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The semantic function of chained pronouns

SAMUEL C. RICKLESS

1. Introduction

Consider the following stretch of discourse:

- (1) A man came to my office yesterday. He was selling encyclopedias.
He was likeable.

The pronouns in (1), if used non-demonstratively, are anaphoric on the antecedent indefinite noun phrase 'a man' that heads (1). Now it might be thought that these pronouns function semantically as do the bound variables of quantification theory. But recent work in linguistics and in the philosophy of language (see, for example, Evans 1977 and Neale 1990) suggests that this is not so. What, then, is the semantic function of these pronouns?

In answer to this question, a number of theories have been proposed. In §§2–4 of this paper, I argue that none of these theories does justice to our intuitions concerning the truth-conditions of the sentences in (1). In the last section, §5, I briefly sketch a theory that accommodates these very intuitions.

To fix ideas, let us say that a 'chain' is any discourse of form (C):

- (C) A(n) F is G. He/she/it is H. He/she/it is J. etc.

And let's call the pronouns that appear in chains 'chained pronouns'. The theories I wish to criticize fall into two groups. In the first group we find theories according to which chained pronouns, as used by a given speaker, are singular terms which share a common referent. On the most popular of these theories, defended by Donnellan (1978) and others, the referent of a chained pronoun is determined by the relevant speaker's intentions: to be precise, the referent is who or what the relevant speaker has in mind as bearing the properties mentioned in the chain. Let us call this theory the 'Referring Expression Theory', or 'REF'. REF says that if, in producing (1), I were to think of Ralph as bearing the properties mentioned in (1), then the sentences of (1) would have the same truth-conditions as the sentences of (1a):

- (1a) Ralph came to my office yesterday. He [Ralph] was selling encyclopedias. He [Ralph] was likeable.

The theories which belong to the second group agree that every chained pronoun goes proxy for a quantified noun phrase of the form 'Dφ', where

the determiner 'D' carries existential import and the relativizer 'φ' is recoverable from previous predicates by means of some fixed syntactic transformation. Semantically, the pronoun is then treated as a restricted quantifier with an unrestricted domain (or, equivalently, as a binary quantifier).

Call this type of theory 'SYN' (for 'syntactic transformation'). There are two popular versions of SYN. Both versions agree that the relativizer 'φ' within the quantified noun phrase for which a chained pronoun goes proxy is obtained by conjoining all the predicates that precede the pronoun in the discourse. But they differ over the identity of the determiner. One version says that 'D' is the *indefinite* article (call this version 'Indefinite-SYN'). The other version says that 'D' is the *definite* article (call this version 'Definite-SYN'). Thus, *Indefinite-SYN* says that (1) may be paraphrased as (1b):

(1b) A man came to my office yesterday. A man who came to my office yesterday was selling encyclopedias. A man who came to my office yesterday selling encyclopedias was likeable.

By contrast, *Definite-SYN* says that (1) may be paraphrased as (1c):

(1c) A man came to my office yesterday. The man who came to my office yesterday was selling encyclopedias. The man who came to my office yesterday selling encyclopedias was likeable.

Now it must be admitted that these theories deliver the correct truth-conditions in many central cases. But I would contend that each of them faces formidable counterexamples.

2. The Referring Expression Theory

To begin, consider *REF*. *REF* says that every chained pronoun refers to whomever (or whatever) the relevant speaker has in mind as bearing the properties mentioned in the chain. However, as King (1988) points out, the following sort of case counts against Donnellan's proposal.

Suppose that I am a lifeguard, and that I have just spotted two swimmers, Smith and Jones, both of whom are waving. Unbeknownst to me, Smith is waving to let me know that he is having a ball, while Jones is waving to let me know that he is sinking. Suppose further that, mistakenly thinking of *Smith* as being in trouble, I utter (2):

(2) A swimmer is waving. He is in trouble.

REF says that the sentences of (2) possess the same truth-conditions as the sentences of (2a):

(2a) Smith is waving. He [Smith] is in trouble.

However, in our example, Smith is *not* in trouble. So the second sentence

of (2a) is false. But, intuitively, given that there is a waving swimmer who is in trouble (namely, Jones), the second sentence of (2) is true. It follows that *REF* gets the truth-conditions of (2) wrong.

Of course, this result does not entail that all theories belonging to the first group are false, since there are theories in this group that deliver the correct truth-conditions in the case of Smith and Jones. But I have yet to see a theory of this type that is more plausible than *REF*. If chained pronouns all have a common referent, how is this referent to be determined if not by the relevant speaker's referential intentions?

3. Indefinite-SYN

Cases like that of Smith and Jones have suggested to some that *Indefinite-SYN* might do a better job of accounting for the truth-conditions of sentences in chains. And, sure enough, *Indefinite-SYN* succeeds just where *REF* fails, for it paraphrases (2) as (2b):

(2b) A swimmer is waving. A swimmer who is waving is in trouble.

Since there is a waving swimmer who is in trouble (namely, Jones), the second sentence of (2b) comes out true, which is just what our intuitions tell us about the truth-value of the second sentence of (2).

With respect to the truth-conditions of the individual sentences in

(C) A(n) *F* is *G*. He/she/it is *H*. He/she/it is *J*. etc.

Indefinite-SYN predicts that:

Sentence #1 is true just in case at least one object is *F* and *G*; sentence #2 is true just in case at least one object is *F*, *G*, and *H*; and sentence #3 is true just in case at least one object is *F*, *G*, *H* and *J*.

But there is a mistake here, one which concerns the truth-conditions of sentence #3. To see this, consider discourse (3):

(3) An Arkansan was elected President in 1996. He is a Republican. He jogs regularly.

Indefinite-SYN paraphrases (3) as (3b):

(3b) An Arkansan was elected President in 1996. An Arkansan who was elected President in 1996 is a Republican. A Republican Arkansan who was elected President in 1996 jogs regularly.

Now it should be clear that the third sentence of (3b) is false, since the Arkansan jogger who was elected President in 1996 is a Democrat. However, my intuitions are that the third sentence of (3) is true. These intuitions are strengthened when I ask myself, at the end of each sentence of (3), whether it is true or false:

- (3) An Arkansan was elected President in 1992. [True]
 He is a Republican. [False]
 He jogs regularly. [True]

From this sort of counterexample, we should conclude, I think, that *Indefinite-SYN* is false.

Now it might be suggested that *Indefinite-SYN* could be modified in such a way as to account for the truth-conditions of (3). Let's hypothesize that every chained pronoun goes proxy for an indefinite description of the form 'A(n) ψ ', where ' ψ ' is the result of conjoining all and only the predicates in sentence one (namely, 'F' and 'G'). In general, this modified version of *Indefinite-SYN* predicts that:

Sentence #1 is true just in case at least one object is F and G; sentence #2 is true just in case at least one object is F, G and H; and sentence #3 is true just in case at least one object is F, G, and J.

In particular, (3) is paraphrased as (3 β):

- (3 β) An Arkansan was elected President in 1996. An Arkansan who was elected President in 1996 is a Republican. An Arkansan who was elected President in 1996 jogs regularly.

The modified version of *Indefinite-SYN*, unlike its unmodified counterpart, thus predicts, correctly, that the third sentence of (3) is true.

Unfortunately, this theory won't work either. To see this, suppose I utter discourse (4):

- (4) A famous philosopher lived in Athens. He wrote *The Republic*.
 He was condemned to death in 399 BC.

The modified version of *Indefinite-SYN* says that (4) should be paraphrased as (4 β):

- (4 β) A famous philosopher lived in Athens. A famous philosopher who lived in Athens wrote *The Republic*. A famous philosopher who lived in Athens was condemned to death in 399 BC.

Now the third sentence of (4 β) is true, since there is a famous philosopher (namely, Socrates) who lived in Athens and who was condemned to death in 399 BC. But, in fact, as the *unmodified* version of *Indefinite-SYN* correctly predicts, the third sentence of (4) is false, because the one and only famous Athenian philosopher who wrote *The Republic* (namely, Plato) was not condemned to death in 399 BC. The falsity of the third sentence of (4) becomes clear if one imagines oneself evaluating the truth-value of each sentence of the discourse as it is produced:

- (4) A famous philosopher lived in Athens. [True]
 He wrote *The Republic*. [True]
 He was condemned to death in 399 BC. [False]

4. *Definite-SYN*

Perhaps we had better abandon the hope of modifying *Indefinite-SYN* in accordance with our truth-conditional intuitions. This leaves us with our third proposal, *Definite-SYN*. *Definite-SYN* says that every chained pronoun goes proxy for a definite description whose relativizer is obtained by conjoining all the predicates that precede the pronoun in the chain. On this view, (3) is paraphrased as (3c):

- (3c) An Arkansan was elected President in 1996. The Arkansan who was elected President in 1996 is a Republican. The Republican Arkansan who was elected President in 1996 jogs regularly.

Now, earlier, I used (3) as a counterexample to *Indefinite-SYN*. But it could just as well be used against *Definite-SYN*. The reason for this is that, whereas the third sentence of (3c) is either false or truth-valueless (depending on how one chooses to evaluate sentences containing empty definite descriptions), the third sentence of (3), as we have already seen, is true.

In order to avoid this result, we could modify *Definite-SYN* in a way that mimics our previous modification of *Indefinite-SYN*. Thus, it might be suggested that the relativizer of the definite description for which a given chained pronoun goes proxy is obtained by conjoining all and only those predicates that appear in the first sentence of the chain. On this modified version of *Definite-SYN*, (3) is paraphrased as (3 γ):

- (3 γ) An Arkansan was elected President in 1996. The Arkansan who was elected President in 1996 is a Republican. The Arkansan who was elected President in 1996 jogs regularly.

It is easy to see that the truth-values of the corresponding sentences of (3) and (3 γ) are identical. It follows that (3) cannot be used as a counterexample to the modified version of *Definite-SYN*.

Unfortunately, this theory runs into problems too. To see this, let us go back to (4). *Definite-SYN*, on both of its versions, says that the first two sentences of (4) should be paraphrased as (4 γ):

- (4 γ) A famous philosopher lived in Athens. The famous philosopher who lived in Athens wrote *The Republic*.

The main problem with this paraphrase concerns the implication of uniqueness carried by the definite description in the second sentence. As we all know, the famous philosophers who lived in Athens number many more than one. Thus, the second sentence of (4 γ) is either false or truth-valueless, while our intuitions tell us that the second sentence of (4) is true.

One might reply, as does Neale (1990: 200–201), that (as he puts it) 'there are [...] cases in which more flexibility seems to be required [...]'. [O]ne obvious type of case is where the [definite description] delivered by

[the theory] is incomplete.' In particular, Neale suggests that when 'speakers are using [indefinite descriptions at the head of chains] nonreferentially yet have particular individuals in mind [...], the content of each pronoun [in such chains] will have to be filled out in one way or another so as to be uniquely-denoting.'

But this sort of reply is inadequate. A person who, say, utters the indefinite description 'a famous philosopher' nonreferentially, *need not have any individual in mind*. For example, I might utter the first two sentences of (4) after having been told by a reliable source that some famous Athenian philosopher or other wrote *The Republic*. Moreover, in this sort of case, I may not be able to furnish enough descriptive material to 'fill out' my use of 'he' in the second sentence so as to render it 'uniquely-denoting'. How, then, is a defender of *Definite-SYN* to contend with such counterexamples?

Neale himself suggests that *Definite-SYN* may not apply in all cases, because there is evidence that 'descriptive pronouns anaphoric on indefinite descriptions are, or at least can be, interpreted as numberless descriptions' (1990: 235). A numberless description is a quantified noun phrase of the form 'whoever is F' or 'whatever is F'. Applied to the case at hand, Neale's suggestion is that the first two sentences of (4) be paraphrased as (4δ):

(4δ) A famous philosopher lived in Athens. Whoever is a famous philosopher who lived in Athens wrote *The Republic*.

Now it is true that numberless descriptions do not carry any implication of uniqueness. Consequently, the current proposal avoids the objection just raised against *Definite-SYN*. But the 'numberless description' proposal won't work either. Consider (4) yet again. It should be clear that at least one famous Athenian philosopher did *not* write *The Republic*. Thus, whereas the second sentence of (4) is true (as we have seen), the second sentence of (4δ) is false

Where, then, does this discussion leave us? We have examined *REF* and different versions of *SYN*, and found each one wanting by virtue of mistaken predictions about the truth-conditions of sentences belonging to various chains. The problems with these theories strongly suggest that we would be better off with a different approach.

5. A semantic theory

Perhaps we should begin the search for a new theory by specifying the truth-conditions of each of the sentences in a chain. If we accomplish this task, we may get a clue as to how to interpret chained pronouns.

The truth value of each sentence in a chain may be determined by means

of an algorithm. Roughly speaking, the algorithm says that the truth value of any sentence *S* in a chain (other than the first sentence) is a function of the cardinality of the common intersection (call it '*I*') of the extensions of those predicates that appear in the *true* sentences that precede *S* in the chain. If the cardinality of *I* is zero, then *S* is false; but if the cardinality of *I* is greater than zero, then *S* is true iff the cardinality of the intersection of *I* and the extension of the predicate in *S* is greater than zero.

To give a more precise description of this algorithm, let us adopt the following notation for (C):

(C) [S₁] A(n) G₀ is G₁. [S₂] He/she/it₁ is G₂. [S₃] He/she/it₂ is G₃.
[S₄] He/she/it₃ is G₄. Etc.

In addition, for every natural number *n*, let *G_n* be the set of objects that are *G_n*; for any set *X*, let |*X*| be the cardinality of *X*; and for any sets *X* and *Y*, let *X* ∩ *Y* be the intersection of *X* and *Y*. The algorithm itself may be represented as follows:

Algorithm

1. S₁ is true iff |G₀ ∩ G₁| > 0.
2. Let H₁ = G₀ ∩ G₁. And let H_{*n*+1} = H_{*n*} ∩ G_{*n*+1} if |H_{*n*} ∩ G_{*n*+1}| > 0, H_{*n*+1} = H_{*n*} otherwise. Then for *n* > 0, S_{*n*+1} is true iff |H_{*n*} ∩ G_{*n*+1}| > 0.

To see how this algorithm works, let's apply it to (3):

- (3) An Arkansan was elected President in 1996. He is a Republican.
He jogs regularly.

The algorithm begins by asking us to determine the intersection of the extensions of 'Arkansan' and 'was elected President in 1996'. This intersection is {Bill Clinton}, and its cardinality is greater than zero. Thus, the first sentence is true. The algorithm then tells us that the second sentence is true iff the intersection of {Bill Clinton} and the extension of 'Republican' is non-empty. But the intersection of these two sets is empty. It follows that the second sentence is false. As to the third sentence, the algorithm first asks us to determine the intersection of the extensions of those predicates that appear in the *true* sentences that precede the third sentence. Since the second sentence is false, this intersection is just {Bill Clinton} again. The algorithm then tells us that the third sentence is true iff the intersection of this set, namely {Bill Clinton}, and the extension of 'jogs regularly' is non-empty, which it is. It follows that the third sentence is true. This result, that the first and third sentences of (3) are true but the second sentence of (3) is false, matches our truth-conditional intuitions perfectly.

The best explanation for the fact that chains are governed by this algorithm is that every chained pronoun *P* performs the semantic function of

an existential quantifier whose domain is the common intersection of the domains of the pronouns that appear in the *true* sentences that precede P in the chain. The sentence in which P appears is true iff there is at least one object belonging to P's domain that bears the property referred to by the predicate in the sentence. On this view, there is no *syntactic* mechanism that delivers the right truth-conditions for the sentences in chains. The relevant mechanism works entirely at the *semantic* level.

The suggestion that syntax cannot help us determine the semantic function of pronouns in chains is not new. (Jeff King, for example, has done a great deal to motivate a completely semantic approach.) What is distinctive about the theory just proposed is the nature of the dependence of the semantic features of a chained pronoun on the context in which it is produced. In the algorithmic construction of the domain of any chained pronoun, the predicates in all preceding *false* sentences are discarded, while the predicates in all preceding *true* sentences are kept. The semantic function of such a pronoun therefore depends on the specifically *semantic* properties of the context in which it is uttered. This is, I would argue, both unusual and unexpected.¹

Florida State University
Tallahassee, FL 32306-1500, USA
srickles@mailier.fsu.edu

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Synchronic self-control revisited: Frog and Toad shape up

ALFRED R. MELE

In 'Underestimating Self-Control' (1997a), I argued that Jeanette Kennett and Michael Smith (1996) underestimate our capacity for synchronic self-control. They argued for a solution to a puzzle about such self-control that features non-actional 'exercises' of self-control. I argued in response that 'a more robust, *actional* exercise of self-control is open to agents in scenarios of the sort in question' (1997a: 119). They disagree (Kennett and Smith 1997).

The puzzle is relatively straightforward.

Is it possible to reconcile the fact that people can exercise synchronic self-control, on the one hand, with a truism in the philosophy of action, on the other? The truism is that whenever people do something intentionally at some time, and so whenever they try to do something, they want to do that thing more than they want to do anything else they believe they can do at the time. (Kennett and Smith 1997: 123; cf. Kennett and Smith 1996: 63, and Mele 1987: 62–63, 67)

Given the alleged truism, if at *t* Frog wants most, for example, to eat cookies at *t*, then he eats cookies at *t*, if he intentionally does anything at all at the time. This is so even if Frog believes that he should not eat cookies then, and even if he thinks that he should exercise self-control in support of his not eating cookies. So how can Frog exercise self-control when he wants most to eat cookies?

In Mele 1997a, I resisted the temptation to criticize Kennett and Smith's attempted resolution, because I thought it better to concentrate on sketching an alternative resolution. Here, I will argue that the resolution they offer is problematic and reply to their criticism (1997) of my suggested resolution.

As Kennett and Smith observe, the alleged truism is consistent with an exercise of synchronic self-control, provided that the exercise is not an action (1996, 1997). The 'truism' leaves it open that Frog does not intentionally do anything straightaway, even though he wants most to eat cookies straightaway; and what brings it about that he does not eat cookies straightaway might be a non-actional exercise of self-control that changes what he wants most to do before he has time to satisfy what was his strongest desire (1996, 1997: 128). This is the heart of their attempted resolution of the puzzle.

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