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Reconstruction and Vehicle Change

0. Introduction*

In his 1977 dissertation, Robert May proposes that structural semantic relations such as scope be expressed at a level of representation called Logical Form (LF). This level is derived from S-structure by the rule QR (Quantifier Raising), which raises quantified NPs and adjoins them somewhere higher up. Whatever one may think of the attractiveness of this proposal from a conceptual point of view, it is hard to present decisive empirical evidence in its favor. In his book Logical Form (May 1985), May presents an analysis of Antecedent Contained Deletion (ACD) as evidence for the rule QR and the level of Logical Form that it derives. We will discuss this evidence, and argue that the proper analysis of ACD entails no such argument in support of LF.

1. Antecedent Contained Deletion (ACD): May's Analysis

An example of Antecedent Contained Deletion is given in (1):

(1) John [$_{VP1}$ kissed every girl Harry did [$_{VP2}$ e]]

The contents of the empty VP in (1) must be reconstructed from the rest of the sentence. (1) can only mean (2), not, for instance, (3):

(2) John kissed every girl Harry kissed
(3) John kissed every girl Harry saw

Therefore the contents of VP2 in (1) must be supplied by copying VP1 kissed every girl Harry did onto the position of the empty VP, just like in standard cases of VP-Deletion, as in (4).

(4) a. John [$_{VP1}$ kissed Mary], but Harry didn't [$_{VP2}$ e]]
b. John kissed Mary, but Harry didn't kiss Mary

This process is called reconstruction. After reconstruction (1) has the following form:

(5) John [$_{VP1}$ kissed every girl Harry [$_{VP2}$ kissed every girl Harry did [$_{VP2'}$ e]]]

In (5) we encounter another empty VP, VP2'. This is because in (1) the empty VP, VP2, is contained in the antecedent VP, VP1. Therefore it must be copied along. In order to get an interpretation for (5), we will have to perform another reconstruction. But this will yield another empty VP, and so on. Because the antecedent VP contains an empty VP, reconstruction will never give us a completely interpretable sentence: there will always be an empty VP left.

Clearly, this is an infinite regress, and applying reconstruction in this way will never give us the required interpretation for (1), which is (2), or:

(6) For every girl x such that Harry kissed x, John kissed x

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An infinite regress in a computer program is fatal. In natural language, an infinite regress gives rise to ungrammaticality, as in (7).

(7) *John [$_{VP1}$ wanted to [$_{VP2}$ e]]

But (1) is a grammatical sentence. Therefore, there must be something wrong with the way the empty VP is reconstructed in (5).

There is another reason why (5) cannot be the correct way of reconstructing the empty VP in (1): it violates the ban on vacuous quantification. As is well known, relative clauses are like Wh-clauses in that they contain a variable that is bound by an operator preceding the clause. Thus a sentence like John kissed every girl he saw must be represented as in (8):

(8) John kissed every girl OP$_i$ he saw t_i

An important principle of the grammar is the ban on vacuous quantification (Chomsky 1982):

(9) Ban on vacuous quantification
Every operator must bind a variable.

(1) contains an operator, but no variable.[1] So (1) should be excluded by the ban on vacuous quantification. But (1) is grammatical. One might suggest that the principle in (9) holds only after reconstruction has taken place. But if reconstruction in (1) yields (5), we still do not get the variable the operator needs:

(10) John kissed every girl OP Harry kissed every girl OP Harry did [e]

In fact, (10) contains two operators but still no suitable variable. So once again this way of reconstructing the empty VP in (1) cannot be correct. In brief, ACD constructions present us with two problems: the first is that of the infinite regress, the other that of vacuous quantification.

In his book Logical Form (1985), Robert May proposes a solution for these problems based on earlier work by Ivan Sag (Sag 1976). May crucially assumes that reconstruction takes place after Quantifier Raising, hence, at LF. ACD constructions are often (but not always, as we will see) characterized by the presence of a quantified NP. In (1) this NP is every girl Harry did, which must be raised by QR in the derivation of LF. This yields (11).

(11) [every girl OP Harry did [e]]$_i$ [John [kissed t_i]]

The trace in (11) is the trace of the quantified NP that has been raised by QR. Now copying the matrix VP in the position of the empty VP that is contained in the quantified NP yields a grammatical representation:

(12) [every girl OP$_i$ Harry kissed t_i]$_i$ [John [kissed t_i]]

The trace of QR that is copied as a part of the matrix VP is now interpreted as the variable which the operator needs to bind. (12) expresses the correct interpretation for (1), cf. (2) and (6). Also, the process of reconstructing stops after one application, so there is no infinite regress. Finally, the operator in the front of the relative clause binds a variable, so that the principle banning vacuous quantification is obeyed.

May's analysis thus solves the two problems raised by ACD constructions: both the infinite regress and the vacuous quantification are lifted by the application of QR prior to reconstruction. Observe that it is crucial for May's analysis of ACD therefore that reconstruction takes place after QR. The way QR provides a solution for the problems that constructions like (1)

pose is considered to provide a strong empirical argument for the existence of QR, and hence for the level of LF that it derives.

2. Problems

There are two problems with May's (1985) analysis of ACD constructions. First, May predicts that ACD is grammatical in all and only those cases in which the VP contains an element that undergoes QR. But this is not the case, as we will show in 2.1 below. Secondly, there are cases of ACD in which the operator introducing the relative clause binds a variable that is outside the VP, i.e. not in the object position but in the subject position. Applying QR to the quantified object yields a second variable, and copying this variable (the QR trace) under reconstruction would give two variables against only one operator. This is the topic of section 2.2.

2.1. The QR-ACD Correlation

2.1.1. QR without ACD

Carlson (1977) shows that ACD is grammatical with only a subclass of the elements that undergo QR. NPs featuring determiners that introduce what he calls Amount Relatives, such as the, all, every, give perfect ACD constructions, whereas those featuring determiners that introduce ordinary restrictive relative clauses, such as a, some, two, do not seem to allow ACD. Consider the minimal pair in (13).

(13) a. John kissed the two girls he could
b. *John kissed two girls he could

The NP two girls in (13b) undergoes QR just like the NP the two girls in (13a). This can be seen from the scope ambiguities that a sentence like everyone kissed two girls reveals. Thus May's analysis of ACD predicts that the infinite regress can be avoided in (13b) by consecutively applying QR and reconstruction. Yet ACD seems to be impossible in this case.

While admitting that (13b) is unacceptable, we do not believe that this must be attributed to an infinite regress. There are two reasons for this. First, (13b) can be salvaged by making minor adjustments, as in (14). Second, in Dutch, more or less the same paradigm occurs, as (15) and (16) show. But Dutch does not have VP-Deletion, nor ACD. Consequently, the pattern in (13) cannot be explained by appealing to an infinite regress under reconstruction of the empty VP in order to rule out (13b).

(14) a. ?John kissed two girls he could not
b. ?John kissed two girls he never had before
(15) a. Jan kuste de twee meisjes die hij kon kussen
Jan kissed the two girls who he could kiss
b. ??Jan kuste twee meisjes die hij kon kussen
Jan kissed two girls who he could kiss
(16) a. ?Jan kuste twee meisjes die hij niet kon kussen
Jan kissed two girls who he not could kiss
b. Jan kuste twee meisjes die hij nog nooit had gekust
Jan kissed two girls who he yet never had kissed

We conclude that no infinite regress occurs in (13b), and that its deviant status is due to something else, the same factor that must account for he pattern in (15). Thus, the fact that May's analysis does not predict the unacceptability of (13b) does not necessarily pose a problem for this analysis.

2.1.2 ACD without QR

Proper names do not undergo QR. May therefore correctly predicts that (17) is ungrammatical.

(17) *Dulles suspected Philby, who Angleton did [e]

In (17), no QR takes place. Reconstruction therefore yields an infinite regress, just like in (5):

(18) Dulles [$_{VP1}$ suspected Philby, who Angleton [$_{VP2}$ suspected Philby, who Angleton did [$_{VP2'}$ e]]]

However, May's analysis does not account for the fact that minor adjustments make (17) more or less acceptable.

(19) a. ?Dulles suspected Philby, who Angleton did not
b. ?Dulles suspected Philby, who Angleton did as well

The sentences in (19) may not be perfect, but they are much better than would be expected if an infinite regress were involved.

May does consider ACD configurations involving non-quantified NPs of the type in (20).

(20) Dulles suspected Philby, who didn't really want him to [e]

According to May, non-restrictive relative clauses are not contained in the matrix VP. Hence, under reconstruction only suspected Philby is copied, yielding the LF representation in (21).

(21) Dulles suspected Philby, who didn't really want him to suspect Philby[2]

In (21), the empty VP inside the non-restrictive relative clause is not copied along with the matrix VP suspected Philby, so no infinite regress occurs.

If (17) is reconstructed along the same lines, (22) results:

(22) Dulles suspected Philby, who Angleton did suspect Philby

According to May, there is no variable for the operator to bind in (22), so the ungrammaticality of (17) is due to vacuous quantification (cf. (9)). By contrast, in (20) there is no violation of the ban on vacuous quantification as the operator binds the variable in subject position. But if that is correct, then why do the minor alterations in (19) constitute such an improvement? The sentences in (19) are, again, not perfect, but surely far too good to involve vacuous quantification.

May now faces the following problem. Either he assumes that (17) is ungrammatical because an infinite regress occurs. Or he adopts a non-standard analysis of non-restrictive relative clauses, and assumes that (17) is out because it features vacuous quantification. In both cases he has no way to account for the fact that minor improvements make the sentence so much better, as in (19).

2.2 An Unbound Variable Introduced at LF

Another problem for May's analysis of ACD is presented by the following sentences.[3]

(23) a. John kissed every girl who t wanted him to [e]
b. John kissed every girl who Harry wanted him to [e]

(23b) resembles (1) in all relevant respects. QR and reconstruction yield the following representation, in which the operator introducing the relative clause binds the copied QR-trace.

(24) [every girl who$_i$ Harry wanted him to kiss t_i]$_i$ [John kissed t_i]

But in (23a) things go wrong. In (23a), the operator binds a variable outside VP already at S-structure. Copying the QR-trace under Reconstruction introduces yet another variable, which is one too many.

(25) [every girl who$_i$ t_i wanted him to kiss t_i]$_i$ [John kissed t_i]

Two variables depending on one operator is not ungrammatical by definition. But it is when one variable c-commands the other (illicit movement). Compare (26), a standard parasitic gap-construction, with (27), an illicit movement case.

(26) [Which papers]$_i$ did you file t_i without reading e_i
(27) *Who$_i$ t_i wanted him to kiss t_i

(27) is an exact copy of the Quantified NP in (25). So the question is, why is (25) not excluded on the same grounds as (27)?[4]

Consequently, May's mechanism of QR followed by reconstruction introduces a variable at LF which remains unbound in a case like (23a). Yet (23a) is a grammatical sentence.

3. Vehicle Change

In a recent paper, Fiengo & May (1990) present a solution for this problem. They claim that reconstruction does not always have to imply exact copying. To be precise, they propose that variables or R-expressions may be copied in the form of their pronominal correlate, i.e. as a pronoun. This phenomenon they call Vehicle Change (henceforth VC).

3.1 Vehicle Change into a pronominal correlate

The problem in (23a) was that, by May's (1985) mechanism of QR followed by reconstruction, a variable (the trace of QR in the matrix VP) is introduced at LF that cannot be bound by an operator. Fiengo & May (1990) propose the following solution for this problem. Variables are defined as [-pronominal, -anaphoric] empty categories. Suppose that under reconstruction the value of the 'pronominal' feature may be changed, according to a rule informally stated in (28).

(28) [-pronominal] → [+pronominal]

This would have the effect that in (23a) the QR-trace need not be copied as a variable (a [-pronominal,-anaphoric] empty category), but may be copied as an element with the feature make-up [+pronominal,-anaphoric]. There is only one such element in English, viz. the lexical pronoun. As a result, QR and reconstruction in the case of (23a) does not necessarily yield (25), with an unbound variable. There is another possibility, (29).

(29) [every girl who$_i$ t_i wanted him to kiss her]$_i$ [John kissed t_i]

In (29), the variable is copied as a pronoun, her. Nothing is wrong with the representation in (29).

This non-literal copying under reconstruction Fiengo & May (1990) call Vehicle Change. Vehicle Change looks like a cheap trick, but in the next section we will present evidence demonstrating that VC is needed indepen-

dently (part of this evidence is taken from Fiengo & May (1990)). Moreover, we will show that VC is in principle an unlimited phenomenon, not restricted by a rule like (28). In particular, we will argue that VC can introduce variables as well as pronominals.

3.2 Evidence for Vehicle Change

It has been known for a long time that reconstruction in the case of VP-Deletion does not always consist in making a literal copy of the antecedent VP. Bouton (1970) notes the following phenomenon.

(30) Cheryl stops to look at every pretty flower she stumbles onto, and I do [e], too.

(30), a case of VP-Deletion, has two readings, but the most natural reading is the one in which the antecedent VP is not copied literally:

(31) Cheryl stops to look at every pretty flower she stumbles onto, and I stop to look at every pretty flower I stumble onto, too

In (31), she has been copied as I. We witness the same phenomenon in the sloppy interpretation of a deleted VP in sentences like:

(32) a. John loves his mother, but I don't [e] (sc. love my mother)
b. I turned in my assignment, but most of the other students didn't [e] (sc. turn in their assignment)

Sag (1976) notes that reconstruction is generally indifferent to inflectional information, as in (33).[5]

(33) John kissed Mary yesterday, but Harry probably will [e] tomorrow (sc. kiss Mary)

The examples (30), (32), and (33) show that reconstruction is not the same thing as 'making a literal copy' of an antecedent. VC is just another instance of this non-literal copying. It differs from the other instances we have encountered in that it involves the feature make-up of NPs.

Fiengo & May (1990) show that there is independent evidence from binding phenomena that VC does take place. Consider (34).

(34) Mary loves $John_i$, and he_i thinks that Sally does [e] too

Reconstruction without VC would result in a Principle C violation:

(35) Mary loves $John_i$, and he_i thinks that Sally loves $John_i$ too

Yet (34) is a grammatical sentence. This can be accounted for if John is copied as a pronoun:

(36) Mary loves $John_i$, and he_i thinks that Sally loves him_i too

The VC that saves (34) can still be captured by rule (28), describing the change into pronominal NPs.

However, it seems to be an interesting hypothesis to consider VC under reconstruction as an in principle unlimited phenomenon, triggered by the environment surrounding the empty VP. The restrictions on VC that do exist will then have to be explained by independent factors. (For example, it seems impossible to introduce an R-expression under reconstruction, presumably because an R-expression automatically brings along an index of its own, which is at variance with the anaphoric character of the deleted VP. See also note 5.)

Interestingly, there seems to be evidence that VC may introduce variables under reconstruction. For this, consider the sentences in (37).

(37) a. John kissed Mary, but I wonder who Harry did [e] (sc. kiss t)
b. John loves himself, but I wonder who Harry does [e] (sc. love t)
c. John was killed by Mary, but I wonder who Sally did [e] (sc. kill t)

In (37a), an R-expression is changed into a variable, in (37b), an anaphor is so changed, and in (37c), an NP-trace is. In all these cases vacuous quantification would arise if no VC were to take place.

One might object that the constructions in (37) are instances of Pseudogapping. In that case, not a VP but a V would have been deleted, as in (38), a standard case of Pseudogapping.[6]

(38) John kissed Mary, before Harry did [e] Sally (sc. kiss)

If the sentences in (37) are cases of Pseudogapping, then the variable is not introduced by VC, but by ordinary Wh-Movement crossing an empty V.

However, it is not likely that (37) involves Pseudogapping instead of VP-Deletion. This can be seen from the behavior of verbs taking prepositional objects. In Pseudogapping constructions, the preposition is obligatorily present (39), just as in Gapping constructions (40):[7]

(39) John talked about Mary, before Harry did [e] *(about) Sally
(40) John talked about Mary, and Harry [e] *(about) Sally

But in constructions of the type in (37), the preposition must be absent (41), just as in VP-Deletion and ACD constructions (42):

(41) John talked about Mary, but I wonder who Harry did [e] (*about) t
(42) a. John talked about Mary, but Harry didn't [e] (*about)
b. John talked about every girl Harry did [e] (*about)

This suggests that in (37) not a V, but a complete VP has been deleted. We therefore conclude that these sentences are characterized by VP-Deletion, and that the variable is introduced under reconstruction as an instance of Vehicle Change.

In conlusion, the trick Fiengo & May (1990) apply in order to save (23a) seems well motivated. Moreover, we must conclude that the rule (28) accounting for Vehicle Change is too limited, and that the preferable hypothesis is, that Vehicle Change is in principle unlimited. Further study will have to reveal its boundaries. In the final section, we wish to examine some consequences of the observation that Vehicle Change must be allowed to introduce variables under reconstruction.

4. ACD revisited

If vehicle change can produce variables under reconstruction, this potentially casts new light on the analysis of Antecedent Contained Deletion. We repeat sentence (1).

(1) John [$_{VP1}$ kissed every girl Harry did [$_{VP2}$ e]]

In (1), the problem was that copying the antecedent VP literally onto the position of the empty VP would yield an infinite regress, as well as vacuous quantification. But now we know that under reconstruction copying

literally is not always mandatory. If the circumstances so require, for instance when vacuous quantification looms, an NP can be copied in a different feature make-up, for instance as a variable. Applying this in the case of (1) after QR will give us (12) again.

(12) [every girl OP_i Harry kissed t_i]$_i$ [John [kissed t_i]]

In (12), no VC has to apply because the QR-trace that is copied under reconstruction provides the variable the operator needs to bind, as explained in section 1. But the necessity to postpone reconstruction until after QR disappears because of the possibility of VC. Reconstruction before QR would not necessarily result in the vicious representation (5), for there is another possibility, involving VC, viz. (43).

(5) John [$_{VP1}$ kissed every girl Harry [$_{VP2}$ kissed every girl Harry did [$_{VP2'}$ e]]]

(43) John [$_{VP1}$ kissed every girl OP_i Harry [$_{VP2}$ kissed t_i]]

In (43), the NP every girl Harry did is not copied literally, but as a variable. (43) gives exactly the required interpretation for (1), cf. (2). There is no empty VP left, so no infinite regress occurs. Also, there is no vacuous quantification (every operator binds a variable) and all variables are bound by an operator. Because this other possibility is available, it is no longer a necessity for reconstruction to take place after QR has applied.

Consider also the sentences in (23), here repeated.

(23) a. John kissed every girl who t wanted him to [e]
b. John kissed every girl who Harry wanted him to [e]

In situ reconstruction, involving VC, will yield (44) in the case of (23a), and (45) in the case of (23b). In the first case, VC introduces a pronoun instead of an NP (the NP every girl who wanted him to), and in the second case, a variable.

(44) John kissed every girl who t wanted him to kiss her
(45) John kissed every girl who Harry wanted him to kiss t

In (44), a pronoun is introduced, because otherwise the sentence would have been ruled out as a case of illicit movement. In the second case, VC is triggered by the ban on vacuous quantification.

Finally, VC introducing variables can solve the remaining problem from section 2.1.2. This is the question why the sentences in (19) are not so bad as they should be if an infinite regress or vacuous quantification were involved.

(19) a. ?Dulles suspected Philby, who Angleton did not
b. ?Dulles suspected Philby, who Angleton did as well

The answer is that both the infinite regress and vacuous quantification can be avoided by reconstructing a variable instead of Philby, who Angleton did not/as well or Philby. This VC takes place because the operator needs a variable.[8] Note also that this analysis does not rest on the assumption that non-restrictives are not contained in the VP.

5. Conclusion

In this article we have shown that the mechanism of Vehicle Change that Fiengo & May (1990) introduce is well motivated. In addition, we have demonstrated that Vehicle Change has an even wider scope than they assume.

To be specific, it appears to be generally possible to reconstruct a variable instead of another kind of NP, in order to avoid vacuous quantification. This possibility of introducing a variable under reconstruction presents an alternative to May's (1985) analysis of Antecedent Contained Deletion. In this alternative, reconstruction is no longer dependent on Quantifier Raising. The analysis we presented has an empirical advantage over May's, since it accounts for ACD-like phenomena in non-restrictive relative clauses. As a result, we feel that the proper analysis of ACD entails no argument for QR and the level of LF that QR derives.

Notes

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1. Haïk (1987) assumes that the empty VP in (1) is actually the variable that the Operator binds in order to satisfy (9). We will not discuss this proposal here.

2. In this LF-representation, Philby violates Principle C of the Binding Theory. As explained in section 3, it is assumed that Philby is reconstructed as a pronominal in order to avoid the Principle C-violation.

3. The pronoun him and the matrix subject in (23a) must corefer. An explanation for this phenomenon falls outside the scope of this paper. See Haïk (1987), De Vries (in prep.).

4. There is also another reason why (25) cannot be considered as a parasitic gap configuration. Parasitic gaps are sensitive to wh-islands, and ACD constructions of the type in (25) are not:

   (i) *Which papers did you file t without wondering why Harry read e
   (ii) John kissed every girl who t wondered why Harry did [e]

5. Sag (1976:17) also notes that reconstruction is in general not indifferent to voice. Thus, (i) is considered ungrammatical.

   (i) *Paul denied the charge, but the charge wasn't [e] (sc. denied) by his friends.

   However, in a footnote to this observation, Sag (1976:75) admits that one can come across examples of VP-Deletion ignoring the difference between active and passive, such as in (ii).

   (ii) A: Someone mugged Tom yesterday.
   B: The same thing happened to Mary.
   A: Come to think of it, Sandy was [e], too (sc. mugged t)

   In (ii), literal reconstruction cannot take place without violating the Case Filter and the Theta-Criterion. This seems to be one more

instance of Vehicle Change. We don't know why in general Vehicle Change into an NP-trace seems less acceptable.

6. There are also substandard cases of Pseudogapping, as studied in Levin (1979). In these constructions, no constituency is required for the gapped element, as in

   (i) Sometimes you can get to know each other better in one night than [e] two weeks (sc. you can get to know each other in)

   These cases have a different status than standard Pseudogapping cases and ACD cases, and cannot substantiate the claim that the sentences in (37) are in fact cases of Pseudogapping.

7. (39) without the preposition is marginally acceptable as a substandard case of Pseudogapping, see note 6. It is noteably worse than (41) and the ACD case (42b) without the preposition.

8. The question then of course rises, what explains the ungrammaticality of (18), repeated as (i). If variables can be introduced by VC, vacuous quantification cannot account for this fact. We believe that the oddness of (i) has nothing to do with vacuous quantification, as corresponding cases without VP-Deletion, both in English (iia) and in Dutch (iib), are also strange. In Dutch, no VP-Deletion occurs, so the variable must still be present.

   (i) *Dulles suspected Philby, who Angleton did
   (ii) a. *Dulles suspected Philby, who Angleton suspected
   b. *Dulles verdacht Philby, die Angleton verdacht
   Dulles suspected Philby who(DO) Angleton suspected

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