed by a lexical, inanimate NP that was not a food item or meal name, the context was coded as Open, as in example 16 (--- = unintelligible segment of speech). If there was no full lexical, inanimate NP between the prior turn and the preceding episode boundary, then the context was classified as Open by default.

16. Child 25 (2;11, CVL = 170, MLU = 3.53)

C: Goldilock have that spoon.
P: Goldilock.
C: That’s the mother’s.
P: Now what (---).
C: I don’t know.
P: You don’t know?
C: Her wanna eat.

Cumulative verb lexicon (CVL) was used as a general measure of linguistic development. CVL was chosen over MLU, which was also calculated for every sample, because CVL is cumulative with
age, while MLU is not. Five CVL levels were used: CVL < 75 verb types, CVL > 75 < 150 verb types, CVL > 150 < 225 verb types, CVL > 225 < 300 verb types, and CVL > 300 verb types.

RESULTS

A total of 1276 sentences spoken by the children with the verb eat were analyzed. Table 1 presents the five CVL levels, the number of eat sentences produced at each level, as well as the average MLU at each CVL level.

<table>
<thead>
<tr>
<th>CVL Levels</th>
<th>Average Age</th>
<th>Average MLU</th>
<th>Total Sentences</th>
<th>Average Sentences Per Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 75</td>
<td>1;10</td>
<td>1.60</td>
<td>180 (N=34)</td>
<td>5</td>
</tr>
<tr>
<td>&gt; 75 &lt;= 150</td>
<td>2;3</td>
<td>2.40</td>
<td>315 (N=37)</td>
<td>9</td>
</tr>
<tr>
<td>&gt; 150 &lt;= 225</td>
<td>2;6</td>
<td>3.05</td>
<td>327 (N=35)</td>
<td>9</td>
</tr>
<tr>
<td>&gt; 225 &lt;= 300</td>
<td>2;8</td>
<td>3.56</td>
<td>205 (N=26)</td>
<td>8</td>
</tr>
<tr>
<td>&gt; 300</td>
<td>2;9</td>
<td>3.86</td>
<td>249 (N=15)</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 2 presents the rate of undergoer omission at each CVL level. The data presented in Table 2 were pooled across children. It is not surprising that, as CVL size increased the percentage of sentences without overt undergoers decreased. CVL is correlated with MLU, so that as the children were able to say more in an utterance, the rate of undergoer omission decreased.
TABLE 2

<table>
<thead>
<tr>
<th>CVL Levels</th>
<th>Total Sentences</th>
<th>Sentences without Undergoer</th>
<th>Percent of Undergoer Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 75</td>
<td>180 (N=34)</td>
<td>129 (N=30)</td>
<td>72%</td>
</tr>
<tr>
<td>&gt; 75 &lt;= 150</td>
<td>315 (N=37)</td>
<td>114 (N=30)</td>
<td>36%</td>
</tr>
<tr>
<td>&gt; 150 &lt;= 225</td>
<td>327 (N=35)</td>
<td>101 (N=26)</td>
<td>31%</td>
</tr>
<tr>
<td>&gt; 225 &lt;= 300</td>
<td>205 (N=26)</td>
<td>45 (N=20)</td>
<td>22%</td>
</tr>
<tr>
<td>&gt; 300</td>
<td>249 (N=15)</td>
<td>50 (N=11)</td>
<td>20%</td>
</tr>
</tbody>
</table>

Table 3 presents the frequency and rate of undergoer omission for response sentences, further divided into Undergoer Expected and Open contexts. These frequencies are of pooled data. As a hedge against inflation of these frequencies by individual children, children who contributed over 20% of the response sentences at any single CVL level were dropped from the analysis. Only one child was dropped, #39, from the highest CVL level (CVL > 300). The undergoer omission rate was closest across discourse conditions at the lowest CVL level (CVL <= 75): 66% in the Undergoer Expected context and 70% in the Open context. At the next highest CVL level (CVL > 75 <= 150), there is a noticeably greater difference in the omission rate across contexts; 26% in the Undergoer Expected contexts and 45% in the Open contexts. By the fifth and highest CVL level (CVL > 300), the omission rate in the Undergoer Expected condition is 2%, while in the Open condition, the omission rate is 30%. These data indicate that, as the children advanced linguistically, the association between discourse context and undergoer omission became noticeably stronger.
TABLE 3

Frequency and Rate of Undergoer Omission in Conversational Responses Only

<table>
<thead>
<tr>
<th>CVL Levels</th>
<th>Discourse Context</th>
<th>Undergoer Expected</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+ U</td>
<td>- U</td>
<td>+ U</td>
</tr>
<tr>
<td>&lt;= 75</td>
<td>12 (34%)</td>
<td>23 (66%)</td>
<td>16 (30%)</td>
</tr>
<tr>
<td></td>
<td>(N=9)</td>
<td>(N=16)</td>
<td>(N=11)</td>
</tr>
<tr>
<td>&gt; 75 &lt;= 150</td>
<td>53 (74%)</td>
<td>19 (26%)</td>
<td>51 (55%)</td>
</tr>
<tr>
<td></td>
<td>(N=24)</td>
<td>(N=11)</td>
<td>(N=23)</td>
</tr>
<tr>
<td>&gt; 150 &lt;= 225</td>
<td>61 (73%)</td>
<td>23 (27%)</td>
<td>33 (60%)</td>
</tr>
<tr>
<td></td>
<td>(N=21)</td>
<td>(N=11)</td>
<td>(N=16)</td>
</tr>
<tr>
<td>&gt; 225 &lt;= 300</td>
<td>66 (90%)</td>
<td>7 (10%)</td>
<td>23 (62%)</td>
</tr>
<tr>
<td></td>
<td>(N=17)</td>
<td>(N=5)</td>
<td>(N=14)</td>
</tr>
<tr>
<td>&gt; 300</td>
<td>51 (98%)</td>
<td>1 (2%)</td>
<td>16 (51%)</td>
</tr>
<tr>
<td></td>
<td>(N=12)</td>
<td>(N=1)</td>
<td>(N=10)</td>
</tr>
</tbody>
</table>

Note. + U = with overt undergoer, - U = missing overt undergoer.

As one might expect, the children's sentences without undergoers in Undergoer Expected contexts sounded strange. Dialogues 17-19 provide examples.

17. Child 31 (2;6, CVL 103, MLU 1.97)
(P has just opened a bag of popcorn)

P: Popcorn.
C: I eat.
P: You gonna save some for your dad?
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18. Child 11 (2;7, CVL 161, MLU 3.21)
(Talking about a pencil)

P: Well I see you already ate the eraser off of it.
That's one of the first things you hadta do.
C: I eat. (4X)
P: I know you ate the eraser, so you don't need a
   candy bar now.

19. Child 28 (2;2, CVL 93, MLU 2.66)

P: I've gotta put this chocolate in there too.
C: There mom chocolate in.
P: Uhuh.
C: Eat mom.
P: Oh, eating it already, huh?

To study developmental trends within individual children, it
was decided that children would be compared across the transition
from the third to fourth CVL levels, CVL = 225. As a hedge
against sampling error individual children were considered only
if they produced at least four eat sentences in both the
Undergoer Expected and Open contexts at both above and below CVL
= 225. Only four children provided enough data for this
analysis. Their data is presented in Table 4 and summarized in
Table 5.
TABLE 4

Frequency of Undergoer Omission in Conversational Responses Before and After CVL = 225.*

<table>
<thead>
<tr>
<th>CVL Period</th>
<th>Discourse Context</th>
<th>Discourse Context</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Undergoer</td>
<td>Expected</td>
</tr>
<tr>
<td></td>
<td>+ U - U</td>
<td>+ U - U</td>
</tr>
<tr>
<td>ID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>#6</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>#28</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>#32</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>

*Children were selected only if they produced four or more sentences in both discourse conditions in both CVL periods.

Note. + U = with overt undergoer, - U = missing overt undergoer.
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TABLE 5
Mean and Range of the Undergoer Omission Rate
Across Discourse Contexts, Before and After CVL 225

<table>
<thead>
<tr>
<th>Discourse Context</th>
<th>Rate of Undergoer Omission</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CVL &lt; 225</td>
<td>CVL =&gt; 225</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean Range</td>
<td>Mean Range</td>
<td></td>
</tr>
<tr>
<td>Undergoer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected</td>
<td>27% (19-33%)</td>
<td>2% (0-6%)</td>
<td></td>
</tr>
<tr>
<td>Open</td>
<td>39% (14-100%)</td>
<td>30% (25-50%)</td>
<td></td>
</tr>
</tbody>
</table>

Note. These are the means and ranges from the data presented in Table 4.

Across the transition of CVL = 225, the mean undergoer omission rate in the Undergoer Expected condition for these four children, fell from 27% to 2%. The undergoer omission rate also fell in the Open condition, but not as dramatically from 39% to 30%. Moreover, variability decreased across the transition of CVL = 225. When the CVL size did not exceed 225 the range of undergoer omission rates in the Undergoer Expected condition (19-33%) was contained within the range of omission rates in the Open condition (14-100%). When the CVL size exceeded 225, the range of undergoer omission rates in the two conditions do not overlap. These longitudinal data from individual children, are congruent with the pooled data and provide additional evidence that undergoer omission was pragmatically controlled for the advanced children in this sample.

DISCUSSION

The advanced children in this sample showed a marked tendency to omit the undergoer of the verb *eat* in the Open discourse context. These are contexts in which the preceding conversation was unrelated to "eating something specific", or in which food items and meal names were not discourse prominent. It was also found that these advanced children almost always produced *eat* with an overt undergoer in what we have termed
Undergoer Expected discourse contexts. The expectation that an undergoer would be overt in the sentences of the Undergoer Expected Context was based on Fillmore's insight that the INC was obligatorily disjoint in reference to any potential patient of the predicate eat that was saliently present in the pragmatic context.

These data indicate that, as children acquire the different argument structures of the verb eat, they become aware of the pragmatic licensing of the alternation. At very least, these data implicate the role of discourse tracking in the acquisition of the argument structure alternation of the verb eat. That is, the advanced children in this study were maintaining a register of the prominent NPs and predicates in discourse, and using this information to motivate the use of the argument structure alternation allowable with the verb eat. Moreover, these data suggest that discourse-pragmatic information is part of the child's representation of this argument structure alternation. Just how this information might be represented remains a subject for future research.

NOTES

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