

Acquisition of Principle B: Evidence from Exceptional Coreference Contexts

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1. Introduction

Children's delayed obedience to Principle B has been a long-standing problem. The major piece of evidence for the currently wide-spread view that 5-6-year-olds have the innate knowledge of Principle B was Chien & Wexler's (1999) experiment where it was found that 5-6-year-olds performed at chance on the condition where a referential NP was used as a potential antecedent of a pronoun, as in (1),

(1) Mama Bear washes her

and performed well on the condition where a quantificational NP was used as a potential antecedent of a pronoun. The crucial difference between the two conditions is the fact that, in some contexts, a pronoun can be construed as coreferent with a proper noun that c-commands it in its governing category. A variety of cases where a pronoun corefers with a c-commanding referential NP were famously discussed in Evans (1980). In contrast, a pronoun cannot corefer with a c-commanding quantificational NP because the latter does not pick out a referent.

However, Chien & Wexler's (1999) finding that there is an asymmetry in children's performance on the quantificational vs. referential NP conditions has not been replicated in more recent experiments. Thus Elbourne (2005) presents a summary of experiments (Lombardi & Sarma (1989), Boster (1991)) in which children did equally poorly on the quantificational NP and referential NP antecedent conditions. At the same time, there is evidence suggesting that 5-6-year-olds do not yet have the correct semantics of the quantifier *every*. Thus it was found that children treat "every N" as a simple plural (Roeper et al, in press) and that they do not respect constraints on the movement of *every* (Coles-White, de Villiers & Roeper, 2004). All of these experimental findings cast doubt on the idea that the asymmetry between children's poor performance on the referential NP condition and their superior performance on the quantificational NP condition that was found in Chien & Wexler's (1999) experiment can be taken as evidence to the effect that 5-6-year-old English-speaking children obey Principle B.

The rest of the paper is organized as follows. In sections 2 and 3, I briefly summarize Thornton & Wexler's (1999) and Reinhart's (2004) accounts of children's Principle B delay, respectively. In section 4, I propose an account of why adults compute the disjoint reference reading in "regular" Principle B contexts (henceforth B contexts) and of what forces the coreference reading in contexts that I will dub Exceptional Coreference contexts. In section 5, I summarize acquisition predictions of each of the accounts in question. In section 6, I discuss the experiment on B-contexts and Exceptional Coreference contexts. Section 7 is the conclusion.

2. Thornton & Wexler's (1999) Extended Creation of Guises Account

According to Thornton & Wexler (1999) (henceforth T&W), children have the innate knowledge of Principle B and perform at chance in the referential NP condition because they misinterpret B-

contexts as Exceptional Coreference contexts in which coreference between the two NPs is forced by the context, as in (2) and (3).

- (2) A: Is this Speaker Zelda?
 B: How can you doubt it? She₁ is praising her₁ to the sky. No competing candidate would do that.

(based on Heim 1998: 213).

- (3) You know what Mary, Sue and John have in common? Mary admires John, Sue admires him and John₁ admires him₁ too.

(Heim 1998: 216).

According to T&W, children overaccept the local coreference interpretation in B-contexts because they assign different guises to a given individual even when such an interpretation is not supported by the context. Consider T&W's Extended Guise Creation hypothesis,

- (4) "Children create guises in a superset of the contexts in which adults do. Children create guises in contexts in which adults do not, but they do not fail to create guises where they are allowed by adults" (T&W: 102; *underlined by A.V.*).

- (5) Mama Bear washed her

Presented with (5) in a B-context, the child assigns it the representation in (6),

- (6) Mama Bear washed her
 P1 P2

where Mama Bear is presented in two different guises, that of the bear in the flesh (P1) and that of the individual that washed somebody (P2). Thus, for the child, (5) has the interpretation that Mama Bear washed the individual that washed somebody. On T&W's account, it is this kind of reasoning that leads 5-6-year-olds to misinterpret B-contexts as Exceptional Coreference contexts 50% of the time.

3. Reinhart's (2004) Processing Account

As in her earlier work, Reinhart (2004) argues that what licenses the coreference reading in an Exceptional Coreference context is the difference between the binding and coreference readings. According to Reinhart's Covaluation Rule I, the coreference reading is not licit if the binding and coreference LFs of a given sentence are the same. If the LFs are different, the coreference reading is allowed, as in (7).

- (7) Everybody hates Lucifer. Only he₁ himself pities him₁.
 Binding reading: Lucifer is the only self-pitier.
 Coreference reading: Nobody besides Lucifer pities Lucifer.
 (Heim 1998: 212).

Reinhart maintains that what causes 5-6-year-old children to perform at chance on B-contexts is their memory limitations. While children have the knowledge of Principle B and Covaluation Rule I, the main stumbling block is computing and holding in memory the reference-set for covaluation, which consists of the binding and coreference readings of a given sentence. Reinhart (2004) argues that when 5-6-year-olds are tested on Principle B contexts, being unable to carry out the reference-set computation, children resort to guessing, as a result of which they compute the erroneous coreference reading in B-contexts about 50% of the time.

4. My Account of B-contexts and Exceptional Coreference Contexts

4.1 Open Propositions and Exceptional Coreference contexts

It has been observed that the coreference reading is licensed in Exceptional Coreference contexts because of the presence of an Open Proposition (Ward 1983). To illustrate what I mean by an Open Proposition, I provide some examples of Exceptional Coreference contexts along with the relevant Open Propositions in (7-9).

- (7) Everyone here admires Oscar. Joan admires Oscar, Mary admires Oscar, and Oscar admires him.
Open Proposition: x admires Oscar
- (8) It's not true that no one voted for John. John voted for him.
Open Proposition: x voted for John
- (9) Everyone hates Lucifer. Only he himself pities him.
Open Proposition: x pities Lucifer

The Open Propositions in (7-9) are made salient by the prior discourse.

In Ward (1983), it was proposed that the relevant Open Proposition is derived by replacing the stressed constituent with an unbound variable. The Open Proposition represents presupposed information and the stressed (or, in modern terms, focused constituent) is new information. I adopt Ward's (1983) original insight that the presence of an Open Proposition licenses coreference in Exceptional Coreference contexts, but argue that Open Propositions are derived in a different manner.

In Exceptional Coreference contexts of the identity debate variety, as in (10), the relevant Open Proposition cannot be obtained by replacing a stressed constituent with an unbound variable, as Ward's rule requires.

- (10) A: Is this Speaker Zelda ?
B: How can you doubt that this Speaker is Zelda₁ ? She₁ is praising her₁ to the sky. No competing candidate would do that.
(based on Heim 1989: 213).

In (10), either *she* or *her* may but do not have to be focused on the coreference reading. In the neutral pronunciation, it is the VP *is praising* that is focus-marked. If the VP *is praising* alone is focused, according to Ward's algorithm for deriving an Open Proposition, the relevant Open Proposition is, "she is X-ing her to the sky." However, the previous discourse does not make this Open Proposition salient, which leaves the coreference reading unaccounted for.

I would like to argue that, in identity debate Exceptional Coreference contexts, the relevant Open Proposition is provided by the situational context rather than by the linguistic form of the preceding utterance. In the dialogue in (10), in order for B to have felicitously referred to Zelda in his last utterance, the dialogue must have taken place in the following context. A and B are watching a Speaker whose identity is under debate praise Zelda. This situational context gives rise to the Open Proposition, "x is praising Zelda to the sky." Interlocutors communicate efficiently by recording old information in the Common Ground. In this instance, if both interlocutors share the view that Zelda is the only person who would praise Zelda, then the pronoun "she" is construed as referring to Zelda.

The coreference reading in an Exceptional Coreference context is licensed if an Open Proposition is made salient either by the prior discourse, as in (7-9), or by the situational context, as in identity debate contexts such as (10). Crucially, the relevant Open Proposition must fix the referent of the pronoun. This requirement is formalized in my Discourse Condition on Exceptional Coreference contexts provided in (11).

- (11) *Discourse Condition on Exceptional Coreference Contexts:*
A pronoun and a non-quantificational antecedent that c-commands it must co-refer if the Common Ground contains an Open Proposition that fixes the referent of the pronoun to the same referent as that of the c-commanding antecedent.

It needs to be noted here that the condition in (11) is a description of what the prior discourse needs to be like in order for the coreference reading to be forced by the context; in and of itself, it does not account for the patterns of coreference and disjoint reference in Exceptional Coreference and B-contexts. However, it will be shown that computing an Open Proposition is a prerequisite for correctly interpreting an Exceptional Coreference context.

4.2. B-contexts, Exceptional Coreference Contexts and Q- and I-implicatures

In this section, I will introduce Levinson's (2000) implicatures-based account of what licenses coreference in Exceptional Coreference contexts and disjoint reference in B-contexts, and argue that it needs to be supplemented with the *Discourse Condition on Exceptional Coreference Contexts*. While I adopt Levinson's (2000) implicatures-based account of disjoint reference and coreference, I do not follow Levinson in assuming that Principle B is completely reducible to a pragmatic principle. Rather, I fully subscribe to Reinhart's (1983) distinction between binding as a syntactic phenomenon and coreference as a pragmatic phenomenon.

Levinson (2000) observes that pronouns and reflexives constitute Horn scales of the form <reflexive, pronoun>, with the reflexive being stronger in terms of being *necessarily referentially dependent*. Thus in B-contexts, by using a pronoun, the Speaker Q-implicates that a stronger reflexive does not hold, i.e., that the coreference reading does not hold.

(12) Mama Bear is washing her.

In (12), coreference is ruled out by the Q-implicature. Thus the use of (12) implicates that (13) does not hold.

(13) Mama Bear is washing herself.

A Q-implicature is not computed if the Speaker has some additional reason other than not being in a position to make a stronger statement not to use the stronger item on the scale. Crucially, the Q-implicature goes through iff the binding reading is the same as the coreferential reading. If the binding and coreferential readings are different, and the coreference reading is the relevant one, this is a reason not to use a stronger scalar item.

In Exceptional Coreference contexts, coreference is ruled in by an I-implicature. Levinson's (2000) I-Principle requires speakers to "say as little as necessary" or "to produce the minimal linguistic information sufficient to achieve your communicational ends (bearing Q in mind)" (Levinson 2000: 114). Clause (c) of recipient's corollary of Levinson's I-Principle requires the Hearer to

(14) "Avoid interpretations that multiply entities referred to (assume referential parsimony); specifically, prefer coreferential readings of reduced NPs (pronouns or zeroes)." (Levinson 2000: 144-115).

Next, I will argue that Levinson's account needs to be supplemented with my Discourse Condition in (11). In an Exceptional Coreference context, an adult computes an Open Proposition, which makes her realize that the referent of the pronoun is fixed. The content of the Open Proposition suggests that the intended interpretation of the pronoun is that of being coreferential with the local antecedent. Since the referent of the pronoun is known from the Open Proposition, the potential Q-implicature to the effect that the coreferential reading does not hold contradicts the knowledge that is already part of the Common Ground. At the same time, in an Exceptional Coreference context, the binding reading is different from the coreference reading. In order to arrive at the difference between the two readings, one needs to compute an Open Proposition. The adult does not compute the potential Q-implicature because using a reflexive would have resulted in a different interpretation from the one that would have been computed had the pronoun been used. So both the Open Proposition and the contrast in meaning rule out coreference. Instead, one computes an I-implicature to the effect that the pronoun is coreferential with the non-quantificational NP that c-commands it. Consider the steps of reasoning that make the Hearer decide to compute an I-implicature rather than a Q-implicature in an Exceptional Coreference context.

- (15) a. It's not true that no one voted for John. John voted for him.
 b. Binding reading: John voted for himself.
 c. Coreference reading: John voted for John, who is the individual that only John voted for.
 d. Open Proposition: "x voted for John."
- (16) Step One: The Open Proposition in (15d), "x voted for John," is computed.
 Step Two: The Open Proposition makes salient the coreference reading in (15c), which fits with the content of the Open Proposition.
 Step Three: The binding reading in (15b) is different from the coreference reading. The binding reading does not fit with the content of the Open Proposition.
 Step Four: A Q-implicature forcing disjoint reference is suppressed.
 Step Five: An I-implicature to the effect that *him* and *John* corefer in (15) is computed.

Step One of computing an Open Proposition is a crucial one in resolving anaphora in Exceptional Coreference contexts; if one is unaware of the content of the Open Proposition, the meaning distinction between the binding and coreference readings often cannot be made. If the last sentence of (15), "John voted for him," is considered out of context, there is no difference between the binding and coreference readings.

5. Acquisition Predictions

T&W's (1999) and Reinhart's (2004) accounts of Exceptional Coreference contexts and the account that I have proposed here make conflicting predictions about children's performance on Exceptional Coreference contexts vs. that on B-contexts.

The predication of T&W's (1999) account is that children will have no trouble interpreting Exceptional Coreference contexts. According to T&W's Extended Guise Creation hypothesis, "children do not fail to create guises in contexts where they are allowed by adults." Crucially, T&W claim that children often misinterpret B-contexts as Exceptional Coreference contexts, which leads them to make coreference errors in B-contexts about half the time.

Thus the T&W account would predict that children go through the following stages.

Non-Adult Stage One: children perform at chance on B-contexts where a referential NP is used as a potential antecedent of a pronoun and perform well on interpreting Exceptional Coreference contexts.

Adult Stage: children perform well both on B-contexts where a referential NP is used as a potential antecedent of a pronoun and on interpreting Exceptional Coreference contexts.

The prediction of Reinhart's (2004) account is that children will find Exceptional Coreference contexts as challenging as regular B-contexts because in both cases they will experience processing difficulties in comparing two representations – the binding one and the coreference one. Reinhart's claim is that the task of comparing two LFs exceeds the child's computational resources, as a result of which the child guesses between the two readings and performs at chance. Once the child's computational abilities have matured to the point that she is able to manipulate two representations simultaneously, she will do equally well on B-contexts and Exceptional Coreference contexts.

Thus Reinhart's account would predict that children go through the following stages.

Non-Adult Stage One: children perform at chance on B-contexts where a referential NP is used as a potential antecedent of a pronoun and on interpreting Exceptional Coreference contexts.

Adult Stage: children perform well both on B-contexts where a referential NP is used as a potential antecedent of a pronoun and on interpreting Exceptional Coreference contexts.

It may be useful to reiterate that both T&W's and Reinhart's accounts presuppose that 5-6-year-old children know that Principle B applies in English. As I have pointed out, both the recent experimental results on Principle B contexts and on *every* suggest that 5-6-year-olds acquiring English have not instantiated Principle B in their grammar.

Thus I hypothesize that 5-6-year-old children acquiring English are yet to instantiate Principle B in their grammar. Based on this hypothesis, I predict that children go through the following non-adult stages. During the first stage, children treat English nonreflexive pronouns as ambiguous between pronouns and anaphors. In interpreting B-contexts and Exceptional Coreference contexts, children are guided by the pragmatic principle of Relevance in determining the referent of the pronoun.

Consequently, at this stage, children compute the disjoint reference reading and the coreference reading at chance both in B-contexts and in Exceptional Coreference contexts.

Subsequently, children go through the second stage where they have constructed the <reflexive, pronoun> scales and instantiated Principle B in their grammar. At this stage, children compute the disjoint reference reading in B-contexts.

In order to classify a context as an Exceptional Coreference context, the child needs to know that what distinguishes Exceptional Coreference contexts from B-contexts is the presence of an Open Proposition and the difference between the binding and coreference readings in the former but not the latter. Crucially, the child needs to be able to compute an Open Proposition. Subsequently, the child needs to reason that the potential Q-implicature is suppressed and needs to compute an I-implicature. Given that Exceptional Coreference contexts are rare in the input, it is unlikely that 5-6-year-olds have had enough experience with these contexts to recognize them as such, and to have learned that they require the presence of an Open Proposition.

In view of this, I am hypothesizing a second non-adult stage where the child mistakenly treats Exceptional Coreference contexts as B-contexts. Thus the child computes the disjoint reference reading in B-contexts and in Exceptional Coreference contexts.

The implicatures-based account predicts that children go through the following stages.

Non-Adult Stage One: children perform at chance on B-contexts where a referential NP is used as a potential antecedent of a pronoun and on interpreting Exceptional Coreference contexts.

Non-Adult Stage Two: children perform well on B-contexts where a referential NP is used as a potential antecedent of a pronoun and perform at chance on interpreting Exceptional Coreference contexts.

Adult Stage: children perform well both on B-contexts where a referential NP is used as a potential antecedent of a pronoun and on interpreting Exceptional Coreference contexts.

6. The Experiment

6.1. Methods

20 5;5 – 6;10-year-old children were tested on B-contexts, which constituted condition one, and on Exceptional Coreference contexts, which constituted condition two. Five test items per condition were given. A within-subjects design was employed. The independent variable was the type of context; the dependent variable was the number of correct responses in each condition. In the case of Exceptional Coreference contexts, the correct response was the coreference reading; in the case of B-contexts, the correct response was the disjoint reference reading.

Children were told a story and then asked a question concerning the identity of the referent of the pronoun. The child was shown dolls and props that were relevant to the story that he was being told. The events described in the story were not acted out because that would have given away the referent of the pronoun. In (17), an example of an Exceptional Coreference context story is given.

(17) Exceptional Coreference context:

One day, Mary, Jane and Billie decided to draw each other. Billie drew Mary and Mary drew Billie. Nobody drew Jane, so Jane drew her.

Q: Who did Jane draw?

6.2. The Hypotheses

As was discussed in detail in section 5, T&W's, Reinhart's and my accounts make conflicting predictions regarding children's performance on B-contexts vs. that on Exceptional Coreference contexts.

Reinhart's account predicts H_1 below.

H_1 : Children perform the same on Exceptional Coreference contexts and B-contexts.

Thornton & Wexler's account predicts H_2 .

H_2 : Children perform better on Exceptional Coreference contexts than on B-contexts.

My account predicts H_3 .

H_3 : Children perform better on B-contexts than on Exceptional Coreference contexts.

6.3. Results

It was found that in the B-contexts condition, the mean number of correct (disjoint reference) responses was 3.5 out of the maximum of 5 with a standard deviation of 1. In the Exceptional Coreference contexts condition, the mean number of correct (coreference) responses was 2.2 out of the maximum of 5 with a standard deviation of 1.2. A significant main effect of the type of context was found: children perform better on B-contexts than on Exceptional Coreference contexts. Paired samples T test: ($T(19)=3.2, p<0.05$).

H₃ predicted by the account that is being argued for here was supported by the data, while H₁ predicted on Reinhart's account and H₂ predicted on T&W's account were not supported. As I have hypothesized, my results have shown that children go through two non-adult stages.

Non-Adult Stage One: children perform at chance on B-contexts where a referential NP is used as a potential antecedent of a pronoun and on interpreting Exceptional Coreference contexts.

During the first stage, children have not instantiated Principle B in their grammar. Eleven children who performed at chance on Exceptional Coreference contexts and B-contexts are at this stage. Their results are provided in Table 1 below¹.

SUBJECT #	CHILD	AGE	B-CONTEXTS	EXCEPTIONAL COREFERENCE CONTEXTS
1	H. A.	6;3	4	3
3	N. K.	6;7	4	4
4	S. A.	6;8	1	2
5	G. O.	6;9	4	3
6	C. A.	6;4	3	2
7	K. E.	6;6	3	3
10	J. A.	5;6	4	3
12	J. U.	5;6	3	3
15	A. G.	5;8	4	3
16	D. A.	6;1	3	3
17	P. H.	6;0	2	3

Table 1. Non-adult stage one.

The Key: the number of correct responses to each type of context is provided.

Below I reproduce my prediction of how children fare on the two conditions during the second stage.

Non-Adult Stage two: children perform well on B-contexts where a referential NP is used as a potential antecedent of a pronoun and perform at chance on interpreting Exceptional Coreference contexts.

During the second stage, children have instantiated Principle B in their grammar but have no knowledge of Exceptional Coreference contexts that force the coreference reading. Eight children who did better on B-contexts than on Exceptional Coreference contexts are at this stage; their results are provided in Table 2.

SUBJECT #	CHILD	AGE	B-CONTEXTS	EXCEPTIONAL COREFERENCE CONTEXTS
8	K. A.	6;8	4	0
9	L. U.	5;6	4	0
11	M. A.	5;6	3	0
13	S. O.	5;5	5	2
14	S. I.	5;7	4	2

¹ It needs to be noted that N. K.'s results probably should not be classified as being at chance on both types of contexts because he provided 4 correct responses out of 5 in both conditions.

18	H. A.	6;0	4	1
19	N. I.	6;3	4	2
20	A. N.	5;7	5	1

Table 2. Non-adult stage two.

Only one child did better on Exceptional Coreference contexts than on B-contexts; this child’s results are provided in Table 3.

SUBJECT #	CHILD	AGE	B-CONTEXTS	EXCEPTIONAL COREFERENCE CONTEXTS
2	R. A.	6;10	2	4

Table 3. The child who did better on Exceptional Coreference contexts than on B-contexts.

No child was at the adult stage, i.e., did perfectly both on B-contexts and Exceptional Coreference contexts. In Figures One and Two below, children’s individual and overall responses are provided, respectively.

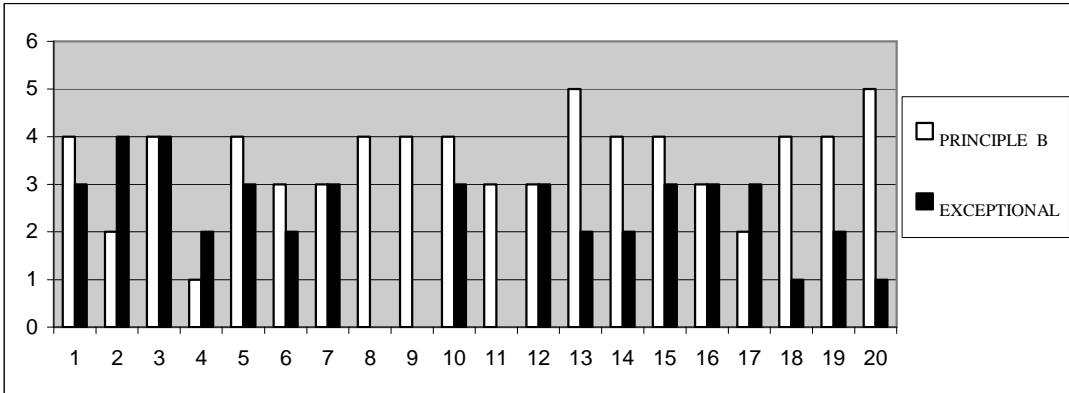


Figure one. Individual subjects’ performance.

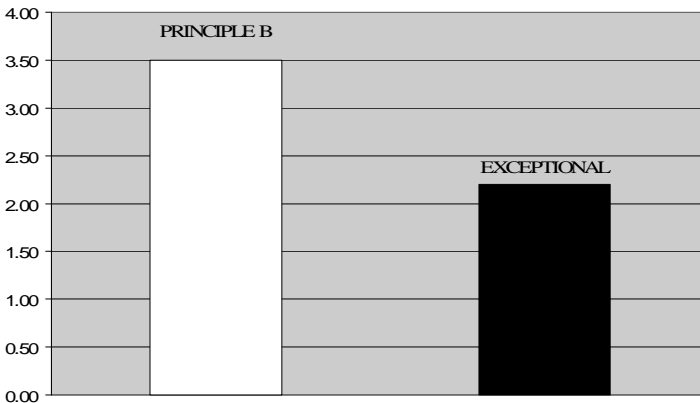


Figure two. Subjects’ overall performance on B-contexts and Exceptional Coreference contexts.

6.4. Discussion

Children who did at chance on the B-contexts condition and on the Exceptional Coreference contexts condition are at a stage where they have not instantiated Principle B in their grammar. I would

like to argue that English-speaking children start out by going through a Middle English stage in their acquisition of nonreflexive pronouns, i.e., a stage where these pronouns are not subject to Principle B. As Elbourne (2005) pointed out, in Middle English, nonreflexive pronouns could be used either as referential with no local antecedent or could be bound as reflexives by a local referential antecedent. Crucially, in Middle English, nonreflexive pronouns could also be bound by a local quantificational antecedent. As was previously mentioned, it was found in Lombardi & Sarma (1989) and Boster (1991) that children perform equally poorly on the quantificational antecedent condition and on the referential antecedent condition. These data are further evidence for the hypothesis that English-speaking children go through a Middle English stage in their acquisition of English pronouns.

Within the framework of the implicatures-based account that I am arguing for here, during the first stage, the child has not learned that reflexives and nonreflexive pronouns constitute Horn scales of the form <reflexive, pronoun> in English. The scale <reflexive, pronoun> itself is part of UG in the sense of being an option provided by UG for languages where pronouns are subject to Principle B. In languages where pronouns are not subject to Principle B, the scale <reflexive, pronoun> is not operative. In Middle English, there were distinct lexical forms for third person singular masculine and feminine accusative pronouns and the corresponding reflexives. Since a reflexive was not necessarily referentially stronger than the corresponding pronoun, the scale was not operative. Therefore, the Q-Principle never came into play and the referent of the pronoun was determined on the basis of the Gricean maxim of Relevance that requires speakers to make relevant contributions to the topic at hand. The ME pronoun could be bound locally, could be coreferential with a c-commanding antecedent or could refer to an antecedent outside its governing category. The Hearer figured out what the intended referent of the pronoun was by finding the most relevant interpretation in the given context.

Non-Adult Stage One: at this stage, in making referential decisions, the child is guided by the general requirement of the Gricean maxim of Relevance to make an inference to the interpretation that she perceives as the most relevant one in the given context. It is on the basis of Relevance that the child is choosing between the reading where the pronoun is bound by a local antecedent and the reading where the pronoun has a non-local antecedent.

During the second stage, the child has instantiated Principle B and the <reflexive, pronoun> Horn scales in his grammar. Thus the child correctly rules out the binding reading in B-contexts. However, during this stage, children perform poorly on Exceptional Coreference contexts because they have not learned what pragmatic conditions license coreference. Both in B-contexts and Exceptional Coreference contexts, the child rules out the binding reading. The child is unaware that an Open Proposition fixes the referent of the pronoun in an Exceptional Coreference context, and cannot compute an Open Proposition that makes salient the coreference reading. As a result of this, the child also cannot arrive at the difference between the binding and coreference readings that precludes an adult from computing a Q-implicature in Exceptional Coreference contexts. Thus the child computes a Q-implicature in both types of contexts.

Non-Adult Stage Two: Both in B-contexts and Exceptional Coreference contexts, the child computes the disjoint reference reading. Thus the child misinterprets B-contexts as Exceptional Coreference contexts.

Next, consider some of the children's responses to the Exceptional Coreference story in (17) reproduced below as (18).

(18) One day, Mary, Jane and Billie decided to draw each other. Billie drew Mary and Mary drew Billie. Nobody drew Jane, so Jane drew her.

Q: Who did Jane draw?

S.O. (5;5): "Mary. Because nobody drew her."

K.A. (6;8): "Nobody. Maybe she didn't have anybody to draw."

L.U. (5;6): "Jane drew him."

S.O., K.A. and L.U. are in non-adult stage two, which is a stage where children do well on B-contexts but at chance on Exceptional Coreference contexts.

Next, consider some of the children's responses to a question concerning an Exceptional Coreference context that involves presenting an individual in different guises.

(19) Q: Who did Mary scare?

- M.A. (5;6): “Billie. If it’s Halloween, then you get a witch costume on you and you scare someone. And they feel like it’s a witch but it’s only your friend.”
 S.I. (5;7): “Jane. Because she’s a witch.”

M.A. and S.I. are also in stage two.

During stage two, while computing the erroneous disjoint reference reading in Exceptional Coreference contexts, children compute the target disjoint reference reading in B-contexts. As an illustration, consider L.U.’s, S.O.’s and S.I.’s responses to a B-context.

(20) Q: Who did Jane feed?

Target response: Jane fed Mary.

L.U. (5;6): “Mary. She was helping her all the time and she is helping her now.”

S.O. (5;5): “Mary. Cause she wanted to try it first.”

S.I. (5;7): “Mary. So she can feed her.”

7. Conclusion

It has been shown that children go through an initial stage where they perform at chance on B-contexts and Exceptional Coreference contexts, and that they go through the second non-adult stage where they do better on B-contexts than on Exceptional Coreference contexts. These experimental results are evidence against the T&W account according to which children make coreference errors in B-contexts because they misinterpret them as Exceptional Coreference contexts; the T&W account makes the prediction that children fare better on Exceptional Coreference contexts than on B-contexts. My experimental results are also evidence against Reinhart’s account according to which children perform at chance on B-contexts because of the processing difficulties brought about by comparing representations; Reinhart’s account makes the prediction that individual children will do either at chance on both types of contexts or well on both types of contexts.

My experimental results provide support for the account that I have developed; on my account, it is predicted that children first go through a non-adult stage where they perform at chance on the two types of contexts in question, and that they go through the second non-adult stage where they fare better on B-contexts than on Exceptional Coreference contexts. Both of these predictions were borne out by the experimental results.

In contrast to the previous accounts of the Principle B lag, I have claimed here that 5-6-year-olds have not instantiated Principle B in their grammar. The question that this claim gives rise to is how does the child instantiate Principle B in his grammar. This occurs once the child has heard a sufficient amount of evidence to the effect that pronominals and reflexives are categorical. The child infers that pronouns and reflexives apply to any identical NP’s for any VP’s, and no special features of NP’s or VP’s play a role. For example, there is evidence suggesting that younger children misinterpret reflexives as having a physical interpretation, i.e., as referring to one’s body (McDaniel 1990). Eventually, the child learns from the input that reflexives are not limited to the physical interpretation. Once the child has classified reflexives and pronouns as categorical, he arrives at the generalization in (21).

(21) Iff two DPs in “DP1 Verb DP2” are identical, then DP2 => reflexive.

An account of English-speaking children’s Principle B lag would not be complete without a discussion of the asymmetry between children’s performance on Principle B and that on Principle C. As far children’s performance on Principle C is concerned, as is well-known, it has also been found in a variety of experiments that children do better on Principle C than on Principle B environments (ex.: McDaniel et al. 1992). Note that children’s early mastery of Principle C environments constitutes a problem for T&W’s (1999) and Reinhart’s (2004) accounts because of Exceptional Coreference contexts that are relevant to Principle C, as the one in (22).

(22) What do you mean John loves no one? He₁ loves John₁.

On T&W's account, children misinterpret B-contexts as Exceptional Coreference contexts, which leads to the Principle B lag. However, it is unclear why children do not misinterpret "regular" Principle C contexts as Exceptional Coreference contexts as well. It appears that, on T&W's account, children would be liable to compute the erroneous coreference reading in Principle C contexts as well because they would mistakenly reason that a given individual is presented in different guises. On Reinhart's (2004) account, in interpreting Principle C contexts, the child should experience the same processing difficulties in comparing the binding and coreference readings as he does in the case of B-contexts. One may argue that the reason why children appear to perform better on interpreting Principle C contexts is that, in these contexts, they reject backward anaphora regardless of condition C. However, Chierchia & Guasti (2000) have shown that very young children show mastery of condition C in reconstruction contexts not involving backward anaphora. On my account, the asymmetry between children's performance on Principle B and Principle C environments is expected. While R expressions are classified as such from the beginning, English nonreflexive pronouns are not, which makes interpreting B-contexts involving the latter more challenging.

8. Appendix

B-contexts test sentences:

- (1) Mary dressed her first.
- (2) Mary covered her with a blanket.
- (3) Then Mary covered her with a towel.
- (4) Jane fed her the chocolate.
- (5) Mary combed her.

Exceptional Coreference contexts test sentences:

- (1) Mary washed Jane, Billie washed Jane and Jane washed her.
- (2) Mary looked in the mirror and she scared her.
- (3) So Billie saved him from the Big Wolf.
- (4) Nobody drew Jane, so Jane drew her.
- (5) So Billie made him a chocolate cake.

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