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DELETION AND VARIABLE BINDING

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## 0. Introduction

It is generally agreed that pronominalization and deletion under identity are closely related phenomena; Postal (1970) and Jackendoff (1972) have made particularly striking cases for the existence of close formal similarities among pronominalization, reflexivization, and coreferential complement subject deletion. Their claims are quite similar in spite of the difference between the generative and interpretive semantics frameworks, and both are concerned with complement subject deletion not only when it is controlled by the next higher verb, i.e. ordinary Equi-NP Deletion, but also when its "controller" is several clauses away, i.e. what Grinder (1970) analyzed as "Super-Equi NP Deletion". What I want to explore in this paper is the relation between pronominalization and deletion in the "Super-Equi NP Deletion" cases, as illustrated by (1) and (2).<sup>1</sup>

(1) John<sub>i</sub> thought it was foolish to shave himself<sub>i</sub>.

(2) John<sub>i</sub> thought it was foolish for him<sub>i</sub> to shave himself<sub>i</sub>.

I am going to argue that (1) and (2) are not simply optional surface variants, but that their similarity rather results from an accidental convergence of quite disparate processes. If my argument is correct, then on a generative semantics approach (1) and (2) should have distinct underlying representations and on an interpretive approach their semantic interpretations should be arrived at by distinct interpretive principles, even though for this particular pair of examples there may be semantic rules which would show the two sentences to be logically equivalent.

A preliminary observation is that in an environment where reflexivization is possible, an ordinary pronoun can never be understood as coreferential with the same antecedent.

(3) The man<sub>i</sub> injured himself<sub>i</sub>.

(4)\*The man<sub>i</sub> injured him<sub>i</sub>.

Similarly, where ordinary Equi-NP Deletion is possible, pronominalization is not an equivalent alternative.

(5) John was eager to start.

(6) \*John<sub>i</sub> was eager for him<sub>i</sub> to start.

Thus whatever formal similarities can be captured among the three rules, generatively or interpretively, it has to be stated that reflexivization and Equi-NP Deletion must apply if they can, and pronominalization can only apply where neither of the other rules is applicable. Grinder (1970) tried to show that his rule of Super-Equi NP Deletion was collapsible with ordinary Equi-NP Deletion; but if it is, it then seems surprising that it should be optional, as the well-formedness of (2) suggests it must be. Kimball (1971) argues against Grinder's rule of Super-Equi, and proposes an alternative analysis of (1) based on a rule of Dative Deletion (which I will discuss in section 2), but still treats (1) and (2) as optional variants. What I will try to show is that the Super-Equi phenomenon, when properly analyzed, is defined on variables (in the logical sense) and is always obligatory, and that the pronoun in (2) arises by a special process, "pronominalization of laziness", and cannot be interpreted as a variable.

One exclusion must be noted at the outset. Whereas Grinder, Postal, and Jackendoff all apparently assume that complement subject deletion can be treated uniformly for infinitives and gerunds, I am dealing only with infinitives. The generalizations that I suggest for infinitives do not all carry over to gerunds, so if there is a way to treat them uniformly, this won't be it. Evidence for non-uniformity comes from pairs such as the following:

(7) (a) Smoking is harmful.

(b) It's harmful to smoke.

(8) (a) Dropping bombs is dangerous.

(b) It's dangerous to drop bombs.

On the one hand, all the sentences above seem to have a generic "one" as the interpretation of the missing gerund or infinitive subject; but there is a difference between the gerunds and the infinitives with respect to the connection between who is doing the activity and who it is harmful or dangerous for. In the (b)

sentences, with infinitives, the only interpretation is that the activity is harmful or dangerous for the one doing it; our analysis will follow Kimball's (1971) in positing a Dative with predicates like "harmful" or "dangerous" as central to the control problem with infinitives. But the (a) sentences, with gerunds, allow an interpretation where the activity is harmful or dangerous to some other unspecified party, e.g. the environment, or people who happen to be in the way of the smoke or the bombs. It should be noted that the counterexamples Grinder (1971) gives to Kimball's (1971) reanalyses of Super-Equi NP Deletion as Dative Deletion all involve gerunds. It may be that there is a generalization to the effect that gerund subject deletion can take place whenever the infinitive subject deletion can though not vice versa. But nothing further will be said about gerunds here.

Returning to the main problem, I will now give some examples to support my claim that (1) and (2) are not as closely related as has been assumed.

(9) Only John believes that it would be inadvisable to vote for himself.

(10) Only John believes that it would be inadvisable for him to vote for himself.

Sentences (9) and (10) differ structurally in the same way as (1) and (2), but (9) and (10) are not synonymous. Sentence (10) can be paraphrased by (10'); what John and the others disagree about is the advisability of John's voting for himself, and no one else's voting is at issue.

(10') Only John believes that it would be inadvisable for John to vote for himself.

Sentence (9), on the other hand, cannot be so paraphrased; in this case, what is at issue is each person's opinion about his own voting, not each person's opinion about John's voting.

Sentences (11) and (12) show a similar distinction.

(11) Everyone considered it inadvisable to perjure himself.

- (12) (\*) Everyone considered it inadvisable for him to perjure himself.

Sentence (12) is well-formed if the him refers to someone outside the sentence altogether, but it cannot be interpreted with the him anaphorically bound to everyone. The difference between (11) and (12) is not surprising in the light of the data from ordinary Equi-NP Deletion, since (11) and (12) match the difference between (5) and (6). Yet it seems inconsistent with the equal acceptability and apparent synonymy of (1) and (2). The rest of this paper will be an attempt to resolve this conflict, making crucial use of a distinction between processes that involve identity of logical variables and processes that involve linguistic identity.

1. Pronouns as variables and pronouns of laziness

In Partee (1970) I discussed the question of whether it was possible to treat all instances of pronominalization in English uniformly, and suggested that it was not. Here I want to reinforce that claim, since I intend to exploit it in accounting for the problem sentences cited above. What I say is neutral, I believe, between a generative and an interpretive approach, but since it is virtually impossible to discuss the details of an analysis in terms that remain neutral, I will talk in generative terms; I believe the conversion to an equivalent interpretive analysis is straightforward. My approach to these matters is heavily influenced by the Montague framework, but I am not bringing that in explicitly here because of the additional technical apparatus it would demand.

It has been commonplace among logicians and more recently widespread among linguists to view pronouns in English as playing the role that variables play in logic. Such a view gives the only sensible account of the pronouns in sentences like (13).

- (13) No prudent man will drive when he is drunk.

he in (13) is clearly not a substitute for the expression

"no prudent man"; neither can it be said to refer to the entity denoted by "no prudent man". Rather, the sentence must be analyzed as being related on some level to the open sentence (13'), with the expression "no prudent man" introduced so that it binds both occurrences of the variable (the exact mechanism for this is irrelevant here).

(13') x will drive when x is drunk.

Geach (1968) coined the term "pronoun of laziness" to describe a different use of pronouns, one which can be equated with the earliest transformational account of pronominalization, namely the substitution of a pronoun to avoid repetition of an identical linguistic expression. A good example of a pronoun which can only be interpreted in this way was given by Karttunen (1969):

(14) The man who gave his paycheck to his wife was wiser than the man who gave it to his mistress.

The it in (14) must be understood as "his paycheck", and cannot be interpreted as a bound variable, at least not on the only natural reading for the sentence.

If examples such as these support the need for two separate pronominalization processes, there remains the problem of defining their domains, for it seems that many examples could be analyzed either way with semantically equivalent results. For example, sentence (15) below could be analyzed as related to (15'), with John binding both variables, or as derived from (15''), with he substituted for the second John.

(15) John expected that he would win.

(15') x expected that x would win.

(15'') John expected that John would win.

Parsons (1972) suggests that the pronoun of laziness analysis is possible whenever the antecedent is a proper name or a definite description, and not otherwise. This correlates with the fact that sentences like (13) with other sorts of quantifier phrases never allow such an interpretation. He also

suggests that whenever a pronoun can be coherently described as a bound variable, then that interpretation is to be taken as one of its possible analyses. The conclusion that sentences like (15) are indeed structurally ambiguous in spite of being semantically unambiguous is likely to be resisted by some linguists, but I know of no a priori arguments against it, and simplicity of the total system, if in fact that is a result, would argue for it.

Furthermore, for the case of (15), unexpected support for a real ambiguity turns up in the behavior of only-phrases. 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 noun or definite description, then subsequent occurrence of the same proper noun or definite description (minus the only) can be substituted for by a pronoun. On the other hand, only-phrases also act like quantifier phrases, with "only John" behaving like "no one other than John". If we substitute "only John" for "John" in (15), the resulting sentence is semantically ambiguous in a way that exactly parallels the syntactic ambiguity postulated for (15).

(16) Only John expected that he would win.

One source involves the open sentence (16'), quantified by "only John"<sup>2</sup>:

(16') x expected that x would win.

The other source must be (16''), with the pronoun-of-laziness rule substituting he for John.

(16'') Only John expected that John would win.

It might be protested that this is a hasty conclusion based on a superficial analysis of only-phrases, and that both interpretations could be treated as bound variables under a more sophisticated analysis that gives multiple-sentence sources for sentences with only-phrases, such as that proposed in Lakoff (1970). Since it would be too large a digression to go into that fully here, let me just mention one bit of evidence that supports my analysis, namely that the same restriction to

proper names and definite description holds for simples pronouns of laziness and for pronouns of laziness with only-phrases, so that, for instance, sentence (17) can have only the bound variable interpretation.

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

An analysis that treated both readings of (16) as bound variable interpretations would then have to explain why one of the bound variable analyses was blocked in cases like (17).

We have established so far, then, that ordinary pronouns can arise by two processes: as bound variables and as pronouns of laziness. Sentences where the antecedent of a pronoun is a proper noun or a definite description are structurally ambiguous, although the two structures often lead to equivalent interpretations. Now we should look at reflexive pronouns and at deletions, to see whether analogs of both processes apply there as well.

For reflexives, there are examples with quantifiers, like (18), which require the bound variable interpretation, and examples with proper nouns or definite descriptions, like (19), which could be analyzed either way (with no difference in the resulting interpretation).

(18) Every man underrated himself.

(19) The man in the brown hat shot himself in the foot.

Such examples give evidence that reflexives must sometimes be analyzed as variables, but are neutral on the question of whether there is a reflexive-of-laziness analysis as well. There are as far as I can determine no analogs to Karttunen's sentence (14) which would require a laziness interpretation. The one piece of differential evidence I know of comes from the classic example (20):

(20) Only Lucifer pities himself.

If there were a reflexive-of-laziness process, then (20) should be ambiguous in the same way as (16), and one of its readings should be equivalent to (21).

(21) Only Lucifer pities Lucifer.

But (20) is not ambiguous; it has only a bound variable reading, and cannot be interpreted as (21). And I know of no example where a reflexive pronoun cannot be interpreted as a bound variable. (I would like to hold open the possibility that heavily stressed reflexive pronouns may perhaps be pronouns of laziness, but I will ignore that issue here and keep such examples out of the argument.)

Thus the only evidence that I can find that bears on the problem points to reflexivization as a process restricted to variables. In what follows I will argue that the same holds for complement subject deletion. Before going on, however, let us look back at the problematical examples we are concerned with and see if we can begin to formulate a hypothesis about what is going on. The examples are repeated below.

- (1) John thought it was foolish to shave himself.
- (2) John thought it was foolish for him to shave himself.
- (9) Only John believes that it would be inadvisable to vote for himself.
- (10) Only John believes that it would be inadvisable for him to vote for himself.
- (11) Everyone considered it inadvisable to perjure himself.
- (12) (\*) Everyone considered it inadvisable for him to perjure himself.

Consider the "for him" in (2), (10), and (12), and the question of whether that him is a bound variable or a pronoun of laziness. I think analyses such as Grinder's and Postal's have implicitly assumed that it was a bound variable, although the question does not come up explicitly in their formulations. But Grinder at least used only proper names in his examples, and hence did not notice the problems posed by (9) - (12). It seems that we can approach a resolution of the problems by analyzing the him in all these examples as a pronoun of laziness, especially if we can go on to argue that a bound variable in the same position is obligatorily deleted. Then the synonymy

of (1) and (2) is just like the synonymy of the two analyses of (15), the non-synonymy of (9) and (10) is exactly parallel to the non-synonymy of the two analyses of (16); and the impossibility of (12) is accounted for by the restriction of pronouns of laziness to antecedents which are proper nouns or definite descriptions. So all we have left to do is to show why we can't have a bound variable him in those positions. This will require some consideration of infinitives and for-phrases.

## 2. Deletion and variables in infinitive constructions

In this section I will try to show that, at least in the processes that relate to infinitives, whenever deletion is "controlled" by noun phrase identity of some sort, the identity conditions are always between free variables and the deletion is obligatory. For ordinary Equi-NP Deletion, the case is quite easy to make and the conclusion is consistent with previous analyses in both generative and interpretive frameworks. For the phenomenon that Grinder has analyzed as Super-Equi NP Deletion, I will argue in support of an analysis largely based on Kimball's rule of Dative Deletion, with some modifications related to the general claim above.

Consider first ordinary Equi-NP Deletion. The claim that the rule is obligatory when its structural description is met has never to my knowledge been disputed, so I will not add arguments for it here. (The fact that some verbs, e.g. try, impose the further condition that the structural description of the rule must be met, is an independent matter, as is the problem of finding the most general way to specify which NP in the matrix sentence acts as the controller.) The claim that NP identity for Equi is identity of free variables can be verified from examples such as the following:

- (22) No one tried to leave.
- (23) Only John expected to lose.
- (24) Only John expected that he would lose.

Example (22) is the sort that was originally adduced to show that Equi-NP Deletion must be regarded not as involving identity in linguistic form, but rather identity of the sort that logical variables represent.<sup>3</sup> If there were in addition a deletion-of-laziness phenomenon, then example (23) should be ambiguous in the way that example (24) is, but it is not. Hence I believe it is clear (and uncontroversial) that ordinary Equi-NP Deletion is an obligatory operation on variables.<sup>4</sup>

In approaching the Super-Equi problem, one of the first things to worry about is the role of for-phrases. Kimball (1971) pointed out the frequent ambiguity of for-phrases as between Datives on adjectives and as part of an embedded complement. The two roles show up most clearly in examples where both can occur.

- (25) It's unpleasant for me for you to leave such a mess.
- (26) It's good for the economy for everyone to have a job.
- (27) It's important for everyone for everyone to be happy.

When only one for-phrase shows up, it is not always clear which role it is playing. Some adjectives, including good and important, appear to take Datives optionally; that is, the language seems to allow a distinction between asserting that something is good or important for someone and asserting that it is good or important in some absolute sense.<sup>5</sup> With such adjectives, a sentence with just one for-phrase is ambiguous.

- (28) It's good for John to stay here.
- (28') It's good [for John to stay here].
- (28'') It's good for John [to stay here].

In the reading (28'), good is being used without a Dative.<sup>6</sup> In (28'') the Dative has triggered deletion of the embedded for-phrase. Now Kimball argues, and we want to support him, that deletion of an embedded for-phrase on identity with a Dative in the next higher clause works just like ordinary Equi-NP Deletion. Like some verbs, some adjectives require that the structural description of Equi be met: e.g. foolish requires that the embedded complement subject be identical to the Dative

on foolish, disallowing (29).

(29) \* It was foolish for John for Mary to leave.

But if the Equi-NP Deletion rule as governed by adjectives with Datives is to be the same as the usual Equi-NP Deletion rule (where the controller is the subject or object of the matrix verb, or subject of an adjective like eager), we are faced with the problem that (30) and (31) are well-formed.

(30) It's good for John for John to stay here.

(31) It's good for John for him to stay here.

Ordinary Equi, as noted earlier, is obligatory and does not permit pronominalization as an equivalent option.

But note that (30) and (31) do not seem to be fully synonymous with (28) (on the reading (28''), which is the only relevant one since (30) and (31) clearly have a Dative). I would like to propose that (30) and (31) are related to an open sentence with two distinct free variables, i.e. (32), whereas (28'') is related to an open sentence with a single free variable, i.e. (33).

(32) It's good for x for y to stay here.

(33) It's good for x for x to stay here.

Then if Equi-NP Deletion is defined on variables and obligatory when the variables are identical, the data would be accounted for. But we have to make (32) and (33) plausible, and we have to try to explain why a similar option is not available with the standard cases of Equi, i.e. why (34) is not possible like (31) with an interpretation analogous to (32).

(34) \* John is eager for him to stay here.

The claim that (30) is an instance of (32) and not of (33) is supported by the fact that only those noun phrases which permit pronominalization-of-laziness can occur in the pattern of (31).

(35) \* It's good for every student for him to have to meet deadlines.

In non-extraposed form with either forward or backward pronominalization, (35) seems even worse, while (31) is still fine.

(31') For John to stay here is good for him.

(35') \*For every student to have to meet deadlines is good for him.

(31'') For him to stay here is good for John.

(35'') \*For him to have to meet deadlines is good for every student.

The explanation for this under the present hypothesis is that a pronoun can be anaphorically related to a quantifier phrase only on a bound variable interpretation, so (35) would have to come from (33), and (33) undergoes obligatory Equi-NP Deletion; hence the only possible realization for the structure underlying (35) is (36).

(36) It's good for every student [to have to meet deadlines].

Further support for the distinction between (32) and (33) can be gotten from contrasts like the following:

(37) It may be good for Mike for him to be home all day, but it's bad for Mary.

(38) It may be good for Mike to be home all day, but but it's bad for Mary.

The underlying variable structure of these might be represented schematically as follows:

(37') It may be good for x for y to VP, but it's bad for z for y to VP.

(38') It may be good for x for x to VP, but it's bad for z for z to VP.

Such pairs are not crucial evidence for this hypothesis as against alternatives, since the distinction could be accounted for simply by a cyclic ordering of rules even if him in (37) was treated as a bound variable.

Thus the data supports, if not exclusively, the hypothesis that Equi-NP Deletion is an obligatory operation on variables. Sentence (30), repeated below, is accounted for as arising via quantification over separate variables by the same NP, just as (39) below is, but sentence (30), unlike (39), permits the second occurrence of the NP to be replaced by a pronoun of laziness to form (31) (compare the ill-formedness of (40)). Sentence (31), then, does not show that Equi is sometimes optional.

- (30) It's good for John for John to stay here.
- (39) It's good for everyone for everyone to have a job.
- (31) It's good for John for him to stay here.
- (40) It's good for everyone for him to have a job.

But now the converse problem, mentioned above in connection with example (34), still remains. Our analysis would seem to predict that an underlying structure like (41) below could have John substituted independently for each variable to give (42) and then pronominalization of laziness should yield (34).

- (41) x is eager for y to stay here.
- (42) \*?John is eager for John to stay here.

At worst, we have just traded one set of cases where Equi is unpredictably optional for another set where substitution of the same NP for different variables is unpredictably forbidden. But note that it is only certain NP's for which the prohibition holds. In particular, it is only the NP's on which pronominalization of laziness can operate that cannot appear in sentences like (42). Thus (43) is perfectly well-formed.

- (43) Everyone is eager for everyone to stay here.

And a distinction which was left implicit earlier comes into play here. It was noted earlier that definite descriptions as well as proper nouns could be replaced by pronouns of laziness. But in contexts where a definite description is ambiguously referential or not, it is only on the referential reading that a pronoun of laziness can be used.

- (44) Only the owner of the chicken farm thought that he should raise turkeys.

Sentence (44) is ambiguous: the bound variable reading for the pronoun, which we are not interested in here, is the reading appropriate to the situation where everyone is contemplating raising turkeys; the reading that must be a pronoun of laziness is the one on which the chicken farmer is considering going into the turkey business against the advice of his friends. That reading should have as its source sentence (45) below.

- (45) Only the owner of the chicken farm thought that the owner of the chicken farm should raise turkeys.

Sentence (45) should in turn be ambiguous: the description "the owner of the chicken farm" should have both a referential and a non-referential reading, with the referential reading as the source for the pronoun of laziness in (44). (The non-referential reading does not permit any kind of pronominalization). With a different subject for the higher clause, the usual ambiguity is clear enough, as in (46), but (45) itself strongly resists the referential reading.

- (46) Smith thought that the owner of the chicken farm should raise turkeys.

It seems likely that the reason (45) resists the referential reading is that pronominalization of laziness can apply to it to turn it into (44), and there is at least a stylistic preference to perform pronominalization whenever possible, especially when pronominalization can reduce ambiguity (though in this particular example, a new ambiguity is introduced when the original ambiguity is eliminated).

The facts just mentioned indicate, incidentally, that pronominalization of laziness does not depend merely on linguistic form, as the earlier discussion of it suggested, for if it did, (44) should share the non-referential reading of (45), which it clearly does not. It would be too strong to claim that pronouns of laziness were always referential, for

(44) could in turn be embedded in some opaque context that would allow a non-referential reading for "the owner of the chicken farm". The additional requirement needed may be that the scope of the NP being pronominalized and the scope of the antecedent must be identical; but that is only a tentative hypothesis and the question will have to remain open here.<sup>7</sup>

The question which is still at issue at this point, and to which this further discussion of pronouns of laziness is relevant, is why sentences like (34), repeated below, are not well-formed on any reading, when we seem to be led to predict a well-formed pronoun of laziness reading.

(34) \* John is eager for him to stay here.

Although I do not have a conclusive answer to this question, I would like to offer the beginnings of a hypothesis about it. One semantic difference between good, which does allow the same definite NP to substitute for distinct variables, and eager, which does not, is that eager denotes a subjective attitude of the subject of eager to the action or state denoted by the infinitive. Good, on the other hand, does not necessarily represent the attitude of the individual referred to by the Dative. Note that feel good to, unlike be good for, does express a subjective attitude of its Dative, and the corresponding restrictions hold.

(47) It felt good to John to touch Mary.

(48) \* It felt good to John for John to touch Mary.

(49) \* It felt good to John for him to touch Mary.

In order for sentences like (34) and (48)-(49) to be generated, on the hypothesis that Equi is obligatory for identical variables, it would have to be possible to substitute John independently for each variable in structures like (50) and (51).

(50) x is eager for y to VP

(51) It felt good to x for y to VP

My tentative semantic explanation for the impossibility of doing so is that with subjective attitudes such as these, if John is the x, he cannot hold such an attitude about his own involvement

in some action or state without recognizing that it is himself who is involved. Of course this is plausible only on a referential reading of the NP substituted for y; if we use repeated definite description, a non-referential reading will be possible, but not a referential one, and accordingly not a pronoun.

- (52) The stupidest official was eager for the stupidest official to be fired.
- (53) \* The stupidest official was eager for him to be fired.

To say that the holders of such attitudes necessarily know when it is themselves the attitudes concern (in the referential cases), is, I would suggest, an appropriate account for why a single free variable must be involved in such cases, and why, consequently, deletion is obligatory when the variable occurs in a position where Equi is applicable.<sup>8</sup>

If this hypothesis is correct, it may not be necessary to add any restrictions to the syntax to account for it, since the ill-formedness would be on the conceptual level. That is, (34) and (48) could be regarded as syntactically well-formed expressions of a conceptually anomalous proposition. If there is any point in marking the restrictions in the syntax, the appropriate verbs and adjectives could be marked with a syntactic feature that would be predictable from their semantic classification. But the syntactic restriction governed by these lexical items would be the rather complex one of prohibiting insertion of identical referential NP's for different free variables.

Let me quickly point out that much more work remains to be done before this tentative hypothesis even reaches a testable formulation. The semantic notions which are claimed to underlie the phenomena have not been made precise, and the influence of syntactic factors has not been fully explored. But at worst, if the hypothesis breaks down, there are some unexplained restrictions on the substitution of identical NP's for distinct variables, and the data involved have not been accounted

for in any other account of Equi either.

This concludes the argument that deletion of a for-phrase controlled by a Dative in the next higher sentence is a case of ordinary Equi-NP Deletion and, like the other cases of Equi, is an obligatory operation defined on variables. Before turning to Super-Equi proper, we must briefly consider the possibilities of uncontrolled deletion of for-phrases.

If an adjective ends up with a bare infinitive, with no controller for deletion in the sentence, there are several possibilities for the underlying structure.

(54) It's against the law to park by a fire hydrant.

If "against the law" takes no Dative, which seems plausible though not certain, then we must either posit infinitive phrases without accompanying for-phrases, or else allow certain for-phrases, e.g. "for one", to be freely deletable.<sup>9</sup> Some evidence, though I think not crucial, for the latter comes from sentences like the following (assuming there is no controlling Dative in the underlying structure, which has not been conclusively established).

(55) It's a sin to covet one's neighbor's ox.

(56) It's a crime against humanity to keep one's wealth to oneself.

In other cases, an adjective which clearly does take a Dative ends up with no for-phrase.

(57) It's easy to learn to ski.

(58) It's foolish to leave too many lights on.

(59) It's dangerous to play with matches.

In such cases, since identity between the understood Dative and the subject of the infinitive clearly holds, the best hypothesis seems to be that the underlying structure has identical free variables, as in (60), to which Equi applies, and the Dative subsequently undergoes Free Dative Deletion. (See Kimball (1971).)

(60) It's easy for x for x to learn to ski.

Free Dative Deletion appears to be possible with I, you, and one; whether there are other possibilities, e.g. someone, I leave open.<sup>10</sup>

- (61) It was stupid to leave your hat in the rain.
- (62) It's unpleasant to stay by myself in the house all day.
- (63) It's startling to find oneself viewed as part of the older generation.
- (64) \* It's hard to get himself out of bed in the morning.

It is difficult, and fortunately inessential to the present argument, to determine just how many ways ambiguous a given construction with a bare infinitive and no controller present is. The only essential point to be made is that there is such a thing as Free Dative Deletion, and probably also free deletion of "for one" in for-to constructions, when there is no Dative or other controller.

Among the sentences that Grinder (1970) cites as evidence for Super-Equi NP Deletion are some which could be equally well analyzed as Free Dative Deletion such as (65) (Grinder's (1a)).

- (65) Harry thought that it would be difficult to leave.

Such a sentence does not provide evidence for Super-Equi unless it can be shown that it has a reading which could not be accounted for by Free Dative Deletion. Grinder clearly thinks it does, but his only direct evidence is the purported synonymy of (65) and (66), which is disputable.

- (66) Harry thought that it would be difficult for him to leave.

The strongest evidence for a deletion rule which operates over unbounded distance comes from sentences which show third-person reflexivization and related processes in infinitives, since such cases cannot arise by Free Dative Deletion (see (64)). Thus the critical examples are those like (67) - (69) (Grinder's (6a-c)).

- (67) Barbara explained why it was so natural to enjoy herself while singing the Gita.
- (68) Michael predicted that it would be trivial to design his own computer.
- (69) Kathleen claims that it is enjoyable to hold her breath for days at a time.

In all of Grinder's examples of this type with infinitives (though not in all of those with gerundives) the adjective in the clause immediately above the infinitive is of the type that takes a Dative. Hence the deletion of the complement for-phrase can be analyzed as controlled by the Dative, and the deletion that has the "Super" properties Grinder describes is deletion of the Dative, as Kimball argued. All of Grinder's arguments about the notion of "possible controller" and "Deletion Path" apply to Dative Deletion; and recognizing the rules as Dative Deletion still leaves open the problem of specifying just what the possible controllers are (see Jackendoff (1972) for some semantically-based hypotheses). The only issue I want to take with the Grinder-Kimball Dative Deletion rule concerns its optionality. This is the point to which examples (9) and (10), repeated below, are relevant.

- (9) Only John believes that it would be inadvisable to vote for himself.
- (10) Only John believes that it would be inadvisable for him to vote for himself.

Similar examples which show Dative Deletion operating across a longer path are given below.

- (70) Only John considers it likely to be unpleasant to shoot himself.
- (71) Only John considers it likely to be unpleasant for him to shoot himself.

The sentences with and without the pronouns are not synonymous; only those without the pronoun permit the bound variable interpretation illustrated schematically in (72).

- (72) [only John]  $\hat{x}$  (x believes that it would be  
inadvisable for x for x to vote for x).

Furthermore, as pointed out earlier, a pronoun cannot occur when the controller is a quantifier phrase such as everyone. Thus it seems clear that when a pronoun does occur in such positions it is a pronoun of laziness and not a bound variable, so that Dative Deletion, like Equi-NP Deletion, is an obligatory rule defined on variables. The structures of (9) and (10) can then be explained as follows.

(a) Sentence (9), where no pronoun shows up, has the structure illustrated in (72). On the first cycle, reflexivization occurs; on the second, the for x of the complement in obligatorily deleted Equi-NP Deletion, controlled by the Dative for x. On the top cycle, Dative Deletion obligatorily deletes the Dative for x and the topmost x is filled by the NP only John.

(b) Sentence (10), with the pronoun of laziness, is ambiguous, since the for him can either be (i) a Dative or (ii) part of the for-to complement. Structure (i) is schematically illustrated in (73).

- (73) [only John]  $\hat{x}$  ([John]  $\hat{y}$  (x believes that it would  
be inadvisable for y for y to vote for y))

Reflexivization and Equi occurs as before, but Dative Deletion does not, since the variables are different. When only John and John are filled in, pronominalization of laziness can apply. Structure (ii) for sentence (10) is illustrated in (74); whether this is a real possibility depends on whether inadvisable requires a Dative or not, on which I have no strong opinions.

- (74) [only John]  $\hat{x}$  ([John]  $\hat{y}$  (x believes that it would  
be inadvisable [for y to vote for y])).

Reflexivization occurs on the first cycle, but Equi cannot apply since there is no Dative, and nothing further happens until the NP's are filled in and pronominalization of laziness applies.

Thus even the Dative Deletion facts, where it originally seemed that deletion and pronominalization were in free variation,

support the claim that deletion of an NP under identity conditions is always an obligatory operation on variables. It would be tempting to leap to the conclusion that all transformational operations which require NP identity are defined on variables and obligatory, but pronouns of laziness constitute one clear exception, and the Super-Equi data with gerunds need further investigation before the generalization can even be made firm for all deletion rules.<sup>11</sup>

#### Footnotes

- (1) In the first few examples I use "referential index" subscripts in the manner of Postal and Grinder to indicate anaphoric relations between pronouns and their antecedents. Since the analysis I will propose will not make use of referential indices as a theoretical device, their use here should just be taken as a shorthand way of indicating what reading of a sentence I am talking about. In later examples I omit indices, and trust that it will be clear from the discussion which readings are relevant.
- (2) See Bennett (1972) for an extension of Montague's (1970) fragment in which only-phrases are analyzed syntactically and semantically as quantifier phrases.
- (3) In recent extensions of Montague (1970), I have offered an analysis of try as taking a verb phrase complement rather than a sentential complement, so that Equi-NP Deletion is not involved (Partee (1972)). I believe such an analysis to be appropriate for those verbs which require (in the usual treatment) the structural description of Equi-NP Deletion to be met, but since I don't believe the difference between the analyses affects the present discussion I am keeping the standard analysis here.

- (4) I believe this claim is also consistent with Jackendoff's treatment of complement subject interpretation, once his "table of coreference" is refined to show what coreference means between a pronoun and a quantifier phrase.
- (5) Of course it can be argued that whatever is good must be good for someone, or perhaps for everyone, and similarly for important, etc.; but it seems to me that such arguments are real ones that the language permits us to debate, and that it would be entirely inappropriate for a linguist to decide qua linguist that no moral judgements were absolute. Linguists who argued that good always has an underlying Dative would end up having to take stands on philosophical issues in formulating the deletion rules that would permit good to end up with no Dative on the surface: e.g. a "utilitarian linguist" might argue for "for the greatest number"-deletion.
- (6) Those who remain unconvinced by footnote 5 may posit some sort of free (i.e. uncontrolled) Dative deletion rule operating in (28'). Kimball suggests for someone-deletion, which seems semantically implausible in such a case. I know of no purely syntactic arguments on either side, and there may even be a further ambiguity in (28') between an underlying structure with no Dative and an underlying structure with some freely deletable Dative.
- (7) One problem in refining the domain of pronominalization of laziness is that it is not clear how Karttunen's example, (14) above, can be treated if reference or identity of scope is reintroduced as a factor.
- (8) I believe these matters are related to the notion of "quasi-indicator" developed by Castaneda (1966), (1967), (1968), but I have not explored the connections yet.
- (9) In sentences with would in the main clause, for me and for you seem to be deletable as well, though they are not

otherwise.

- (a) It's a sin to kill oneself.
- (b) \* It's a sin to kill myself.
- (c) It would be a sin to kill myself.

The would suggests an underlying if-clause, but since I do not understand what is going on here, I will simply avoid examples with would in them.

- (10) I'm inclined to doubt the possibility of for someone-deletion, partly because the pronoun for someone, either he or they depending on dialect, never shows up in the bare infinitives.
- (11) I am grateful to Emmon Bach for helpful discussion in the early stages of this paper; he is of course not responsible for any of its shortcomings.

#### References

- Bennett, Michael (1972). Accommodating the plural in Montague's fragment of English. In Rodman (1972).
- Castaneda, Hector-Neri (1966). 'He': a study in the logic of self-consciousness. Ratio 8, 130-157.
- (1967). Indicators and quasi-indicators. Am. Phil. Qtrly. 4, 85-100.
  - (1968). On the logic of attributions of self-knowledge to others. J. Phil. 65, 439-456.
- Geach, Peter T. (1968). Reference and Generality. Ithaca: Cornell Univ. Press.
- Grinder, John (1970). Super Equi-NP Deletion. In Papers from the Sixth Regional Meeting of the Chicago Linguistic Society, pp. 297-317. Chicago: Chicago Linguistic Society.

- Grinder, John (1971). A reply to 'Super Equi-NP Deletion as Dative Deletion'. In Papers from the Seventh Regional Meeting of the Chicago Linguistic Society, pp. 101-111. Chicago: Chicago Linguistic Society.
- Jackendoff, Ray S. (1972). Semantic Interpretation in Generative Grammar. Cambridge, Mass.: MIT Press.
- Karttunen, Lauri (1969). Pronouns and variables. In Papers from the Fifth Regional Meeting of the Chicago Linguistic Society, pp. 108-116. Chicago: Chicago Linguistic Society.
- Kimball, John P. (1971). Super Equi-NP Deletion as Dative Deletion. In Papers from the Seventh Regional Meeting of the Chicago Linguistic Society, pp. 142-148. Chicago: Chicago Linguistic Society.
- Lakoff, George (1970). Repartee, or a reply to "Negation, conjunction, and quantifiers." Foundations of Language 6, 389-422.
- Montague, Richard (1970). The proper treatment of quantification in ordinary English. Mimeographed, UCLA. (To appear in Hintikka, J. et al, eds. Approaches to Natural Languages, Dordrecht: D. Reidel).
- Parsons, Terence D. (1972). An Outline of a Semantics for English. Dittograph draft, Univ. of Mass.
- Partee, Barbara H. (1970). Opacity, coreference, and pronouns. Synthese 21, 359-385.
- (1972). Some transformational extensions of Montague grammar. In Rodman (1972).
- Postal, Paul M. (1970). On coreferential complement subject deletion. Linguistic Inquiry 1, 439-500.
- Rodman, Robert (ed.) (1972). Papers in Montague Grammar. Occasional Papers in Linguistics No. 2, UCLA.