ANAPHORIC PRONOUNS WITH UNIVERSAL QUANTIFIER NOMINALS AS ANTECEDENTS

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Abstract

It has become commonplace among logicians and linguists to view many uses of pronouns in English as playing the role that variables play in logic. Peter Geach coined the term «pronoun of laziness» to describe a different use of pronouns, where an anaphoric pronoun cannot be treated as a variable bound by its antecedent, but instead goes proxy for it in the sense that the pronoun is replaceable in paraphrase by simple repetition of its antecedent. Several researchers have recommended criteria for distinguishing these two uses. Here I will consider two, one by Partee and Parsons, and one by Hintikka and Carlson, and show that each is inadequate by establishing the need to extend the range of pronouns of laziness further than has so far been suggested. Contrary to what each proposal implies, and to what, as far as I know, everyone has supposed, I will show that there are pronouns with *quantifier* nominal antecedents which we cannot treat as variables bound by these antecedents but must instead treat as pronouns of laziness. Once I show this, I will also be able to dispose of Geach's Argument that many instances of anaphora which appear to be pronouns of laziness are not.

It has become commonplace among logicians and linguists to view many uses of pronouns in English as playing the role that variables play in logic. Geach coined the term «pronoun of laziness» to describe a different use of pronouns, where an anaphoric pronoun cannot be treated as a variable bound by its antecedent, but instead goes proxy for it in the sense that the pronoun is replaceable in paraphrase by simple repetition of its antecedent. Several researchers have recommended criteria for distinguishing these two uses. Here I will consider two, one Partee [13, 14] and Parsons [12], and one by Hintikka and Carlson [2], and show that each is inadequate by establishing the need to extend the range of pronouns of laziness further than has so far been suggested. Contrary to what each proposal implies, and to what, as far as I know, everyone has supposed, I will show that there are pronouns with *quantifier* nominal antecedents which we cannot treat

as variables bound by these antecedents but must instead treat as pronouns of laziness. Once I show this, I will also be able to dispose of Geach's argument that many instances of anaphora which appear to be pronouns of laziness are not.

Do pronouns serve a purely abbreviatory function in language? Do they merely act as placeholders for their explicit (or implicit) antecents? Support for this view derives from examples like:

(1) If Smith owns a donkey, then he is happy.
(2) Either the man with the hat wins or he loses.

However, there are other uses of pronouns which show that this cannot be a correct account for all uses of pronouns. In sentences (3) and (4) the pronouns «himself» and «him» are clearly not substituting for «no one» and «any-one» because (3) and (4) are not paraphrases of (5) and (6) respectively:

(3) No one would put the blame on himself.
(4) If anyone had been there, I would have seen him (them).
(5) No one would put the blame on no one.
(6) If anyone had been there, I would have seen anyone.*
(Asterisk (*) indicates ungrammaticality.)

In search for an alternative account for the function of pronominal anaphora, a number of researches have suggested that pronouns play the role that variables play in logic. [e.g. 1, 7, 9, 10, 11].

The notation of quantification logic was designed in part to represent perspicuously just the sort of pronoun usage we find in sentences (3) and (4). These sentences can be represented in something quite close to that notation with relatively little violence to their overt syntactic structure, as in (7) and (8) below:

(7) No (there is some person x) (x would put the blame on x)
(8) ((For) any person x) (if x had been there, I would have seen x)

Recurrent variables serve to ensure that in evaluating a sentence, like (4), for example, whichever individual we arbitrarily choose, we must assign it to both occurrences of the variables as its «denotation» relative to our choice. Pronouns, then, act like variables inasmuch as they indicate chains of co-assignment.

Although it does not seem necessary, some researchers have

recommended that this treatment of pronouns as variables be extended to all anaphora pronouns [5, 15]. However, this extension does not seem possible in light of examples like (9)-(11).

(9) The man who gives *his paycheck* to his wife is wiser than the man who gives *it* to this mistress.

(10) My political views are rather complicated now, but when I was young they were quite radical.

(11) John Doe's house was once in Maryland, but it is now L.A.

In (9), the «it» must not be treated as a variable bound by its antecedent «his paycheck», at least not for the only natural reading for this sentence (example from [8]). If we try to, we derive the wrong truth conditions for (9), for, we would have two men giving the same paycheck to two different women, and this is not the intended reading. Instead we treat «it» as a pronoun of laziness in which the pronoun functions simply as a replacement for a full noun phrase and is not interpreted like a bound variable. Similarly, in (10), under one interpretation of this sentence, «they» cannot be treated as a bound variable (example from [2]). And, in (11), under one of its interpretations, «it» cannot be treated as a bound variable (example from [13]). If, as these examples suggest, there is a need for a distinction between pronouns as bound variables and pronouns as pronouns of laziness, then there is a problems of defining their domains. Hintikka and Carlson suggest that the distinction rests on whether we can treat a pronoun and its antecedent as *picking out* the same individual [2:14, 17-19]. We have a pronoun of laziness only where we cannot regard the pronoun and its antecedent as «picking out the same individual». Certainly if we cannot assign the same individual to both the pronoun and its antecent then we cannot treat the pronoun as a variable bound by the pronomalizing noun phrase. This suggestion is supported by our examples (9)-(11).

Partee and Parsons each lends further support to this suggestion when they argue that if an antecedent noun phrase contains a quantifier word, it is no longer semantically plausible to regard an anaphoric pronoun as a replacement for its antecent. «A pronoun can be anphorically related to a quantifier phrase only on a bound variable interpretation» [14:26, cf. also 13:430; 2:20]. Parsons suggests that a pronoun of laziness analysis is possible only when the antecedent is a

proper name or a definite description [12]. These suggestions correlate with the fact that sentences like (3) and (4) never allow such an interpretation. If all instances of anaphora with antecedent quantifier words are eliminated as possible pronouns of laziness, then this lends support to Hintikka and Carlson's suggestion that laziness has to do with lack of co-referentiality. I will now argue, however, that, Partee, Parsons, Hintikka and Carlson are all wrong. There are pronouns of laziness which have quantifier words as their antecedents, and therefore, which have antecedents that are not referring expressions. If I am correct, then the domain of pronouns of laziness should extended to a much broader range of cases than has so far been suggested.

Consider the following sentences, each of which contains a pronoun having a universal quantifier noun phrase as its antecedent: ([1])

(12) Either every American athelete goes to Moscow or they stay home.

(13) If John owns all donkeys, then John beats them.

(14) If Sue touches every red apple, and Mary touches them too, then they will be touched by at least two people.

In each of these examples, the pronoun must be treated as a pronoun of laziness and it cannot be treated as a variable bound by its antecedent. (12) is a disjunction; its left disjunct is «every American athlete goes to Moscow» and its right is «they stay home». If we suppose that «they» is a variable bound by «every American athlete» then we might try to represent it as (15):

(15) ((For) every American athelete x) (x goes to Moscow or x stays home)

This representation has the advantage of binding the «x» in «x stays home» by letting «every American athelete x» have the whole sentence as its scope, but it does so at the cost of obliterating the disjunctive from of (12). More sigificantly, (15) assigns the wrong truth-conditions to (12). For, to analyze (12) as (15) is to see it as equivalent to (16):

(16) Every American athlete either goes to Moscow or stays home.

Although it may be possible to construe (12) this way, it is not open to dispute that this is neither the only, nor the most natural interpretation. Upon the most natural interpretation, the sentence would not be true unless:

(17) Either every American athlete goes to Moscow or every American athlete stays home.

In the same way, sentence (13) is not equivalent to (18):

(18) ((For) all donkeys x) (if John owns x, then John beats x)

To analyze (13) as (18) is to see it as equivalent to (19):

(19) If John owns any donkey, then John beats it.

(19) would be false if John has one donkey and he doesn't beat it, whereas, (13) might still be true. Similar remarks can be made for sentence (14).

What this data strongly suggests is that we must see (12), (13) and (14) as a disjunction and two conditionals respectively with the scope of the quantifier in each case going only to the end of the clause in which it appears, and the pronouns in each instance as a pronoun of laziness. If indeed we interpret the pronouns as bound variables, then we do not give the sentences the meanings they are most naturally interpreted as having.[2] There is another piece of evidence that this analysis is correct.

In [14], Partee tries to further delimit the domain of pronouns of laziness. She says:

It seems that «only»-phrases must be classed as permitting pronouns of laziness; but in a special way: if what follows the «only» is a proper name or definite description, then subsequent occurrences of the same proper name or definite description (minus the «only») can be substituted for by a pronoun. [14:20]

For example, sentence (20) below could be analyzed as a paraphrase of (21), with «only John» binding both variables, or as a paraphrase of (22), with «he» substituted for the second John. But for (23) there is only one paraphrase (i.e., (24)) since (23) is not a paraphrase of (25).

(20) Only John expected that he would win.

(21) (Only John x) (x expected that x would win)

(22) Only John expected that John would win.

(23) Only one man expected that he would win.

(24) (Only one man x) (x expected that x would win)

(25) Only one man expected that one man would win.

Partee offers this data as support for the thesis that only pronouns whose antecedents are proper names or definite descriptions can be pronouns of laziness. However, the following data shows that this thesis is false.

(26) If only men could vote, then they would run this country.

(27) John will eat only fish for breakfast and John likes them well done.

(28) If only men could vote, then men would run this country.

(29) John will eat only fish for breakfast and John likes fish well done.

Not only are the pairs (26) and (28), (27) and (29) paraphrases, there is no interpretation of (26) and (27) which treats the pronoun as a bound variable.

As an immediate conclusion, we can infer that on the basis of this data and our previous data, Partee and Parsons are wrong; pronouns of laziness can have antecedents which are not proper names or definite descriptions. Also, since quantifier expressions are not referring expressions, Hintikka and Carlson are wrong in thinking that only when a pronoun and its antecedent cannot be taken as *co-referential* can the pronoun be a pronoun of laziness. ([3])

Which pronouns with antecedent universal quantifier expressions should be treated as pronouns of laziness, and which universal quantifier expressions permit such readings? First, obviously, not all pronouns with universal quantifier expressions as antecedents can be treated as pronouns of laziness. In (30)-(32) we cannot treat the pronouns as pronouns of laziness:

(30) Every man loves himself.

(31) Each man loves his mother.

(32) All men think that they are honorable.

But what distinguishes these cases from the others? What appears to be going on is this: when the pronoun and its antecedent are in coordinate clauses (i.e., clauses combined by connectives like «or», «if, then», «but», «and», etc. and also by non-truth-functional connectives like «because» and «since»), then the pronoun of laziness reading applies. (⁴) However, if the pronoun is in the same clause, or in a clause subordinate to the one in which the antecedent appears (as in (32)), then the bound variable interpretation applies.

On the question which expressions is this thesis true of, it seems to hold good for all universal quantifier expressions («every», «each», «all», and «any» in its generic sense)(⁵) and also for plural common nouns and generic readings of «a (n)» as in (33) and (34):

> (33) Scientific theories may be fun to learn, but they are not easy to learn.
>
> (34) A donkey is an animal and it is a lovely animal at that.

For these these sentences the role of the pronoun seems best described as pronoun of laziness. (⁶)

In conclusion, I would like to address Geach's argument that pronouns function like bound variables even when they have singular terms as antecedents [5: 123]. Geach contends that (1) and (35) are not paraphrases, which is to say that «he» in (1) is not, despite appearnces, a pronoun of laziness.

> (1) If Smith owns a donkey, then he is happy.
> (35) If Smith owns a donkey, then Smith is happy.

His argument is as follows ([5: 138]; cf. also [6: 89-90]): (1) predicates of Smith exactly what (36) predicates of anyone. Both contain the same unambiguous complex predicable «if ____ owns a donkey, then he is happy»:

> (36) If anyone owns a donkey, then he is happy.

If (1) and (35) were paraphrases, then presumably (35) would predicate of Smith whatever (1) predicates of Smith. But it doesn't since (37) predicates of anyone something entirely different from what (36) predicates of anyone.

> (37) If anyone owns a donkey, then Smith is happy.

This is enough to establish, Geach concludes, that «he» in (1) has a definite logical role of its own and is not a mere pronoun of laziness.

The soundness and clarity of this argument are obviously not selfevident. But if sound, this argument can be extended to many cases. In fact, on the basis of it, no longer can we be sure when the substitution of a pronoun by its antecedent results in a paraphrase. We would be warranted in drawing this conclusion, according to Geach, just in case the predicables we obtain by removing the antecedent in both cases result in paraphrases for every grammatical attachment. This is a very strong condition, but our observations about pronouns with universal quantifier nominals as antecedents enables us to dispose of Geach's argument quite easily.

On the basis of it, we would have to infer that sentences (13) and (38) do not have the same import:

(13) If John owns all donkeys, then he beats them.
(38) If John owns all donkeys, then he beats all donkeys.

(13) predicates of all donkeys what (39) predicates of some donkeys:

(39) If John owns some donkeys, then he beats them.

Both contain the same unambiguous complex predicable «if John owns_____, then he beats them». Sentence (38), though, contains the completely different predicable «if John owns_____, then he beats all donkeys», when this predicable is attached to «some donkeys' we derive (40):

(40) If John owns some donkeys, then he beats all donkeys,

which is wholly different in force from (39). Since the predicables differ in sense, we cannot treat «them» as a pronoun of laziness in (13) But we know Geach *must* be wrong since we have already observed that this pronoun cannot be treated as a bound variable but must be treated as a pronoun of laziness. This suffices to show that Geach cannot demonstrate, with the above argument, that (13) and (30) differ in meaning, nor that (1) and (35) differ in meaning.([1])

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FOOTNOTES

(1) Strictly speaking, (12) and (14) are ungrammatical since «every» is singular and the anaphoric pronoun is plural «they». But they are certainly acceptable and are much more likely to be said than their grammatical counterparts. This seems to be general phenomenon when antecedent for a pronoun contains a universal quantifier and the antecedent and pronoun are in separate coordinate clauses. (More on this later).

(²) In the following two sentences, the pronoun can be given a pronoun of laziness interpretation.

Everly millionare was happy, but every pauper envied them (him).

Violet smiles at each man, but Mary ignores them (him).

However, they apparently have variable binding interpretations as well because the following analyses assign the correct truth conditions to them.

((For) every millionare x) (x was happy but every pauper envied x)

((For) each man x) (Violet smiles at x, but Mary ignores x)

I think this duplicitly springs not from ambiguity but rather from the fact that in predicate logic the following two forms are logically equivalent:

(x) $(Ox \& Px)$ (x) $Ox \& (x) Px$

(³) The reader familiar with Carlson and Hintikka [3] or with Evans [4] might think that my arguments for treating the pronouns in (12)-(14) and (26)-(27) are valid only if we assume a classical semantic account fo quantification and variable binding. If we adopt either Carlson and Hintikka's gametheoretic semantics (with subgames) or Evan's Fregean semantics with E-type pronouns, it is true that we circumscribe my objection that variable binding interpretation of the pronouns requires obliterating the syntactic form of these sentences. However, it is an easy exercice to show that both theories assign the wrong truth-conditions to these sentences if, a la Carlson and Hintikka, we treat the pronouns as bound variables, or, a la Evans, we treat these pronouns as E-type pronouns.

I do not interpret my results here as bringing out an inadequacy in either of these theories. Rather, I view my work as a vindication of both semantic projects, since once we treat these pronouns as pronouns of laziness both theories can proceed in evaluating them as usual. More on this in «The Proper Treatment of Qunatifier Scope in English» (forthcoming) (with Jim Carson).

(⁴) All men die because they are mortal.

All men die because all men are mortal.

Every guy I know must be working since they didn't show.

Every guy I know must be working since every guy I know didn't show.

(⁵) Anybody I know is welcome and he (they) can come any time he (they) likes.

Anybody I know is welcome and anybody I know can come any time he (they likes.

Note that the last pronoun here cannot be given a pronoun of laziness interpretation.

(⁶) It is interesting to note that contrary to what Hintikka and Carlson say in [3], we can also have backwards pronominalization with universal expressions.

When parents speak to them, children should listen.

(⁷) I would like to thank Jim Carson for his help.