REFLEXIVE BINDING IN ESL CHILDREN:
A REANALYSIS BASED ON DISCOURSE PROMINENCE

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Statement of the Problem

Much previous work has been done on reflexive binding under a
Government Binding (Chomsky 1981) and Principles and Parameters
(Wexler & Manzini 1987) approach. However, certain issues have been
shown to be problematic. For example, "rogue" grammars, defined as long-
distance binding along with object orientation, are not uncommon in young
monolingual and ESL children (Franks & Connell 1996; Pearson 1997a,
1997b, 1998a), and thus pose a problem for current hypotheses of
Universal Grammar (Gass 1997; White 1997). These current hypotheses
are as follows:

   H_1: Full Transfer/Partial Access. Initial state is the L1;
          nonlinguistic mechanisms play a part and therefore "rogue"
          grammars are possible.
   H_2: Full Transfer/Full Access. Initial state is the L1; "rogue"
          grammars are not possible due to full access.
   H_3: No Transfer/Full Access. Initial state is UG, with similar
          development as seen in L1; "rogue" grammars are again not
          possible.
   H_4: Partial Transfer/Full Access. Initial state is a combination of
          UG and L1; as with the previous two hypotheses, "rogue"
          grammars are not possible.

As can be seen, based on the data from the above studies, the Full
Transfer/Partial Access hypothesis is the only tenable option under the
present UG formulation, which does not make sense when discussing young
children. That is, how can it be said that young monolingual children, or
even young ESL children, have only partial access to UG? Therefore, either
the UG hypotheses need reconceptualizing or response patterns need to be
looked at from a different perspective.

In order to explore this issue, a reanalysis of previous data was
undertaken, using Baker's (1995) discourse prominence as a possible

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explanatory factor. Two specific research questions were addressed: 1) Do young monolingual and/or ESL children use discourse prominence in preference to syntactic constraints when binding reflexive anaphors? and 2) Are "errors", defined under a syntactic view, possibly the result of a strategy of relying on discourse prominence during the early stages of language acquisition?

Overview of Previous Data

The goal of the previous research was to ascertain how children bind reflexive anaphors. Reflexive anaphors are lexical items which get their reference/identity from another noun phrase, within a language-specified domain, or from the context. For example, in the sentence "Cookie Monster told Grover$_i$ to help himself$_i$ to a cookie," *himself* in English would refer to Grover. However, in some other languages, it is possible that *himself* could be bound outside the more local domain and refer to Cookie Monster. In such a case, this would be referred to as long-distance binding. This continues to be an interesting line of investigation for several reasons. For example, the question arises of how ESL learners whose first language has a different binding domain from English "reset" this domain, especially when reflexive binding is never explicitly taught. It also has implications for how much of second language acquisition in this area is based upon UG and how much is acquired through more general learning mechanisms, as exemplified in the previous four UG hypotheses.

The data upon which this reanalysis was based were obtained from forty-five subjects in the midwest United States. Five subjects were monolingual English-speaking adults, twenty were monolingual English-speaking children aged four to eighteen years, and twenty were ESL children aged five to twelve years and of varying L1s and English proficiencies. All of the ESL children attended the same elementary school in a university town. Screening measures for the children included nonverbal analytical reasoning ability, English proficiency level, and hearing acuity.

The task itself involved listening to the investigator read a story about typical childhood television characters and then discussing at certain points within the story what was occurring. Thus, reflexive binding probes were inserted within a story format, and were designed to test Governing Category Parameter along with Proper Antecedent Parameter. Fifteen question sets were used, made up of five sentence types, two tokens each, along with one distracter for each sentence type. Sentence

types were randomized within the story. Both preference and possibility judgments were obtained. The sentence types, along with examples, were as follows:

Type A: Biclausal with 2 NPs, finite
Bert thought that Ernie hurt himself.
Type B: Biclausal with 3 NPs, finite
Grover told Mickey that Ernie shouldn't blame himself.
Type C: Biclausal with 2 NPs, nonfinite
Ernie told Bert to pour some milk for himself.
Type D: Uniclausal [NP, NP]
Grover likes Mickey's picture of himself.
Type E: Uniclausal (subject/object orientation)
Grover told Bert about himself.

Sentence types A - D test Governing Category Parameter, though note that sentence type D is problematic for the theory, as adult monolingual responses do not converge on the same referent. Sentence type E assesses Proper Antecedent Parameter. It should be noted that subject forcing was used.

Results from the above subjects included "rogue" grammars, which as discussed earlier, are problematic for the theory. That is, many of the children allowed both long-distance binding along with object orientation, which narrows the tenable hypotheses to the first one of partial access, which is improbable when discussing young children. (For a fuller discussion of these studies, see Pearson 1997a, 1997b, 1998a.)

Reanalysis

Due to the above problem, data from the above subjects and task were reanalyzed based on a discourse prominence view. Baker (1995) has found that locally free reflexives occur in written British English. However, their acceptance is based upon two conditions: 1) a Contrastiveness Condition, where "intensive NPs are appropriate only in contexts in which emphasis or contrast is desired" (p. 77), and 2) a Condition of Relative Discourse Prominence, where "intensive NPs can only be used to mark a character in a sentence or discourse who is relatively more prominent or central than other characters." (p. 80) Note that both conditions must be met in order to have a locally free reflexive. It is further important to note that Baker's view is not in opposition to Chomsky's work, but rather complements it, addressing that part of the definition of reflexive

anaphors (see above) which states "or from the context." Baker's view, then, provides a framework and constraints for when reflexive anaphors can be locally free in English.

In order to reanalyze the previous data, it was necessary to determine which characters were most prominent in the task story used in the previous work. Six native English-speaking linguists from Indiana University gave discourse judgments of the story probes under two conditions: 1) aural (audiotaped) in order to simulate the experience of the subjects, and 2) visual (written) in order to carefully explore the text and all factors of the story. Responses converged closely on all dimensions explored: narrator of story, directly responsible agent, affected patient, primary topic of concern, viewpoint, and contrast. Based on these judgments, data from the forty-five subjects discussed earlier were reanalyzed. This was done by calculating percentages of error under two conditions (syntactic view and syntactic + discourse prominence view) for three groups (total subject pool, monolinguals only, and ESL only) under three sentence conditions (total sentence types A-E, sentence types A-C only, and sentence types A-C with confounds minimized).

The statistical questions posed by the research questions of this study were: Is there a significant difference between what is syntactically correct and what is correct according to a discourse prominent view, regarding the number of "errors" in the subjects' responses? That is, if both syntactically correct response patterns and responses reflecting what was most prominent in the discourse were to be considered correct, was the amount of residual error significantly different than what would be found under a purely syntactic view? In other words, could a significant number of "errors" under purely syntactic constraints be explained by discourse prominence, thus indicating that the "errors" were not random, but possibly a strategy of relying on what was most prominent in the discourse?

It is important to note at this point that the original study, upon which this reanalysis is based, was not designed to explicitly test between a syntactic view and a discourse prominent view. Therefore, some of the reflexive binding probes had overlap between what was syntactically correct and what was most prominent in the discourse, making statistical analyses difficult. However, due to the large number of data points, z-tests were deemed appropriate, even though non-independence existed. Therefore, three sets of z-tests were run: 1) all probe sentences, including sentence types A-E; 2) a subset of sentence types (all A-C), eliminating the more problematic types D and E; and 3) a further subset of

sentences (of types A-C), which did not have the confound of overlap between what would be syntactically correct and what would be most prominent in the discourse. Within each of these sets, three z-tests were run: 1) total subject pool; 2) monolingual subjects only; and 3) ESL subjects only.

Statistical analyses of the first set revealed the following:

Total sample of sentences, total subject pool: $z = 5.734$, $\alpha = .00003$
Total sample of sentences, monolinguals only: $z = 1.101$, ns
Total sample of sentences, ESL only: $z = 4.724$, $\alpha = .00003$

	Syntax only	Syntax + Discourse Prominence
Total subjects	12%	4%
Monolinguals only	3%	2%
ESL only	24%	7%

Table 1
Percentage of Error under Two Accounts
All Probe Sentences: Types A-E

These results indicate that a discourse prominent view has high probability of explaining the response patterns of subjects which under a purely syntactic view would be considered errors. For example, with the total subject pool, 12% of the responses were errors under a syntactic view. Allowing the character who was most prominent in the discourse to also be considered a correct answer, the error rate drops to 4% residual error (made up of "I don't know" responses along with unexplained error). This results in a 2/3 reduction in what is termed "error." Dividing the total subject pool into monolingual subjects and ESL subjects, a different pattern emerges. The monolingual response patterns are nonsignificant, indicating little, if any, reliance on discourse prominent characters. However, the ESL response patterns are highly significant, indicating that it is this group which is influencing the total sample. Under a strict syntactic account, 24% of this group's response patterns would be considered errors. However, allowing the addition of a discourse prominent character to be correct, residual error drops to 7%, thus resulting in a greater than 2/3 reduction in what is termed "error."

As has been noted earlier in this paper, sentence type D is problematic for the theory and sentence type E tests a different parameter. Therefore, it was thought that these two sentence types might possibly be skewing

the data.   In order to obtain a clearer picture of what might be occurring, these two sentence types were deleted and z-tests were run on sentence types A-C only, with the following results:

Subset of sentences - Types A-C; total subject pool: z = 3.628, α = .00002
Subset of sentences - Types A-C; monolingual only: z = .193, ns
Subset of sentences - Types A-C; ESL only: z = 3.911, α = .00005

	Syntax only	Syntax + Discourse Prominence
Total subjects	14%	6%
Monolinguals only	3%	2%
ESL only	29%	10%

Table 2
Percentage of Error under Two Accounts
Probe Sentences: Types A-C

From this further analysis, a very similar pattern emerges.   A discourse prominence view shows potential for explaining a significant portion of the "error" under a syntactic-only account, and again, this significance is a result of the ESL group. For example, 29% of the responses in the ESL group were errors based on a strict syntactic analysis. When the character who is prominent in the discourse is also considered as a correct response, the error rate drops to 10% residual error. As seen before, this represents a 2/3 reduction in error rate.

In a further attempt to reduce the confounds in the existing data base, a smaller subset of sentences was analyzed. These four sentences, all of which were types A-C, did not have the overlap that the previous sentences exhibited. That is, the character which was syntactically "correct" and the character(s) which was/were most prominent in the discourse were mutually exclusive. This subset produced the following results (as the previous analyses had shown the monolingual group to produce nonsignificant responses, this group was not further analyzed):

Subset of sentences - Types A-C, confounds constrained; total subject pool: z = 2.160, α = .0154
Subset of sentences - Types A-C, confounds constrained; ESL only: z = 2.346, α = .0096

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	Syntax only	Syntax + Discourse Prominence
Total subjects	15%	8%
ESL only	30%	15%

Table 3
Percentage of Error under Two Accounts
Selected Probe Sentences: Types A-C

Again, results are highly significant, indicating even more clearly that the character most prominent in the discourse is being relied upon for reference of the reflexive anaphor. For example, 30% of the ESL responses are errors under a syntactic account, yet when a discourse prominence view is also considered as acceptable, residual errors fall to 15%, a reduction of 50%. Thus, even though the reanalysis must be viewed with caution, owing to the fact that the previous study was not designed to specifically explore this issue, this last analysis, with confounds constrained, does indicate that the ESL children are relying on discourse prominence to a high degree in their binding of reflexive anaphors.

As a discourse prominence view appeared to be a possibility in explaining the second language acquisition of ESL children, specific discourse roles were explored. Many of the children exhibited "wrong" answers, and what was interesting was that they exhibited the same wrong answers, raising the suspicion that something such as discourse prominence was actually influencing their responses.

Based upon the story, "primary topic of concern" was predicted to be the role attracting the children's attention. In the story, Bert and Ernie arrive home from school and have a snack before going outside to play. Grover, Cookie Monster, and Mickey Mouse join them in typical backyard activities, such as playing in a sandbox and swinging on a swingset. Unfortunately, Grover swings too hard and falls off, hitting his head and injuring his knee. After this, all activity revolves around Grover - going inside to clean his knee, getting a band-aid, and finally reading books quietly on the sofa so that Grover can rest his knee. Thus, Grover was considered to be the "primary topic of concern" and the predicted role for the children's responses. Exploration of response patterns, however, showed "directly responsible agent" to be weighted heaviest, with "affected patient" and "primary topic of concern" secondary.

Since the "directly responsible agent" is often the first NP in a sentence, and thus could simply be explained as a "first NP" strategy, the

probe sentences and story context were carefully explored. Of most interest was the fact that the "directly responsible agent" was often not even in the probe sentence, but rather occurred in the previous discourse. Thus, the children were not using a "first NP" or "last NP" strategy at all. Rather, the children were keeping in mind the story plot and were assigning reference of the reflexive anaphor to the "directly responsible agent" in the discourse. As noted earlier, the original study was not designed specifically to test discourse roles, and therefore a carefully designed study to specifically test these is needed. However, based upon the findings here, especially in light of the most often chosen character not even being in the probe sentence but of a particular discourse role, further study is indicated.

Summary and Future Study

In summary, the results reported here indicate that in ESL children it may be possible to explain the majority of "errors" by a discourse prominence view. That is, the "errors" do not appear to be random, but rather may be based upon a reliance on discourse factors in preference to syntactic constraints during the early stages of child ESL acquisition. Thus, what appears on the surface to be an error, may actually not be, if we consider Baker's locally free reflexives, along with his two conditions, to be viable alternatives to a strict syntactic account when determining reference. In other words, Baker's account may offer a working solution to the problem encountered under the existing UG hypotheses, where the data from young ESL children, because of their "rogue" grammars, fit only into a "partial access" slot, which is improbable. Additionally, because some monolingual children also exhibit these "rogue" grammars, Baker's account may offer a constrained explanation for when locally free reflexives may occur, and thus address the "or from the context" section of the working definition of reflexive anaphors.

As has been noted several times in this paper, the reanalysis presented here was based on data from studies not specifically designed to test discourse prominence or discourse roles. However, results are so highly statistically significant as to warrant further research. Therefore, the following are suggested: 1) carefully designed studies to eliminate confounds between syntactically correct and discourse prominent responses; 2) investigation into specific discourse roles which appear to be most prominent during early language acquisition; 3) use of younger monolingual children (ages 2-5 years) in order to capture the beginning stages of syntactic development; 4) larger numbers of ESL children,

divided into L1 groups, across a range of well-defined English proficiency levels; and 5) exploration into whether discourse prominence is a possible developmental stage between the ability to differentiate pronouns from reflexive anaphors and the ability to use true syntactic binding. These suggestions should include both longitudinal and cross-sectional studies.

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