How Pragmatics and Syntax Make Principle B Acquirable

Abstract

We present an experiment on the acquisition of regular Principle B contexts (B-contexts) and Exceptional Coreference Contexts (ECCs) by English-speaking children. We argue that binding is determined by the syntax, and adopt Levinson's (2000) implicatures-based account of disjoint reference and coreference that we supplement with our Discourse Condition on ECCs. We found that children went through a non-adult stage where they did well on B-contexts and misinterpreted ECCs as B-contexts. This result was predicted on our account but not on Thornton & Wexler's (1999) or Reinhart's (2004) account. We argue that the child creates grammatical classes of lexical items and then moves to syntactic representations open to parametric variation when crucial triggering input on anaphora is recognized. We argue that discrepancies in responses and comprehension/production differences can be accounted for with a Multiple Grammars approach.

1. Introduction

Our goal – the classic goal of acquisition research – is to represent Principle B in a manner which respects language diversity and permits the acquisition of a narrow option,

(1) Which grammar captures all and only the binding facts of English.

Our increased knowledge of the intricacy of pragmatic factors in pronoun resolution complicates the acquisition challenge in ways that engage conversational implicatures and Multiple Grammars. The first step is to outline roughly both the diversity of grammars and the diversity of experience to which the child is exposed.

We begin with an outline of what the child experiences for binding – which defines the acquisition space – although we address in depth only the question of simple pronominals. Our purpose in

this review is related to our ultimate claims: children begin with pragmatically refined and lexically linked hypotheses about every potential anaphor. They extract syntactic, hence categorical, generalizations at a later point as a result of specific triggering experiences after they have fixed the full array of lexical options.

There are learnability assumptions that this perspective entails. It is generally assumed – and we share the assumption – that parameters are innate. However, they must meet lexical criteria in order to apply. For instance, if there are no inflections, then it is not clear that the Pro-drop parameter can apply. Asian languages lack inflections and, therefore, we must explain missing subjects for reasons outside of the parameter.

Likewise, the famous Principle B principle does not apply unless the lexical presuppositions are met: for instance, the language must have pronouns and reflexives to differentiate. Ultimately, meeting the lexical presuppositions involves a very refined analysis of many potential anaphors. Eventually, the child drops refined assumptions, based on evidence, and comes to see *him* and *himself* not as an array of subtly different coreference devices, to which we return, but as in syntactic opposition within the clause (pronoun and reflexive)

Much acquisition work contains a rather different implicit assumption,

(2) Children acquire broad contrasts first and learn refined semantics later.

This assumption runs against a naturally restrictive view of how a child establishes a grammar, based on the Subset Principle,

(3) Make the narrowest hypothesis possible, experience will make it broader.

An assumption which is too broad at the outset will not encounter evidence to contradict it. In fact, the "broad" assumption about how the Binding Theory works does characterize English and thereby makes it difficult for linguists to see that a child could begin with a narrower hypothesis.

The acquisition problem that a child acquiring English faces is to determine binding for English.

In doing so, the child must obey the Subset Principle. The child has a full array of UG options to choose from, including many subtle differences not found in English. He can obey the subset principle by making the narrowest hypothesis until evidence forces a broader one.

2. General Outline

In our paper, we will use the following linguistic tools.

A) Parametric Theory and Binding Theory.

Parameters are construed as statements about sentence grammar. The domain of application of the Binding Theory is individual sentences.

a) We will discuss how the child acquires the syntactic difference between pronouns and anaphors, which leads to the instantiation of Principles A and B of the Binding Theory.

b) As is well-known, Principle B applies to arguments but not to adjuncts.

For instance, coreference with a non-reflexive is fine in, "John took a flashlight with him." In the light of this, we will consider the role that the adjunct / argument distinction plays in how a child acquiring English instantiates Principle B.

C) Conversational Implicatures.

We adopt Levinson's (2000) proposal that disjoint reference and coreference are forced by Quantity and I-implicatures, respectively. It will be argued that constructing Horn scales of the form <reflexive, pronoun> is a crucial step that a child has to make in order to correctly interpret regular Principle B environments (henceforth, B-contexts) and contexts discussed in Evans (1980) where the coreference reading is forced (henceforth, Exceptional Coreference contexts).

D) Discourse Structure.

We will demonstrate that Levinson's (2000) implicatures-based account needs to be supplemented with a *Discourse Condition on Exceptional Coreference Contexts*.

In order to capture coreference in a discourse like, "Everybody here admires John. Bob admires John, Mary admires John and John$_i$ admires him$_i$, too," this Condition requires the presence of an Open

Proposition in the prior discourse that fixes the referent of the pronoun and makes salient the coreference reading in Exceptional Coreference Contexts.

E) Multiple Grammar Theory.

Finally, we will use the Multiple Grammar theory approach to account for the comprehension / production asymmetry relevant to the instantiation of Principle B.

We will utilize and partially extend all these theories to describe an acquisition path that captures the old data and our own experiment on Exceptional Coreference contexts. The acquisition path that we claim children go through is the following one.

A) Stage 1.

Lexical distinctions determine – from a wide array in UG – how children define pronouns and reflexives (*self* / *himself* / *him*) and their phonological variations (*hisself* / *'im*). The factors that are relevant in this process are Point of View and physical/mental representation, among others. No parameters apply until *him* / *himself* are seen in opposition.

B) Stage 3.

The child constructs Horn scales of the form <reflexive, pronoun>, which enables him to compute the Quantity-implicature forcing the disjoint reference reading in B-contexts where the referential antecedent is used. However, Exceptional Coreference contexts are misinterpreted as B-contexts. The child computes the Q-implicature in both types of contexts.

C) Stage 2.

A specific trigger of syntactic noncoreference in clausemate environments enables the child to set Principle B, which has the following consequences.

a) Lexical definitions are dropped for arguments but not adjuncts.

b) Binding is determined syntactically.

c) However, at this stage, coreference and disjoint reference relations still require further determination.

D) Stage 4.

Semantic representations with Open Propositions are acquired, which allow apparent but not real

violations of Principle B. The child computes an I-implicature forcing coreference in Exceptional Coreference contexts.

E) Stage 5.

At this stage, the child uses Multiple Grammars, which gives rise to the comprehension / production asymmetry. Comprehension falls behind production because, in the case of comprehension, the child may use a pre-Principle B representation like that of Frisian or Old English.

The rest of the paper is organized as follows. In sections 3.1. – 3.6., we discuss the input relevant to anaphora that the child is exposed to, how the Multiple Grammars approach is relevant to instantiating principle B in one's grammar, how the child creates grammatical classes of lexical items and parametric variation. In sections 4.1. and 4.2., we introduce Thornton and Wexler's (1999) and Reinhart's (2004) accounts of children's Principle B failure, respectively. In section 5., we introduce our own account of children's Principle B errors. In section 6.1., the acquisition predictions of the three accounts in questions are discussed; section 6.2. is devoted to the discussion of the experiment in which we tested children's performance on B-contexts vs. that on Exceptional Coreference contexts. Our hypothesis is that children go through a non-adult stage where they perform better on B-contexts than on Exceptional Coreference contexts. Section 6.2.4. is the discussion of the results. The experimental results supported our hypothesis; overall, children did better on B-contexts than on Exceptional Coreference contexts. We argue that Exceptional Coreference contexts are more challenging than B-contexts for the following reasons. In order to compute the disjoint reference reading in a B-context, one needs to syntactically rule out the binding reading. In order to compute the coreference reading in an Exceptional Coreference context, one needs to compute the meaning difference between the binding and coreference readings, and to compute an Open Proposition that makes salient the coreference reading. On the basis of this, one computes an I-Implicature that forces coreference. In the concluding section 7., we propose a trigger for changing the setting of the Principle B parameter to "on" in English and discuss the comprehension / production asymmetry.

3.1. Diversity of Binding in Children's Experience

What is the input to which children are exposed? It includes but is not limited to the pronoun / reflexive contrast. Consider these extremes.

They must grasp in the sentence,

(4)   John put a hat on

that John puts the hat on himself. In another case, there is a reflexive-like binding for the word *home* which must contain a hidden anaphor,

(5)   Every boy went home

which means that each went to his own home, and it means something distinct from,

(6)   Every boy went to a home.

Perez-Leroux & Roeper (1999) argue (as do Jackendoff & Maling (1993)), in fact, that *home* is the first anaphor which triggers the Principle A for *himself* and *each other*, since, like other anaphors, *home* is clause-bound.

(7)   John expected Bill to go home (=Bill's home).

The facts about the early acquisition of *home* immediately suggest that the acquisition path is not perfectly reflected in the preferred data which led to the development of linguistic theory, and they indicate that specific lexical items have an important role to play.

Now consider in a single paradigm the following variations,

(8)   Every policeman keeps a gun nearby himself

                                        nearby him

                                        nearby'im

                                        nearby__

All four options in (8) are possible and they mean roughly the same thing. Note that the empty option is linked to particular PP's. One cannot say,

(9)   *Every policeman keeps a gun next to__

Each variant in (8) occurs in the daily life of a child (Take the baby's hat off (=the baby/ =/=the shelf)),

The theoretical emphasis upon the reflexive / pronoun contrast has obscured this fact in the literature. In particular, many PP's, which are usually adjuncts, allow coreferential pronouns to appear within a single clause,

(10)   a.   John took his wallet with him.

        b.   John put his problems behind him.

        c.   Keep your umbrella next to you.

In fact, Solan (1987) has shown that coreference within PP's is strongly preferred by children (*him = horse's* for the child),

(11)   The dog found the horse's picture of him.

(Solan 1987: 196).

Kuno (1987) and Levinson (2000: 320) point out that very subtle distinctions in perspective arise with PP's,

(12)   Speaker perspective: the women were standing in the background with the children behind
        themselves.

(13)   Observer perspective: The women were standing in the background with the children behind
        them.

It is notable that these subtle distinctions are not found with direct arguments in English, though they may be in other languages. In our view, this is no accident, but a consequence of a UG assumption that a child is able to make.

        In addition, we have emphatic reflexives which appear with no discourse reference,

(14)   Apart from myself, who is here?

Finally, we need to include Exceptional Coreference contexts in which pronouns may also acquire coreference through what we will define as an Open Proposition,

(15)   It is not true that no one likes Zelda. Zelda likes her.

This kind of connection requires special semantic operations, including projecting and interpreting an Open Proposition [x likes Zelda], which we will address in depth. We present below an experiment that

shows that children learn the Open Proposition option much later than they fix Principle B.

3.2. Other Grammars: the Multiple Grammars Approach

In sections 3.2. and 3.3., we consider the problem of how a child acquiring English instantiates Principle B in his grammar from the point of view of the Multiple Grammars approach (Roeper (1999), Yang (2001)). Children do not know that they are learning English. Therefore, they inevitably seek to interpret what they hear in light of the full range of options of Universal Grammar, the set of possibilities for any possible human language. If any options are easier in other languages, then children will try to find them in English. This effort is largely invisible because adult English speakers may have lost the distinctions that the children try to find, just like Asian speakers see no difference between /l/ and /r/.

Reflexives can be linked to a variety of properties in a variety of languages.

(16)   intentional

        physical

        distributive

        generic

        Speaker POV (logophoric)

        emphatic

These properties are conflated or distinct in various languages and seem to interact with conversational implicatures as well. (See Levinson (2000) for a good discussion). In English, there is no distinction made between intentional and non-intentional action,

(17)   John hurt himself

can either be accidental or intentional. The difference between physical and non-physical reference can be seen in examples like,

(18)   a.   John put the obstruction behind him.

        b.   John put the obstruction behind himself.

In the (18b) case it appears to be his physical body which is involved, while in (18a) it is possible that it is

abstract, as in, "he put the problem behind him." There have been suggestions in the literature (McDaniel (1990)) that children begin with a physical notion of *himself*. For instance,

(19)   He put himself through his pants

Whether or not children pass through this stage, it remains a clear option in Universal Grammar and, therefore, a child with a restrictive grammar should attempt to impose this restriction on his grammar.

Distributivity is also possible with some reflexives and not others in languages like German,

(20)   a. Sie   lieben sich.
            they love   self
            'They love each other.'

         b. Sie lieben sich selbst.
            they love themselves
            'Each loves himself or herself.'

In (20a), it means that they intentionally love each other. In (20b), it means either that they collectively love themselves, or that each of them individually loves himself.

It is precisely because such distinctions are subtle that one can easily imagine that a child does not immediately know which particular features attach to a reflexive form. Many sentences are genuinely ambiguous in context.

(21)   John ignored himself in his description.

This could be accidental or intentional. A restrictive Subset Theory would imagine that the child first takes the narrowest reading,

(22)   reflexive = physical, intentional, distributive.

Then he might quite rapidly have experiences which cause either one or the other feature to drop or to be shifted to a different lexical item. Thus in English the existence of the reciprocal *each other* could cause the child to drop that potential reading for *themselves* when he hears,

(23)   a.   They love each other.

         b.   They love themselves (each loves each) or they, as a group, love themselves, as a group.

We are unaware of studies which have carefully looked to see if children have more restrictive definitions of some of these expressions than what one finds in the adult grammar. They could be subject to

individual variation or be very short-lived. Nevertheless, the most straightforward acquisition theory would predict that a child makes the most refined hypothesis possible.

We consider now a few possibilities. It is possible that children only use reflexives physically,

(24) a. He hurt himself

   b. He gave himself a shower

   c. They helped themselves get up

   d. They admired themselves

where they each (except b) have both a physical and non-physical reading for adults but might have only a physical reading for a child.

It is possible that some children pass through stages with a different definition of *self* than others. Tuen Hoekstra reported (p.c.) that Dutch children often first say, *zelf tun* 'by myself' at the two-word stage, which is an infinitive that carries the reading, (*do it*) *by myself*. And it is clear that this form of adjunct reading is readily available to English children, though not necessarily at the two-word stage,

(25) I did it all by myself.

3.3. Lexical Restrictions

Reinhart and Reuland (1993) have suggested that in Dutch reflexivity for the simple form *zich* 'self' is linked to particular verbs and must be subcategorized by them.

(26) a. Sie   lieben zich.
         they love   self
         'They love each other.'

   b. *Sie   hassen zich.
         they hate   self
         'They hate each other.'

This restriction does not hold for English, except in compounds,

(27) a. self-promoting

   b. self-excusing

   c. self-perpetuating

where there is a link to an implicit agent in the compound, but not to the subject of the sentence,

(28) John hates self-promoting remarks (=someone promotes himself, not John).

English children, but not Dutch, must acquire this morphological restriction on the word *self*. Children do hear things like, "it is self-service around here," and they must interpret them.

We have deliberately exhibited an extensive array of variation which, perhaps, should constitute the agenda for the study of reflexivity in acquisition. How do children acquire each of these distinctions? Our goal, however, is to isolate the non-lexical and syntactic acquisition questions, and argue that syntactic principles are realized despite this diversity. Levinson (2000), among others, suggests that this diversity represents the ultimate description. Deep but simple syntactic generalizations are not necessary in grammar. This view makes acquisition much more difficult. We argue that the child seeks deeper, more efficient generalizations. We will propose specific mechanisms involving the projection of a hierarchy of referential terms that fits a Horn-scale, and a concept of categorical generalization that then permits syntactic parameters.

3.4. Acquisition Theory and English Lexical Variation

In sections 3.4. – 3.6., we discuss the theoretical question of how the child creates grammatical classes of lexical items, pronouns and reflexives being an instance thereof that is central to the present work. Acquisition work has often proceeded with a version of the Subset Theory, as in (29),

(29) Make the narrowest semantic distinction for the narrowest grammatical class.

The narrowest grammatical distinction would be to,

(30) Treat each meaning as separate

and the narrowest class would be to,

(31) Link each meaning distinction to a particular verb.

In fact, we have verbs that are very limited in possible objects, and a few which are linked to specific

reflexive objects,

(32)   John craned his neck.

One cannot "*crane an arm" nor can one "*crane her neck."

Does English show lexical variation in this realm? There are verbs that can be used with

reflexives but not pronouns, like *enjoy*,

(33)   John enjoyed himself

which cannot be put into an Open Proposition.

(34)   *It is not true that no one had a good time. John enjoyed him.

In addition where empty objects involve reflexivity, we find that there are lexical links,

(34)   a.   They kissed, met, parted.

         b.   They are lovers, enemies, friends, acquaintances.

All of these forms have implied *each other* readings. However, these do not,

(35)   a.   * They hated, they avoided, they criticized

         b.   They are haters, criticizers, fighters

These are either ungrammatical or they take an open object with no reflexivity or reciprocality implied.

Explicit reciprocals are of course possible – "they criticized each other." Therefore, we find explicit

evidence in the realm of nominalizations for the lexical restrictions that Reinhart and Reuland (1993)

found for verbs. It is often the case that core phenomena of one grammar appear as marginal phenomena

elsewhere (which has been described as subparametric variation (Roeper (1992)) and has been pursued

in Optimality Theory).

Avoidance of overgeneralizations is the heart of what is known as Subset Theory, and it rests

upon the idea that new evidence can expand generalizations, but no evidence will force an overly general

hypothesis to be restricted.

The narrowest hypothesis would be that every child begins with lexically restricted specific

meanings. Since these are grammatical in the adult language, it may not be evident to an adult that the

child's use is lexically specific. Here is an example, from the realm of subcategorization where a restriction can pass unnoticed. In some work studying children from 4-12 years (Nygreen 1972), it was reported that adults answer "yes" to this question,

(36)   Can you saw cheese?

while many 4-year-olds said,

(37)   No, you can only saw wood.

Only by teen-age years do children reliably adopt the idea that *saw* is primarily defined as back-and-forth motion.

We are led to an atomic hypothesis,

(38) Every pragmatic distinction can be captured in a lexical item.

This is far too strong, but it is a logical first assumption in a restrictive acquisition theory. It follows that,

(39) Every generalization is motivated by specific evidence.[1]

Our goal will be to imagine the evidence that moves a child along an acquisition path toward an efficient system of binding. In the initial stage we argue that every lexical item capable of binding is acquired as a separate lexical item with narrow pragmatic and lexical restrictions.

3.5. Phonological and Morphological Variation

It is important to realize that the set of relevant items in the child's experience is even more extensive because of phonological variation,

(40)   a.   John saw HIM.

        b.   John saw him.

        c.   John saw'm.

Emphatic *him* can shift reference in several contexts – one is the Open Proposition case that we have

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[1] The item-based theory of Tomasello essentially makes this assumption but without the concept of a background of UG which supplies hypotheses about abstractions.

broached and another is contexts where switch-reference is implied,

(41)   John kicked Bill and then HE kicked HIM.

In addition, it is known that in child grammar and in dialects, there are instances where children say,

(42)   John helped hisself

and do not appear to have established the bi-morphemic nature of the reflexive.

3.6. Parametric Variation and Syntax

First, let us advance the claim that the child seeks non-lexical variation for an efficient syntax, although lexical variation can be found in every module. For example, consider wh-movement which operates upon categories like DP. Every DP is eligible to undergo long-distance movement,

(43)   A: What did John say that Bill avoided___?

        B: Fred's music practice.

All the wh-expressions operate upon grammatical categories and therefore are syntactic. Nevertheless, in restrictive domains we find lexical effects,

(44)   a.   Why eat lunch?

        b.   *Where eat lunch?

Why allows an untensed VP as a complement, while *where* does not. This lexical variation survives alongside the syntactically efficient wh-system that treats all wh-words the same. Therefore, we expect the binding system to be the same,

(45) Syntactic generalizations co-exist together with lexical idiosyncrasy in the realm of binding.

In English, the emphatic system, the logophoric system, and the compound system all show lexical variation alongside syntactically defined domains which are devoid of those kinds of variation. The challenge for the child is to find syntactic generalizations where so many lexical generalizations exist, to find the syntactic binding theory without lexical variation.

The traditional Binding Theory is syntactic because it refers to the syntactic entity of a clause.

(46) Principle A: anaphors are bound within their clause.

  Principle B: pronouns are bound outside their clause.

It is Principle B that has provided the biggest challenge.

  However, there is evidence of two kinds (Elbourne (2005)) that has always been a problem for

the purely syntactic account. First, it is the fact that the binding theory does not always hold for

prepositional phrases,

(47)   John keeps a gun close to him

and second, the fact that in OE and Frisian it is possible to violate Principle B directly, as in, "Every man

washes him." The account of children's Principle B errors that we develop in this paper will address both

of these problems. But before introducing our own account, we will summarize Thornton & Wexler's

(1999) "pragmatic" and Reinhart's (2004) "processing" accounts of children's Principle B errors.

4. Previous Accounts of Principle B Failure

In sections 4.1. and 4.2., we introduce Thornton & Wexler's (1999) account and Reinhart's (2004)

account of children's Principle B errors, both of which presuppose that 5-6-year old English-acquiring

children have instantiated Principle B in their grammar. In a nutshell, Thornton & Wexler (1999) claim

that the source of children's errors is pragmatics and Reinhart claims that the source of children's errors is

their processing limitations.

4.1. Thornton & Wexler's (1999) 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 (48) and (49), respectively.

(48)   A: Is this Speaker Zelda?

  B: How can you doubt it? She$_1$ is praising her$_1$ to the sky. No competing candidate would do that.

(based on Heim 1998: 213).

(49)   You know what Mary, Sue and John have in common? Mary admires John, Sue admires him and John$_1$ admires him$_1$ too.

(Heim 1998: 216).

T&W (1999) adopt Heim's (1998) account according to which all Exceptional Coreference contexts involve two different guises of the same individual. (48) is an example of an "identity-debate" Exceptional Coreference context, in Heim's terminology; Heim points out that Zelda is presented in two guises: the referent of *she* is Zelda-the-Speaker and the referent of *her* is the interlocutors' idea of Zelda. In (48), while the binding reading would tell us nothing regarding the identity of the speaker, the coreference reading does provide the information about the speaker's identity. Contexts like the one in (49) Heim labels "structured meaning" contexts. "John admires him" has the reading on which John has the property P of admiring John and the reading on which John has the property Q of admiring oneself. These readings can be expressed as LFs in (50) and (51) below, respectively.

(50)   John admires him
         J   J

(51)   John $\_1$ [t$_1$ admires him$_1$]

Both LFs are logically equivalent – they express the proposition, "John admires John." However, the LFs in question express two different structured propositions, namely, <j, P> or "John admires John" and <j, Q> or "John admires himself" (Heim, 1998). In the "structured meaning" case in (49), John is presented in two guises. Firstly, he is presented in the guise of an individual, in the flesh, and, secondly, he is presented in the guise of an individual that everyone admires, including himself.

T&W claim that it is a hallmark of Exceptional Coreference contexts that an individual introduced under a given guise is behaving in an unexpected way under another guise. On T&W's account, in (49), the property of being admired by everyone is atypical for the John presented under the first guise. 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,

(52)   "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. & T.R.*).

Thus the child creates guises in B-contexts because she wrongly reasons that the individual who was

introduced under a given guise is behaving in an unexpected way, whereby the child assumes that the

second guise is relevant. Consider an illustration of this.

(53)   Mama Bear washed her

Presented with (53) in a B-context, the child assigns it the representation in (54),

(54)   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, (53) has the interpretation that Mama Bear

washed the individual that washed somebody. The property of washing the individual who is washing

someone is atypical for the Mama Bear introduced under the first guise. Thus, according to T&W,

children make coreference errors in B-contexts because they misinterpret them as Exceptional

Coreference contexts where the two guises are supported by the context.

        Heim's (1998) analysis of Exceptional Coreference contexts has two main ingredients – the

notion of guises and Reinhart's (1983) original pioneering insight that what licenses coreference

in an Exceptional Coreference context is the difference between the binding and coreference

interpretations. Because Principle B rules out the binding interpretation, if the coreference interpretation

is to be licensed, it has to be different from the one that was ruled out syntactically. In and of themselves,

different guises do not license the coreference reading; the concept of guises is merely instrumental in

accounting for the difference between the binding and coreference readings[2]. In their version of Heim's

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[2] In Madame Tussaud sentences introduced in Jackendoff (1992) and discussed in Lidz (1996), an individual is
introduced in two guises, however, only a reflexive can be used and a nonreflexive pronoun is disallowed.
(i) Context: Ringo Starr walks into Madame Tussaud's wax museum and trips over a statue of himself.
            A: Ringo fell on himself.
            B: * Ringo fell on him.

account, T&W focus on the concept of guises alone and do not make the difference between the two readings part of their theory. This amendment to Heim's account is problematic because it is unclear what constrains the creation of guises either for children or adults. In principle, one may interpret (53) as presenting Mama Bear in two different guises; the reason why adults eschew this interpretation is because the coreference and binding readings are the same when (53) is presented in a B-context.

4.2. Reinhart's (2004) Account

In this section, we will discuss Reinhart's (2004) account of children's errors in Principle B environments. 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. Reinhart holds that children have the innate knowledge of Principle B and that of Covaluation Rule I that compares the binding and coreference readings.

(55) <u>Covaluation Rule I.</u>

α and β cannot be covalued if

a. α is in a configuration to bind β, (namely, α c-commands β) and

b. α cannot bind β and

c. The covaluation interpretation is indistinguishable from what would be obtained if α binds β.

(Reinhart 2004: 5).

Reinhart further argues that the application of Rule I involves the following three steps.

Step 1: Does c-command hold between the two DPs ?

Step 2: Is binding possible ?

Step 3: Compare the binding and coreference representations to see if they are distinguishable.

Consider an illustration of how Rule I may be applied.

(56)   Mama Bear is washing her

Using a pronoun is disallowed precisely because the coreference reading is the same as the binding reading. (More recently, Jeffrey Lidz (1996) has offered an extensive discussion of issues related to reflexivity).

Step 1: C-command holds between the two DPs;

Step 2: Binding is ruled out by Principle B;

Step 3: Compare LFs of the bound variable representation and the coreference representation.

The two LFs are in (57) and (58).

(57)   Mama Bear is washing her   (coreference)
        MB   MB

(58)   Mama Bear (λx(x is washing x))   (bound variable)
            MB

The two LFs in (57) and (58) are indistinguishable, therefore Rule I applies and the coreference

interpretation is excluded. If (56) were used in an Exceptional Coreference context, the two LFs would

have had different interpretations, as (59) demonstrates.

(59) You know what Peter Pan, Aladdin and Mama Bear have in common ? Peter Pan is washing Mama

Bear, Aladdin is washing Mama Bear and Mama Bear$_1$ is washing her$_1$, too.

Claiming that Mama Bear has the property of washing herself is different from claiming that Mama Bear

has property of washing Mama Bear that she shares with the other characters.

On Reinhart's account, 5-6-year-olds have sufficient syntactic knowledge (Principle B) and

sufficient knowledge of the syntax / discourse interface (Covaluation Rule I) for computing the correct

disjoint reference reading in B-contexts and the intended coreference reading in Exceptional Coreference

contexts. Reinhart argues that what causes children of this age to perform at chance in B-contexts is their

memory limitations. It is claimed that the main stumbling block that children run into is computing the

reference-set for covaluation. Consider an illustration of how such a reference set is computed on the

example of (59), the last sentence of which is reproduced as (60).

(60)   Mama Bear is washing her

        a) Mama Bear is washing her & her = Mama Bear

        b) Mama Bear (λx (x is washing x))

In order to make the decision that *her* and *Mama Bear* can corefer in (60), the child needs to construct

both (a) and (b) and to conclude that the two have different meanings.

Reinhart argues that, while children have the innate knowledge of Covaluation Rule I, they cannot carry out the computation required by clause (c) of this rule that requires them to construct two representations and compare them. Being unable to carry out the computation, the child resorts to guessing, hence computes the erroneous coreference reading in B-contexts about 50% of the time.

Computation of scalar implicatures (SIs) is another area where the comparison of representations is involved. In order to derive the implicature to the effect that by using *some* the Speaker implicates that he does not know that *all*, the Hearer needs to compare two representations, which is illustrated in (61).

(61)   a.   A: How many of the UMass linguists live in Northampton ?

        b.   B: Some UMass linguists live in Northampton.

        c.   >>[3] B does not know that all UMass linguists live in Northampton.

        d.   All UMass linguists live in Northampton.

Speaker B's utterance implicates (61c). In order to compute this implicature, Hearer A first needs to construct the representation in (61d) and then compare (61b) and (61d); since (61b) and (61d) are identical except for the strength of the scalar items *some* and *all*, and since (61d) entails (61b), A infers that B has implicated (61c). The process of comparing representations involved in computing SIs is closely parallel to that required by Reinhart's Covaluation Rule I; both require constructing an additional representation, holding both relevant representations in memory and deciding on the meaning differences between the two representations. Thus if it were found that 5-6-year-olds performed better than at chance on computing SIs, it is unlikely to be the case that memory limitations are the cause of children's errors in B-contexts.

While earlier experimental results suggested that 5-6-year-olds performed at chance on computing SIs, more recent studies suggest that children of this age perform significantly better than at chance on computing SIs. Thus in Papafragou (2004) it was found that children of the mean age of 5;3 computed SIs based on the scale <all, some> 77.5% of the time; in Foppolo et al. (in press), it was found that children whose mean age was 5;4 computed SIs based on the <all, some> scale 70% of the time for

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[3] ">>" stands for "implicature."

the *some* in subject position and 75% of the time for the *some* in object position. While 5-6-year-old children fall short of the adult level of competence in deriving SIs, their performance is clearly above chance. Thus it is unlikely that children's errors in B-contexts are due to their memory limitations, as Reinhart's account suggests.

5. Discourse Condition on Exceptional Coreference Contexts and an Implicatures-Based Account of B-Contexts and Exceptional Coreference contexts

In section 5., we introduce our own account of what licenses coreference in Exceptional Coreference contexts and what licenses disjoint reference in B-contexts. The difference between the binding and coreference readings is a necessary but not sufficient condition on licensing the coreference reading. Heim (1998) points out that her reinterpretation of Reinhart's approach needs to be supplemented with a description of what the discourse needs to be like in order for the coreference reading between a pronoun and a c-commanding antecedent to be felicitous. According to Evans' (1980) proposal, an Exceptional Coreference context is characterized by the presence of an antecedent in the previous discourse to which both the referential and pronominal NPs are anaphorically linked. As Heim (1998) justly argues, while Evans' proposal overgenerates the class of acceptable Exceptional Coreference contexts, some sort of a condition on the type of discourses that license Exceptional Coreference contexts needs to be identified. "So the condition identified by Reinhart and carried over into my Exceptional Coindexing Rule is not by itself sufficient, and a common antecedent seems to be required on top of it. This needs further exploration" (Heim 1998: 244).

5.1. Part One: 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, Guasti 2002). To illustrate what we mean by an Open Proposition, we provide some examples of Exceptional Coreference contexts along with the relevant Open Propositions in (62-64).

(62)   Everyone here admires Oscar. Joan admires Oscar, Mary admires Oscar, and Oscar admires him.

Open Proposition: x admires Oscar

(63)   It's not true that no one voted for John. John voted for him.

Open Proposition: x voted for John

(64)   Everyone hates Satan. Only he himself pities him.

Open Proposition: x pities Satan

The Open Propositions in (62-64) 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. It will be argued here that the Open Proposition that licenses coreference in Exceptional Coreference contexts needs to be derived in a different manner.

In Exceptional Coreference contexts of the Identity Debate variety, as in (65), the relevant Open Proposition may not be obtained by replacing the stressed constituent with an unbound variable, as Ward's rule requires.

(65)   A: Is this Speaker Zelda ?

        B: How can you doubt that this Speaker is Zelda$_1$? She$_1$ is praising her$_1$ to the sky. No competing
           candidate would do that.

(based on Heim 1989: 213).

In (65), 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.

We 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 (65), 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." Speakers communicate efficiently by assuming what is known as 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 (62-64) or by the situational context as in identity debate contexts such as (65). Crucially, the relevant Open Proposition must fix the referent of the pronoun. This requirement is formalized in the discourse condition on Exceptional Coreference contexts provided in (66).

(66)   *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 (66) 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.

5.2. Part Two: B-contexts, Exceptional Coreference contexts and Q- and I-implicatures

In this section, we will introduce Levinson's (2000) implicature-based account of what licenses coreference in Exceptional Coreference contexts and why coreference is disallowed in B-contexts, which we will supplement with the notion of the Open Proposition. We would like to point out that, while we adopt Levinson's (2000) implicatures-based account of disjoint reference and coreference in B-contexts

and Exceptional Coreference contexts, respectively, we do not adopt Levinson's view that Principle B is completely reducible to a pragmatic principle. Rather, we fully subscribe to Reinhart's (1983) distinction between binding as a syntactic phenomenon and coreference as a pragmatic phenomenon.

First, it will be useful to distinguish between Exceptional Coreference contexts, B-contexts and contexts that seem to resist being classified as either. There is a class of cases where coreference between the two offending NP is allowed, though not required. We will argue that these cases do not belong to the class of Exceptional Coreference contexts as we are defining it here; as we have argued above, we are defining Exceptional Coreference contexts as contexts that *force* coreference between a pronoun and a non-quantificational antecedent that c-commands it. Contexts where both coreference and disjoint reference are allowed are provided in (67-70). (These contexts were extensively discussed in Kuno (1987)).

Picture NPs:

(67)   George W. Bush saw a picture of him in The New York Times.

Adjunct PPs:

(68)   John is building a wall of books around him.

Possessive NPs:

(69)   Pavarotti and Domingo adore their performances.

Emphatic NPs:

(70)   Pavarotti said that tenors like him would not sing operas like that.

(67-70 are based on Huang, 2004: 293).

Deictic use of a pronoun:

(71)   When Aladdin looks in the mirror, he doesn't see Jasmine. $Aladdin_1$ sees HIM_1.[4]

(Guasti 2002: 281).

For the sake of convenience, we will coin a term Janus contexts or J-contexts to refer to the contexts like the ones in (67-71) where the two offending NPs may or may not corefer. If the pronoun is construed

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[4] The use of caps indicates that *him* is focused.

as coreferent with the referential NP in (67-71), the knowledge that the pronoun and the referential NP refer to the same individual is part of the Common Ground and, thus, is shared by the interlocutors. Note that, as distinct from Exceptional Coreference contexts where coreference is forced, J-contexts do not require the presence of an Open Proposition.

Next we will present Levinson's (2000) account of when coreference is forced, allowed and disallowed in terms of the interplay between Q- and I-implicatures. It needs to be noted that implicatures-based accounts of the patterns of disjoint reference and coreference in question were first introduced in Dowty (1980) and Reinhart (1983); in Reinhart's (1983) account, a specially invented submaxim of Manner was instrumental in ruling out the coreference reading in B-contexts and Principle C environments. Levinson (2000) puts forth a much more evolved implicatures-based proposal that accounts for cross-linguistic patterns of coreference and disjoint reference, and for diachronic changes in these patterns.

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.

(72)   Mama Bear is washing her.

In (72), coreference is ruled out by the Q-implicature. Thus the use of (72) implicates that (73) does not hold.

(73)   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,

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

      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. The adult does not compute the potential Q-implicature because using a reflexive would have resulted in a different interpretation from what would occur if the pronoun is 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 an illustration of what type of reasoning makes the interlocutor decide to compute an I-implicature rather than a Q-implicature in an Exceptional Coreference context.

(75)   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."

(76)   Step One: The Open Proposition in (75d), "x voted for John," is computed.

    Step Two: The Open Proposition makes salient the coreference reading in (75c), which fits with

the content of the Open Proposition.

Step Three: The binding reading in (75b) 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 (75) 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 (75), "John voted for him," is considered out of context, there is no difference between the binding and coreference readings.

However, it is not always the case that the difference between the two readings cannot be made unless an Open Proposition is salient in the given context. A sentence considered out of context may have two truth-conditionally distinct readings due to the presence of a focus operator *only*, as in (77).

(77)   Only John voted for him.

Binding reading: John is the only person who voted for himself

Coreference reading: John is the only person who voted for John.

However, note that if (77) is considered out of context, the pronoun cannot be construed as coreferential with John[5]. For this reading to arise, an Open Proposition needs to be salient in the preceding discourse, as in (78).

(78)   a.   A: So, did everyone vote for John?

        b.   B: No. In fact, only John voted for him.

        c.   Open Proposition: x voted for John.

This example illustrates that even in cases where the distinction between the binding and coreference

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[5] When the sentence in (31) is considered out of context, the binding reading is ruled out syntactically. In the absence of context, neither a Q- nor an I-implicature arises. On our view, conversational implicatures are pragmatic inferences that are computed only if they are relevant in the given context rather than by default.

readings *can* be made without the aid of an Open Proposition, an Open Proposition is still needed in order to license the coreference reading; hence Step One of computing an Open Proposition is a necessary one.

Next, consider how anaphoric decisions are made in J-contexts. In a J-context, the pronoun may corefer with a c-commanding NP because the knowledge that the pronoun refers to the same individual as the c-commanding NP is part of the Common Ground.

(79)   Bush loves seeing his own pictures. The other day, Bush saw a picture of him in <u>The New York Times</u>.

Coreference is possible in J-contexts because the coreference reading is different from the binding reading. In (79), the two readings are different – seeing a picture of oneself is different from seeing a picture of Bush. Since the referent of the pronoun *him* in (79) is fixed by the context, using a reflexive would not have resulted in a stronger statement than using a pronoun. Therefore, an I-implicature to the effect that coreference holds is computed.

Alternatively, it may be the case that the referent of the pronoun does not corefer with a c-commanding NP in a J-context, as in (80) below.

(80)   Bush loves seeing Cheney's pictures. The other day, Bush saw a picture of him in <u>The New York Times</u>.

In (80), the prior context does not force the pronoun *him* to corefer with *Bush*. Therefore, if the coreference reading were, in fact, intended, using a reflexive in lieu of the pronoun would have resulted in a stronger statement; the Q-implicature to the effect that the coreferential reading does not hold goes through.

6.1. Acquisition Predictions

T&W's (1999) and Reinhart's (2004) accounts of Exceptional Coreference contexts and the account that we have proposed here make conflicting predictions about children's performance on Exceptional Coreference contexts vs. their performance on B-contexts. We will start by discussing the predictions that the T&W account makes.

6.1.1. Acquisition Predictions that Thornton and Wexler's (1999) Account Makes

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 guises 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 non-adult stage.
<u>Non-adult Stage One</u>: *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.*
<u>Adult Stage</u>: *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.*

6.1.2. Acquisition Predictions that Reinhart's (2004) Account Makes

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 on Exceptional Coreference contexts.

Thus Reinhart's account would predict that children go through the following non-adult stage.
<u>Non-adult Stage One</u>: *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.*
<u>Adult Stage</u>: *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.*

6.1.3. Acquisition Predictions of the Implicatures-based Account

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. The currently prevalent view that 5-6-year-old children acquiring English have the knowledge of Principle B, and the idea that the source of their Principle B errors is pragmatic is largely based on Chien & Wexler's (1990) finding that there was an asymmetry in children's performance on the quantificational vs. referential NP conditions. As is well-known, the crucial distinction between the two conditions is that coreference between the two offending NPs is possible only in the latter. Thus, if children do well on the quantificational NP condition but make Principle B errors in the referential NP condition 50% of the time, this may be due to the fact that they rule out binding but compute the coreference reading in the referential NP condition. However, Elbourne (2005) presented 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 (Anonymous et al., in press), and that they do not respect constraints on the movement of *every* (Coles-White, Roeper & de Villiers, 2003). All of these experimental findings demonstrate 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 (1990) experiment cannot be taken as evidence to the effect that 5-6-year-old English-speaking children obey Principle B. Thus we hypothesize that 5-6-year-old children acquiring English are yet to instantiate Principle B in their grammar.

We predict that children will go through the following non-adult stages. During the first stage, children will treat English nonreflexive pronouns as ambiguous between pronouns and anaphors. In interpreting B-contexts and Exceptional Coreference contexts, children will be guided by the pragmatic Principle of Relevance in deciding on 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. Crucially, the child needs to be able to compute the 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.

What complicates matters even further is the existence of J-contexts where coreference is possible, yet not obligatory, and there is no salient Open Proposition. Being exposed both to Exceptional Coreference contexts and J-contexts may cause the child to be confused about the discourse conditions that license coreference.

In view of this, we are hypothesizing the 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 two non-adult stages.

<u>Non-Adult Stage One</u>: *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.*

<u>Non-Adult Stage Two</u>: *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.*

6.2. The Experiment

6.2.1. 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 (81), an example of an Exceptional Coreference context story is given.

(81)   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?

6.2.2. The Hypotheses

As was discussed in detail in section 5.1, T&W's, Reinhart's and our 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.

H₂: Children perform better on Exceptional Coreference contexts than on B-contexts.

As it was argued here, our account predicts that children go through non-adult stage two that we reproduce below.

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.

Thus our account predicts H_3.

H₃: Children perform better on B-contexts than on Exceptional Coreference contexts.

6.2.3. 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).

H_3 predicted by the account that is being argued for here was supported by the data; H_1 predicted on Reinhart's account and H_2 predicted on T&W's account were not supported by the data. As we have hypothesized, our results have shown that children go through two non-adult stages.

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 below[6].

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[6] 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.

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 we reproduce our prediction of how children fare on the two conditions during the second stage.

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
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

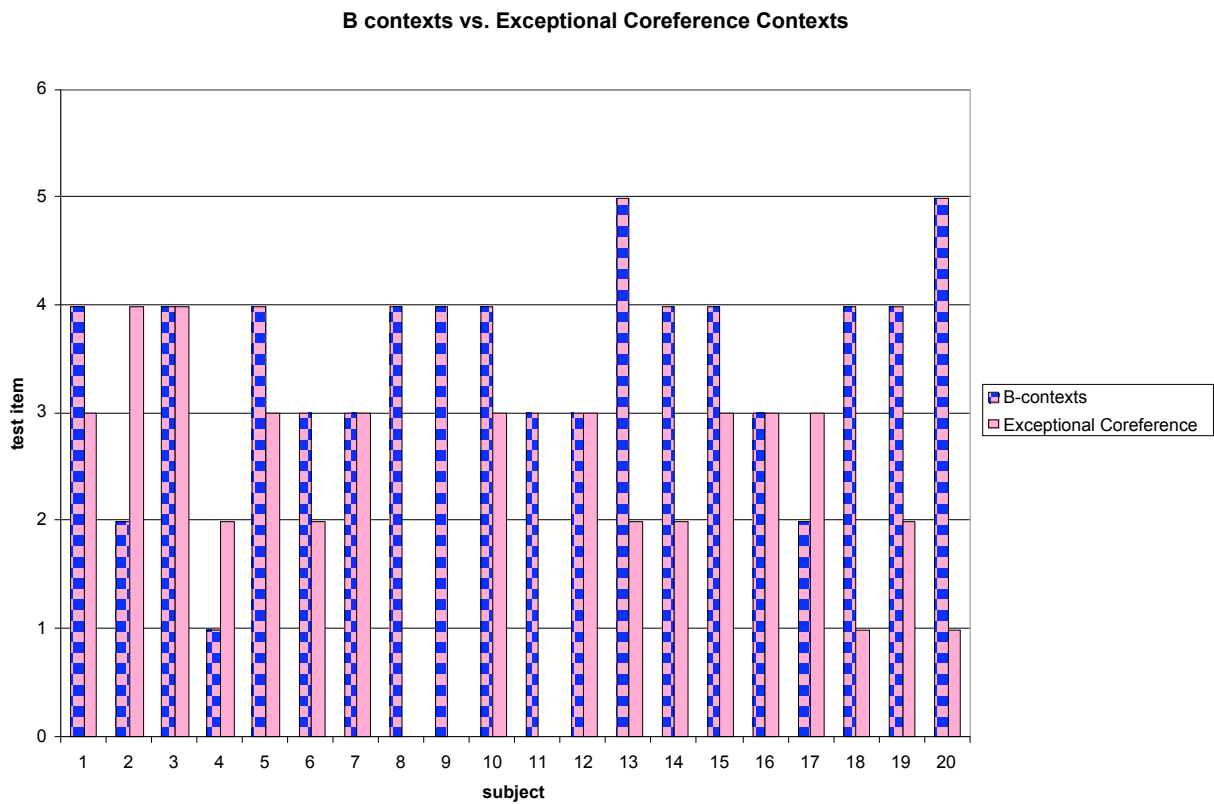contexts. In Figures One and Two below, children's overall responses are provided.

Figure one. Individual subjects' performance.

B-contexts vs. Exceptional Coreference contexts
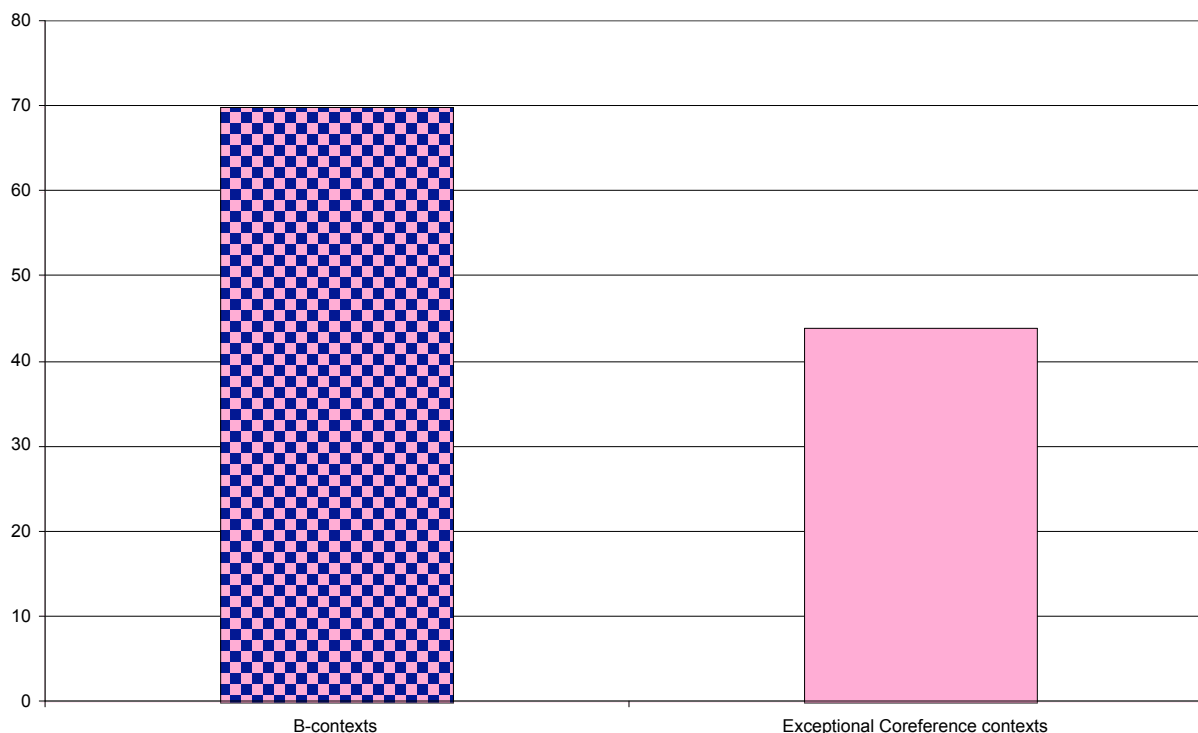

Figure two. Subjects' overall performance on B-contexts and Exceptional Coreference contexts.

6.2.4. 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. We 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 we are 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. Frisian is another language where there are distinct lexical forms for reflexives and pronouns, and pronouns are not subject to Principle B, whereby the referent of the pronoun is determined pragmatically.

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 fixes the referent of the pronoun and 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 the 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 in B-contexts and in Exceptional Coreference contexts that she misinterprets as B-contexts.

Next, consider some of the children's responses to the structured meanings Exceptional Coreference story in (81) reproduced below as (82).

(82) 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 drawed 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.

(83) 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 children compute the erroneous disjoint reference reading in Exceptional Coreference contexts, they compute the target disjoint reference reading in B-contexts. Consider L.U.'s, S.O.'s and S.I.'s responses to a B-context.

(84)   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."

What triggers the construction of the <reflexive, pronoun> scales that takes the child from stage one to stage two is the generalization that the locus of the contrast between pronouns and reflexives is referential dependence. In order to construct the scales in question, the child must reason that pronouns and reflexives are identical in their meaning and share the same features with one exception – reflexives differ from pronouns in terms of being necessarily referentially dependent. The construction of Horn scales results in the instantiation of Principle B in the child's grammar.

6.2.4.1. What Pragmatic Reasoning Tells Children about Exceptional Coreference Contexts

The Gricean system is built in such a way that pragmatic principles of Quantity and Informativeness are in opposition; Quantity impels the Speaker to provide the maximal amount of relevant information and Informativeness impels the Speaker to say as little as necessary. In Horn (1984), it was observed that if a Horn scale is relevant, Quantity wins over Informativeness; if not, Informativeness wins over Quantity. Consider Horn's illustrations of both cases.

(85)   I slept on a boat yesterday.

Q-implicates: "The boat was not mine."

This Q-implicature arises because *a boat* was chosen over *my boat.* The relevant scale is <possessive pronoun, indefinite article>.

(86)   I lost a book yesterday.

I-implicates: "The book was mine."

(Horn 184: 19).

The speaker's use of (86) generates this I-implicature because using *my book* would falsely suggest that the Speaker owns only one book. Because the stronger alternative is not relevant, the Q-implicature does not arise and an I-implicature to the best interpretation is computed (Horn 1984: 19). Likewise, in Exceptional Coreference contexts, Informativeness wins over Quantity precisely because the Horn scale <reflexive, pronoun> is not relevant.

We view the opposition between the principles of Quantity and Informativeness as part of the child's innate pragmatic knowledge. It is plausible that this opposition is what helps the child learn what kinds of contexts license, and, in fact, require the coreference reading in question. Once the child has constructed the scale <reflexive, pronoun>, she realizes that the use of a pronoun Q-implicates that the corresponding statement in which a reflexive is used in lieu of the pronoun does not hold. Through receiving increasing exposure to Horn scales, the child learns that potential Q-implicatures do not arise precisely in contexts where the stronger item on the scale is not relevant; in these contexts, an I-implicature is computed, as in (86). Since a Q-implicature is what rules out coreference, the child may hypothesize that coreference is possible precisely in contexts where the stronger item on the scale is not relevant. In an Exceptional Coreference context, the stronger reflexive is not relevant because the Open Proposition makes salient the coreference rather than the binding reading. In order to compute Open Propositions and interpret their presence as signaling Exceptional Coreference contexts, the child needs to acquire the Discourse Condition on Exceptional Coreference contexts in (66).

7. Conclusion.

7.1. Summary of the Findings

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. Our 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.

Our experimental results provide support for the account that we have developed; on our 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.

7.2. Parametric Principle B

It is worth note, here, that we depart sharply from the informative account of Principle B as exclusively within the theory of generalized conversational implicatures which has been championed by Levinson (2000). In this paper, we made the claim that the initial setting of the Principle B parameter is "off." In section 7.2, we will discuss what type of positive input serves as the trigger for changing the setting of the Principle B parameter to "on." The possibility raised by Elbourne (2005) is that Principle B is parametric. Some languages have it and some do not. In that case, the acquisition challenge is to determine under what conditions the Principle B parameter may be set to "on." The large array of coreference variation suggests that indeed,

(87) The child initially is in a non-parametric lexical state.

If a grammar never allowed the conditions for a parameter to arise, then this state should continue. We are not sure what the semantics of Frisian are, but it seems very likely that the two expressions,

(89)   a.   John washed him

        b.   John washed himself

do not mean exactly the same things. We assume that there is some subtle semantic difference of exactly

the kind we find with PP's.

        Levinson (2000: 339) reports that Creole languages follow a path whereby pronominals stop

being coreferential with subjects in simple clauses, and that this is a gradual process.

(90)   Stage 1: no morphological reflexives

        Stage 2: gradual emergence of reflexive morphology based on body-part metaphors co-existing

                but encroaching upon the use of ordinary pronouns.

        Stage 3: the loss of the reflexive use of ordinary pronouns.

        The child grammar could proceed through the same stages, but one must ask how they actually

decide to exclude pronouns as reflexives in direct argument, but not PP, cases. Essentially, we are asking

under what conditions will a child establish a syntactic parameter. We argue that the parameter exists

when the child hears sufficient evidence that pronominals and reflexives are categorical: they apply with

respect to any identical NP's for any VP's. No special features of NP's or VP's play a role. How would

that occur?

        First, the child systematically loses all of the special features that define when a reflexive is used. If

the child hears the sentence,

(91)   Johnny hurt himself accidentally

then the situation and the adverb reveal that it cannot be intentionally. Such critical examples may not be

frequent but they should reliably occur in years of experience before the age of six.

        Then the child experiences a sentence which clearly eliminates the physical interpretation of the

reflexive – although most experiments refer exactly to the physical interpretation. Finally, when all

special features are eliminated, the child has a representation that says,

(92) Iff two DPs in "DP1 Verb DP2" are identical, then DP2 => reflexive.

This means automatically that one should not generate a coreferential object with a non-reflexive. In addition, we expect there to be specific contexts which trigger the non-coreference of pronominals, as the one in (93).

(93)   Context: Johnny washed himself but not his brother Billie. Father does not know if Johnny washed himself or his brother or both. Mother knows that Johnny washed only himself. Father to Mother: "Did Johnny wash himself and his brother?" Mother to Father, "Johnny didn't wash him."

In Mother's last utterance, "Johnny didn't wash him," the pronoun refers to Billie; Mother's utterance is an informative answer to Father's question only if the pronoun obligatorily refers to Billie. Through being exposed to contexts like the one in (93), the child learns from positive evidence that *him* does not function as a reflexive pronoun in English and classifies it as a nonreflexive pronoun that is subject to Principle B. Now the child has used an array of evidence to invoke Principle B as a basis for syntactic determination that is efficient and free of subtle semantics.

However, a further distinction is crucial to make this account work,

(94) The Adjunct/Argument distinction is relevant to parameters.

If the child took the clause-mate restriction as presented, then it would erroneously rule out,

(95)   John found a quarter near him

This sentence should demolish the Principle B parametric choice and it is certainly in the child's environment. Therefore UG delivers the question,

(96) Does the categorical interpretation apply to adjuncts as well as arguments?

to which the answer will be "no," since both forms occur there. The status of <u>adjuncts</u> is unclear in linguistic theory (Chomsky (2004)), and facts like these should contribute to the child making a fundamental distinction here. Adjuncts are left with the subtle semantic distinctions linked to lexical

items (prepositions) with which the child began. This appears to be exactly correct. It is a result that is worth a moment's contemplation. A set of subtle distinctions that apply to PP's are simply eliminated with respect to arguments. Why should this be the case? We will not explore the issue in depth, but simply suggest that it is a more sophisticated version of what separates syntax from the lexicon. Syntactic principles, the cornerstone of efficiency, achieve their efficiency precisely because they refer to a categorical level: NP and VP, etc. The shift to a syntactic representation entails an automatic loss of systematic variation in semantic relations that extend beyond the word.

The next question that naturally arises at this point is why principle B lag is not found in all languages; we address this question in the following section.

7.3. Instantiation of Principle B in Romance Languages

In section 7.3., we discuss crosslinguistic evidence on children's performance on Principle B. As is well-known, while English-speaking children exhibit a delayed obedience to Principle B, in Romance languages where clitics are used in Principle B environments, children appear to master Principle B at a younger age. Thus there is no Principle B lag in Italian (ex.: McKee 1992). In one of McKee's (1992) experiments, it was found that children acquiring Italian aged 3;2-5;3 provided correct responses in Principle B environments where clitics *lo* 'him' and *la* 'her' were used 90% of the time. When the experiment was replicated in English, children acquiring English provided 61% of correct responses. We would like to argue that children acquiring Italian take less time to instantiate Principle B in their language because Italian clitics cannot be used in the adjunct position and corefer with a c-commanding antecedent. In (97) and (98), the pronoun *lui* 'him' is used in the adjunct position; the corresponding clitic *lo* 'him' cannot be used in this position[7].

(97)   John ha visto un serpente vicino a lui / *lo

         'John saw a snake near him'

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[7] McKee proposes a different account of the difference between English and Italian children's performance on Principle B environments. She argues that the difference is due to the fact that, syntactically, clitics and pronouns are in different positions. While Italian children correctly hypothesize IP as the clitic's governing category from the start, children acquiring English start out with the wrong hypothesis that the pronoun's governing category is VP.

(98)   John ha legato una corda intorno a lui / *lo

        'John tied a rope around him'[8]

A child acquiring Italian does not need to sort out the contradictory argument / adjunct data that a child

acquiring English is faced with. Thus a child acquiring Italian does not need to answer the question in

(99) that was previously provided in (96),

(99) Does the categorical interpretation apply to adjuncts as well as arguments?

The contrast between children's performance in languages like English that have nonreflexive pronouns

and lack clitics and that in languages that have clitics is fully accounted for on the account that we have

argued for here.

7.4. Principle C

In section 7.4., we discuss the asymmetry between English-speaking 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 in (100).

(100)   What do you mean John loves no one? He_1 loves $John_1$.

If children misinterpret B-contexts as Exceptional Coreference contexts, which leads to the Principle B

lag, it is unclear why children do not misinterpret "regular" Principle C contexts as Exceptional

Coreference contexts as well. On T&W's account, children are liable to compute the erroneous

coreference reading in Principle C contexts because they mistakenly reason that a given individual is

presented in different guises. On Reinhart's account, the child should experience processing difficulties in

comparing the binding and coreference readings. One may argue that the reason why children appear to

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[8] The Italian data and judgments were provided by Ilaria Frana.

perform better on interpreting Principle C contexts in 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 our account, the asymmetry between children's performance on Principle B and Principle C environments is expected because R expressions are classified as such from the beginning.

7.5. Production / Comprehension Difference

Lastly, in section 7.5., we account for the production / comprehension difference relevant to Principle B. During a stage where English nonreflexive pronouns are ambiguous between pronouns and anaphors for the child, one possibility why the child won't make Principle B errors in production is as follows. When reflexivity is called for and when the child controls all the contexts where it is necessary, the child will always use *himself*, which is unambiguously reflexive. *Him* will not be used because it is ambiguous between a pronoun and a reflexive. (A careful study of the meanings of reflexives in child grammar would be helpful here).

Alternatively, it is possible that children make Principle B errors in comprehension but not production because they allow point of view (POV) shifts in environments where they are disallowed by adults. Imagine an experimental situation where a child is shown a picture in which John is dressing himself and is asked by an experimenter, "Is John dressing him?" The child is liable to take the experimenter's POV; for the child, from the experimenter's perspective, "John" can be referred to as *him*. If there is an option in the child's current grammar – or a nearby or earlier grammar – to allow this sort of a perspectival shift, this could be the cause of his Principle B errors in comprehension. The child may avoid making this error in production because she consistently takes the agent's perspective. Thus when the child wants to refer to a self-directed action, she uses a reflexive because she takes the agent's perspective, as in "John$_1$ is dressing himself$_1$." If the child refers to an action where the agent and patient are different individuals, taking the agent's perspective will lead her to employ a non-reflexive pronoun, as in "John$_1$ is dressing him$_2$." To summarize, the child may consistently assume the Speaker's

perspective in comprehension and the agent's perspective in production, which would lead to the comprehension / production asymmetry in question.

At the same time, there is a possible ambiguity in comprehension that resembles what we have argued for adjuncts. If the child has some pragmatic principle – like seeing non-body as a separate entity – then the child might not be sure what meaning the adult has.

(101)   a.   John likes to have a gun nearby himself.

         b.   John likes to have a gun nearby him.

We find a slight difference. If the gun is closer to Bill it could still be "nearby him" for John, but only if it is closer to John than Bill is it true to say,

(102)   John likes to keep a gun nearby himself.

Here we find the "physical body" reading emerging again. We find the distant or close relation in this contrast as well,

(103)   a.   I am looking at me in this picture.

         b.   I am looking at myself in this picture.

The first case treats *me* as conceptually distinct – it is the observer of the photograph, while in the second it could be that within the picture itself I am looking at myself.

Now suppose we have the sentence and the experimental context,

(104)   Picture: Every girl washes herself

         Q: Did every girl wash her?

with a possibility that one could construe the object as conceptually independent or not. Then it might be more acceptable. After all, the grammar requires that we examine all contexts and all grammars for one that could fit the sentence. This is distinct from the Open Proposition possibility where the nature of the object is not in question, rather an operation, that is used to determine the set of possible subjects.

Could we argue that Principle B applies, but something in the question causes the child to suppress the Q-implicature and allow a coreferential reading? We will argue that it is not an implicature connection, but a similar kind of extension of readings to include an implicit but excluded grammar. It is

an instance where children have access to Frisian and utilize it, even though adults do not. In fact, there are other contexts where implicatures are relevant to the interpretation of coreference. It has long been known that agentless passives are generally interpreted as subject to disjoint reference and for this reason Baker, Johnson, and Roberts (1989) analyzed the *–ed* as a pronoun.

Notably, unlike declaratives, passives allow the cancellation of disjoint reference,

(105)   The FBI was investigated by itself

while in declaratives one would have,

(106)   a.   The FBI investigated itself by itself.

         b.   *The FBI investigated it by itself.

It is noteworthy that one obtains a further implication that it is one branch of the FBI investigating another, but this is not possible in the declarative cases.

Therefore it is not far-fetched to argue that a conversational implicature forcing disjoint reference could be present in the case of passives. One may argue that agentless passives generate an implicature which is forced by the Disjoint Reference Presumption (DRP) proposed in Farmer & Harnish (1987), according to which, "the arguments of a predicate are not intended to be disjoint, unless marked otherwise" (F&H 1987: 328). Levinson (2000) argues that DRP follows from the I-Principle because, typically, Agents act on disjoint referents.[9]

Suppose we argue that question-formation also induces this difference since the Hearer does not know exactly what the Speaker's assumptions are. If we say,

(107)   Did every girl wash her?

is it a question about every girl washing herself, her body, or Mary knowing that it was Mary that she

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[9] The claim that an I-implicature forces the disjoint reference interpretation does not contradict our earlier claim adopted from Levinson (2000) that, in the case of Exceptional Coreference contexts, I-implicatures force the coreference interpretation. According to Levinson, the hierarchy that regulates implicature projection is, Q-implicatures > M-implicatures > I-implicatures. In a B-context, the interlocutor first considers (and computes) a Q-implicature. In an Exceptional Coreference Context, the interlocutor reasons that a Q-implicature cannot be computed, and then computes an I-implicature forcing coreference; an I-implicature forcing disjoint reference cannot be computed because it would contradict the content of the Open Proposition that is already part of the Common Ground.

was washing? Consider a stronger environment.

(108)   a.   Did the President defend him?

        b.   Did the President defend himself?

In the first case, the President could defend the concept of the President or himself as President, while in the second case it could be the President as an individual person (one step removed from the body-interpretation). These options are not really present for adults, but they are logical differences that a child could be sensitive to.

Note that this circumstance resembles the Open Proposition situation, but in fact no Open Proposition has been introduced. And the use of subtle semantics, which we claim would be relevant here, resembles what is transpiring putatively in OE or Frisian. Therefore, we suggest that the child is maintaining an option on the other side of the parameter in these question-contexts that is like the use of the opposite parameter in limited Pro-drop environments. For instance, we allow pro-drop, but it is lexically restricted to occur for *seem* but not *appear*.

(109)   a.   Seems nice out.

        b.   *Appears nice out

We now have an avenue to explain the production / comprehension difference that applies to children only. We expect that triggering experiences with questions like the one in (93) will make the difference, blocking access to what is a non-English grammar. This fits the model articulated by Roeper (1999) and Yang (2000) that children maintain several grammars and slowly choose among them, using a variety of diagnostics including frequency and recursive productivity.

Interestingly, it is not a function of a child being egocentric and failing to take the Hearer perspective, but rather of being over-generous to the Speaker, seeking a "yes" answer, with an environment in which the option is depicted (John washing himself), and retreating to an early stage, another Grammar which would allow a "yes" answer. This then fits nicely the claim that children may continue to maintain, in reduced form, several grammars available to them.

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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