# Puzzles involving anaphora

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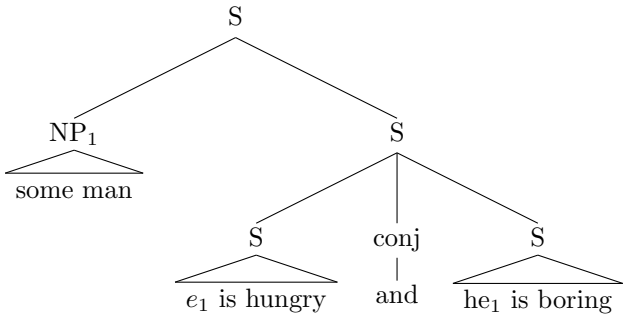
## 1 Restrictions on movement

On the theory we've been developing, it looks like we would treat the sentence

> Some man is hungry and he is boring.

as having the structure




This seems to get the right truth conditions for the sentence. To obtain them, we have to think of 'some man' as moving out of the first conjunct of the sentence.

This leads us to expect the same behavior from universally quantified expressions; but we don't find this. In fact, sentences like

> Every man is hungry and he is boring.

aren't even grammatical.

One might think that the puzzle here is about 'every.' But a plausible case can be made that the puzzle is really about 'some' (and 'a'). This is based on patterns of wh-movement (the movement of interrogative words) in question formation.

Consider the following pairs:

John gave me a gift.
What did John give me?

John gave me a gift and Bob napped.
*What did John give me and Bob napped?

John gave me a gift which Bob liked.
*Who did John give me a gift which liked?

The last two examples seem to illustrate constraints on wh-movement: you can't have movement out of conjuncts, or out of relative clauses like 'which Bob liked.' But it also seems like 'every' can't move out of these 'islands.' We already saw an illustration of the point about 'every' and conjunctions. The point about 'every' and relative clauses is illustrated by the pair

Fido has a bone in every corner of the house.
Fido has a bone which is in every corner of the house.

The first, but not the second, seems to be ambiguous. Why is this?

Indefinites like 'some' and 'a', by contrast, can move out of relative clauses. Consider

I talked to everyone who was in a dorm on South Quad.

Does this have a reading on which 'a' has wide scope?

## 2 Discourse anaphora

One might think that we can explain these differences between 'every' and 'a' at the level of syntactic theory, via rules governing movement. But indefinites exhibit other, related behaviors which are difficult to account for syntactically. This is that indefinites seem, unlike 'every', to be able to bind pronouns in different sentences. Compare:

(1) A man knocked on my door. He was rude.

Can we make sense of the first pair of sentences using our mechanism of movement and quantified noun phrases c-commanding pronouns?

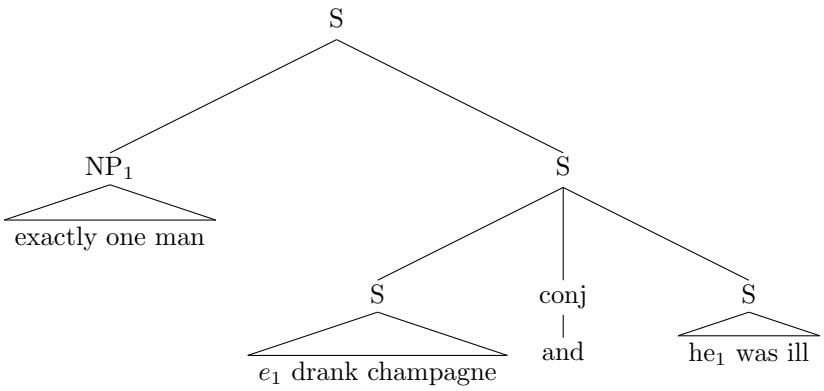
One might think that we could handle this case by, in effect, thinking of a discourse, or conversation, as a long conjunctive sentence. Then we could explain the first case above via quantifier movement, treating 'he' in the second sentence as bound. Then, if we posited different rules for the movement of 'every' and 'a', we would also have an explanation for the ungrammaticality of

*Every man left. He was in a hurry.

But in other cases the 'conjunction + binding' strategy gives the wrong truth-conditions. Consider the following example from Gareth Evans (1980):

(2) Exactly one man drank champagne. He was ill.

Does this have the truth conditions which would be assigned to the tree




by our theory? Here 'he' seems to be in some way anaphoric on 'exactly one man', but not bound by it.

Let's consider two different theoretical options for handling sentences like (2).

1. *The definite description theory.* One idea is that 'he' in (2) is functioning as a definite description, and that which definite description it expresses depends on the expression it is anaphoric on. Here it might be 'the man who drank champagne.' This appears to give us a way to understand the sense in which an expression might be anaphoric but not simply functioning as a bound variable (or as inheriting the semantic value of a c-commanding NP). But does this give the right truth conditions for (1)?

   To develop this theory, we would need to give systematic rules for determining which definite description should give us the interpretation of the pronoun.

2. *Dynamic semantics.* Dynamic semantic theories are theories according to which the semantic values of expressions depend in unexpected ways on earlier

features of the discourse. Here's one way in which this idea might help with donkey anaphora. (For more details on competing dynamic approaches, see the extra reading on the web site by Jeff King.)

One sort of theory of this kind takes (1) at face value, and says that the occurrence of 'he' in the second sentence is unbound. So the discourse on this view would have the form

$[_S$[a man][$e_1$ knocked on my door]]$[_S$ he$_2$ was rude]

The idea is then that the unbound pronoun he$_2$ gets its semantic value from the sentence which precedes it. Informally we can think of this sentence as setting the value of subsequent free variables to be the set of things which make the first sentence true, and that the second sentence is true if one of these things makes it true.

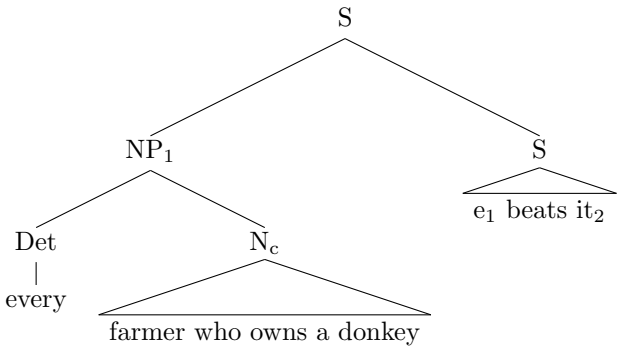
Note also that this seems to give the right treatment of cases like (2).

## 3 Donkey anaphora

Both of these theories face problems handling another problematic kind of sentence:

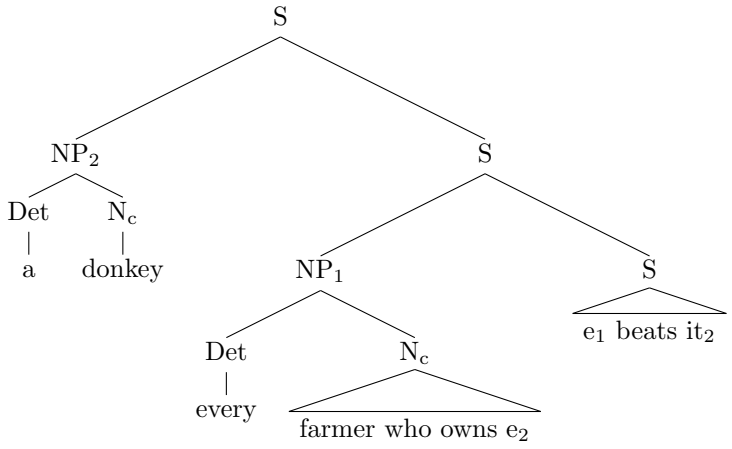
(3) Every farmer who owns a donkey beats it.

Our theory so far leads us to expect that 'every farmer who owns a donkey' and 'a donkey' are quantifier phrases, and that 'it' is bound by the latter. But there are two problems with this. The first is that it is hard to see how 'a donkey' could c-command 'it.' For it looks like 'a donkey' is something like a constituent of the common noun which is part of the first quantifier phrase, meaning that our tree will look something like




However we interpret the complex N$_c$, 'a donkey' is not going to c-command the pronoun.

One might try to solve this problem by letting 'a donkey' take wide scope, giving us the following tree:




Here the requirement of c-command is met. But does this give the right truth-conditions for (3)?

The problem here is in a way twofold. First, to get the right truth-condition, we have to say that 'a' here means the same as 'every' – but this seems completely unprincipled. Second, if we take 'a' here to express universal quantification, the idea that it has wide scope conflicts with the principle (discussed earlier) that universal quantifiers cannot scope out of relative clauses.

There is some controversy about what the correct truth conditions for (3) are. The two plausible candidates are:

> *The universal reading*: Every farmer who is such that s/he owns a donkey beats every donkey that s/he owns.
>
> *The existential reading* : Every farmer who is such that s/he owns a donkey beats at least one donkey that s/he owns.

The problem is that there appears to be no principled way to derive *either* truth-condition as the truth-condition of (3).

Let's now try out the two views discussed in the previous section to see whether they can help here.

Suppose first that we treat 'it' as expressing a definite description. The obvious choice here would be something like 'the donkey he owns.' Would this give us the correct truth conditions for (3)?

Dynamic approaches fare better – and indeed were developed partly to handle sentences like this. One treatment of this sentence parallels the treatment of (1) and (2) discussed above, in that it treats the sentence as involving free variables. One approach would be to treat the sentence as a conditional of the form

> [S [every farmer] [if $e_1$ owns a donkey, then $e_1$ beats $\text{it}_2$]]

where the pronoun is unbound. We might then hold that conditionals are governed by the following rule: the antecedent outputs a set of sequences of objects which make the antecedent true (intuitively, the set of pairs of objects such that the first is a farmer, the second is a donkey, and the first owns the second). The conditional as a whole is true if every such sequence also makes the consequent true.

This delivers the universal reading of (3). But what about the existential reading? This question can't be dismissed, because there are sentences which are apparently of the same form as (3) but which only have the existential reading. King gives the example

> Every man who had a credit card paid with it.

How would you modify the above sketch of a dynamic account to handle this? Does the modification run into other problems?

Another problem for this sort of treatment of pronouns as free variables whose value is given by the discourse, which King points out, is that it seems to say the wrong thing about discourses like

(4) A man broke into Sarah's apartment. Scott believes he came in the window.

The problem is that in some settings it is clear that the second sentence attributes to Scott a general belief about whoever came in the window rather than a belief about that particular individual. Can you see how the dynamic approach we have been discussing might have trouble with that? That suggests that the definite description theory mentioned above, even if it cannot provide an adequate treatment of donkey sentences, may still have a role to play.

## References

Gareth Evans, 1980. Pronouns. *Linguistic Inquiry* 11(2):337–361.