The Interpretation of Complement Anaphora: The Case of *The Others**

Nobuaki Akagi
Centre for Cognition and its Disorders
(CCD), Macquarie University
nobuakagi@mq.edu.au

Francesco-Alessio Ursini
Centre for Cognition and its Disorders
(CCD), Macquarie University
francescoalessio.ursini@mq.edu.au

Abstract

This paper presents an experimental study on the interpretation of the complement anaphora *the others* in inter-sentential discourse. It aims to offer an answer to the following two empirical questions. First, how complement anaphora denote the "complement set", a set of referents that includes those referents not denoted by the matching anaphoric antecedent. Second, what are the exact interpretation principles that govern the anaphoric potential of complement anaphora. The answers to these two questions shed light on how complement anaphora fit into a broader theory of anaphora resolution, and what is the most accurate logical and psychological model of this aspect of grammar.

1 Introduction

Complement anaphora can be seen as a particular sub-set of natural language anaphora. Noun phrases (NPs) that act as complement anaphora usually occur in inter-sentential environments (e.g. discourses). These NPs appear to refer not to the relevant set of discourse referents currently under discussion[1], but rather to the set making up the "rest" of discourse referents.

The semantic properties of complement anaphora were first discussed in Moxey and Sanford (1993), who investigated these anaphora from an experimental perspective. They can be illustrated in a simple and pre-theoretical way via the following examples:

(1) Few children ate their ice-cream. *They* chose strawberry flavor

(2) Few children ate their ice-cream. *They* threw it around the room instead

(3) Few children ate their ice-cream. *The others* threw it around the room instead

Consider the mini-discourses in examples (1)-(3) as being uttered in a context in which there are nine children, but only three children ate their ice-cream out of these nine. The first sentence in each mini-discourse denotes the set of three children that ate their ice-cream, and thus focuses on a certain relevant set of children. The anaphoric (pronominal) NPs *they* and *the others*, however, differ with respect to the anaphoric relation they establish. In (1), *they* refers to the three children who ate ice-cream, and combines with the second verb phrase (i.e. *chose strawberry flavor*), which further explains the children's choices. In (2), *they* refers to those children who did *not* eat their ice-cream, but decided to do something else with it, as the second verb phrase clarifies (i.e. *threw it around the room*).

[1]We adopt the standard practice of dynamic semantics approaches and label as "discourse referents" the individuals in the Universe of Discourse denoted by NPs (Kartunnen, 1976; Kamp, 1981; Heim, 1982). We assume that these anaphora denote "sets" of referents, even if our analysis is compatible with theories of Plurality, both "static" (Schwarzschild, 1996; Link, 1998); or dynamic, as in *Discourse Representation Theory* (DRT) (Nouwen, 2003; Kamp, van Genabith and Reyle, 2005; Brasoveanu, 2008).

The discussion in Moxey and Sanford (1993) also indirectly mentions that some pronominal NPs may explicitly refer to this "other" set. This reference to the set of "ice-cream-throwing children" is made explicit by the special type of plural pronominal NP *the others*, in (3). This plural pronominal NP explicitly refers to those children who are involved in a different event than the one described in the first sentence. These children form a different, possibly "complementary" set to the set of (few) ice-cream-eating children. Although Moxey and Sanford (1993) do not offer experimental evidence on *the others*, they suggest that this NP should explicitly refer to this "other" set of referents. These findings motivated Moxey and Sanford (1993) to introduce the term "complement anaphora", a type of anaphora that denotes some other set of referents than the previously introduced one(s).

Even if the ability of these anaphora to refer to this specific set of referents is taken more or less as uncontroversial, the exact status of this set appears to be subject to debate. The two goals of this paper concern some central themes of these debates. A first goal is to offer experimental evidence regarding the interpretation of complement anaphora, focusing on the still poorly studied *the others*[2], by native speakers of English. A second goal is discuss which of the current approaches to complement anaphora found in the literature appears to be supported by the experimental evidence offered in this paper.

So, the general aim of this paper is to shed light on how different mechanisms of anaphora resolution proposed in the literature can model complement anaphora. We will propose that mechanisms of anaphora resolution behind complement anaphora are the same as other anaphora, but also that the set denoted by complement anaphora involves a specific computation of its members. So, we will suggest that a logically and psychologically precise model of anaphora resolution must also incorporate a way to compute complement anaphora, as anaphora denoting "other" sets in discourse.

The paper is organized as follows. The rest of the introduction presents some background assump-

tions (section 1.1), and three sets of theories on complement anaphora (section 1.2). Section 2 presents an experiment that aims to adjudicate between these competing theories. Section 3 offers some conclusions.

1.1 Background: Generalized Quantifier Theory

In this section we discuss some notions of *Generalized Quantifier Theory* (GQ theory) (Barwise and Cooper, 1981), shared by all approaches to complement anaphora. We follow a simple presentation of these core assumptions, offered in Nouwen (2003).

GQ theory assumes that standard declarative sentences of English can be assigned the syntactic structure $[[DetNP]VP]$. This structure is interpreted as the relation $Det'(A, B)$. Taking the first sentence in examples (1)-(3), if Det is a determiner such as *few*, then A is the set denoted by the NP in *restrictor* position. The label "restrictor" refers to the role of an NP as a constituent that restricts the range of the determiner it combines with. This NP combines with a determiner (e.g. *children*, to form the *generalized quantifier few children*). The set B is the set denoted by a Verb Phrase (VP) in the *nuclear scope* position (e.g. *ate their ice-cream*). The label "nuclear scope" refers to the minimal syntactic unit on which a Generalized Quantifier scopes over. The interpretation of this structure will amount to a relation between two sets, plus a condition on the cardinality of this relation. This is roughly represented by the relation $Few'(A, B)$, which can be informally read as: "there are referents that are children, and are eating ice-cream, and are small in number".

A key property is *conservativity*. The proposition denoted by the first sentence in (1)-(3), which we represent as $Few'(A, B)$, is equivalent to the proposition represented as $Few'(A, A \cap B)$. This is the proposition obtained by "selecting" those elements of the restrictor set which are also part of the nuclear scope set. In words, if few children ate their ice-cream, then few children were children who ate their ice-cream.

As Nouwen (2003) discusses, anaphora select their antecedent among the sets introduced by a previous sentence or discourse. One set that can act as an antecedent is the *maximal* set A, but anaphora can also refer to the set $A \cap B$, known as the *reference*

---

[2]We leave aside any discussion on whether NPs are anaphoric or referential. We will focus on inter-sentential, and thus anaphoric examples, in this paper Poesio and Vieira (1998); Elbourne (2005); Schwarz (2009).

set. In the previously mentioned scenario, the nine boys under discussion correspond to the maximal set A, which is the denotation of the restrictor NP *children*. The reference set $A \cap B$ corresponds to the set of children who are children having eaten ice-cream. These assumptions are shared by all approaches to complement anaphora. These approaches differ in how they explain that *they* in (2) and *the others* in (2) can denote the so-called *complement set*. We will discuss these differences, and the nature of this set, in the next section.

1.2 Three Approaches

1.2.1 The "Complement Set" Approach

The first type of approach stems from the experimental work of Moxey and Sanford (1993); Sanford et al. (1994), and includes dynamic semantics proposals (Kibble, 1997; Nouwen, 2003). Their shared assumption is that complement anaphora select the complement set as their semantic antecedent. This set is defined below.

Sanford and associates offered this approach because they investigated the difference in anaphoric potential between closely related quantifiers, e.g. *a few* vs. *few*, or vs. *few of the*. The experiments mainly involved a *continuation task*. In this task, participants were offered a paper on which the first sentence of a mini-discourse, followed by the pronoun *they*, was written. Participants were invited to continue the mini-discourse by completing the second sentence, without any specific restrictions on its content.

Participants were asked to complete incomplete mini-discourses such as:

(4) A few children ate their ice-cream. They...

(5) Few of the children ate their ice-cream. They...

(6) Few children ate their ice-cream. They...

Once participants completed this task, they were asked to which set of referents *they* referred to, in their continuation. Using these examples as a guide, the five possible answers to this follow-up question were: *children in general*, *all the children*, *the children who ate ice-cream*, *the children who did not eat ice-cream*, or *none of the above*.

The main finding was that, while mini-discourses such as (4) seldom licensed continuations involving complement anaphora, mini-discourses such as (5) and (6) could license continuations involving complement anaphora, as in e.g. (2). When participants chose a complement anaphora continuation, they defended their choice by claiming that *they* referred to those referents that were not involved in the event described by the previous sentence. The authors suggested that this set of children corresponded to the *complement set*, the set-theoretic difference between maximal set and the set denoted by the VP, represented as $A - B$. So, in the opportune syntactic and discourse-bound context, reference to complement anaphora was possible. Although Sanford and associates did not investigate *the others* and similar "overt" complement anaphora, they suggested that the same considerations would hold for these anaphora.

The proposal in Nouwen (2003) offers a more precise, dynamic treatment of this phenomenon. According to this treatment, anaphoric relations are identity relations between sets of referents. Both *they* and *the others*, as anaphoric expressions, establish an identity between a novel referent set (e.g. the set C) and a previous referent set. Complement anaphora differ from other anaphora because they establish a relation between this novel referent and the complement set, the identity relation $C = (A - B)$[3]. So, speakers should interpret *they* in (2) and (3) as denoting the relation $C = (A - B)$, according to this proposal.

1.2.2 The "Sloppy Reference" Approach

The second type of approach contends that reference to the complement set is a consequence of the possibility that anaphoric elements may have *collective* or *distributive* reference[4]. An anaphoric pronoun may receive either interpretation, depending on whether it combines with a distributive or collective predicate.

---

[3]This notation for anaphora resolution, borrowed from DRT, is only used in the first two chapters of Nouwen (2003), as a different approach (and notation) is developed in the remainder of Nouwen's work.

[4]This distinction focuses on whether predicates can apply to each referent in the denotation of an NP (distributive reference), or to these referents as "collective" (collective reference) (Nouwen, 2003; Link, 1998; Winter, 2001).

Works such as Corblin (1996); Geurts (1997) observed that, under Sanford et al.'s approach, the pronoun *they* appears to violate a general principle of anaphoric relations. Anaphoric elements must receive their interpretation from an *overt* antecedent, either introduced by a NP in previous discourse, or accessible from the context (Elbourne, 2005; Elbourne, 2008). In cases such as (2) and (3), both *they* and *the others* appear to violate this assumption. Their interpretation seems to depend on a referent not explicitly introduced, but rather "implied" by *few children*, the only NP that can act as an anaphoric antecedent.

As an alternative explanation, Geurts (1997) proposes[5] that complement anaphora interpretations arise when a pronoun refers to the maximal set A. If P is a predicate (e.g. "eating ice-cream") then a combination of pronoun and predicate ($P(A)$) may receive a collective interpretation. In this case, the predicate holds true even if a subset D of A makes it true (we have $D \subseteq A$ (read: "D is a subset of A"). A sentence involving a complement anaphora will thus denote $P(D)$, the contextually salient set of children eating ice-cream, from which "other" children are excluded. This account does not treat overt complement anaphora NPs such as *the others* and, as Geurts (1997) concedes, may license that the contextually salient set may be even empty, given its "sloppy" reference.

1.2.3 The "Lexicalist" Approach

The third type of approach is exemplified by recent works such as Kotek (2008); Dotlačil (2010). These approaches assume that the lexical, compositional semantics of *the others* determines which are the referents that make up the complement set. Three assumptions are relevant.

First, pronouns are considered as semantically equivalent to definite NPs. Definite NPs are then assumed to denote the maximal set. So, *they* and *the others* are respectively considered as semantically equivalent to *the children* and *the other children*[6].

[5]Neither Corblin (1996) nor Geurts (1997) offer a formal analysis of these properties, in their discussion. The proposed formal analysis is ours, not theirs, but should hopefully make their claims precise.

[6]This is a standard assumption in D-type approaches to pronouns Elbourne (2005), Elbourne (2008).

The adjectival element *others* contributes by combining with an NP and restricting the maximal set A to a sub-set O that excludes previously mentioned (sets of) referents. The relation $O \subseteq A$ represents the relation between this set and the maximal set.

Second, the set O is a disjointed set from the set denoted by the previous VP ("contrast set", in Dotlačil's terms), a property represented as $\neg(O \cap B)$. In words, no referent which is part of the *others* set is also a referent that ate his ice-cream. So, *the others* denotes a sub-set of the maximal set that does not include previously referred referents, a property represented as $(O \subseteq A \cap \neg(O \cap B))$[7].

Third, anaphora are combined and interpreted with respect to their clause-mate VP. The second sentence in (3), according to this assumption, denotes the set $P(O \subseteq A \cap \neg(O \cap B))$. In words, the second sentence denotes the set of children that throw their ice-cream against the wall (i.e. $P(O \subseteq A)$), and that also do not eat their ice-cream (i.e. $P(\neg(O \cap B))$). So, this approach includes both the "lexical" content of *the others* and other complement anaphora, but also its ability to establish an anaphoric relation in discourse. It captures the intuition that these anaphora denote the complement set as a *result* of explicitly individuating this referent in discourse.

1.2.4 Three Approaches: Predictions

These three types of approaches appear only to differ with respect to their assumption on the computation of the complement set, and its resulting denotation. In the opportune context, however, each approach makes slightly different predictions with respect to the interpretation of complement anaphora. These predictions are as follows.

The first approach predicts that complement anaphora denote a set of referents which have not been involved in previous discourse, the complement set (i.e. $A - B$). The second approach predicts that complement anaphora may denote any "group" which is part of the maximal set. This group may be distinct from a previously mentioned set of referents (i.e. $P(D) \subseteq P(A)$, D being a contextually relevant sub-set), but holds no "special" status as a comple-

[7]This is a partial mis-representation of Dotlačil's approach, since Dotlačil couches his approach in a lattice-theoretic perspective.

ment set. The third approach proposes an intermediate position. It predicts that the complement set is the result of first finding those involved in a "new" event, and *then* by excluding previously mentioned referents in discourse (i.e. $P(O \subseteq A \cap \neg(O \cap B)))$.

The next section offers an experimental study that attempts to adjudicate among these three categories. It does so by studying how speakers interpret the complement anaphora *the others*, on which there is a dearth of empirical evidence (Moxey and Sanford, 1993). However, the results may be extended to other complement anaphora, as we discuss in the conclusions.

2   The study

2.1   Participants

The experiment involved adult participants (N=20). All participants were native speakers of English and undergraduate students of Psychology, and received course credit for their attendance. Between one and three participants attended a session, for a total of fifteen minutes of experiment time.

2.2   Procedure

The experiment involved a variant of the *Truth-Value Judgement Task* (TVJ task) (Crain and Thornton, 1999). Our choice is based on the following reason. The continuation task used by Sanford et al. (1994) allowed participants to choose a continuation of a discourse which, in the opportune conditions, licensed a complement anaphora reading. However, the nature of the task would make the testing of the precise interpretation rather problematic. Since the task is inherently a *production* task, it does not allow an easy testing of possible differences in *comprehension* among speakers, and thus the testing of our experimental predictions.

The TVJ task provides a simple way to test speakers' intuitions and their competence of grammar. One type of a standard TVJ task, the so-called *description mode*, involves two experimenters. One experimenter acts out the scenario and narrates the events. The other experimenter controls a hand-puppet (e.g. Kermit the Frog). At the end of the story, the puppet offers a yes-no question to the participant about the story, which is aimed at testing whether a participant can interpret a sentence as per predictions.

After a participant offers an answer, a follow-up question is usually offered, in order to test whether his answer is based on a correct understanding of the events described by the story. When a TVJ task involves yes-no questions, the story should describe events in such a way that both a "yes" and a "no" answer should be possible answers. However, only one answer correctly matches the outcome of the story. This condition is known as the *Condition of Plausible Dissent* (Crain & Thornton 1999: chapter 5).

We briefly describe an example of the TVJ task used to test speakers' interpretation of the universal quantifier *every*, to elucidate the structure of the task. In a description mode story, a participant and Kermit the frog observe a story in which five horses are involved in a jumping contest. Each of them has to jump over a fence. Four of them are successful, but one of them trips before completing the task, so that he is unsuccessful at it.

At the end of this story, Kermit the frog asks a sentence like the one in (7):

(7)   Has every horse jumped over the fence?

If one assumes that the participant has a interpretation of *every* as denoting the universal quantifier, then the participant will offer a "no" as answer, possibly defending his or her choice by observing that one horse did not complete the target task. Although a "yes" answer could have been entertained, at some point (i.e. when the fallen horse almost completed the jump), the end result made only the "no" answer as the correct one.

The TVJ task thus allows to test participants' comprehension of sentences in a simple and experimentally sound way, whether participants are adults or children. For the purposes of testing our experimental hypothesis, the following changes to the task, involving materials and procedure, were made.

First, rather than acting out the task, we prepared a power-point presentation depicting a story in which a number of characters were involved. An introduction preceded this story, in which the main characters and the instructions were presented to the participants.

Second, each slide included a short text that described the events in which one or more tank engines were involved, and which was matched with a pic-

ture illustrating the described events. Instead of using a puppet (Kermit the frog) as in the original TVJ task, we displayed a character known as "Mr. Little Bears" on the PPT screen. Mr. Little Bears played the same role as the puppet.

Third, participants received an answer sheet before the start of the experiment. They were invited to choose their answer between two different options: "yes" and "no". After Mr. Little Bears' question at the end of the story, participants were invited to circle their answer of preference, according to their intuitions. After the experiment, a follow-up question was offered, by asking participants why they offered their answer. For each participant, the main experimenter wrote each participant's reason on offering a "yes" or a "no" answer, on a separate sheet. This choice allowed participants to defend their choice by explaining how they "computed" the complement set.

2.3 Materials

The main characters in the story were Thomas the tank engine, and nine other characters from the eponymous toy line. This list of tank engines included Thomas, Duncan, Mighty Mac, Spencer, Arthur, Rosy, Percy, Diesel 10 and Billy. Mr. Little Bears was introduced as an amnesiac bear who would watch the stories with the participants. Because of his bad memory, Mr. Little Bears had to ask a question on the story presented to the experimenters.

The story presented the following set of events. The nine tank engines had to perform two inspections about two alleged ghosts' infestations: one at the Smurfs' castle, one at the Power Puffs' Hotel[8]. Since they had to check two locations, they split in two groups. One group, composed by Thomas, Duncan and Mighty Mac went to the Smurfs' castle. Another group, composed by the remaining six tank engines, went instead to the Power Puffs' Hotel. Thomas was in charge of writing the official report. So, after verifying that there were no ghosts at the Smurfs' castle with Galaxy, he also went to check and sign off the documents with Blossom, the

---

[8]The choice of "random" fictional locations has a goal: that participants may not be biased by real world knowledge (of cartoons) in their answers, should they have any doubts. See Crain and Thornton (1999) for discussion.

owner of the Power Puffs' Hotel. Thus, Thomas (and Thomas only) visited both locations by the end of the story.

Each slide depicted one tank engine reaching one of the two locations. The tank engines that went to the Smurfs' castle were introduced first, then the remaining six that went to the Power Puffs' Hotel were introduced. The text below each slide closely matched the pictures, and stated that which engine was shown as reaching either location. Thomas was presented as the last tank engine that reached the Power Puffs' Hotel, as he arrived from the Smurfs' castle. A subsequent slide presented Thomas as compiling the documents with Blossom, thus concluding the story.

After the story, Mr. Little Bears appeared in a slide and offered a question to the participants. We chose the quantified NP *few tank engines* as a relevant antecedent, for the following reason. As reported by Moxey and Sanford (1993), NPs such *few tank engines* almost always license complement anaphora interpretation, in the right context. We also chose the pronominal NP *the others* as a target complement anaphora, since it is the only complement anaphora discussed in relevant detail by each of the three types of approach.

The question was:

(8) *Few tank engines* have gone to the Smurfs' castle. Have *the others* gone to the Power Puffs' hotel?

Participants were invited to write down their answer once the question in (8) was presented, as per instructions. Once the experiment was over, the main experimenter asked the follow-up question, on an individual basis. The answers were then collected and analyzed. The predictions of the three approaches discussed in the introduction for this story are as follows.

The Complement Set approach predicts that participants would have answered "no", since the complement anaphora *the others* should denote the complement set. The complement set $A - B$ included the six tank engines that did not go to the Smurfs' castle, disjointed from the reference set $A \cap B$. Its members were: Spencer, Arthur, Rosy, Percy, Diesel 10 and Billy. Since Thomas was part of this set, but also of the reference set of engines that went to the

Power Puffs' Hotel, the underlying declarative sentence was false. Participants should have defended their choice by pointing at Thomas as the "offending" tank engine, in the follow-up question.

The Sloppy Reference approach predicts that participants would have answered "yes", by the end of the story. That is, *the others* should denote the set of tank engines that went to the Power Puffs' Hotel, taken as a "group". The complement set is not computed as a difference between two sets, according to this approach. So, participants should have defended their choice by only mentioning the tank engines that went to the Power Puffs' Hotel. The set $P(D)$, with $P(D) \subseteq P(A)$, included Thomas, as well as the other six tank engines.

The Lexicalist approach predicts that participants would have answered "yes", by the end of the story. That is, *the others* in the target question was interpreted by first computing the set of tank engines that went to the Power Puffs' Hotel. Then, this set was restricted to the set of engines who also did not go to the Smurfs' Castle (we have $P(O \subseteq A \cap \neg(O \cap B)))$). So, participants should have defended their choice by pointing out that they excluded Thomas from the denotation of *the others*, and then consider the remaining six engines as the "other" engines.

2.4 Results and Discussion

The answers to the yes-no were as follows: yes=19, no=1 (95%/5%). This result is consistent with the Sloppy Reference and the Lexicalist approach. In the follow-up question, 16 participants observed that Thomas went to both locations, but that "the others" were the six engines that only went to the Power Puffs' Hotel (80% of the total). They explicitly excluded Thomas from the larger set of engines that went to the Power Puffs' Hotel. Three participants observed that some, but not all engines made the story true, although they could not recall their identity (15% of the total). The only participant that answered "no", instead, defended his choice by observing that Thomas had to be included in the relevant "group" of tank engines (5%). So, the underlying declarative sentence was false, according to this participant.

The follow-up answers offer results that are more consistent with the Lexicalist approach, rather than with the Sloppy Reference approach. Most participants explicitly mentioned that they excluded Thomas from a "larger" set, when computing which engines made the sentence true. This is a fact that is not predicted by the Sloppy Reference approach. So, the Lexicalist approach better fits these findings. The Sloppy Reference approach would need a more accurate way to account for this process of "elimination", instead. One further observation on these data is the following. Assume that the Lexicalist approach is a correct model of complement anaphora. In this case, if we expect a 95% rate of follow-up answers that excluded Thomas, then a 80% (16/20) rate is not a statistically significant divergence. The other two approaches appear not to be suited to account the combination of yes-no and follow-up answers, given their low "success" rate. These results invite two important conclusions.

First, complement anaphora appear to be semantically "real", when the opportune syntactic and semantic requirements are met. Participants interpreted *the others* as denoting a certain set of referents. These referents were involved in the event described in the target question, but were not involved in previous events. Participants thus explicitly pointed out that *the others* denoted a distinct (complementary) set of engines from the one previously introduced in discourse.

Second, the results support the Lexicalist approach, and suggest that both the Complement Set and the Sloppy Reference approach may require further revisions. The results suggest that the interpretation of *the others* in discourse is inherently anaphoric, *and* the result of "computing" a certain referent, which is indirectly introduced by the previous context.

The first and second conclusions invite a third "global" conclusion. The interpretation of *the others*, and possibly all complement anaphora, should be part of a general theory of grammar. So, anaphoric elements depend on their lexical content and related predicates for their interpretation, as well as their ability to establish anaphoric relations. In the specific case of the described experimental setup, *the others* selected the set of tank engines which were defined as not involved in an event already introduced in discourse (i.e. going to the Smurfs' castle). They were defined as being involved in another (here, complementary) event (i.e. going to the

Power Puffs' Hotel). So, participants' interpretation of *the others* was based on the context outlined by previous discourse (i.e. the presented story). At the same time, it was also based on the property of this anaphora to select a "complementary" set of referents, because of its specific lexical content.

3 Conclusions

This paper offered experimental evidence about the interpretation of the complement anaphora, and pronominal NP, *the others* in multi-sentential discourse. Three types of approach on the interpretation of this anaphora were discussed. The first approach assumes that *the others* denotes the complement set, a set of referents not previously introduced in discourse, and not introduced by any anaphoric antecedents to *the others*. The second approach assumes that *the others* does not denote the complement set, but denotes a sub-set of the maximal set of referents under discussion (here, tank engines), when defined in discourse. The third approach assumes that *the others* denotes a sub-set of the maximal set of referents, which at the same time is part of the interpretation of the second sentence, and has not been introduced in previous discourse.

We carried out an experiment involving adult speakers of English, in order to adjudicate which approach correctly predicted the interpretation of *the others*. The evidence found suggests that the Lexicalist approach offers a more appropriate analysis of the *the others*, and possibly other complement anaphora. In our experiment, participants interpreted *the others* as denoting the set of tank engines who went to the Power Puffs' Hotel. However, participants also excluded those engines who also took part in previous events (i.e. Thomas, who went to the Smurfs' Castle), as supported by the answers to the follow-up question.

This result also seems to support a view of the semantics of anaphora that could be defined as "truth-conditions plus anaphoric potential". This view has been proposed in some dynamic frameworks (Brasoveanu, 2008), but also in more "static" frameworks which study in detail the properties of anaphoric pronouns (Sanford et al., 1994; Dotlačil, 2010). This view suggests that mechanisms of anaphora resolution have two components. One involves the resolution of an anaphoric relation, and the other involves the computation of the "content" of this relation, and how it is computed from the previous context. So, a logically and psychologically accurate model of anaphora resolution should include at least both components, according to our findings.

This experiment offers an answer to one experimental question, but leaves open several other related questions. One is whether these findings can be extended to the interpretation of *they* as a complement anaphora, as in sentences such as (2). Again, Sanford et al. (1994) found that this seems to be the case, at least indirectly. However, an open question is whether the use of the TVJ task could confirm these results, and offer further insights on the nature of this anaphoric phenomenon. The same reasoning can be extended to other complement anaphora, such as the definite NPs *the other tank engines*, which may also receive a "complement set" interpretation.

Another question is whether the nature of the anaphoric antecedent plays a role in this phenomenon. In this experiment, we only tested one type of determiner, *few*, and left open the question of whether other quantifiers licensed a similar interpretation, when acting as antecedents for *the others*. For instance, Sanford et al. (1994) observed that the minimally different determiner *a few* invariably blocks the emergence of complement anaphora. Similar observations can be extended to both variants of the same quantifier (i.e. *few of the Xs*), as to other quantifiers (e.g. *many*, *no*, and so on). Although interesting and important questions for the topic at hand, both answers will be left for future investigation.

References

Barwise, Jon and Robin Cooper. 1981. Generalized quantiers and natural languages. *Linguistics & Philosophy*, 4(2):159–219.

Brasoveanu, Adrian. 2008. *Structured Nominal and Modal Reference*, Newark, NJ: Rutgers University Ph.D. dissertation.

Corblin, Francis. 1996. Quantification et anaphore discursive: la rfrence aux complémentaires. *Langages* 123(1):51-74.

Crain, Stephen and Rosalind Thornton. 1999. *Investigations in Universal Grammar: A Guide to Experiments in the Acquisition of Syntax and Semantics*. Cambridge, MA: The MIT Press.

Dotlačil, Jacob. 2010. *Anaphora and Distributivity: A study of same, different, reciprocals and others*. Utrecht: Utrecht University Ph.D. dissertation.

Elbourne, Paul. 2005. *Situations and Individuals*. Cambridge, MA: The MIT Press.

Elbourne, Paul. 2008. The interpretation of pronouns. *Language and Linguistics Compass* 2(1): 119-150.

Geurts, Bart. 1997. Book review of Linda M. Moxey and Anthony J. Sanford. Communicating Quantities. 1993. *Journal of semantics* 14(1): 87-94.

Heim, Irene. 1982. *The semantics of definite and indefinite noun phrases*. Amherst, MA: University of Massachussetts Ph.D. Dissertation.

Kamp, Hans. 1981. A theory of truth and semantic representation. In Jeroen A. G. Groenendijk, Theo M. V. Janssen, and Martin J. B. Stokhof (Eds.), *Formal Methods in the Study of Language*, 277–322. Amsterdam: Mathematical Centre.

Kamp, Hans, Josef van Genabith, & Uwe Reyle. 2005. Discourse Representation Theory. In Dov Gabbay & Franz Guenther (eds.), *Handbook of Philosophical Logic*, 125–394. North Holland: North Holland.

Kartunnen, Lauri. 1976. Discourse Referents. In J. D. McCawley (ed.), *Syntax and Semantics 7: Notes from the Linguistic Underground*, 363–385, Academic Press, New York.

Kibble, Rodger. 1997. Complement anaphora and dynamic binding. In Aaron Lawson (Ed.), *Proceedings of SALT VII*, 258–275.

Kotek, Hatas. 2008. Resolving Complement Anaphora. In: Johansson, Christer (ed.). *NEALT Proceedings Series, Vol. 2: Proceedings of the Second Workshop on Anaphora Resolution (WAR II)*, 41–53.

Link, Godehard. 1998. *Algebraic semantics in Language and Philosophy*. Stanford, CA: CSLI publications.

Moxey, Linda and Anthony Sanford 1993. *Communicating quantities. a psychological perspective*. Laurence Erlbaum Associates.

Nouwen, Rick. 2003. *Plural pronominal anaphora in context*. Utrecht: Utrecht University Ph.D. Dissertation.

Poesio, Massimo and Renata Vieira. 1998. A Corpus-based Investigation of Definite Descriptions Use. *Computational Linguistics*. 24(2):183–216.

Sanford Anthony J., Linda M. Moxey and Kevin Patterson. 1994. Psychological studies of quantifiers. *Journal of Semantics* 11(1):153- 170.

Schwarz, Florian. 2009. *Two Types of Definites in Natural Languages*. Ph.D. thesis, University of Massachusetts Amherst.

Schwarzschild, Roger. 1996. *Pluralities*. Dordrecht: Kluwer.

Winter, Yoad. 2001. *Flexibility Principles in Boolean Semantics: coordination, plurality and natural language*. Cambridge, MA: The MIT Press.