

Late Acquisition of Reflexive and Reciprocal Pronouns:
A Pilot Study

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1. Introduction

Certain aspects of the acquisition of the adult system of anaphora have recently been debated by psycholinguists. One of these aspects is the child's acquisition of reflexives and reciprocals. Two linguists, Solan (1978) and Matthei (1978), have conducted research on children's understanding of the Specified Subject Condition (SSC), a restriction on bound anaphora considered by some syntacticians to represent the adult grammar of reflexives and reciprocals. It states:

In: ... X [α...Y...]....X...

No rule can involve X and Y where α contains a specified subject distinct from Y and not controlled by X, except where Y is in Comp.

For example, the SSC accounts for the grammaticality of the following sentences which involve reciprocal constructions:

1. *The boys want to vote for each other.*
2. **The boys want Max to vote for each other.*

It accounts also, for the grammaticality of the following reflexive constructions:

3. *Mary wants to vote for herself.*
4. **Mary wants Max to vote for herself.*

Their results leave several questions open. The study by Matthei (1978) of reciprocals, and the study by Read and Hare (1977) of reflexives, suggest that children may still not know the restriction on bound anaphora at age 6.¹ However, results of an experiment on reflexives by Solan suggest that restrictions on reflexives are understood at age 6 and that it is these restrictions that are overgeneralized and cause errors on backward anaphora at age 6 (Solan 1981:70-71). Thus the results of both Matthei and Solan agree that there is no sharp cutoff at which children start to interpret sentences as adults do. The open question is what auxiliary hypotheses children are adopting in the process of acquiring adult hypotheses.

To summarize the current debate, it is not yet certain to what extent children have acquired the SSC at age 6. The exact inter-relationship of the various anaphoric domains is unclear. No researcher seems to treat the question of whether reflexives and reciprocals are acquired at the same time, probably assuming that they are, since both require the same structural restriction. Since there are open questions

about children's hypotheses and strategies in acquiring the grammar of anaphora, a pilot study was devised to "test these unsettled waters" and suggest direction for an expanded experimental design.

2. The Pilot Study

2.1 Method

In this pilot study, no attempt was made to include a sufficient number of tokens for a full statistical analysis. Three tasks were involved: comprehension, imitation and production.

The comprehension task was modelled after Matthei (1978). Subjects were interviewed alone. A list of twelve randomly ordered sentences (two tokens each of six different structures) were read one by one by an experimenter. After each sentence was read the subject acted out the sentence using dolls. Four dolls were present and mentioned in the various sentences (Barbie, Ken, Wayne Gretzky and his girlfriend, Vicki). The children recognized the dolls and because they had moveable parts it was easy for the subjects to do the acting out. A list of the sentences by type and token appears in Table A together with the scoring code. The number in parenthesis after each sentence represents its position in the actual order of presentation. Type (a) sentences were designed to test processing of the verb *seem* and its effect on the choice of antecedent. Types (b) to (d) are considered neutral. Types (e) and (f) compare the child's reaction to the use of a definite or reflexive pronoun in prepositional phrases. We would note that grammaticality judgments for the (f) type sentences seem somewhat difficult since even some adults accept the definite pronoun as a reflexive in these cases. Nonetheless, for scoring purposes only those subjects choosing an antecedent outside the clause containing the pronoun were given a correct rating in these sentences.

The second task was a production task based on the imitation of five sentences similar to the (e) and (f) types of the comprehension task. Because there were very few errors even in the youngest group, we have excluded analysis of this task from the present study.

The final task required that the child observe a scenario which one experimenter acted out using the dolls. Having watched the actions, the child was asked who had done what. This resulted in a freely produced sentence. Three sentences were elicited in this manner. When responses were unclear, the child was given a probe. The children seemed to like watching an adult play with the dolls and readily created sentences. The questions and scenarios used in this task appear as type (g) to (i) in Table A. The entire procedure, even with a fourth task done for another study took from 10 to 15 minutes per subject.² All subjects were tested in two five-hour school days.

Table A

Type	Token	Correct Answers	Incorrect Answers
a	1. Barbie seemed to Vicki to pinch herself. (1) 2. Ken seemed to Wayne to pinch himself. (4)	Barbie pinches herself. Ken pinches himself.	Vicki pinches herself. Wayne pinches himself.
b	1. Wayne told Vicki that Barbie pinched herself. (5) 2. Barbie told Ken that Wayne pinched himself. (10)	Barbie pinches herself. Wayne pinches himself.	Vicki pinches herself. Ken pinches himself.
c	1. Barbie said that Vicki pinched herself. (7) 2. Ken said that Wayne pinched himself. (2)	Vicki pinches herself. Wayne pinches himself.	Barbie pinches herself. Barbie pinches Vicki. Ken pinches himself. Ken pinches Wayne.
d	1. Barbie wanted Vicki to pinch herself. (9) 2. Ken wanted Wayne to pinch himself. (12)	Vicki pinches herself Wayne pinches himself.	Barbie pinches herself. Barbie pinches Vicki. Wayne pinches Ken.
e	1. Vicki said that Barbie put some perfume on herself. (11) 2. Wayne said that Ken put a pencil beside himself. (6)	Barbie puts perfume on herself. Ken puts pencil beside himself.	Barbie put perfume on Vicki. Ken puts pencil beside Wayne.
f	1. Vicki said that Barbie put some perfume on her. (3) 2. Wayne said that Ken put a pencil beside him. (8)	Barbie puts perfume on Vicki. Ken puts pencil beside Wayne.	Barbie puts perfume on herself. Ken put pencil beside himself.
g	What is Barbie doing?	She is putting perfume on herself. Probe = on whom?	
h	What are Barbie and Vicki doing?	They are putting perfume on each other. Probe = on whom?	
i	Now what are they doing?	They are putting perfume on themselves. Probe = on whom?	

2.2 Subjects

The 31 subjects were all students in grades 1, 3, 4 and 6 at an elementary school in Calgary, Alberta, Canada. The age range was 6 years, 2 months to 11 years, 9 months. The school has a bilingual (French-English) program, and students are listed in Appendix A as either B (bilingual) or R (regular). All students considered in the results speak English at home. Two students who speak another language at home and who performed in a markedly different manner from that of the other subjects, were eliminated. That the effect of true bilingualism is evident is itself an interesting finding.

For the purposes of the Results (Appendix A, Tables 1-3), subjects were divided into three groups:

- Group 1 - grade 1, ages 6 years, 2 months to 7 years, 2 months
- 10 subjects: 4 boys, 6 girls
- Group 2 - grade 3, ages 8 years, 1 month to 8 years, 9 months
- 9 subjects: 5 boys, 4 girls
- Group 3 - grades 4 and 6, ages 10 years to 11 years, 9 months
- 12 subjects: 5 boys, 7 girls

2.3 Results

Results can be seen in Appendix A, Tables 1-3. It is best to consider these data and means in terms of what is "going on" in children's late acquisition of reflexives and reciprocals. The following trends can be distinguished:

(i) There remains much misunderstanding of the *seem* construction even in Group 3 (Table 3), where responses were only about 50% correct. The effect of age may be significant since, until the age of 7, no subject responded correctly to token (a) *Barbie seemed to Vicki to pinch herself*.

(ii) One subject (No. 11, Group 3), at age 11 years, 7 months, gave what could be called the complete adult response to every item. Indicative of these complete adult responses are the \checkmark responses to token (f) *Vicki said that Barbie put some perfume on her*, when subjects begin to choose an antecedent outside the clause containing the pronoun. Prior to this time, younger children clearly use the definite pronoun as if it were a reflexive. The choice of adult response increases from 20% in Group 1 to 44% in Group 2 to 83% in Group 3. The fact that the experimenter tended to use contrastive stress on the definite pronoun in token (f.2) shows up in a slightly increased non-reflexive choice, especially in Group 3 (50% for (f.1) *Vicki said that Barbie put some perfume on her*, 83% for (f.2) *Wayne said that Ken put a pencil beside him*).

(iii) The results of the production task seem to indicate that children sometimes produce the reflexive instead of the reciprocal until Group 3, when their response for tokens (7-8) are 100% correct. In Group 2, two subjects still use the reflexive for (7) *putting perfume on each other* as did four subjects in Group 1. Along with the two subjects using the definite pronoun instead of the reflexive, this means that 60% of subjects up to age 7 did not produce the reciprocal. In addition, over 30% of the subjects (one was not given a probe) did not produce the reflexive but, instead, produced the definite pronoun in token (6) *putting perfume on herself*. Two of these were the above-noted exceptions, who produced the definite pronoun for (7). One of these produced the definite pronoun even for the reflexive in (8) *putting perfume on themselves*.

(iv) The least surprising trend in these data is that production of correct formal features of the reflexive is a very late acquisition. Children in Group 3 are still using the form *theirselves* or some variation of it 42% of the time. In Group 2, it was 78%, practically unanimous deviation from "standard English".

2.4 Discussion

These results have a number of implications. They suggest that acquisition of the complete adults system for reflexives and reciprocals continues well into grade 3 and that formal aspects of it are being learned as late as 11 years, 9 months.

There are indications that children in grade 1 are still trying to figure out how domains of anaphora fit together. Even if comprehension is not affected, perhaps production lags behind, leading to confusion of definite pronoun, reflexive and reciprocal. It seems to be a late step in acquisition of the complete adult system for children to link *him* or *her* with an antecedent outside the clause. We have come full circle from Group 1, where some children use *him* or *her* as if they were reflexive.

This lag in production, seen in errors made on the production task, suggests a tentative developmental sequence: an insight into children's auxiliary hypotheses. Although a child in grade 1 would never produce the sentence *Barbie is washing her* (instead of *herself*), several subjects do produce the sentences: *Barbie is putting perfume on her* (instead of *herself*); *They are putting perfume on -em* (instead of *themselves*). The child is using the definite pronoun as the reflexive at least in this prepositional phrase structure. There might be a series of stages that children go through while constructing the adult grammar. The system might look like this:

(i) Children confuse *himself* with *him*, etc. For example, a child produces: *She is putting perfume on her* instead of *She is putting perfume on herself*.

(ii) Children confuse *themselves* and *each other*. For example, a child produces: *They are putting perfume on theirselves* instead of *They are putting perfume on each other*.³

(iii) Children make proper distinctions. For example, a child uses *her* to mean *She is putting perfume on another person*. A child also uses reflexive and reciprocal pronouns correctly and distinguishes between them.

There are explanations for such a sequence in the acquisition of the several domains of anaphora. Children must learn pronoun interpretation (a discourse rule), reciprocal and reflexive interpretation, bound anaphora restrictions and the backward anaphora restriction (structural restrictions and sentence rules). Solan (1978:178-80) explains how the real complexity for children is in grasping the system as a whole, understanding the relationship among all these systems. The two different domains of interpretative strategies and structural restrictions do not overlap but "the inability to integrate various linguistic domains limits the possibilities of incorrect hypotheses and also inhibits the positing of certain correct ones".

3. Conclusion

As a pilot for an expanded experimental design, the study has suggested several alterations. The production task would include an adequate number of tokens and would reverse the order of presentation in the series on reflexives and reciprocals so that reflexive would precede reciprocal as well as the other way around. Comprehension tasks would be devised to compare comprehension and production at various stages. Tokens using constructions with *promise* and *persuade* might further test children's willingness to violate the SSC. A test for mastery of *seem* would also be useful. The sample should be expanded to test students at age 5 to see what results there are on the production and comprehension tasks at the age when Solan claims acquisition of the SSC. Adults would be tested to see how their judgments on tokens such as (f) *Vicki said that Barbie put some perfume on her* would differ, if at all, from those of older children. No children in a bilingual program would be used.

The focus of the study would be late acquisition of reflexives. The adult grammar of anaphora would be outlined as a context for the relevant reciprocal and reflexive interpretation rules and bound anaphora restriction. Certain subtle features of reflexive usage, especially the use of reflexive in prepositional phrases, would be studied. Since many of these reflexives are ambiguous and adult judgments may vary, some experiments could test children's use of contrastive stress. Hypotheses would be formulated in order to determine steps in late acquisition of the adult grammar. They would specifically test current theories that complex structural constraints are learned late because they are more marked, and because the data is not rich enough (low frequency), and that some complex structural constraints are never learned.

Thus, an expanded design could provide further evidence for a developmental sequence in children's attempts to form a theory of anaphora and, in addition it would examine acquisition of subtle features of the anaphoric domain.

Footnotes

*I wish to thank Karen Taylor-Browne for making arrangements to test students, and Dr. William O'Grady and Ron Smyth for guidance and comments. This paper is an adaptation of a project for Dr. O'Grady's course on child language acquisition.

¹Six year olds in the Read and Hare study violated the restrictions on bound anaphora by choosing *the boy* as coreferential with *himself* in the following sentence: (40) *The boy thought that the man hurt himself.* (Solan 1978:99).

²See the paper in this issue of Calgary Working Papers in Linguistics 9 (1983) by Karen Taylor-Browne, titled "Acquiring Restrictions on Forwards Anaphora: A Pilot Study" for questions that students answered before this study.

³It is interesting that several adults say that *Barbie and Vicki are putting perfume on themselves* is equivalent to *Barbie and Vicki are putting perfume on each other.*

APPENDIX A: TABLE 2

Group	Sentence Type			Age	a	b	c	d	e	f			
	Subject	Sex	Pro										
2	1	M	R	8:1	x : x	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	x : x	✓	✓	theirselves
	2	F	B	8:1	x : x	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓	✓	theirselves
G	3	M	R	8:2	x : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	x : x	✓	✓	theirselves
	4	F	B	8:5	x : x	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : x	✓	✓	theirselves
A	5	M	B	8:5	x : x	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	x : ✓	✓	✓	theirselves
	6	F	B	8:6	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	x : x	✓	✓	theirselves
D	7	M	B	8:8	x : x	✓ : ✓	x : ✓	✓ : ✓	✓ : ✓	✓ : x	✓	✓	theirselves
	8	M	R	8:9	x : x	✓ : ✓	x : ✓	✓ : ✓	✓ : ✓	x : ✓	✓	✓	✓
E	9	F	B	8:9	✓ : x	✓ : ✓	✓ : ✓	x : ✓	✓ : ✓	x : ✓	✓	✓	theirselves
	Average response in %				78% x	100% ✓	78% 100% ✓	89% 100% ✓	78% 100% ✓	33% 44% ✓	100% ✓	78% 22% other	100% ✓ 78% incorrect form
LEGEND					B = bilingual program R = regular program ✓ = correct x = incorrect								
1. Barbie seemed to Vicki to pinch herself.					2. Ken seemed to Wayne to pinch himself.								
1. Wayne told Vicki that Barbie pinched herself.					2. Barbie told ken that Wayne pinched himself.								
1. Barbie said that Vicki pinched herself.					2. Ken said that Wayne pinched himself.								
1. Barbie wanted Vicki to pinch herself.					2. Ken wanted Wayne to pinch himself.								
1. Vicki said that Barbie put some perfume on herself.					2. Wayne said that Ken put a pencil beside himself.								
1. Vicki said that Barbie put some perfume on her.					2. Wayne said that Ken put a pencil beside him.								
What is Barbie doing? (She is putting some perfume on herself.) Probe = On whom?													
What are Barbie and Vicki doing? (They are putting some perfume on each other.)													
What are they doing now? (They are putting perfume on themselves.)													

APPENDIX A: TABLE 3

Group	Sentence Type			a	b	c	d	e	f			
	Subject	Sex	Age									
3	1	M	10:0	x : x	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	x : ✓	✓	✓	✓
	2	F	10:0	x : ✓	✓ : ✓	✓ : x	✓ : ✓	✓ : ✓	x : x	✓	✓	✓
	3	M	10:0	✓ : ✓	✓ : x	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓	✓	✓
G	4	F	10:0	✓ : ✓	✓ : x	✓ : ✓	✓ : ✓	✓ : ✓	x : ✓	✓	✓	✓
	5	F	10:1	x : x	x : ✓	✓ : x	✓ : ✓	✓ : ✓	✓ : ✓	✓	✓	✓
	6	F	10:1	✓ : x	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓	✓	✓
4	7	M	10:1	✓ : x	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓	✓	✓
	8	M	10:3	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : x	✓	✓	✓
	9	F	10:5	x : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓	✓	✓
G	10	M	11:6	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	x : ✓	✓	✓	✓
	11	F	11:7	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓	✓	✓
	12	F	11:9	x : x	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓ : ✓	✓	✓	✓
6	Average response in %			42x : 50x 56 : 50x	92 : 93	100 : 83	83 : 83	92	100x	50 : 83	100x	100x
LEGEND												
B = bilingual program												
R = regular program												
✓ = correct												
x = incorrect												
				100x / 42x incorrect form								

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