

THE USE OF EMPTY CATEGORIES IN SYNTAX

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Topics in Syntax II

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May 2000

INTRODUCTION.

Empty categories, both base-generated (*PRO* and *pro*) and derived from movement (traces) are one of the most prominent features of transformational theories of syntax, such as GB and Minimalism¹. However, to a very large extent, they can only be justified on the basis of theory-internal considerations, which has led a great number of researchers to develop frameworks that make no use of gaps. Probably the best motivation for positing a theory that doesn't need gaps comes from the problem of language acquisition: an empty category is something that has no representation whatsoever in the input children receive (there isn't even a break in the speech that could suggest there is something missing there). Therefore, how can children get to know that there are gaps? Moreover, how can they infer where exactly those gaps belong, and what kind of gaps they exactly are? The answer given from a transformational point of view has a theory-internal and an empirical side. As regards the former, many pieces of work in transformational grammar imply that gaps are a feature of our innate knowledge of language (for example, the DP hypothesis, which makes use of empty determiners as the canonical heads for bare NPs), so as a matter of fact children do know that gaps exist. It is also claimed (see, f.i., Bouchard 1984) that all empty categories (except for *pro*, in the languages that have it) have to get their reference from some appropriate antecedent, so there is a basis to establish what kind of category they are, and what their meaning is. Empirically, it is argued that gaps give some actual evidence of their existence, in that they modify overt constituents in a certain way. On the other hand, non-transformational theories argue that the evidence available is not sound enough to infer the existence of gaps (since the effects they allegedly have on overt constituents might be due to

¹ However, Chametzky (2000, ch 4) argues that a true minimalist framework should be able to do without movement and, therefore, without traces. He does not tackle the question, though, of whether base-generated empty categories would be permissible in such a framework.

other causes) and thus try to construct a framework in which there is no need for gaps. In such a theory, they argue, language acquisition and speech comprehension are a much easier task, because the parser doesn't need to worry about constituents that are not present.

In this paper, I will examine the arguments for and against the use of empty categories in a number of syntactic constructions. I will focus mainly on control and raising, wh-movement, cliticisation and coordination. I will finish by discussing the role empty categories play in sentence processing. For each of these points, I will first present the reasons why traces are deemed necessary, and then I will survey what gapless analyses have been proposed in the frameworks of LFG (Bresnan 1982, 2001) and HPSG (Borsley 1991; Pollard & Sag 1994; Sag and Wasow 1999).

CONTROL & RAISING.

Consider the following sentences:

- 1) a. A lot of young musicians try to play Led Zeppelin songs.
- b. A lot of young musicians seem to like Led Zeppelin songs.

The relevant fact here is that there are two verbs in each sentence (*try* and *play*; *seem* and *like*), but only one overt subject, namely *a lot of young musicians*, which appears as the subject of the main clause. However, any speaker will interpret *a lot of young musicians* as being the subject of the embedded clause as well. To sort out this discrepancy, the GB-Minimalism tradition proposes an analysis in which there is an empty category in the subject position of the embedded clause. This empty category is correferential with the subject of the main clause, from which it gets its meaning. The relevant structures are as follows:

- 2) a. [A lot of young musicians]_i try PRO_i to play Led Zeppelin songs.²
- b. [A lot of young musicians]_i seem *t_i* to like Led Zeppelin songs.

Although there is an empirical argument in favour of PRO and NP-trace, the main argument comes from theory-internal considerations (see Haegeman 1994 and Radford 1997 for further

details). In other theories, such as LFG or HPSG, a subject can be described in relational or functional terms, for example as being “the argument with the most prominent role” or “the last argument eliminated from SUBCAT / PRED” (an exact definition is not relevant here). GB and Minimalism, however, rely heavily on structure to represent grammatical relations, so *subject* comes to be regarded as “the element that occupies the Spec-IP position”.

Taking these assumptions into account, it is easy to understand why an empty category is needed to represent the missing subject. If there is no specifier position available, it will not be possible for the verb to discharge its subject theta role, or to check some of its features. It is not possible to use the subject of the main clause for these purposes, since all these operations require a local relation, i.e., a relation between a head and its specifier, not between a head and the specifier of a higher head. Thus, an empty category is proposed, so as to provide the embedded clause with a suitable subject. The stipulation that gaps have to get their reference from an appropriate antecedent -namely the subject of the main clause- ensures that we interpret the missing subject of (1) and (2) as *a lot of young musicians* and not somebody else.

As for empirical arguments in support of the existence of an empty category, Radford (1997) points out some anaphor binding facts:

- 3) a. The audience wanted [Angus to prove himself / *themselves a good musician]
- b. Angus_i wanted [PRO_i to prove himself / *themselves a good musician]

What (3a) shows is that the only acceptable binder for the anaphor of the embedded clause is *Angus*, the subject of that same clause. *The audience*, the subject of the main clause, cannot bind an anaphor within the embedded clause, because the clause boundary represents a barrier for binding (cf. Haegeman 1994). Hence the ungrammaticality of *themselves*. For the same reason, in (3b) *Angus* cannot bind the anaphor within the embedded clause. The solution in this framework is to assume that the embedded clause has actually a subject, namely PRO, that can bind the anaphor. The reason why *themselves* is still ungrammatical is because PRO is coindexed with *Angus*, so they refer to the same person in the world. Since *Angus* requires a masculine singular reflexive pronoun, so does PRO in this case.

As I have said, LFG and HPSG do not rely so much on structural notions, so they do not need to posit an empty category to represent the missing subject of control / raising structures. Rather, they make use of the notion of structure sharing, by virtue of which two elements can have the

² It has been argued recently that control involves no PRO, but is actually an instance of movement, so (2a) would have a structure similar to (2b). See, f.i., Hornstein (1999). However, this doesn't change anything, since it is still necessary

same features. Let us begin with LFG. The PRED feature for sentences like (1a) and (1b) would be $\langle(\text{SUBJ}), (\text{XCOMP})\rangle$. To ensure that the subject of the XCOMP is the same as the subject of the main clause, Bresnan (1982:376) introduced the Lexical Rule of Functional Control. Roughly speaking, this rule forces the subject of the XCOMP to be correferential with the OBJ2 -if there is one- otherwise with the object, and otherwise (as happens in the previous examples) with the subject of the main clause. The anaphor binding effects of sentences like (3) are achieved through the f-command relation (Bresnan 1982:386), by which an anaphor has to be f-commanded by its antecedent:

- 4) *F-command*: For any occurrences of the functions x, y in an f-structure F , x f-commands y if and only if x does not contain y and every f-structure of F that contains x contains y .

In other words, the antecedent has to be contained within the same (sub)f-structure as the anaphor (i.e., within the XCOMP), and both have to be independent elements within the XCOMP. Thus, the XCOMP SUBJ is left as the only available antecedent in sentences like (3). Since this subject has got its reference from a element outside the XCOMP in (3b), namely *Angus*, the binding effects also find an explanation within LFG.

The treatment of these sentences in HPSG is somewhat similar, in that it also resorts to the concept of structure sharing. This framework employs the SUBCAT list to express what the arguments are that a certain verb subcategorises for. Nonetheless, unlike LFG, these arguments are not defined in a relational way, but rather in terms of the category they belong to. Thus, the verb *play* in (1a) would have a SUBCAT list of the form $\langle(\text{NPnom}), (\text{NPacc})\rangle$. Due to the Subcategorisation Principle (which, roughly speaking, states that the SUBCAT list of the mother is what results from eliminating the values of the complement daughters from the SUBCAT list of the head daughter), the second argument, $\langle(\text{NPacc})\rangle$, will be eliminated from this list when the verb is unified with such an element (namely, *LZ songs*). However, the $\langle(\text{NPnom})\rangle$ is not to be found within the subordinate clause, but as the subject of the main clause. To ensure that it is interpreted as the subject of both clauses, both the actual occurrence of the subject and its representation in the SUBCAT list of any verb that requires it as its subject are assigned a mark. Thus, *a lot of young musicians* will be represented as $\langle(\text{NPnom} [1])\rangle$, and both *try* and *play* will have a SUBCAT list with a specification $\langle(\text{NPnom} [1])\rangle$. The subject is shared by both verbs, hence making it possible to explain raising and control sentences without positing any empty category.

to have some kind of empty category, namely NP-trace, in the subject position of the embedded clause.

LONG DISTANCE DEPENDENCIES.

Although researchers have been quite successful in devising analyses without gaps for many domains of syntax, the study of long distance dependencies (wh-movement, topicalisation, relativisation, *tough*-movement) is the one topic in which it seems more sensible to allow for gaps rather than to try to do without them. Nearly all the analysis within LFG and HPSG have had to posit some kind of empty category in order to be able to account for certain phenomena.

The problem with long distance dependencies is that there are phrases lacking a constituent without which they are ungrammatical. This constituent can be found higher in the structure, and related to its canonical position. As an example, consider the following sentences:

- 6) a. I pleased **e* / the girl.
b. Who(m)_{*i*} did you please *e*_{*i*}? (wh-movement)
c. [This girl]_{*i*}, I pleased *e*_{*i*} (topicalisation)
d. [The girl]_{*i*} that I pleased *e*_{*i*} (relativisation)
e. [This girl]_{*i*} was easy to please *e*_{*i*} (*tough*-movement)

As shown in (6a), the verb *please* has to have an NP in its object position so as to form a grammatical sentence. However, none of the other four sentences fulfils this requirement. Rather, the element that should be in that position is found at the very beginning of the sentence, and related to the object position. Evidence for this last point comes from languages in which NPs have morphologically overt case: the dislocated element has the same case it should have were it in its canonical position. As an example, consider the following sentences from Basque:

- 7) a. Poztu nuen neska bat.
Pleased AUX girl.ABS one.ABS
“I pleased a girl”
b. [Neska bat]_{*i*}, poztu nuen *e*_{*i*}
“A girl, I pleased”
c. Nor_{*i*} poztu zenuen *e*_{*i*}?
Who.ABS pleased AUX
“Who did you please?”

In this paper, I will only consider wh-movement and topicalisation. These two phenomena are easily handled in a theory that allows for movement and gaps. In the GB-Minimalism framework, they are analysed as instances of A'-movement, this is, movement to a non-argument position (see Haegeman 1994 and Radford 1997) for details). This non-argument position is the Spec-CP position of the clause, followed in wh-movement (though not in topicalisation) by movement of the verb to the complementiser position. From this position, it is possible for the moved element to bind its trace down in the original position, thus ensuring a correct interpretation. A further refinement of the theory comes from the following sentences:

- 8) a. [When_i did you say [that they composed their first big song e_i]]
 b. [When did you say [how they composed their first big song]]

It is currently assumed that in the case of long distance movement (such as in 8a), in which the landing site is the Spec-CP position of a higher clause, the Subjacency condition prevents the moved element from raising there directly. Thus, it is correctly predicted that for a sentence like (8b) it is not possible to interpret *when* as originating within the subordinate clause. For this to be so, it should have moved to its surface position directly from its base position, skipping over the intermediate Spec-CP (and violating Subjacency) because this position was already occupied by *how*. Thus, *when* can only be interpreted as having its base position outside the subordinate clause. I have not found any attempt at explaining phenomena like these nor in LFG neither in HPSG.

As regards non-transformational frameworks, let us begin again with LFG. I will focus here on Kaplan & Zaenen's (1989) analysis, since they did not make use of gaps. Thus, a special FOCUS position was posited to the very left of the sentence, to represent the dislocated element:

$$9) \quad S' \rightarrow _ XP \quad S$$

$$\quad \quad \quad \uparrow \text{FOCUS} = \downarrow$$

However, the actual value of the element in the FOCUS position depends on the value of the gap, which, in principle, can be anything. This is a potential problem, since there should be no gaps in LFG. The solution is to devise an equation that contains a variable over a set of functions, rather than a set of equations, one for each function that can appear under FOCUS. This equation is represented as follows:

10) $\uparrow\text{FOCUS} = \downarrow\text{GF}^*$

The notion of *functional uncertainty* is also introduced. This means that, without allowing for gaps, it is possible for an f-structure not to satisfy one or more elements in the PRED list until the equation is encountered. However, this approach has some drawbacks. For instance, it is necessary to establish some language-specific restrictions on elements that cannot undergo wh-movement. This, I believe, is a loss of the generalization achieved. An example of such a restriction in English are *that* clauses³, as in (11) below. Also, it is necessary to have a specific off-path equation (which seems quite *ad hoc* to me) so that the wh-element is related to the right base position.

11) a. *[That this song is very good]_i, most people think e_i

b. Restriction: ($\square\text{TOPIC}$) = ($\square\text{COMP}^*$ (GF-COMP)): the gap cannot be a COMP

Turning now to HPSG, this is a framework in which researchers allow for gaps in cases of wh-movement (although they do not resort to movement to create these dependencies). These sentences are dealt with by means of a SLASH feature, which indicates that the element has null phonology and a not specified syntactic-semantic value. In addition to this feature, the Non-Local Feature Principle is required, which states that the non-local features (i.e., SLASH) of the daughters are passed onto the mother node until they are satisfied, this is, until an element matching the features needed to fill the gap is encountered. As I have said, the syntactic-semantic value of the gap is not specified, meaning that it consists of a mark that is shared with the filler, whatever this turns out be. Thus, the features of the filler will be automatically assumed by the gap, ensuring the correct interpretation.

For example, in the sentence [*Led Zeppelin*]_i, *many people like* e_i , the object has been topicalised. In the HPSG analysis, this would mean that the verb *like* (with a SUBCAT list of the form $\langle(\text{NPnom}), (\text{NPacc})\rangle$) would be unified with an element with null phonology, and marked, first with an index such as [1], and second, with a SLASH value $\langle(\text{NPacc})\rangle$. This means that, while the $\langle(\text{NPacc})\rangle$ is erased from the verb's SUBCAT list at this stage, the SLASH is passed up the tree until it can be satisfied by an accusative NP. This NP is then assigned the same mark [1] as the gap. Thus, both of them have identical syntactic-semantic value.

³ However, as pointed out to me by Kersti Börjars, transformational grammar does not offer any explanation for this sentence either.

It should be noted here that Sag & Wasow (1999) take a somewhat different approach. Since they try to posit no gaps in the representation of the sentence, they argue that the SLASH feature (GAP in their terminology) is an inherent part of the syntactic structure of a verb. This feature can either be saturated from the beginning (if there is no *wh*-movement) or can have the value of one or more arguments of the verb. In the latter case, the arguments that appear under the GAP feature are erased from the verb's SUBCAT list, the rest of the analysis proceeding as above. The problem I see with this approach is that, if the arguments have to be distributed between both SUBCAT and GAP from the beginning, this would imply that either the syntactic properties of the verb in question have to be rearranged depending on how the sentence is going to be constructed (which, at first sight, looks like quite an *ad hoc* solution), or otherwise one should postulate several entries for each verb, each one varying in what arguments are under what feature (and this would end up in an atrociously big lexicon).

As we have seen, long distance dependencies represent a great difficulty for theories that try to do without empty categories. Although some gapless analyses, like Kaplan & Zaenen's (1989), have been proposed, it seems that the only way to achieve a good degree of explanatory adequacy as regards this constructions is through the use of gaps (though, perhaps, movement can be dispensed with).

CLITICISATION.

Transformational grammar has argued for the psychological reality of gaps on the basis that, although phonetically null, their syntactic presence has certain side effects on neighbouring constituents. For example, the cliticisation, or failure to cliticise, of certain words onto the immediately preceding word is attributed to the absence / presence of an intervening element, namely a gap. Jacobson (1982) argues along these lines to explain the placement of object pronouns in English. Her point is illustrated in the following set of sentences:

- 12) a. I gave Mary the book for Christmas.
b. *I gave Mary it for Christmas.
c. I gave it to Mary for Christmas.

She argues for the existence of an Object Pronoun Constraint. According to this hypothesis, English object pronouns are actually clitics, so they have to be cliticised onto the verb for the

sentence to be grammatical. Cliticisation, she argues, is only possible when both constituents are adjacent. Thus, the ungrammaticality of (12b) is explained: *Mary* is preventing *it* from cliticising onto *gave*. On the other hand, (12a) is correct because *the book* is not a pronoun, therefore it does not cliticise. Following this line of thought, it is also possible to explain the following contrasts:

- 13) a. It's hard to tell the children the stories.
b. *The children are hard to tell them
c. They're hard to tell the children.

The reason why (13b) is deviant is because it is derived from (13a), the phrase *the children* having been moved to the front. This movement leaves a trace in the original position *the children* occupied, the structure of the sentence being *The children are hard to tell [e] them*. If we assume that adjacency is necessary condition for cliticisation, and that gaps have actual syntactic existence, the ungrammaticality is easily explained: the gap does not allow the pronoun *them* to cliticise onto the verb. As far as I know, nobody has ever offered a plausible explanation of these contrasts without making use of gaps.

However, two other instances of cliticisation, namely *wanna* and *is* contraction, are more easily explained in a framework without gaps. Let us begin with *wanna* contraction. It is commonly assumed (see, f.i., Jacobson 1982 and Radford 1997) that while wh-traces prevent *wanna* contraction, PRO does not. Thus, the contrasts below are accounted for:

- 14) a. Does she_i want PRO_i to (wanna) go to the movies?
b. Who_j does she_i want PRO_i to (wanna) go to the movies with e_j?
c. Who_j does she want e_j to (*wanna) go to the movies?

However, as Pullum (1997) and Sag (2000) point out, this is an implausible explanation in that it misses the point that *to*-contraction only happens with a set of seven verbs, which Pullum (p. 81) dubs *therapy verbs*⁴. Thus, it is ungrammatical to say **intenna* (intend to), **meanna* (meant to), **lufta* (love to), and so on, even if there is no wh-trace intervening. According to Pullum, *to*-contraction is possible with those seven verbs because they select for a single infinitival complement. Transitive *want*, as in (14c), which selects two complements, cannot undergo *wanna* contraction.

⁴ These verbs are: *wanna* (want to), *gonna* (going to, future meaning), *usta* (used to, habitual meaning), *hafta* (have to), *gotta* (got to), *oughta* (ought to) and *supposta* (supposed to).

Turning now to *is* contraction, it is argued that it is not possible if *is* immediately precedes either a *wh*-trace (15a) or a *VP*-ellipsis site (15b):

- 15) a. How_i tall do you think she is (*she's) *e*_i?
b. The butcher is laughing, and the baker is (*baker's) *e* too.

Sag (2000), referring back to Selkirk (1984, 1995)⁵, makes use of the Accent Condition to explain the impossibility of auxiliary reduction in (15). This condition states that “lack of accent is a necessary condition on auxiliary reduction”. Following Selkirk’s 1995 work on Optimality Theory, he claims that “phrase final function words are themselves prosodic words heading a phonological phrase”. Thus, if the auxiliaries in (15) are actually stressed, they cannot be reduced.

These two last analyses are superior in that they explain the ungrammaticality of certain instances of auxiliary reduction without resorting to *wh*-traces (recall from Chametzky (2000) that a true minimalist framework should involve nor movement neither traces). On the other hand, I don’t know of any non-movement analysis of object pronoun cliticisation, as described earlier in this section. Nonetheless, my own opinion is that if a gapless account of *to*- and auxiliary reduction can be offered on the basis of the phonological and subcategorisation properties of the elements involved, chances are that it should be possible to explain the Object Pronoun Constraint in the same way.

COORDINATION.

Sentences like those in the following set have been baffling transformational syntacticians for years. It was Ross (1967) who first noticed the problem:

- 16) a. *Which dignitaries do you think [[Sandy photographed the castle] and [Chris visited *e*]]?
b. *Which dignitaries do you think [[Sandy photographed *e*] and [Chris visited the castle]]?
c. Which dignitaries do you think [[Sandy photographed *e*] and [Chris visited *e*]]?
d. *Which rock legend would it be ridiculous to compare [[*e*] and [*e*]]?
e. *Which of her books did you find [[a review of *e*] and [*e*]]?

⁵ I haven’t been able to get hold of these two pieces of work, so I rely on what Sag reports from them.

These contrasts were explained by Ross in the two parts of the Coordinate Structure Constraint (CSC), sentences like (16c) being its Across-the-Board (ATB) exceptions:

- 17) a. *Conjunct Constraint*: in a coordinate structure, no conjunct may be moved (cf. 16d, 16e).
- b. *Element Constraint*: in a coordinate structure, no element contained in a conjunct can be moved out of that conjunct (cf. 16a, 16b and 16e).
- c. *Across the Board Exceptions*: the Element Constraint can be violated if in both conjuncts the extracted constituent is structurally the same.

As Sag (2000) explains, no satisfactory explanation has been given for both the CSC and the ATB exceptions in the GB-Minimalism framework. However, he argues that the Conjunct Constraint is easy to explain in a framework that employs no traces. His reasoning is as follows: first, a gap is not a place where a syntactically present element is not phonetically realised, but rather the place where an element selected by a head fails to be realised at all. Second, the conjuncts of a coordinate structure have to be syntactic constituents. Third, conjunctions are not heads: rather, coordinate structures are instances of headless structures. From these premises, it follows that gaps cannot be coordinated: they are not syntactic constituents, so they cannot be conjuncts; neither can they be “licensed” by a head, since conjunctions are not heads. As we have seen, the Conjunct Constraint follows without further stipulation.

The Element Constraint and the ATB⁶ exceptions are tackled in Sag & Wasow (1999). The solution offered there relies on the fact that coordination is only possible if the conjuncts are syntactically identical, i.e., if both lack the same constituent. Thus, examples like (16a) and (16b) are deviant because they involve a full constituent and a constituent that lacks one of its elements. In this respect, it is important to assume that a gap is not just a phonetically null constituent, since then both conjuncts would be syntactically identical and the sentence would be predicted to be grammatical. If this reasoning is somewhere near right, ATB exceptions like (16c) follow directly, since in those sentences both conjuncts lack the same constituent, therefore they can be coordinated.

⁶ Pollard & Sag (1994) point out some counterexamples, such as *How many lakes can we [destroy e and not arouse public sensibility]*. These are explained by claiming that the Coordination Principle requires the CATEGORY and NON-LOCAL values of the daughter nodes to be extensions of those of the mother node. However, there seem to be

SENTENCE PROCESSING.

A reasonable consequence of what I have discussed so far is that if empty categories do indeed exist and have some influence over other constituents of a sentence, then these side effects should be observed in parsing experiments. On the other hand, if empty categories do not exist, no such effects should be noticed (or, at least, they could be attributed to other causes). However, the results of experiments in this topic are far from conclusive, and both sides show equally strong evidence in favour of their claims.

Let us begin by pointing out some effects usually attributed to the existence of a gap in the structure of the sentence. Stowe (1986) discusses the so-called *filled gap* effect, in which “the processor has found an antecedent, is looking for a trace [...] and discovers that some likely gap position is actually filled”. This is illustrated in the following sentences:

- 17) a. Who_i could the little child have forced e_i to sing those songs for Cheryl last Christmas?
b. Who_i could the little child have forced us to sing those songs for e_i last Christmas?
c. The little child could have forced us to sing those songs for Cheryl last Christmas.

As explained by Stowe, in controlled experiments (17b) took slightly longer to the speakers to process than (17a). The reason for this, she argues, is that, since the moment the parser finds *who*, it is looking for an appropriate position in which its trace can be placed. When the parser gets to *forced*, it identifies the object position as suitable to contain a trace. Therefore, it expects that position to be empty, in order to accommodate the trace. That is what happens in (17a). However, in (17b) the object position is already filled, so it is impossible to interpret it as the base position for the trace. In this case, the parser has to abandon its initial analysis and keep on looking for a suitable trace position, which occurs later in the sentence. This, Stowe claims, is what causes the processing difficulty. The lack of difficulty in processing (17c), with an overt object after *forced* is due to the fact that in this sentence the parser did not come up with any antecedent at the beginning of the clause, so it wasn't looking for any gap to which it could be related. Thus, no *filled gap* effect is perceived.

Fodor (1989) reports another experiment in which the different degrees of difficulty in processing a sentence were attributed to the likelihood of there being a trace in a certain position. She notes that in the following pairs, the first sentence is easier to process than the second:

counterexamples to this principle as well, such as *Stuart is [a rude player and quite nutty]*, where the conjuncts appear to have different CATEGORY values.

- 18) a. [Which book]_i did the teacher read e_i to the children?
 b. [Which book]_i did the teacher read to the children from e_i ?
- 19) a. [Which student]_i did the teacher walk to the cafeteria with e_i ?
 b. [Which student]_i did the teacher walk e_i to the cafeteria?

The sentences in (18) contain a verb, *read*, which is very frequently used in transitive sentences, such as (18a), although it can also form intransitive sentences such as (18b). *Walk*, on the other hand, is mainly found in intransitive sentences like (19a), though it also admits a transitive reading, as shown in (19b). Fodor argues that the parser, in a sense, “knows” that a verb is mainly used in either transitive or intransitive readings, and when the need arises to look for a gap, it uses this information so as to narrow the array of places where the gap could be.

Thus, when confronted with the task of placing a gap in (18a), the first possibility is the object position of *read*, since as a (mainly) transitive verb it can be reasonably expected that the antecedent has originated there. In this sentence it is actually possible to interpret the gap as being there, therefore no parsing complexity arises. In (18b), however, *read* works as an intransitive verb, so there is no object position where the gap could be inserted (note that this is something different from the *filled gap* effect. The problem is not that a possible position for the gap is already filled, the problem is that there is no such position at all). Because of this, the parser has to abandon its first analysis and look for an appropriate position for the gap somewhere later in the sentence. The sentences in (19) have the same explanation, although from the opposite perspective: the parser assumes that *walk* is a mainly intransitive verb, therefore the presence of a gap in the direct object position is not expected. Thus, the parser has to redo its analysis of (19b) though not of (19a)⁷. Note that this explanation relies heavily on the assumption that the parser “knows” whether a verb is used mainly in either intransitive or transitive structures (this is, it has access to the subcategorisation information of the verb) and that it can use this information as a means to reduce the number of places where a gap is expected to appear (or even whether a gap is expected to appear at all. As Fodor herself acknowledges, this assumption is far from being proven.

On the other hand, there are also experiments that suggest that a gapless framework could be on the right track. Fodor & Sag (1994) and Sag (2000), drawing information from Pickering &

⁷ However, I believe that, given the DAH sketched below, the same effects are predictable without traces, only if the parser expects to relate a dislocated phrase to a licensing head, rather than to a trace in the base position. I haven't found any arguments of this kind, though.

Barry (1991), argue that double object sentences with heavy NP shift provide an argument against the use of gaps. As an example of their argumentation, consider the following pair of sentences:

- 20) a. That is [the award]_i; that we gave [the best band among the thirty-odd that had decided to play for a very scarce audience in the semi-unknown festival celebrated in Cardiff last year] [_i].
b. We gave [the best band among the thirty-odd that had decided to play for a very scarce audience in the semi-unknown festival celebrated in Cardiff last year] [an award].

(20a) is far easier to process than (20b). Pickering & Barry (1991) argue that a theory of movement and gaps predicts exactly the opposite effect: (20a) should be quite difficult to process because *the award* can only receive its interpretation once it is related to its trace, which is not found until after the very long constituent *the best band...last year*. On the other hand, (20b) should be easy to process because there are no gaps the parser needs to worry about. Because of this, they propose the Direct Association Hypothesis (DAH): the dislocated element is associated with its semantic role as soon as the head licensing that role is encountered. The consequence of such a proposal is that now it is correctly predicted which sentence is easier to process. In (20a), the licensing head –i.e., the verb- is adjacent to both objects. Therefore, both of them can immediately be assigned an interpretation, and no problems appear. In (20b), on the other hand, *the award* is a long distance away from the verb, therefore some processing difficulty is observed.

Further evidence comes from center-embedded relative clauses. Consider the following sentences, (21a) being extremely more difficult to process than (21b):

- 21) a. John found the saucer [which Mary put the cup [which I poured the tea into *e*] on *e*]
b. John found the saucer [on which Mary put the cup [into which I poured the tea *e*] *e*]

Again, a framework making use of movement and traces would make the wrong prediction. As we have seen, the dislocated elements cannot be properly interpreted until their traces are encountered. In both cases, the traces are at the very end, so both sentences are wrongly predicted to be more or less equally difficult to process. On the analysis proposed by Pickering & Barry, (21b) is predicted to be easier because the licensing of the first extraction is finished as soon as *put* is found, this is, before the second even starts. In (21a), on the other hand, the parser has first to wait until literally the last word of the sentence to be able to complete the licensing, and on top

of that it has to compute two extractions at the same time. This results on a sentence extremely tough to process.

However, as I have said, these results are far from conclusive. Gorrell (1993) claims that similar effects are predicted, but do not actually happen, if the long NP is the subject, rather than one of the objects. Gibson and Hickok (1993) argue that it is possible to make the same predictions as Pickering & Barry (1991) if we assume that “traces [...] can be projected as soon as a grammatically permissible attachment site is licensed –that is, the parser need not wait until the actual sequential position of the gap in the input string”. However, Pickering (1993) argues that none of these replies is not more plausible than the original account in Pickering & Barry (1991). He also claims that, while maintaining the core postulates of the analysis, it is still possible to account for the effects described by Gorrell (1993) and Gibson & Hickok (1993) without making any use of gaps, since “processing evidence gives us no reason to postulate empty categories”. As is easy to see, nobody has still come up with a reliable piece of evidence either against or in favour of the hypothesis that the parser is aware of the existence of gaps.

SUMMARY & CONCLUSION.

An extensive use of empty categories is one of the defining characteristics of the GB-Minimalism framework. Since the body of work within this theory (and also the level of depth and breadth of the theory) is far bigger than any of its alternatives’, one may have the impression that gaps are something natural, and assume their use without further thoughts on this matter. However, a number of other theories can account for the same phenomena as GB-Minimalism without resorting to gaps, in some cases even providing better analysis. These achievements make one think over whether gaps are really something necessary in syntactic theorising. Whether a good theory of syntax should use empty categories or not is a debate that is far from being closed. Many of those gaps are due to theory internal considerations, what means that, although necessary in a certain framework, other frameworks do not need to postulate them, and vice versa. As to those gaps that seem necessary, like wh-traces, nobody has still been able to give a sufficiently sound argument either for or against them, so their existence depends to a large extent on each one’s beliefs.

My own opinion is that, although gaps can be dispensed with in several fields of syntax (as we have seen, control, coordination, clitics, and so on), this is not to say that one does not need gaps anymore. As a matter of fact, it seems to me that long distance dependencies cannot be properly explained unless one accepts that there may be some empty category somewhere down in the tree.

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