

## ON VP DELETION

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In this paper two theories that account for (1) will be discussed:

(1) John should leave the room and Peter should too.

The first theory, developed by Sag (1980), is one of the most complete theories of VP Deletion, and was put forward as an alternative to previous theories of VPD which worked only on syntactic grounds. These theories would, for example, propose the following rule in (2):

(2) VPD (Optional): X - VP - Y - VP - Z  
                          1    2    3    4    5  
                          1    2    3    Ø   5   if 2 = 4

This rule would apply in (3) to yield (1):

(3)  $_{IP}[_{IP}[\text{John } I'[\text{should } _{VP}[\text{leave ...}]]]]$  and  $_{IP}[\text{Peter } I'[\text{should } _{VP}[\text{leave...}]]]$   
          too]

Unlike these purely syntactic theories of VPD, Sag's theory tries to account also for the semantics of sentences such as (1). It will be shown, however, that Sag's theory fails to account for some cases of VPD, namely, those which seem to be pragmatically controlled. Accordingly, another approach will be suggested which draws on the work done by Ruth Kempson (1989) and Sperber and Wilson (1986). It will be claimed that there is no need for a rule of VP Deletion, and that the underspecified IP in (1) is interpreted pragmatically.

1. In this first section Sag's (1980) theory of VP Deletion will be dealt with. Sag claimed that purely syntactic theories of VPD failed to account for the following:

- (4) Someone hit everyone and then Bill hit everyone.
- (5) Sandy greeted everyone when Betsy did.
- (6) We finally got in touch with John, who my brother tried to visit...
  - a. ... but couldn't.
  - \* b. ... but who he couldn't.

The left conjunct in (4) is ambiguous between a reading in which there was one person who hit everyone else, and one in which everyone was hit by someone, although not necessarily by the same person. Sag argues that it is only when (4) has the first interpretation that deletion can occur, and that syntactic theories would wrongly predict that deletion is possible also where the first conjunct has the second interpretation.

As regards (5), syntactic theories would predict that it was derived from (5a)

(5a) Sandy greeted everyone when Betsy greeted everyone.

which would be appropriate in a context where only after Betsy had greeted everyone would Sandy greet them. Sag agrees that (5) has that interpretation, but he claims that (5) also shares the interpretation of (5b)

(5b) Sandy greeted everyone when Betsy greeted them.

which would be uttered in a context where Sandy greeted each one that Betsy was greeting but always after Betsy had done it. Syntactic theories, however, would disallow deletion in (5b).

Finally, Sag argues that syntactic theories cannot rule (6b) out.

Sag proposes a new theory that accounts for all cases of deletion including the problematic (4) to (6). Sag is chiefly concerned with the recoverability of VPD. He assumes that deletion rules, which apply to convert what he calls shallow structures into S-structures, are defined on syntactic objects, e.g. VPs, but are subject to a general recoverability condition that concerns the representation of those syntactic objects at the level of logical form. By applying some rules of semantic interpretation on the shallow structures he gets to the logical form, where we have lambda expressions of the following kind:

- (7) a. Peter likes Betsy and Sandy likes Betsy.  
 b. Peter,  $\lambda x$  ( $x$  likes Betsy) and Sandy,  $\lambda y$  ( $y$  likes Betsy).

where we have two lambda expressions, which are alphabetic variants because they differ only in the variables and these are bound in the same way within the lambda expressions.

VP Deletion can, then, apply on a VP whose representation in logical form is a lambda expression that is an alphabetic variant of another expression in the same S or in another S in discourse. For example, VPD would apply on (7) because its logical form has two lambda expressions,  $\lambda x$  and  $\lambda y$ , and they are alphabetic variants.

Let us now see how this theory accounts for the problematic cases in (4)-(6). The two interpretations of the first conjunct in (4) correspond to two different representations at the level of logical form:

- (4a)  $(\exists x) (x, \lambda y ((\forall z) (y \text{ hit } z)))$  and then Bill,  $\lambda w ((\forall u) (w \text{ hit } u))$   
 (4b)  $(\forall z) (\exists x) (x, \lambda v (v \text{ hit } z))$  and then Bill,  $\lambda w ((\forall u) (w \text{ hit } u))$

In (4a),  $\lambda y$  and  $\lambda w$  are alphabetic variants and therefore deletion is possible. In (4b),  $\lambda v$  and  $\lambda w$  are not alphabetic variants and therefore deletion is impossible.

We have also seen that (5) had two interpretations and that it could have two source sentences, namely (5a) and (5b). If this is so, both of them should have logical representations including lambda expressions which are alphabetic variants. (5a) would be logically represented as in (5c) and (5b) as in (5d):

- (5c) Sandy,  $\lambda x ((\forall y) (x \text{ greeted } y))$  when Betsy,  $\lambda z ((\forall w) (z \text{ greeted } w))$   
 (5d)  $(\forall x) ((\text{Sandy}, \lambda y (y \text{ greeted } x)) \text{ when Betsy}, \lambda w (w \text{ greeted } x))$

$\lambda x$  and  $\lambda z$  in (5c) are alphabetic variants and therefore the second VP can be deleted. Similarly,  $\lambda y$  and  $\lambda w$  in (5d) are also alphabetic variants and are thus deletable. In this way, Sag's theory can, unlike purely syntactic theories, account for the two interpretations attributed to (5) above.

Let us turn now to example number (6). Sag should account for the grammaticality of (6a) and the ungrammaticality of (6b). (6a) is logically represented as in (6c):

- (6c)... (*who*  $x$ ) ((my brother,  $\lambda y (y \text{ tried } (y, \lambda z (z \text{ visit } x))))$ ) but Not  
 Could (my brother,  $\lambda w (w \text{ visit } x))$ )

where  $\lambda z$  and  $\lambda w$  are alphabetic variants because they differ only in the variables and these are either bound identically within the lambda expression or bound by the same operator outside. Deletion is, therefore, allowed.

(6b) is logically represented as in (6d):

- (6d)... (*who*  $x$ ) (my brother,  $\lambda y (y \text{ tried } (y, \lambda z (z \text{ visit } x))))$ ) but (*who*  
 $v$ ) Not Could (my brother,  $\lambda r (r \text{ visit } v))$ )

where  $\lambda z$  and  $\lambda r$  are not alphabetic variants because  $x$  and  $v$  are bound outside the lambda expression by two different operators. Therefore deletion is disallowed and (6b) is judged ungrammatical.

To sum up, Sag claims that VP Deletion is a rule that applies to delete syntactic VPs whenever these are recoverable at the level of logical form as lambda expressions which are alphabetic variants of another expression.

Continuing with this idea, Sag distinguishes two types of anaphoric relationships: those which can be pragmatically controlled and those which can only be grammatically controlled. Obviously, for his VPD theory to be valid he must include VPD under the second type, because as he says «non-linguistic entities have no representation at the level of logical form» (Sag 1980:329) and his theory is based on representations at that level.

However, we can find counterexamples to the claim that VPD cannot be pragmatically controlled. Consider (8)-(10):

- (8) (Mother to child who is about to put his fingers into a socket)!  
Don't!
- (9) (Peter and Anouk are walking in the street. It is raining very hard but they have not opened their umbrellas yet. They see a man opening his umbrella in front of them and Peter says): I think we should too.
- (10) (A high jumper is trying to beat his own record by jumping over a bar at 3 metres high. An observer says to another): I'm sure he won't be able to.

It seems that the deletion of the VPs in (8) to (10) has been pragmatically controlled. Sag's theory clearly fails to account for these cases of VP Deletion. In the next section a non-deletion approach will be proposed which accounts for all the examples accounted for by Sag, and for those cases for which Sag has no explanation, namely, (8) to (10).

2. In this section I claim that, first, the examples we have been looking at are not derived through VP Deletion, but that the D/S-structure of (1), for example, would be (11), where no VP is deleted because none has been generated in the first place.

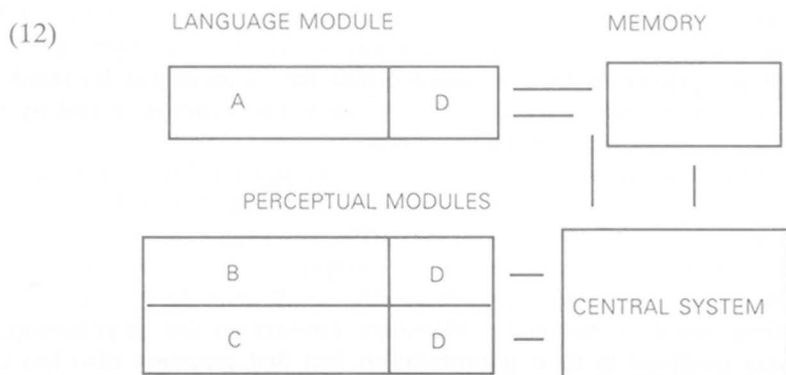
- (11)  $IP_{IP}$ [John I'[should  $VP$ [leave...]]] and  $IP$ [Peter I'[should]] too]

Secondly, I claim that the interpretation of the second IP involves the same kind of process that is involved in the interpretation of pronominals, DO SO anaphor, DO IT anaphor, Proadjectival SO etc... Thirdly, this interpretation is claimed to be dependent on the context and to involve psychological processes constrained by relevance and grammar. The principle of relevance and the type of psychological process referred to are not exclusively constructed for the interpretation of these Proforms, but are essential mechanisms of a general system of communication and comprehension; they are, in short, cognitive mechanisms (Sperber and Wilson 1986).

I am assuming a modular cognitive system of the type represented in (12), where the Language Module and the Perceptual Modules are input systems (Fodor 1983). Each of them receive information in specialized formats A, B or C. In these modules these specialized formats are converted into the neutral format D, so that information from different modules can then be used by the central system where all information is integrated. Inferential processes occupy a central part in this system.

Let us see what happens in the Language Module: it receives linguistic input and the syntactic parser located in the module assigns it a syntactic structure, both D/S-structure. In order for the central processes to operate

with this information, however, it must be in logical form and in order for it to become part of one's representation of the world, that is, part of the encyclopaedic knowledge, it must represent a full proposition, in the sense that it must be possible to assign some kind of truth value to it. This propositional logical form constitutes D.



What I want to claim following Kempson (1989) is that information derived from sentence grammar and from the parser will very often fail to yield fully propositional logical forms, in other words, in the process of converting A into D, inferential processes which draw information from the Memory Module as well as from other Perceptual Modules are essential.

Consider the following sentence:

(13) Peter asked John to kiss *him*.

If (13) is received by our Language Module, the syntactic parser will assign it a structure without problems. Grammatical Binding Condition B (that a pronominal should be free in its governing category) will deny John as a possible antecedent for *him*. But this grammatical information will still be insufficient for us to decide on the referent of *him*, and this decision is necessary for the logical form to be fully propositional. Pragmatic interpretation which assigns reference to the underlined pronoun is absolutely necessary to enrich the information that comes from sentence grammar.

The inferential processes involved in this pragmatic interpretation will engage the context, where by context we understand different sets of assumptions from such diverse sources as short term memory, long term memory or perception. It is important to understand that with this con-

ception of «context» a piece of linguistic input which has just been processed and which can now be either stored in memory or temporarily kept in the central system, automatically becomes part of the context for succeeding linguistic input. In short, the linguistic context, the situational context and the encyclopaedic knowledge are involved in inferential processes of interpretation.

An important question may then be raised: Can we ever reach an interpretation if so much context has to be considered? Relevance theory provides us with an answer: only the most accessible assumptions at the moment of uttering X constitute the context for X, and in the light of it only relevant interpretations are considered, where the extent to which something is relevant is measured by the effort required to process it and by the contextual effects yielded by its processing.

Having said this, *him* in (13) will be assigned a value by a psychological process which selects the most relevant interpretation from what is immediately accessible without violating Binding Condition B.

This can easily be extended to the interpretation of underspecified I's which have up to now been regarded as the result of VPD. Notice that it is not being claimed that only relevance constrains the psychological processes involved in their interpretation, but that grammar also has this constraining role. So that in the same way as Binding Condition B has been considered to be a constraining grammatical rule for the inferential processes selecting reference for Pronominals, we should also accept the existence of grammatical rules which will constrain the pragmatic interpretation of underspecified I's.

One such rule should capture what Deletion theories have called the Backward Anaphora Constraint (Wasow 1979, Sag 1980). This rule could be restated as follows: when the pragmatic enrichment of an I' appeals to linguistic context, if the head of the I' is the head of the main IP, only the preceding linguistic context can help specify it. If the head of the I' is not the head of the main IP, then both preceding and succeeding linguistic contexts can include a possible referent for it. Let us see how this grammatical rule can constrain the interpretation of utterances such as:

(14) John did after Mary left the party.

(15) After Mary left the party, John did.

(16) Susan joined the party and then, as soon as Mary did, John left.

The rule will deny the underlined I' in (14) as a possible referent for *did*, because *did* is the head of the main IP and therefore the succeeding linguistic context cannot be considered. Thus the inferential processes involved in the interpretation of the underdetermined I' will have to appeal to previous linguistic contexts, if any, to the situational context or to the encyclopaedic knowledge.

In (15), where again *did* is the head of the main IP, the preceding linguistic context can be considered without violating the rule, so that if it happens to be sufficiently relevant, (15) could be interpreted as (15a):

(15a) After Mary left the party, John left the party.

In (16), where the head of the underspecified I' is not the head of the main IP, inferential processes can freely take either preceding or succeeding linguistic contexts into account so that there are at least two possible readings in a situationally neutral context:

(16a) Susan joined the party and then, as soon as Mary joined the party, John left.

(16b) Susan joined the party and then, as soon as Mary left the party, John left.

Interpretation of (16) then will have to involve the situational context or the encyclopaedic knowledge, and will eventually be constrained by the principle of Relevance.

A second rule that seems to constrain the interpretation of underdetermined I's, and which I will call the Specifier Constraint, reads as follows (cf. Wasow 1979): no part of the specifier of an I' can be the linguistic antecedent of that I'.

(17)<sub>IP</sub>[<sub>SPEC</sub>[the fact that John [surprised me]]] I'<sub>I</sub>[[did]]

Because of the Specifier rule, (17) cannot be interpreted as (17a):

(17a) The fact that John surprised me surprised me.

However, if we have (18) the same utterance can be interpreted as in (17a) because of the additional linguistic context:

(18)A: What surprised you?

B: The fact that John surprised me did.

To sum up, it has been claimed (i) that the second conjunct in (1) is not the result of deletion, but that it has been generated as such, and (ii) that the interpretation of this type of underspecified I's involves psychological processes which are constrained by the principle of relevance, on the one hand, and by grammar on the other. Finally two constraining grammatical rules have briefly been defined.

This approach should account for the problems that Sag solved with his theory, i.e. it should account for (4)-(6). And it should also account for those cases which could not be accounted for by his theory, namely, examples such as (8)-(10).

In the approach presented in this paper, (4) is not regarded as the source sentence for (4c), but (4c) is generated as such in D-structure, as is shown in (4d):

(4c) Someone hit everyone and then Bill did.

(4d)  ${}_{IP}[_{IP}[\text{someone } {}_{I'}[_{I'}[3sgpast] \text{ }_{VP}[\text{hit everyone}]]]]$  and then  ${}_{IP}[\text{Bill } {}_{I'}[_{I'}[3sgpast]]]$

In the first conjunct, *someone* is ambiguous as Sag says. The process of disambiguation will be entirely dependent on the context and will be constrained by relevance. As for the second conjunct, the underdetermined  $I'$  will also have to be specified through inferential processes. The preceding linguistic context will probably be accessed because of its immediacy, and in the light of it, the IP will be interpreted as «Bill hit everyone», unless there exists a situational context or an earlier linguistic context which happens to be strong enough as to invalidate that interpretation and point at another. In any case, the interpretation arrived at will be that which requires the least effort to process and that which yields the largest number of contextual effects.

Let us look at (5) now, (5) can, as Sag says, be interpreted as (5a) and (5b), but if our approach is right, this does not mean that (5) must be derived from any of them. On the contrary, (5) can be generated directly in D-structure, and its interpretation will depend entirely on the context, linguistic or situational. Suppose for example, that we all know that Sandy and Betsy came into the house and that each said: «Hello, everybody», but that we are arguing about who did first. If in this context one of us says (5), «when Betsy did» will be interpreted as «when Betsy greeted everyone». But if we all know that they started to greet each person in the house one by one, and what we cannot remember is whether Sandy or Betsy went first, «when Betsy did» will be interpreted as «when Betsy greeted them».

As regards (6), I will claim that (6b) can be ruled out on syntactic grounds if our non deletion approach is accepted. Let us compare the S-structure for (6a) and (6b) in (19) and (20) respectively.

(19)  ${}_{CP}[\text{who } {}_{IP}[\text{my brother } {}_{I'}[_{I'}[\text{tried to visit } t] \text{ but } {}_{I'}[\text{could not}]]]]]$

(20)  ${}_{CP}[\text{who } {}_{IP}[\text{my brother } {}_{IP}[\text{tried to visit } t] \text{ but } {}_{CP}[\text{who, } {}_{IP}[\text{he } I'[\text{could not}]]]]]]]$

In (19) we see that *who* is generated as a complement of the verb *visit* in the first  $I'$ , and that it is then moved to the complementizer position in S-structure. The second  $I'$ , the underdetermined one, is generated without verbal complements but is then enriched inferentially as in all the examples we have seen so far. (6b) can be ruled out, because we see in (20) that the second *who* is in complementizer position and yet, no VP has been generated out of which it can have moved. The sentence is, thus, ungrammatical.



This shows that the non-deletion approach can account, at least as well as Sag's, for (4)-(6), (8), (9) and (10), as we have already seen, cannot have been derived transformationally through VPD because there is not any identical material in the preceding discourse which is necessary for the rule to apply. They constitute, therefore, clear evidence for the approach presented here.

In (8), the child decodes *don't!* as a negative command. This linguistic information, combined with his own knowledge of the state of affairs and with the situational context allows him to infer that his mother means «don't put your fingers into the socket» rather than, for example, «don't watch TV». The interpretation the child will arrive at will be the easiest to process and that which produces some effect in the child's representation of the state of affairs.

In (9) Anouk will follow the same kind of inferential process to interpret Peter's utterance as «we should open our umbrellas». This interpretation will be inferred from the linguistic information, from perceptual information (i.e. it is raining, a man has opened his umbrella in front of them...) and from the assumption of optimal relevance that is inherent to all acts of ostensive communication, i.e. the utterance.

In (10) the hearer will interpret the utterance as «I'm sure he won't be able to jump over the bar». The hearer will infer this interpretation by combining the linguistic information in (10), perceptual information (their seeing the athlete training for the jump) and the encyclopaedic knowledge (knowing perhaps about the athlete's capabilities).

To conclude, in this paper a non-deletion approach has been proposed which accounts for all cases explained by VPD theories and for those they could not explain. This proposal should be understood in the framework of Fodor's Modularity and Sperber and Wilson's Relevance Theory.

## References

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