1.0 Introduction

In Tancredi (2013) I argued for a reduction of Condition B effects to timing effects of discourse incrementation combined with an analysis of pronouns as anaphoric on individuals or variables in the context. The basic idea pursued in that paper is that pronominal anaphora is a discourse phenomenon whereby a (non-reflexive) pronoun picks up its antecedent not through syntactic mechanisms of anaphora but rather through discourse mechanisms. Discourse anaphora, it was claimed, requires an antecedent to be present in the discourse context at the point where the pronoun is processed. Condition B effects were accounted for as a side effect of the timing by which pieces of a syntactic structure get added to the discourse context, with the minimal chunk that can be added to the discourse context being a phase. Empirical motivation for this claim came from the observation that licensing of deaccenting, a clearly discourse-related process, gives rise to Condition B-like effects as well. Since deaccenting can be licensed independently of coreference and binding, a reduction of deaccenting licensing to binding constraints was seen to be untenable. The reverse reduction, however – of binding constraints to licensing of deaccenting – resulted in an overall simplification of the grammar.

In this paper I will examine the parallelism between pronominal binding and licensing of deaccenting in more detail. Deaccenting will be seen to provide a sharper tool for investigating the timing of discourse incrementation since it can in principle apply to overt expressions of any syntactic category or any semantic type. At the same time, I will show that the binding-deaccenting parallelism breaks down in cases of cataphora: backward binding of a pronoun by an expression that follows it is allowed in a limited range of configurations, but backward deaccenting can never be licensed in those configurations. This suggests that a distinct mechanism is responsible for backward binding. Independent motivation for this suggestion will be seen to come from the fact that cataphora, but not anaphora, can lack number agreement. I will propose that the mechanism involved is a variant of discourse anaphora in which a quantifier
is discourse anaphoric on a pronoun rather than the reverse.

2.0 Binding-Deaccenting Parallelism

In this section I demonstrate the basic parallelism between pronominal binding and licensing of deaccenting. Intended anaphora is indicated by underlining the anaphoric pronoun and bold facing the intended antecedent. Intended licensing of deaccenting is indicated by writing the deaccented expression in italics and its intended licenser in bold face. Using these conventions, the core cases of cross-sentential anaphora and cross-sentential licensing of deaccenting can be indicated as follows:

(1)  a. John/A man walked into a bar. He sat down.
     b. A man walked into a bar. A man was sitting there.

In (1a), typically the pronoun would be not only anaphoric on John/a man but also deaccented. However, deaccenting is not necessary for the anaphora to hold – it holds just as well if the pronoun is focused, as it could very naturally be if the example were continued but everyone else in the bar was standing, showing that anaphora is not dependent on deaccenting. In (1b) deaccenting is seen to not be dependent on coreference, since reuse of an indefinite makes intended coreference an impossibility.

Since both of the examples in (1) involve cross-sentential relations, it is clear that the relations themselves are not purely syntactic in nature. However, both deaccenting and anaphora can be licensed internal to a sentence as well, a fact noted about deaccenting as far back as Tancredi (1992):

(2)  a. John/A man told Mary that he was smiling.
     b. A man told Mary that a man was smiling.

And as also noted in Tancredi (1992), in neither case can the licensing be too local:

(3)  a. #John/A man saw him.
     b. #A man saw a man.

Examples like these can, of course, be felicitously uttered in a context that provides an appropriate antecedent external to the sentence. Thus, in the context Many people heard (a) John/ (b) a man, the utterances will be perfectly acceptable, and with John used in both the context and in (3a) the pronoun will end up coreferent with both occurrences of John. The infelicity of the licensing indicated in (3), however, can be seen clearly by embedding the sentences in a
context that lacks such alternative antecedents, one such as: *Entering a mirrored room filled with women*, .... With such a context, the only plausible intended antecedents for the pronoun in (3a) or for licensing the deaccenting of *a man* in (3b) would be the subjects of the sentences these expressions occur in. The infelicity of the examples in such a context shows that the intended antecedents cannot be actual antecedents.

The parallelism seen above extends to a wide range of other cases, as can be seen below. In each case I supply a context that helps to force the intended antecedence or licensing relation. In the (a,b) examples, the relevant relation is too local, making the sentences unacceptable on the intended reading. In the (c,d) examples the intended reading is acceptable.

(4) Yesterday there was a department party.
   a. #Mary showed {John / a professor} him.
   b. #Mary showed a professor a professor.
   c. Mary showed {John / a professor} someone sitting close to him.
   d. Mary showed a professor someone sitting close to a professor.

(5) There will be a school-wide chess competition tomorrow.
   a. #{John / A student} believes him to have the best chance of winning.
   b. #A student believes a student to have the best chance of winning.
   c. {John / A student} thinks most people believe him likely to lose.
   d. Students think most people believe students likely to lose.

(6) Mary is a very irrational person.
   a. #She never considers {John / a doctor} him.
   b. #She never considers a doctor a doctor.
   c. She considers {John / a doctor} the source of nasty rumors about him.
   d. She considers doctors the source of nasty rumors about doctors.

There are additional cases in which deaccenting can be licensed but in which there is no parallel structure in which a pronoun can be bound, for the simple reason that what gets deaccented is of a different semantic type from a pronoun. The following examples fall into this category.

(7) a. John spoke about what Bill spoke about.
   b. It makes John happy to see others happy.
   c. A night when it rains is better than a day when it rains.
   d. Two men walked in and sat at two tables.
e. **Interesting** problems often have *interesting* solutions.\(^1\)

However, if we expand the anaphoric expressions we examine beyond personal pronouns, we find that parallel examples involving anaphora can be constructed in many of these cases as well:

(8)  
   a. John *spoke* about what Bill *did* that about.\(^2\)  
   b. It makes John *happy* to see others *so*.  
   c. A night *when it rains* is better than *such* a day.  
   d. Two men walked in and sat at *as many* tables.  
   e. **Interesting** problems often have *such* solutions.

While the underlined expressions in the above examples are not pronominal, they are anaphoric. And while it is difficult to construct examples in which deaccenting of one of these kinds of expressions is not licensed because its intended antecedent is too close, in those cases that can be constructed we find that anaphora is equally blocked in parallel cases:

(9)  
   a. #**Hard** hard problems rarely have **easy** easy solutions.  
   b. #**Hard** such problems rarely have **easy** such solutions.

(10) a. #A **sunny** day *that’s sunny* is nicer than a **rainy** night *that’s rainy*.  
     b. #A **sunny** such day is nicer than a **rainy** such night.

### 3.0 Binding-Deaccenting Divergence

The examples in the previous section illustrated a close parallelism between availability of pronoun binding and licensing of deaccenting. The parallelism is not, however, complete. In particular, there are cases of cataphora in English that do not have any deaccenting counterpart. While there is a fair degree of

\(^{1}\) The presence of deaccenting is clearest with sentence final expressions, though it can be detected in non-final positions as well, such as in (7d,e). Under the relevant pronunciation, the second occurrences of *two* and *interesting* are reduced to an extent to which *three* and *boring* could not be if substituted.

\(^{2}\) The parallelism between the (a) and (c) cases in (7) and (8) is not perfect, and (8a) itself is somewhat awkward. (8a) could be made perfect by using only *did* in place of *did that about*, though it isn’t clear that *did* counts as an anaphoric expression. Indeed, if we accept the arguments of Abe and Tancredi (2014) we would analyze this case as an extreme case of deaccenting, and so the parallelism would be clearly expected but equally irrelevant to connecting deaccenting and anaphora. In the (c) case there seems to be no alternative to placing the anaphoric *such* before the head noun, making for an unavoidable order difference between the anaphora licensing and the deaccenting licensing.
variation in the degree to which people accept cataphora, the following examples at least marginally allow backward binding for some native speakers.\(^3\)

(11) a. His acne bothers every school boy.
   b. Mary introduced his new teacher to every student that looked lost.
   c. His mother every boy loves.
   d. His parents are ashamed of no man who succeeds in life.
   e. Which of his relatives does every man love the most?
   f. It’s his mother that every man loves the most.

However, structurally parallel examples systematically disallow an expression in the position of the pronoun to be licensed as deaccented by an expression in the position of the quantifier, as seen below.\(^4\)

(12) a. #A school boy’s acne bothers a school boy.
   b. #Mary introduced a student’s new teacher to a student.
   c. #New York women’s husbands New York women love.
   d. #Criminals’ parents are ashamed of criminals.
   e. #Which of a New Yorker’s relatives does a New Yorker love the most?
   f. #It’s geniuses’ achievements that geniuses love the most.

4.0 Analysis of the normal cases of anaphora and deaccenting.

Licensing of deaccenting is generally accepted to be a discourse phenomenon. Following Schwarzschild (1999), I take deaccenting of an expression to be possible when its interpretation is entailed (module existential F-closure – see Schwarzschild for details) in the local context. Schwarzschild only looked at cases of cross-sentential licensing of deaccenting, and so could implicitly take a very coarse-grained approach to context incrementation, adding whole sentences to the context only after they have been completely processed. If his analysis is to be extended to sentence-internally licensed cases of deaccenting, obviously a more fine-grained analysis of context incrementation is needed. Such a

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\(^3\) The examples in (11e,f) seem to be more widely accepted than those in (11a-d). I will not attempt to account for this difference in this paper.

\(^4\) In all cases given here it is, irrerelevantly, possible for the licensing of deaccenting to go in the opposite (i.e. normal) direction, or for both the italicized expression and the expression in bold type to be simultaneously deaccented. (Cf. Rooth 1992 for other cases of simultaneous deaccenting.) In this latter case, the licensor is presumably accommodated.
fine-grained analysis is developed in Tancred (2013) for cases of anaphora and in Abe and Tancredi (2014) for licensing of deaccenting. The common core of these two analyses is that discourse incrementation applies phase by phase, top down, left to right in a sentence, with an expression being semantically interpreted immediately upon being encountered, but added to the discourse context only after it has fulfilled all its syntactic roles. Both pronominal anaphora and deaccenting then relate expressions in a syntactic structure to antecedents in the discourse context, accounting for the parallelism between these two processes.

To see how these assumptions about discourse incrementation help account for the parallel restrictions on deaccenting and anaphora licensing, consider the sentences in (3), repeated here as (13).

(13) a. #A man saw him.
    b. #A man saw a man.

There are four relevant phases in these sentences: the CP phase, the subject DP phase, the vP phase, and the object DP phase. Top-down, left-to-right processing dictates that these phases be processed in the order given: CP, DPs, vP, DPO. Of these, the CP phase can be ignored, adding at most the past tense to the discourse context. The subject DP phase contains a D head a and an NP man. I assume that man has no role to play outside of this phase – whatever features it has are satisfied through agreement with the D head. This allows man to be added to the discourse context as soon as the DP phase is processed. While the DP as a whole checks its Case within the CP phase, however, it does not have its theta-role checked at this level. On the assumption that both Case and theta-roles are checked through the D head, this means that the D head cannot yet be added to the discourse context. At the vP phase, three overt expressions get added to the discourse context: the subject D, which after having its theta-role checked has no further unchecked features; the verb, which checks its theta-roles with both the subject D and the object D and checks the Case of the object D; and the object D which has both its Case and theta-role checked. Since these expressions all get added to the discourse context together, it is impossible for any of them to act as a discourse antecedent to any of the others. For (13a) this means that neither the subject DP as a whole nor its theta-role can act as an antecedent for the pronoun him, making it impossible to generate a bound reading for this pronoun. For (13b) it means that the subject determiner cannot act as an
antecedent for deaccenting of the object determiner, making deaccenting of the entire object DP impossible as a consequence.5

The acceptable cases of deaccenting and anaphora all involve an antecedent that gets added to the discourse context prior to processing of the pronoun or deaccented expression. To illustrate, consider (2), repeated here as (14).

(14) a. A man told Mary that he was smiling.

b. A man told Mary that a man was smiling.

The processing of these sentences follows that of (13) above, with *man* added to the context at the DP5 phase and *a, told, Mary* and *that* at the vP phase. Since *he* in (14a) and the second occurrence of *a man* in (14b) are not directly syntactically related to the matrix verb, they are not processed at all in the vP phase. This means that their intended antecedent *A man* gets added to the discourse context prior to their being processed, making the indicated antecedence relation possible.

4.1 Inapplicability to Cataphora

The analyses of pronominal anaphora and of licensing of deaccenting sketched above make it impossible in principle for a discourse-licensed expression to precede its antecedent. This fits perfectly with observation with respect to deaccenting, but fails with respect to pronominal anaphora. In particular, the analysis sketched has no way to account for the cases of cataphora examined in section 3.0. To illustrate, consider (11a), repeated here as (15).

(15) a. His acne bothers every school boy.

With top-down, left-to-right processing of the sentence, the first word encountered is the pronoun *his*, which by hypothesis needs to be semantically interpreted immediately.6 Since the quantifier *every school boy* hasn’t even been pronounced yet let alone added to the discourse context at this point, there is no way for the pronoun to take the quantifier as a discourse antecedent. If the only way for a pronoun to be bound were for it to be anaphoric on an antecedent in the discourse context, then this sentence together with the rest of the sentences in

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5 For more detailed analyses see Tancredi (2013) and Abe and Tancredi (2014).
6 Semantic interpretation is assumed to be immediate and independent of syntactic and discourse timing effects. These effects only affect discourse incrementation.
(11) should disallow a bound variable interpretation for the pronoun. The fact that such an interpretation is at least marginally available shows that some other process must be available for generating bound variable interpretations in these cases.

4.2 Lack of Number Agreement in Cataphora

Independent evidence that something different is going on in the cases of cataphora in (11) above comes from differences in number agreement. In all those cases of bound variable anaphora for which the analysis in section 4.0 gives the correct prediction, number agreement between the pronoun and the antecedent is obligatory, as seen below with a few illustrative examples.

(16) a. **Most men** told Mary that {#he was / they were} smiling.
   
   b. **Most students** think people believe {#him / them} likely to win.
   
   c. Mary considers **doctors** the source of nasty rumors about {#him / them}.

As observed in Kanazawa, Shimada and Tancredi (2014), however, in cases of cataphora, number agreement is not obligatory. In particular, to the extent to which backward binding is possible with a number-agreeing quantifier, it is equally possible for a singular pronoun to be bound by a plural quantifier in the same configuration, as can be seen by comparing (11) with the examples below.

(17) a. {**His / Their**} acne bothers **most school boys**.
   
   b. Mary introduced {**his / their**} new teacher to **most students** that **looked lost**.
   
   c. {**His / Their**} mother **most boys** love.
   
   d. {**His / Their**} parents are ashamed of **few men who succeed in life**.
   
   e. Which of {**his / their**} relatives do **most men** love the most?
   
   f. It’s {**his / their**} mother that **most men** love the most.

5.0 Analysis of Cataphora

If we are to maintain that pronominal anaphora and licensing of deaccenting are both discourse processes, then the strict linear precedence requirement on licensing of deaccenting makes it clear that the solution to the cataphora problem cannot be to tweak the timing of discourse incrementation. Such a solution would potentially allow for cataphora in (11) and (17) above, but at the cost of wrongly allowing backward licensing of deaccenting in (12). I propose instead to
analyze examples of cataphora as involving discourse anaphora of the quantified expression on the pronoun rather than the reverse. Formally this involves interpreting a pronoun as a random variable when it is first encountered and taking anaphora of the quantifier to result in identification of the variable inherent in the quantifier with that assigned to the pronoun. While such identification of variables is in principle possible across sentences, a bound variable interpretation will only result in those cases in which the quantifier can syntactically bind the pronoun, for example through reconstruction of the pronoun to a position in the scope of the quantifier or through raising of the quantifier to a position above the pronoun. Thus the only cases in which such reverse anaphora will even potentially have an interpretive effect are cases where the pronoun and quantifier are in the same sentence.

5.1 Consequences of the Analysis
Since the analysis proposed is based on anaphora on an expression in the discourse context, the same locality effects that are found with forward binding of pronouns are predicted to occur with backward binding as well. Such effects are indeed found, as can be seen below.

(18) a. #His picture of every man appeared in the newspaper.
   b. #He praises every man.

The significance of these observations, however, is unclear given that the configurations involved are all cases of strong crossover and that a separate analysis is still needed for non-local cases of strong crossover like the following.

(19) #He thinks that people respect every man.

The analysis also predicts a difference between certain cases of weak crossover involving wh-expressions and parallel cases involving quantifier phrases like the following:

(20) a. #Who does his mother love?
   b. #His mother loves every man.

In neither case is the pronoun predicted to be able to be anaphoric on the intended antecedent since in neither case is that antecedent added to the discourse context until its thematic role is discharged, which only occurs after the pronoun is processed. However, the quantifier in (20b) is predicted to be able to be anaphoric on the pronoun in that example since the pronoun is added to the
context before the quantifier is interpreted. In the case of (20a), in contrast, the wh-expression is initially processed and hence interpreted before the pronoun gets interpreted, making anaphora of the wh-expression on the pronoun impossible. While (20b) is only marginally acceptable, the distinction between it and (20a) is clear.

6.0 Discussion

The analysis given in section 5.0 predicts cases of backward anaphora to be as acceptable as cases of forward anaphora, something that appears not to be the case. In addition, the distinction in acceptability between (11a-d) and (11e,f) is not predicted, and weak crossover cases with quantifiers like (20b) are also wrongly predicted to be perfectly acceptable. The overall degradation in acceptability of these cases suggests that reverse anaphora, i.e. anaphora of a quantified expression on a pronoun, is itself a marginal process, perhaps a post-syntactic fix-up process that overrides standard compositional interpretation.

To the extent to which the proposed analysis of cataphora is plausible, it supports the view that pronominal anaphora and licensing of deaccenting are both processes that involve relating an expression in a sentence to an antecedent in the discourse context. Since in both cases the antecedent can be sentence internal, this view necessitates a fine-grained analysis of context incrementation which allows part of a sentence to be added to the context before the entire sentence has been processed. The analyses of context incrementation developed in Tancredi (2013) and Abe and Tancredi (2014) have this quality, taking the minimal unit of context incrementation to be a phase. Apparent restrictions on antecedence relations fall out on this approach as an epiphenomenon, resulting from the inherent timing relations involved in interpreting expressions and in adding them to the discourse context. Cataphora was seen to be incompatible with such a discourse analysis if analyzed as anaphora of a pronoun on a quantifier that follows it. It was proposed, however, that the anaphoric connection in instances of cataphora is one whereby the quantifier takes the pronoun as an antecedent rather than the other way around. Such an analysis makes it possible to analyze pronominal anaphora as a discourse process that obligatorily takes an antecedent from the discourse context.
While the analysis presented makes crucial reference to top-down, left-to-right processing of syntactic structures, it should not be seen as arguing that syntax itself involves such an ordering. As Chomsky rightfully argues, knowledge of syntax is distinct from the use to which we put that knowledge, and in the analyses presented and examined in this paper it is the use of structures compatible with our syntactic knowledge that is at issue, not our syntactic knowledge of those structures itself. Still, to the extent to which the analysis depends on phase-by-phase processing, it lends indirect support to a syntactic analysis that is based on phases.

Bibliography.
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