

# RELATING NON-ARGUMENT REFLEXIVES TO ARGUMENT STRUCTURE IN ENGLISH\*

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## 1. The Issue

Reflexive pronouns in English are generally considered to be governed by Condition A of the binding theory as formulated by Chomsky (1981); that is, a reflexive should be bound in its governing category. This account for the distribution of reflexives is challenged by the work of Reinhart and Reuland (1993), wherein the distribution of reflexive pronouns also takes argument structure into account, rather than solely examining the position in the syntax. Sensitive to both syntax and semantics, the Reinhart and Reuland approach would seem to be superior, but one drawback is that it only predicts the distribution of reflexive pronouns in argument positions.

In English, however, reflexive pronouns are not restricted solely to appearing in argument positions. Two such non-argument uses of reflexives are the appositive use, and the manner adjunct use:

- (1) a. Cilla<sub>i</sub> herself<sub>i</sub> decided it was time for the dog to go.  
b. Chesney<sub>i</sub> filled Schmeikel's bowl by himself<sub>i</sub>.

In both cases, Condition A is satisfied; the reflexive pronouns are locally bound by their antecedents. This would seem to indicate that an argument-structure based account of the distribution of reflexive pronouns would not have full enough coverage.

This paper reports on an experiment which shows that even these non-argument uses, particularly the manner adjunct use, are still sensitive to the argument structure of the associated predicate. These structures will be discussed in Section 2, leading to a testable hypothesis. The experiment will be described in Section 3, with the results presented in Section 4. Section 5 will contain an elaboration of the conclusions drawn from the experimental results here, and an outline possible avenues of future work.

## 2. Background

In the general literature on reflexives in English, two sorts of data receive the bulk of attention. The first are those cases in which the reflexive pronoun

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appears in an argument position:

- (2) a. Sunita<sub>i</sub> revealed herself<sub>i</sub>.  
 b. Maya<sub>i</sub> thought that Dev<sub>j</sub> should behave himself<sub>j</sub>.

Through examples such as this, the broader definition of the binding domain, the clause level, can be established. The second type of data which is usually presented is that which challenges this account. This comes in two forms, the first of which being the so-called ‘picture’ NP’s, which show that the binding domain should be even smaller than the clause level:

- (3) Fred<sub>i</sub> was constantly irritated by Roy<sub>j</sub>’s low opinion of himself<sub>\*ij</sub>.

Because the antecedent for the reflexive here can only be Roy, this example shows that the NP is actually the relevant binding domain. The other frequently-cited type of counter-example are the ‘exempt’ anaphors, which do not seem to follow the binding theory whatsoever:

- (4) Hayley<sub>i</sub> invited Jack<sub>j</sub> and myself for tea.

In this sentence, the reflexive *myself* has no antecedent in the sentence, and yet is considered to be perfectly grammatical. These exempt uses, also sometimes referred to as logophors, are generally characterised by a free alternation between the use of a reflexive pronoun or a referential pronoun in the same position

- (5) Hayley invited Jack and me for tea.

Because this free alternation can be used as a diagnostic for logophoricity, it then follows that the lack of such a free alternation can be used as a diagnostic for non-exemptness. That is, if a reflexive pronoun cannot be replaced by a referential pronoun in a given position, then it should not be dismissed as exempt.

Given that the appositive and the manner adjunct uses are apparently “well-behaved” according to Condition A, it is not surprising that they are infrequently discussed. They are locally-bound, and they cannot be replaced by a referential pronoun, so they are not exempt. From the perspective of Condition A, they are quite unremarkable. However, from the perspective of an argument structure approach, they are much more remarkable. Here are two reflexive pronouns which are not exempt from the rules for the distribution of reflexives that do not appear in argument positions. For a theory which is based upon argument structure, this presents a problem. Thus, from the perspective of exploring the viability of a Reinhart and Reuland-type analysis of binding, these constructions are important.

These constructions are worthy of attention for another reason as well: simple frequency. Storoshenko (in press) reports on a corpus analysis of English

reflexive usage. In that study, it is found that just over half of the occurrences of reflexive pronouns in a combined corpus of written and spoken data appear in argument positions. Furthermore, it is found that combined, the picture NP and exempt uses make up just more than 2.5% of the total usage. The bulk of the gap between the argument position cases and the well-known exceptions is taken up by the combination of the appositives and the manner adjuncts. Given their relative frequency in naturally-occurring data, these constructions are worthy of closer attention.

Looking first at the appositives, they can appear in more than one position. In the canonical use, the appositive reflexive occurs immediately following its antecedent, as shown in (1a). However, the reflexive can also appear at the end of a sentence:

- (6) Cilla<sub>i</sub> t<sub>i</sub> decided it was time for the dog to go herself<sub>i</sub>.

Following the analysis of Bickerton (1987), this can be treated as a simple extraposition process. Assuming that this extraposed position is relatively low in the syntax, this still presents no problem for Condition A; the reflexive pronoun will still be c-commanded by its antecedent.

Turning to the manner adjuncts, there is also a variation in their usage:

- (7) Chesney<sub>i</sub> filled Schmeikel's bowl himself<sub>i</sub>.

The *by* preposition in this construction is in fact optional, able to be elided without any change in meaning. However, this does nothing to the position of the reflexive pronoun and so has no effect on the binding relations.

In and of themselves, these variable uses of the non-argument reflexives seem to be unremarkable. However, they do conspire to create potentially ambiguous sentences such as (8a):

- (8) a. David<sub>i</sub> obtained the contraband himself<sub>i</sub>.  
 b. David<sub>i</sub> himself<sub>i</sub> obtained the contraband.  
 c. David<sub>i</sub> obtained the contraband by himself<sub>i</sub>.

As shown, there are two possible underlying structures for (8a). It could be the result of an extraposition in a sentence such as (8b), or it could be a manner adjunct with an unpronounced preposition, deriving from a sentence such as (8c). This ambiguity proved to be problematic in the corpus work mentioned previously, as it made it difficult to classify bare sentence-final non-argument reflexives.

To solve this problem, a test was devised, based in part upon the extraposition analysis proposed by Bickerton for the appositive case. If indeed the sentence-final appositive is formed through extraposition, it should be impossible to pronounce the reflexive pronoun at both the trace position and the extraposed position:

- (9) \* Vera<sub>i</sub> herself<sub>i</sub> was a member of the bridge club herself<sub>i</sub>.

However, if the sentence final reflexive were a manner adjunct, then this should be a possible construction, with the first reflexive emphasising the subject, and the second indicating the manner. While these sentences are definitely marked from a pragmatic point of view, they are grammatical, and with the right context, they seem perfectly fine:

- (10) Les<sub>i</sub> himself<sub>i</sub> fixed his car by himself<sub>i</sub>, though he advised his friends to use a mechanic.

Looking at the contrast between (9) and (10), another contrast emerges. In the ungrammatical (9), the predicate is non-agentive, whereas the example in (10) uses an agentive predicate. This suggests that the manner adjunct may indeed need to be licensed by an agentive predicate. To justify the use of this duplication test in sorting out the corpus, and to test this relationship between the manner adjuncts and agentivity, an experiment was conducted.

### 3. Experiment Design

The collection of grammaticality judgements for sentences such as (9) and (10) is not a simple task, as the sentences seem so unnatural to most native speakers that it would be difficult to determine whether a negative response is a result of actual ungrammaticality, or just pragmatic oddness. For this reason, a more sensitive task is required.

This experiment is based upon a magnitude estimation task, in which participants are required to evaluate a series of new stimuli with respect to a fixed modulus. Originating in work on psychophysics used to test sensitivity to stimuli such as light or sound intensity (Stevens, 1975), this methodology has been adapted to the measurement of grammaticality judgements. Essentially, participants are presented a modulus sentence, and asked to score its naturalness. Then, new stimuli are presented, with the task being to score the stimuli relative to the modulus. Keller and Asudeh (2001) use this method to test binding judgements of native English speakers, showing that their findings are not significantly different from experiments using a more straightforward forced-choice task.

In this case, all experimental stimuli took the shape of sentences which ended with a non-argument reflexive. In all, there were four different configurations of non-argument reflexive, crossed with two predicate types, agentive versus non agentive. In total, this yielded eight stimulus types, shown in (11) and (12):

- (11) Agentive Stimuli
- a. Jim painted the house himself.
  - b. Jim painted the house by himself.

- c. Jim himself painted the house himself.
- d. Jim himself painted the house by himself.

(12) Non-Agentive Stimuli

- a. Will was a subscriber himself.
- b. Will was a subscriber by himself.
- c. Will himself was a subscriber himself.
- d. Will himself was a subscriber by himself.

As shown, the sentence final reflexive appears both with and without the by preposition, and again both with and without the earlier incident of an appositive reflexive pronoun. For each stimulus type, there were three tokens, yielding a total of 24 experimental stimuli. An equal number of filler sentences were created, with a broader range of sentence types, and grammaticality. To distract from the presence of the reflexive pronoun at the end of the experimental stimuli, all the fillers also ended with a reflexive pronoun, though some of these were argument reflexives.

(13) Sample Fillers

- a. Robin saw a lizard beside herself.
- b. Jean wanted to distinguish himself.
- c. \* Will was talking to herself.
- d. \* Who the fact that was a crook proved itself?

Ideally, in order to encourage the participants to give as wide a range of responses as possible, there should be a maximal amount of variety in the stimuli. Because it is difficult to make a sentence seem “more grammatical,” there is not much room for this in the construction of grammatical filler sentences. Where this is more possible is in the ungrammatical fillers. Here, the examples show an error based on a lack of agreement, and one based upon a subadjacency violation. To balance these out, grammatical fillers with similar structure were also used.

Care must also be taken in the choice of a modulus sentence. In an experiment like this, the ideal modulus is not completely grammatical, but not so immediately perceptible as ungrammatical as some of the ungrammatical fillers. Again, finding this middle ground is important in order to encourage participants to make as wide a distinction as possible between grammatical and ungrammatical stimuli. For this experiment, it was decided that the best choice for a modulus would be a sentence containing a superiority error based in which an adjunct *wh* phrase has moved over a subject *wh*:

(14) Why did who criticise himself?

Note that the modulus also ends with a reflexive pronoun, though its

ungrammaticality is not connected at all to that pronoun.

Participants begin the experiment by assigning a numeric score to the modulus sentence. In this case, participants are asked to judge the modulus based upon its naturalness as a sentence of English. They are then instructed to assign relative scores to the experimental stimuli; more natural stimuli receiving higher scores, and less natural ones receiving lower scores. Using the original modulus score, the raw scores from each participant can be converted into ratio scores and then normalised by taking the decadic logarithm, so that the scores can be used for statistical comparison.

Whereas prior implementations of this experimental protocol have used pencil and paper approaches, the decision was made in this case to use an electronic method implemented using web-based survey software. This has the benefit of recruiting a large number of participants in a short period of time without requiring them to visit a laboratory or classroom, and greatly facilitates the data analysis process. To orient participants to the task, a two minute instructional video was prepared, introducing the magnitude estimation methodology, first using line lengths as a simple illustration, then showing how it can be applied to sentences. To get familiar with the web interface, participants were then required to evaluate the sample sentences from the video against a sample modulus before proceeding into the experiment itself.

Participants were recruited online through social networking websites, as well as through undergraduate classes at Simon Fraser University. Participants were all required to be native speakers of English who had been born and raised in a primarily English-speaking environment. In all, 30 participants were recruited for this experiment, each being entered into a draw for a \$100 gift certificate. A within-subjects experimental design was used, with all participants evaluating all types of experimental stimulus.

#### 4. Findings

As a first measure of the effectiveness of the method and implementation, all participants' scores for the filler sentences were examined. Because some participants had given scores of zero to some of the ungrammatical stimuli, it was impossible to carry out a full statistical analysis on this data. However, even without statistics, a simple inspection of the results shows that participants are able to make clear distinctions between grammatical and ungrammatical sentences using this method. Recalling that a score of 1.0 indicates that a sentence is judged to be as natural as the modulus (14), the average ratio score for the grammatical fillers was 1.71, while the average ratio score for the ungrammatical fillers was 0.99. The ungrammatical fillers even segment out into a distinct pattern of scoring, with subjacency violations and cases of a reflexive pronoun lacking a c-commanding antecedent being scored markedly worse than superiority violations or agreement mismatches.

After all mathematical transformations, a 2-way ANOVA was conducted on the average scores for each experimental stimulus. A significant main effect for predicate type was found ( $F_{(1,29)} = 287.39, p < 0.001$ ), indicating that the

choice of agentive versus non-agentive predicates had an effect on the overall scores. Similarly, a main effect of reflexive configuration was found ( $F_{(3,29)} = 235.67$ ,  $p < 0.001$ ), indicating that the different patterns of reflexive pronouns found in the paradigms in (10) and (11) had a significant effect on the scores. Finally, a significant interaction between these two factors was found ( $F_{(3,29)} = 16.547$ ,  $p < 0.001$ ), indicating that the choice of predicate type interacts with the configurations of reflexive pronouns.

Looking closer at the scores between the different stimulus types, it was found that there was a significant difference between the scores for the agentive versus non-agentive sentences ending with *by self* ( $t_{(29)} = 3.98$ ,  $p = 0.004$ ). Specifically, the non-agentive sentences were significantly less acceptable (an average ratio score of just 1.12) than the agentive sentences with *by self*. Though the margin was not as wide, a significant difference was also found for the *self...self* sentences ( $t_{(29)} = 2.76$ ,  $p = 0.01$ ), again with the agentive sentences being more acceptable than the non-agentive ones.

## 5. Conclusions and Future Work

The results of the ANOVA confirm that the agentivity of a predicate does interact with the acceptability of non-argument reflexive configurations, providing first experimental proof for the generalisations drawn from the previous corpus work.

More conclusive are the between-group results. The first result enhances the findings of the ANOVA analysis, making it clear that the *by* phrase manner adjunct is significantly less acceptable with a non-agentive predicate. This not only provides a more solid empirical basis for the use of predicate type as a factor in deciding ambiguous cases in the corpus work, but it also provides independent evidence for proposing a connection between this type of adjunct and the argument structure of the predicate. Recalling the initial discussion of making a choice between competing binding theories, this would be an indication that the best method may be to take a hybrid approach, as it would seem that this particular non-argument reflexive pronoun requires a specific argument (an agent) to be licensed, though not necessarily licensed within the reflexivity principles as defined by Reinhart and Reuland.

The second significant between-group comparison, showing that there is a significant difference between sentences with the double reflexive, again based on predicate type, is also important. First of all, by establishing that in a controlled experiment, native speakers can distinguish between grammatical and non-grammatical uses of sentences with two bare non-argument reflexives, the test used to diagnose ambiguous cases in the previous corpus work now has experimental validation. Furthermore, this indicates that even without the *by* preposition, native speakers are sensitive enough to the argument structure distinction to be able to determine whether the adjunct is licensed or not. Finally, having established that the non-agentive sentences could not support a manner adjunct, the *self...self* cases with a non-agentive predicate could only be produced in a derivation wherein an extraposed appositive was pronounced at

both the trace position and the landing site. The unacceptability of such cases provides experimental support for Bickerton's extraposition analysis of the sentence-final appositive.

Based on the conclusions from this experiment, the most intriguing avenue for future research would be to more formally characterise the connection between the manner adjunct and the predicate's argument structure. Because this adjunct makes use of the preposition *by*, and is connected with agency, there is a strong suggestion that this adjunct may be in some way similar to a passive *by* phrase. This formalisation is held over for future work.

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