

# Bound Pronouns and Weak Crossover

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This work is intended as an attempt to derive the so-called weak crossover phenomena from general principles governing scope assignment and linking of pronouns to referential expressions. It is argued that pronouns do not count as *syntactic* variables in the unmarked case, since they need not be linked to a c-commanding position in order to be interpreted as bound variables. It is claimed that logical forms in which pronouns are directly linked to operators are ruled out by a general principle of grammar. The well-known fact that weak crossover effects show up more clearly in quantified contexts than in relative and interrogative clauses can be accounted in a principled way in our theoretical framework. Our approach also predicts the significant correlation that seems to exist in Romance and Germanic languages between the status of backward pronominalization and the presence of weak crossover effects in wh-contexts.\*

I want here to present a principled account of the weak crossover phenomena, relying on the crucial assumption that pronouns need not be *syntactically* bound (i.e. linked to a c-commanding position)<sup>1</sup> in order to be interpreted as bound variables. This general hypothesis is arrived at through two distinct steps. First of all, I will discuss a class of data strongly suggesting that pronouns may be correctly licensed as bound variables even in syntactic environments in which they should produce w.c.o. effects according to the standard accounts. What is crucial for such accounts is the fact that the pronoun is not A-bound in these contexts: behaving as a syntactic variable (i.e. being locally A'-bound), it should produce the violation of independent requirements on operator-binding such as the Bijection Principle and the

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<sup>1</sup> The term *binding* has both a syntactic and a semantic meaning. From a syntactic point of view, a pronoun counts as bound by an element c-commanding it whenever it is *linked* to such an element (see Higginbotham (1983) and (1985) and Bars (1986) for some elucidations on the so-called *linking theory*). However, as I will argue below, *syntactic* binding is not required in order for a pronoun to be interpreted as a variable bound by an operator. The reasons for which I prefer to express the binding relations in the framework of the linking theory will be also clarified below.

Parallelism Condition on Operator Binding (PCOB).<sup>2</sup> The observation that w.c.o. effects do not show up in some of these structures casts strong doubts on the familiar assumption that A-binding be *required* in order to avoid w.c.o. violations. The second step will consist in providing evidence that a pronoun cannot be directly linked to an operator in the unmarked case.

On the grounds of these observations, I want to reject the so-called Functional Theory of Syntactic Variables (presupposed by both the Bijection Principle and PCOB), according to which pronouns *are* syntactic variables in certain configurations. On the contrary, my proposal amounts to claiming that pronouns, unlike wh- and Q-traces, *may not* be linked to operators, for the very reason that they do not count as *syntactic* variables. Moreover, pronouns *need not* be linked to a c-commanding element (i.e. be A-bound) in order to get the bound reading (perhaps as a consequence of their capacity of being independently referential, that makes them different from *lexical* variables such as anaphors), provided they occur in the scope of the operator by which they end up bound.

Given the theoretical framework sketched above, we will try to derive the w.c.o. effects by exploiting general constraints on scope assignment and on linking. We will see that the interaction of these constraints produces just the right results, providing an explanation for the well-known fact that w.c.o. effects show up more clearly in quantified than in interrogative and relative clauses; this difference remains unaccounted for in the traditional approaches to w.c.o. phenomena. Finally, it is worth-while underlining that w.c.o. effects arising with wh-phrases amount to *backward* violations in the theoretical framework I am arguing for. This fact will lead us to predict significant correlations between the status of backward pronominalization and the presence of w.c.o. effects in wh-contexts: some data from Germanic SOV languages suggest that the prediction is indeed borne out. It is not clear how these correlations might be accounted for should we allow pronouns to be directly linked to operators.

### 1. Against the functional interpretation of syntactic variables.

Our aim in this section will be to present empirical arguments against the assumption that pronouns are directly linked to operators in the contexts in which they are not A-bound (i.e. linked to a c-commanding argumental position). A first step in this direction will consist in showing that the bound

<sup>2</sup> The Bijection Principle is defined in Koopman and Sportiche (1982) in the following way:

- a. Every variable must be bound by exactly one operator
- b. Every operator must bind exactly one variable,

where a *variable* is any element that is locally A'-bound by an operator.

This principle is modified in Safir (1984) in the following way:

*Parallelism Condition on Operator Binding:*

If O is an operator and x is a variable bound by O, then for any y, y a variable bound by O, x and y are [ $\alpha$  lexical] (where pronouns = [+lexical] and traces = [-lexical]).

reading is available in contexts in which the pronoun cannot be linked to a c-commanding argumental position. We want to regard this as evidence that pronouns, differently from anaphors, are not *lexical* variables, as shown by their capacity of being independently referential.<sup>3</sup> Notice that w.c.o. effects do not show up in the following Italian and English sentences, in spite of the fact that a PCOB violation should be produced (given the absence of A-binding, the pronoun is assumed to be locally A'-bound in (1)-(4)):

- (1) a. Quale terrorista avete intervistato t prima che parlargli diventasse legale  
b. Which terrorist did you interview t before talking to him became legal
- (2) a. Quale uomo avete potuto incontrare t solo dopo che parlargli era diventato legale  
b. Which man were you able to meet t only after talking to him had become legal
- (3) a. (Non) siamo stati in grado di intervistare ogni/nessun terrorista prima che parlargli diventasse legale/illegale  
b. We were able to interview each terrorist/no terrorist before talking to him became legal/illegal
- (4) a. Abbiamo promosso ogni studente solo dopo averlo esaminato attentamente  
b. We passed every student only after having examined him carefully

A natural objection would be that c-command (hence A-binding) *does* hold in all of these cases between the object position of the main clause and the pronoun in the adjunct, given Contreras' observation that a Principle C violation is likely to arise in (5), where the pronoun is not naturally understood as coreferential with the R-expression in the adjunct:

- (5) We filed them before reading Mary's articles

As observed in Chomsky (1986b), the violation in (5) seems however to be weaker than the typical Principle C violation detected in (6):

- (6) They visited us before examining those students

Another potential problem for Contreras' account is the observation that the syntactic structure exemplified in (5) allows a parasitic gap to be licensed, an unexpected fact assuming the validity of the anti-c-command requirement on parasitic gaps.<sup>4</sup>

- (7) Which articles did you file t before reading e

As noticed by Chomsky, these facts are easily accounted for by assuming that the adjunct phrase is attached to the VP, but outside a small VP node, so

<sup>3</sup> See Higginbotham (1988) for some suggestions concerning this point.

<sup>4</sup> The validity of the anti-c-command requirement on the distribution of parasitic gaps is confirmed by some data concerning quantification inside NPs. Namely, consider the fact that subjects of small-clauses do not license parasitic gaps, as shown by (i) (due to Stowell) and (ii) (due to Rizzi):

- (i) Who did you call t an enemy of e
- (ii) Who do you consider t absolutely certain that we can help e

The parasitic gap is correctly licensed in (ii) (see Giorgi and Longobardi (1987)), where the *by-phrase* (given its status of argument adjunct: see Jaeggli (1986), Grimshaw (1988)) is not contained within the c-command domain of t':

- (iii) Which topic would you approve a discussion of t by a specialist in e

that a *weak c-command* relation may be assumed to hold in (1)-(4).<sup>5</sup> It might then be argued that A-binding holds under weak c-command. Other data seem however to indicate that weak c-command is *not* required in order for a pronoun to be correctly interpreted as a bound variable. Consider for example the perfect status of the bound reading in (8)-(9), where weak c-command (hence A-binding) does not hold under plausible syntactic assumptions (the quantifier is embedded in the object NP in (8), while the adjunct, in which the pronoun is contained, is clearly in a higher position than the antecedent in (9)):

- (8) a. Non siamo stati in grado di leggere frammenti di nessuna confessione prima che l'autore decidesse di renderla pubblica  
 b. We were able to read the fragments of no confession before the author decided to make it public
- (9) a. Quale articolo Giovanni ha deciso di dire alla sua segretaria che era indisponibile prima di leggerlo  
 b. Which paper did John decide to tell his secretary t was unavailable before reading it

These facts strongly suggest that A-binding is not required in order for w.c.o. effects to be avoided.

At this point I want to present an even stronger argument against the functional interpretation of syntactic variables. I will try to show that there are empirical reasons for assuming that pronouns cannot be directly linked to operators in A'-positions in the unmarked case. Should this be true, w.c.o. effects could not be derived from general constraints on operator-binding such as PCOB, for the very reason that operator-binding (i.e. A'-binding) would not be allowed to take place in typical w.c.o. configurations, as a consequence of the general prohibition we are arguing for. The evidence is provided by the so-called *weakest crossover* contexts, widely discussed in Lasnik and Stowell (1987). These contexts, exemplified by the instance of *tough movement* in (10) and by the *cleft construction* in (11), do not exhibit surprisingly any w.c.o. effect, in spite of the fact that a PCOB violation should be expected according to the standard account:

- (10) John<sub>i</sub> should be easy O<sub>i</sub> to persuade his mother to vouch for t<sub>i</sub>  
 (11) It was John<sub>i</sub> O<sub>i</sub> that his mother was talking about t<sub>i</sub>

It is in effect generally assumed that null operators are present in the COMP position of the infinitival complement of the adjective in (10) and of the *that-clause* in (11); given the absence of A-binding between the pronoun and the variable, the operator is forced to A'-bind both of them, producing a clear violation of the constraint on operator-binding. The difficulty does not

<sup>5</sup> I will adopt here the definition of weak c-command proposed in Contreras (1988):

x c-commands y if and only if

(a) x doesn't dominate y, and

(b) for every z, z a maximal projection not immediately dominated by a maximal projection of the

same type, if z dominates x, z dominates y

admit a straightforward solution within the standard binding theory framework, where anaphoric relations are indicated through coindexing. Namely, the pronoun cannot be allowed to be referentially dependent on the controlling subject in (10) and the clefted NP in (11) ('*John*' in both cases) without being at the same time A'-bound by the null operator. The only mechanism available in the standard framework in order to avoid A'-binding is contraindexing. In other words, the operator in (10)-(11) has to be assigned a different index with respect to the pronoun in order to avoid the latter being bound by the former, and a PCOB violation to arise. The difficulty is that the operator is in turn coindexed with *John* (on which it is clearly referentially dependent), and if we allow the pronoun to pick up its reference from a conraindexed antecedent, it is not clear at all how we could filter out the coreferential reading in sentences such as (12):<sup>6</sup>

- (12) a. John saw him  
 b. It's John that he saw

A similar problem arises for the standard approach in accounting for the absence of w.c.o. effects in appositive relative clauses, exemplified by (13):

- (13) John, who his wife loves t, will arrive early

Notice that the difficulty arises here independently of any assumption about the presence of null operators. On the other hand, the well-known contrast with restrictive relative clauses, where w.c.o. effects clearly show up, seems to provide evidence in favor of the hypothesis that pronouns are not linked to operators in A'-position whenever a referential antecedent is available. Namely, notice that the w.c.o. effects exhibited by (14) are directly accounted for under the plausible semantic assumption that the head NP of a restrictive relative clause cannot be interpreted as fully referential, so that a referential antecedent is not available in this case:

- (14) a. The man who his wife loves t will arrive early  
 b. Every man who his wife loves t will arrive early

A further complication is represented by the fact that wh-traces appear to behave like referential expressions, as shown by the absence of w.c.o. effects in the following instance of *tough movement*:

- (15) Which man<sub>i</sub> t<sub>i</sub> should be easy O<sub>i</sub> to persuade his<sub>i</sub> mother to vouch for t<sub>i</sub>

No w.c.o. effect is therefore predicted to arise in (14), where the object wh-trace in the relative clause is available as antecedent of the pronoun. The relevant difference between (13) and (14) seems to consist in the fact that the referential antecedent *precedes* the pronoun in (13), while it *follows* the pronoun in (14).

<sup>6</sup> I am not claiming that this technical difficulty cannot be circumvented: the point is that every solution turns out to be theoretically expensive. One could for example suggest (following Safir) that LF consists of more than one level and that different elements are indexed at different *logical* levels; alternatively, it might be proposed (following Lasnik and Stowell) that traces of empty operators don't count as *variables*, introducing a new kind of empty categories.

Since the reference to *backward effects* cannot be dispensed with, let me assume the strong hypothesis, mentioned above, that pronouns are *never* linked to operators in A'-positions. The pronoun is therefore forced to pick up its reference from the *following wh-trace* in (14), producing a backward violation. As observed above, this hypothesis predicts a systematic correlation between the status of backward pronominalization and the presence of w.c.o. effects in wh-contexts. We will see in the third section that indeed this prediction seems to be borne out.

Before closing this section, I want to underline that a satisfactory formulation of the general principle on pronominal anaphora we are arguing for is only possible in the framework of linking theory, given the technical difficulties arising from the use of indexes. We regard this as evidence that linking, and not indexing, is the correct technical device for the expression of anaphoric relations.

Summatizing, pronouns are not variables, even though they may be interpreted as variables through linking to an argumental position filled by a variable. They are not *syntactic* variables in that they cannot be linked to operators in A'-positions and they are not *lexical* variables in that they need not be linked to a c-commanding position (contrary to anaphors).<sup>7</sup>

Furthermore, the idea that pronouns must not be assimilated to *syntactic* variables is supported by the observation that pronouns are not subject to the *bounding* constraints to which syntactic variables are. It is quite uncontroversial that parasitic gaps *are* syntactic variables, as shown by the fact that they appear to yield strong crossover violations; consider the following example (for which I am indebted to G. Longobardi):

- (16) \*Quale ragazza hai abbandonato t<sub>i</sub> dopo averle promesso di sposare t<sub>i</sub>  
Which girl did you leave after having promised to her to marry

Now, parasitic gaps are clearly subject to *bounding* constraints to which pronouns are not, as shown by the fact that the contrast in grammaticality exhibited in (17) completely disappears in (18):

- (17) a. \*Which student did you interview t because giving books to e was illegal  
b. Which student did you interview t because you weren't able to give books to e  
(18) a. Which student did you interview t because giving books to him was illegal  
b. Which student did you interview t because you weren't able to give books to him

We will proceed as follows. In the second section we will make some observations on the structural constraints on backward pronominalization. The conclusions we will arrive at will play an important role in the treatment of the w.c.o. phenomena we are going to propose in the third section.

## 2. On backward pronominalization.

It is well-known that backward anaphora is a complex phenomenon where factors linked to parsing and discourse strategies certainly play an important

<sup>7</sup> See Delfitto (1988) for an extensive discussion of the c-command requirement.

role. *Structural* conditions are however also relevant, as confirmed by the bad status of the coreferential reading in sentences such as (5), where *weak c-command* can be assumed to hold between the pronoun and its antecedent according to the discussion in the first section. Consider also the following sentence (in its Italian and English version):

- (19) a. Lo abbiamo promosso solo dopo aver esaminato quello studente  
b. We have passed him only after having examined that student

The impossibility of the coreferential reading in weak c-command contexts such as (5) and (19) clearly amounts to a structural constraint on backward pronominalization, and cannot be evaluated as a Principle C violation, *pace* Contreras. As observed in the first section, the violation yielded by the coreferential reading is somehow weaker than the typical Principle C violations. Furthermore, weak c-command is not detected to interact with the other Binding Theory principles in any significant way, as confirmed by the fact that the sentences in (20) represent clear Principle A violations, while no Principle B violation shows up in (21), as noticed by Contreras himself:

- (20) a. \*John's mother likes himself  
b. \*I left my friends without a word to themselves  
(21) a. John's mother likes him  
b. I filed those articles without a look at them

Nevertheless, no specific prosodic pattern appears to be able to rescue the coreferential reading in examples such as (5) and (19).

Let me turn now to contexts in which weak c-command does not occur between the pronoun and the antecedent, exemplified by the sentences in (22):

- (22) a. La donna che lo ha sposato ODIA Giovanni  
The woman who married him HATES John  
b. Il fatto che Maria lo disprezza PREOCCUPA Giovanni  
The fact that Mary despises him WORRIES John

As observed at least as far as in Chomsky (1976), the coreferential reading becomes fully acceptable here only if the antecedent is forced not to count as a *focused* element by using appropriate prosodic patterns (e.g. an intonational break after the main verb with the consequent marginalization of the antecedent). In other words, coreference is possible in (22) provided the antecedent does not count as NEW from an informational point of view. Whenever the antecedent is interpreted as the *focus* (i.e. as informationally NEW), the linking of the pronoun to the following R-expression will result in a backward violation.

There are, however, contexts in which backward pronominalization is fully acceptable quite independently of the satisfaction of further conditions. This appears to be the case whenever the antecedent is given syntactic prominence, as in the contexts in which it counts as a subject of predication. Cases in point are shown in (23)-(24):

- (23) a. Quando lo incontri, Gianni corre via  
 b. Whenever you meet him, John runs away  
 (24) a. Giovanni lo ha esaminato senza trovare quello studente noioso  
 b. John examined him without finding that student boring

As indicated by the clear improvement of the coreferential reading in (24) with respect to (19), the occurrence of the antecedent in a context of secondary predication appears to be sufficient to circumvent (at least partially) structural constraints on backward anaphora such as weak c-command. No backward violation is obviously expected to arise in primary predication contexts; the prediction seems indeed borne out, as shown by the relative acceptability of the coreferential reading in (25), where weak c-command holds between the pronoun and its antecedent according to our assumptions:

- (25) a. Gianni lo ha esaminato prima che quello studente si ritirasse  
 b. John examined him before that student withdrew from the examination

These facts are not surprising in the light of the observation that the prominence of the antecedent (i.e. its being a subject of predication) seems to be able to affect the stronger binding principles under particular circumstances; consider the relative acceptability of the coreferential reading in (26), where a Principle C violation should arise (see Maes (1987)):

- (26) She was told that if she wanted to get anywhere in this dog-eat-dog world,  
 Mary was going to have to start stepping on some people

Other contexts of syntactic prominence are those in which the antecedent c-commands the pronoun. According to what we observed before, no backward effect should be expected in these environments. The prediction can be tested by taking into consideration some phenomena of pronominal anaphora inside NPs discussed in Giorgi and Longobardi (1987) (see chapter 1). Giorgi observes that a sentence such as (27) appears to be ambiguous in Italian, in that it can mean either *his mother's description of Mario* or *Mario's description of his mother*:

- (27) La descrizione di Mario di sua madre  
 The description of Mario of his mother

Although Giorgi assumes that the relative order of the postnominal arguments can be freely inverted without affecting syntactic operations such as binding, the sentence seems to become unambiguous according to many Italian speakers when the PP containing the pronoun precedes the PP containing the antecedent; consider (28):

- (28) La descrizione di sua madre di Mario

This sentence cannot naturally mean *his mother's description of Mario*, while it is quite easily given the meaning according to which *Mario* is interpreted as the agent. The explanation for these facts is straightforward if we take into consideration both the NPs internal structure proposed by Giorgi and the backward effects produced by linking a pronoun to a following antecedent. Backward effects are not expected to arise with respect to the reading in which

*Mario* counts as the agent (the only reading available for (28)); namely *Mario*, being the external argument, is assumed to be syntactically prominent with respect to the other argument: Giorgi convincingly argues that *Mario* c-commands the pronoun in configuration such as (28). On the contrary, the reading in which *di sua madre* counts as the agent corresponds to a syntactic structure in which this PP (hence the pronoun), being syntactically prominent, is not c-commanded by the referential antecedent. Given the absence of c-command, the antecedent is not understood as prominent, so that backward effects can freely show up, yielding the strong marginality of the reading mentioned above. Significantly, such an interpretation is clearly more accessible in (27): since backward pronominalization is not present in (27), no backward effect is expected to show up in this sentence, quite independently of the configurational relation between the pronoun and its antecedent.<sup>8</sup>

Summarizing, backward pronominalization is fully acceptable whenever the antecedent is given syntactic prominence. Otherwise, linking a pronoun to a following antecedent produces backward effects, unless the latter doesn't count as a *focused* element (i.e. as informationally NEW). Finally, the coreferential reading cannot be rescued by any specific prosodic pattern whenever the pronoun weakly c-commands the following antecedent. These conditions are tentatively stated in (29):

(29) *Conditions on backward pronominalization*

A pronoun can be linked to a following antecedent if and only if:

- either (a) the antecedent is given syntactic prominence  
 or (b) the pronoun does not weakly c-command the antecedent *and* the antecedent is not interpreted as a focused element

3. *On weak crossover.*

On the grounds of the observations made in the preceding sections, I want to provide here a principled account of w.c.o. phenomena. I have been led by the discussion in the first section to assume that pronouns cannot be linked to operators in A'-positions. Although the relevant empirical evidence has to do with cases in which a QNP is moved to a non-argumental position in syntax, I will try to state the principle under discussion in the unconstrained form in (30):

<sup>8</sup> Consider the interpretation of (i) and (ii) according to which the PP containing the possessive is given the *agentive* reading:

- (i) La descrizione di ogni ragazzo (theme) di sua madre (ag.)

The description of every boy of his mother

- (ii) La descrizione di sua madre (ag.) di ogni ragazzo (theme)

The description of his mother of every boy

The bound reading is impossible in (ii) but it is quite natural in (i) according to some Italian speakers. The fact seems to imply that neither the conditions on backward pronominalization nor the Scope Condition (see the following section for an extensive discussion of this point) are violated in (i). These data probably have to be linked to the possibility for a genitive QNP to bind a pronoun in the VP in Italian, shown by examples such as (iii) (for which I am indebted to G. Longobardi):

- (iii) La madre di ogni ragazza in età da marito si adopera più che può per farla sposare

The mother of every girl of marriageable age does her utmost to make her marry

(30) Pronouns cannot be linked to operators

This move amounts to assuming that linking takes place at LF, where a QNP in argumental position at S-structure is assigned scope through adjunction to some maximal projection; according to (30), the pronoun may not be linked to the operator in the adjoined position, but has to be linked to the Q-trace in argumental position. It is worth-while to notice that although assuming LF-movement allows us to state the constraint on linking in the general form expressed by (30), such an assumption is underdetermined, from an empirical point of view, with respect to the hypothesis that pronouns are directly linked to QNPs filling argumental position at S-structure. As we will see in the second part of this section, what is really crucial is the empirical content of the scope assignment principle applied to QNPs which are not overtly moved in syntax, independently of the hypothesis that scope has a syntactic representation at LF.

Having assumed for the sake of generality that the scope of an operator is identified with its c-command domain (at S-structure in the case of the wh-phrases and at LF in the case of QNPs which are not moved in syntax), let us state the following semantic constraint on the bound reading:

(31) *Scope Condition*

A pronoun interpreted as a variable bound by a QNP must be contained in the scope of the latter

We have seen that a pronoun is not required to be syntactically bound (i.e. linked to a c-commanding position) in order to get the bound reading; the only condition we want to state, expressed in (31), has to do with the requirement that the pronoun occur in the c-command domain of the operator by which it turns out to be finally bound at LF.

3.1. Let me turn to w.c.o. effects present in sentences containing wh-phrases moved in syntax to a position of configurational prominence (i.e. SPEC of CP), exemplified by (32):

- (32) a. ??Chi, ogni qualvolta lo incontri, dovresti avvertire t  
          ??Who, whenever you meet him, should you warn t  
      b. ?\*Chi pensi che la donna che lo ama abbia tradito t  
          ?\*Who do you think that the woman who loves him betrayed t

First of all, notice that the Scope Condition is clearly satisfied in (32), since the pronoun *ia* contained in the c-domain of the wh-operator at S-structure. I want to claim that the strong marginality of the bound reading in (32) is due to the backward effects produced by linking the pronoun to the following wh-trace. Backward effects cannot be avoided in (32) as a consequence of the condition (30), which makes direct linking to the wh-phrase unavailable. But why should backward anaphora yield marginality in (32)? The answer to this question is straightforward under the natural assumption that a wh-phrase has to be understood as informationally NEW, i.e. as a *focused* element, in order to be given its interrogative meaning (see among others Calabrese (1982) for

a discussion of this point). On the other hand, both sentences in (32) require the antecedent to be interpreted as *non-focused* in order for backward pronominalization to be correctly licensed, as shown by (33), where the wh-trace has been replaced by a lexical R-expression:

- (33) a. Ogni qualvolta lo incontri, dovresti AVVERTIRE Giovanni  
          Whenever you meet him, you should WARN John  
      b. La donna che lo ama HA TRADITO Giovanni  
          The woman who loves him BETRAYED John

In (33), differently from (32), it is possible to give *John* a non-focused interpretation by adopting a specific prosodic pattern. However, this option cannot be exploited in the case of (32), since the wh-phrase (hence the wh-trace) counts as inherently focused.<sup>9</sup> This proposal has the merit of providing an immediate account for the well-known fact that w.c.o. effects show up less clearly with *whicb-phrases* than with *who* or *what*. Consider for example the better status of the sentences in (34) with respect to the sentences in (32):

- (34) a. ?Quale studente, ogni qualvolta lo incontri, dovresti avvertire t  
          ?Which student, whenever you meet him, should you warn t  
      b. ?Quale studente pensi che la donna che lo ama abbia tradito t  
          ?Which student do you think that the woman who loves him betrayed t

Following Pesetsky (1988), we may assume that *whicb-phrases* are discourse-linked, in that the range of felicitous answers to questions containing this kind of phrases appears to be limited by a set of things the speaker has in mind. This means that (34a) sounds as a natural question only if a contextually defined set of students can be assumed to be salient for the speaker (and the hearer). This assumption appears to be compatible with the interpretation of the *whicb-phrase* as a focused element, in that the elements of the set need not have been verbally specified (and therefore be actually known). As observed by Pesetsky, if Mary is looking at a shelf full of books, John may ask the question *Which book are you planning to steal?* without actually knowing any of the books. However, the better status of (34) with respect to (32) can be assumed to depend on the fact that *who* and *what* count as informationally NEW in a more radical way than the corresponding *whicb-phrases*.

Given our account of w.c.o. phenomena arising in wh-contexts in terms of backward effects, a systematic correlation between backward pronominalization and w.c.o. effects is predicted within the framework for which I am arguing. Let me check whether this prediction is indeed borne out.

<sup>9</sup> The extension of our treatment to w.c.o. effects arising in relative clauses would be quite natural under the assumption that the wh-phrases (hence, wh-traces) contained in restrictive relative clauses not count as informationally GIVEN. Apart from the complexities arising here (having to do with a fully satisfactory semantic treatment of relative clauses), such an hypothesis appears to be reasonable when we consider the fact that the head NP of a restrictive relative clause (hence the chain headed by the wh-operator) is not assigned a full referential content. One might speculate that only the complex NP containing the relative clause can be assigned one of the features [ $\pm$  focused]. This analysis would be compatible with Horvath's observation (see Horvath (1981)) that relative wh-phrases seem not to count as *focused* elements in languages such as Hungarian.

First of all, we observed above that no backward effect seems to show up whenever the antecedent counts as a subject of predication, as confirmed by examples such as (23). As predicted by our hypothesis, no w.c.o. violation arises in (35), where the position filled by *John* in (23) is replaced by the wh-trace:<sup>10</sup>

- (35) a. Quale ragazzo, ogni qualvolta lo incontrai, t fuggì via  
 b. Which boy, whenever you meet him, t runs away

More interestingly, we expect w.c.o. effects not to be detected in languages in which backward pronominalization is not subject to the constraints which it obeys both in English and in Italian. Germanic SOV languages such as Dutch seem to provide the appropriate test, in that the coreferential reading in sentences such as (36) appears to be accessible quite independently of the intonational pattern adopted:

- (36) Zij die haar kennen, bewonderen Zelda  
 Those who know her admire Zelda

The absence of strong constraints on backward anaphora is confirmed by the fact that the coreferential reading appears to be available even in the weak c-command contexts exemplified by (37):

- (37) Iederen die het beschadigde alvorens zijn boek te verkopen zal vervolgd worden  
 Everyone who damaged it before selling his book will be prosecuted

As predicted by our analysis, no backward effect appears to show up in typical w.c.o. configurations; the bound reading is indeed fully acceptable in Dutch in sentences such as (38)-(39), while it gives rise to a slight but clear marginality in their English counterparts:

- (38) Welke man geloof je dat je zonder hem boos te maken alrijd kan storen  
 Which man do you believe that without making him angry you can always disturb  
 (39) Welke artikel besloot Jan alvorens het te lezen zijn secretaresse uit te laten typen  
 Which paper did John decide before reading it to let his secretary type

Even more significantly, the bound reading is allowed in Dutch in the following syntactic configurations, where w.c.o. effects are clearly detected in English:<sup>11</sup>

- (40) Wie verraadde de vrouw waarvan hij hield t  
 Who did the woman he loved betray  
 (41) Wie verraadde de vrouw die van hem hield t  
 Who did the woman who loved him betray

It is worth-while underlining that sentences such as (40) and (41) represent strong counterexamples to any account of weak crossover based on principles somehow reminiscent of the *bounding* conditions applying to the wh-traces. Contreras (1988) argues actually that the absence of w.c.o. effects in English

<sup>10</sup> As observed by G. Cinque (p.c.), the good status of the bound reading in (35) is also compatible with other assumptions about the nature of the empty categories contained in (35).

<sup>11</sup> The observations we made about Dutch could be extended to German, even though the judgements are here less clear and there is a wider range of variation among native speakers.

sentences such as (42) might be due to the satisfaction of the requirement that the pronoun *not be subjacent* to the operator in order to be interpreted as a bound variable:

- (42) Who does the claim that his father is a thief bother t

This *Antisubjacency Condition* appears to be untenable on the grounds of the clear w.c.o. effects arising in English sentences such as (40)-(41). Although the bad status of the bound reading in (40) in English might be independently accounted for by invoking Pesetsky's *Path Containment Condition* (PCC),<sup>12</sup> such a solution would leave the better status of (40) in Dutch entirely unexplained. Furthermore, no PCC violation apparently arises in (41) (due to the absence of intersecting paths), which is however on a par with (40).

Turning our attention to (42), the absence of w.c.o. effects in this sentence can be easily explained on the grounds of the fact that the coreferential reading is freely accessible (independently of the intonational pattern adopted) in the counterpart of (42) where the wh-trace is replaced by a proper name, as shown in (43):<sup>13</sup>

- (43) The claim that his father is a thief bothers John

Since no backward effect is therefore expected, the good status of the bound reading in (43) is directly accounted for.

These facts strongly suggest that the better status of backward pronominalization in Dutch should be taken as responsible for the absence of w.c.o. effects in this language.<sup>14</sup> This provides in turn a strong argument in favor of Principle (30), stating that there is no LF-representation in which pronouns are directly linked to operators.

3.2. I want now to consider w.c.o. effects arising in contexts containing QNPs filling A-positions at S-structure. As is well-known, the bound reading is quite marginal in sentences such as (44), both in Italian and in English:

<sup>12</sup> The Path Containment Condition filters out configurations with crossing A'-chains such as (40):

(40) Who<sub>i</sub> did the woman<sub>j</sub> O<sub>k</sub> he<sub>l</sub> loved e<sub>m</sub> betray e<sub>n</sub>

<sup>13</sup> We have no principled explanation for the absence of backward effects in (43).

<sup>14</sup> The absence of w.c.o. effects in wh-contexts is not absolute. According to some Dutch speakers, w.c.o. effects show up in sentences such as (i):

(i) Wie heeft zijn moeder gekozen  
 Who has his mother kissed

It might be suggested that weak c-command holds in (i) between the possessive and the wh-trace: the SPEC position of NP, although counting as a syntactic position and not as a categorial label, is filled in (i) by a pronominal NP, sharing its categorial status with the maximal projection of N immediately dominating it. Both factors involved in the degraded status of backward pronominalization are therefore present in (i): the pronoun weakly c-commands the wh-trace, and the latter counts obligatorily as a focused element. It is worth-while to notice that no w.c.o. effects is detected when the antecedent is a R-expression containing a pronoun interpreted as a bound variable; consider (ii):

(ii) Iederen signeerde het alvorens zijn boek te verkopen  
 Everyone signed it before selling his book

The bound reading is acceptable in (ii), while its English counterpart gives rise to a clear crossover violation.



- (44) a. I suoi sostenitori non hanno votato per nessun candidato  
 His supporters voted for no candidate  
 b. Coloro che lo conoscevano apprezzavano ogni candidato  
 Those who knew him appreciated every candidate

It might be suggested that w.c.o. effects are due to backward violations in (44). It seems actually that QNPs are on a par with wh-phrases in that they cannot be given a non-focused interpretation, as confirmed by the fact that the bound reading cannot be rescued by any prosodic pattern in (44). However, these backward effects are not sufficient to derive the strong marginality of the bound reading in quantified contexts such as (44); as is well-known, crossover effects are stronger in contexts involving QNPs than in wh-contexts. On the grounds of this observation, I want to argue here that the stronger violations detected in (44) amount to Scope Principle violations. According to my hypothesis, what makes the bound reading so marginal in sentences such as (44) is the fact that the pronoun is not contained at LF within the scope of the operator by which it is finally bound. The correct result is derived if we assume that scope assignment to QNPs is governed by the condition independently argued for in Delfitto (1986), according to which the scope of a quantified phrase in A-position is limited to constituents interpreted as *predicates*. Such a condition can be stated in the following terms:

- (45) Every QNP in A-position can be assigned scope only over *semantic* constituents licensed at LF as *predicates*

The elements counting as semantic constituents are those having an interpretation at LF, i.e. licensed under some version of the Full Interpretation Principle at that level of representation; according to Chomsky (1988) the only elements permitted at LF (and therefore counting, in our terms, as semantic constituents) are *arguments*, *adjuncts*, *lexical heads*, *predicates* and *operator-variable constructions* (each of them counting as a *chain* at a more abstract level). The condition in (45) amounts to claiming that a quantified NP cannot be interpreted within the scope of another QNP unless the former is contained in a wider constituent, licensed as a *predicate* at LF<sup>15</sup> (where the choice of the Complete Functional Complex<sup>16</sup> representing the domain of application of (45) depends on the properties of clause-boundedness exhibited by a given quantified phrase).

Let me consider now the cases in (44). In both sentences the pronoun is contained in the SPEC position of IP (the subject in more traditional terms).

<sup>15</sup> See Delfitto (1986) for a discussion of the empirical arguments in favor of the Scope Assignment Principle we have argued for. The main facts have to do with the impossibility of interpreting the external argument in scope of an internal QNP in the unmarked case, and with the interactions among internal QNPs and scopal elements such as negation, which are normally assumed to be attached under INFL. Consider for example (i), where the reading in which the negation is in scope of the QNP turns out to be quite unnatural:

(i) Giovanni non ha letto ogni libro  
 John didn't read every book

Namely, the sentence cannot mean that for every book x, John didn't read x.

<sup>16</sup> A Complete Functional Complex can be defined as the domain in which all the  $\theta$ -roles pertaining to a lexical head are assigned.

Being a subject of predication, the constituent filling such a position cannot be interpreted in the scope of a VP-internal QNP, since every wider constituent in which it can be *assimilated* denotes a relation of predication instead of counting as a *formal predicate*. The pronoun has to be linked to the A-position occupied by the QNP (or by the Q-trace if we assume that scope is syntactically represented at LF through VP-adjunction) in order to be interpreted as a bound variable in (44). However, the scope of the operator from which it has to be bound does not extend over the constituent containing the pronoun in the final LF-representation, producing a Scope Principle violation.

Such a treatment can be extended in a natural way to other typical w.c.o. configurations. Consider the sentence in (46):

- (46) Non abbiamo votato per nessun candidato, poiché il presidente lo aveva raccomandato  
 We voted for no candidate, since the chairman had recommended him

First of all, notice that the reading corresponding to the LF representation in which the adjunct turns out to be in the scope of the negative quantifier is almost unavailable; according to this interpretation, we may have voted for some candidate, but not for the very reason that the chairman recommended him. It is worth-while noting that the bound reading does not become more natural in the cases in which the quantified antecedent (or its trace at LF) commands the pronoun, as shown by the modified version of (46) in (47):

- (47) Ogni candidato è stato votato, poiché il presidente lo aveva raccomandato  
 Every candidate was voted, since the chairman had recommended him

This is, therefore, another case in which the Functional Theory of Syntactic Variables makes the wrong prediction. A reasonable hypothesis is that the causal clauses are attached to the IP node, so that they cannot give rise, together with the VPs, to a unique formal predicate. Such an hypothesis is confirmed by the fact that the bound reading becomes available in the cases in which there is no intonational break after the main clause, as shown in (48):

- (48) Abbiamo votato per ogni candidato per il fatto che il presidente lo aveva raccomandato  
 We voted for each candidate for the reason that the chairman had recommended him

The absence of intonational break after the VP of the main clause leads to the natural assumption that the adjunct is VP-internal in these cases, so that no Scope Principle violation is correctly predicted to arise.

The crucial role played by the Scope Condition is also confirmed by the contrast between (49) and (50):

- (49) Quando lo interrogai, Giovanni si rifiutò di rispondere  
 When I asked him questions, John refused to answer

- (50) a. Quando lo interrogai, ogni imputato si rifiutò di rispondere  
 When I asked him questions, every defendant refused to answer  
 b. Quando lo interrogai, nessun imputato si rifiutò di rispondere  
 When I asked him questions, no defendant refused to answer

The coreferential reading is clearly available in (49), where no backward effect is expected to arise, due to the syntactic prominence of the antecedent,



counting as a subject of predication. Therefore, backward effects cannot be assumed to play any role in the slight but clear marginality of the bound reading exhibited by (50). The derivation of the w.c.o. effects in (50) is, however, straightforward if we assume that the adjunct containing the pronoun, being attached to IP, is outside the scope of the quantified antecedent, so that a Scope Principle violation results.

Further evidence is provided finally by the contrast between (51) and (52):

(51) PRO aver aiutato i suoi colleghi è stato molto utile alla carriera di Giovanni

Having helped his colleagues was very useful to John's career

(52) PRO aver aiutato i suoi colleghi è stato molto utile alla carriera di ogni professore

Having helped his colleagues was very useful to the career of every professor

The w.c.o. effects showing up in (52) cannot be assumed to depend on backward violations, since there is a well-formed LF-representation in which the possessive is linked to the *preceding* null subject of the infinitive clause; on the other hand, linking PRO to the following Q-trace does not yield marginality, as shown by the full acceptability of the following instance of backward control:

(53) PRO aver lavorato duramente è stato molto utile alla carriera di ogni studente

Having worked hard was very useful to the career of every student

Again, the Scope Condition seems to account for w.c.o. effects showing up in (52): since the scope of the QNP does not extend over the subject infinitive, the possessive is not contained in the c-command domain of the operator in the final LF-representation, so that the requirements imposed by the Scope Condition are not satisfied.

An interesting problem is raised by the absence of w.c.o. effects in (54), where the pronoun is replaced by the local anaphor *se stesso* ('himself') and the long-distance anaphor *proprio* ('self'), respectively:

(54) a. PRO aver aiutato i propri colleghi è stato molto utile alla carriera di ogni professore

Having helped self's colleagues was very useful to the career of every professor

b. PRO aver aiutato se stesso con una terapia psicoanalitica è stato molto utile alla carriera di ogni professore

Having helped himself with a psychoanalytic therapy was very useful to the career of every professor

We want to argue that the difference has to do with the status of *lexical* (i.e. intrinsic) variables shared by all the kinds of anaphors. Namely, notice that only the variable reading is available for lexical anaphors and PRO in the so-called *stopy identity* contexts, exemplified in (55):<sup>17</sup>

<sup>17</sup> As is well-known, sentences such as (55) give rise to ambiguity whenever pronouns are involved instead of anaphors. There is other evidence that anaphors *must* select variables as their antecedents and that  $\lambda$ -abstraction takes places in contexts containing lexical R-expressions. As noticed in Saito and Hoji (1983), the following sentence counts as ambiguous in English, in that it receives the two readings shown in (ii) and (iii):

(i) Only John thinks he will win

(ii) [Only x : x = John ] x thinks x will win

(55) a. Los Angeles è adorata dai propri abitanti, ma New York non lo è

Los Angeles is adored by self's dwellers, but New York isn't

b. Giovanni cura se stesso, ma Giorgio non lo fa

John takes care of himself, but George doesn't

c. Giovanni è orgoglioso di aver vinto la gara, ma Giorgio non lo è

John is proud of having won the race, but George isn't

An anaphor, counting as a lexical variable, has to be syntactically bound (i.e. linked to an element c-commanding it).<sup>18</sup> The Scope Condition, i.e. the requirement that a pronoun be in the c-command domain of the operator at LF, can be dispensed with as far as anaphors are concerned, in that it is replaced by the requirement that a lexical variable be linked to an element c-commanding it at levels prior to LF. The anaphor is therefore correctly licensed in (54), as it is linked to the c-commanding PRO. On the other hand, the fact that PRO is not subject to w.c.o. effects may be assumed to depend on its status of pronominal anaphor: as a pronominal, it is allowed to be linked to a not c-commanding variable; as an anaphor, it counts as bound by the element to which it is linked, even though c-command does not hold.

The hypothesis that anaphors are licensed as variables at levels prior to LF leads to the strong prediction that the (referential or quantificational) nature of the antecedent does not play any role in the licensing of anaphoric

(iii) [Only x : x = John ] x thinks John will win

On the contrary, the ambiguity disappears in the Japanese sentence corresponding to (i). Namely, only the reading shown in (ii) is available in Japanese whenever the long-distance anaphor *zibun* is used, as in (iv):

(iv) John-dake-ga [<sub>CP</sub> zibun-ga karu to ] omotteiru  
only-NOM self-NOM win COMP think

On the other hand, the sentence receives only the meaning indicated in (iii) if the pronoun *karu* is used, since, as discussed below in the text, pronouns cannot be bound by lexical quantifiers in Japanese:

(v) John-dake-ga [<sub>CP</sub> kare-ga karu to ] omotteiru  
he

These facts represent clear evidence that pronouns (differently from anaphors) do not count as *intrinsic* variables. There are languages, such as Japanese, in which they cannot be given the bound reading. I have tried to show that in the languages (such as English and Italian) in which the bound reading is admissible, *pronominal* binding obeys peculiar conditions. In other words, the difference between pronouns and anaphors is not limited to the fact that they obey different *locality* conditions (as those studied by the Binding Theory).

<sup>18</sup> This requirement on c-command has to be articulated in different ways with respect to local and long-distance anaphors. As discussed in Giorgi (1984) and Belletti and Rizzi (1988), the behavior of the Italian anaphoric possessive *'proprio'* in contexts containing psych-verbs seems to imply that the binding requirement can be satisfied indifferently at D- or at S-structure as far as *'proprio'* functions as a local anaphor, as shown by the fact that both (i) and (ii) are acceptable:

(i) I propri, sostenitori preoccupano Gianni,  
Self's supporters worry Gianni

(ii) Gianni preoccupa i propri, sostenitori  
Gianni worries self's supporters

Long-distance *'proprio'* seems to require to be bound by a  $\theta$ -position, as shown by the contrast

between (ii) and (iv):

(iii) \*Gianni, preoccupa chiunque dubiti della propria, buona fede  
Gianni worries whoever doubts self's good faith

(iv) Gianni, teme coloro che vogliono sostenere la propria, candidatura  
Gianni is afraid of those who want to support self's candidature

In (iii) the theme *'Gianni'* cannot bind the long-distance *'proprio'* embedded within the Experiencer, even though c-command holds at S-structure.

expressions. The prediction appears to be borne out in languages such as English and Italian. Whenever the bound reading is impossible, as in (57), this fact cannot be assumed to depend on the quantificational nature of the antecedent, as shown by the strong marginality of its referential counterpart in (56):

- (56) ?\*La propria madre ha contribuito alla carriera di Mario  
 Self's mother contributed to Mario's career  
 (57) ?\*La propria madre ha contribuito alla carriera di ogni ragazzo  
 Self's mother contributed to the career of every boy

Referential and quantificational antecedents exhibit the same behavior even with respect to sentences containing psych-predicates, as shown by the fact that *proprio* appears to be correctly bound both in (58a) and in (58b):

- (58) a. La propria salute preoccupa Mario  
 Self's health worries Mario  
 b. La propria salute preoccupa ogni ragazzo  
 Self's health worries every boy

Given the prominence of the Experiencer  $\theta$ -role (see Bellerti and Rizzi (1988)), it can be assumed that the anaphoric possessive is linked to the commanding Q-trace at D-structure, even though it is outside its c-command domain at LF; the absence of w.c.o. effects in (58b) is immediately accounted for under the assumption that the Scope Principle, as a condition on LF-representations, need not be satisfied in order for anaphors to be licensed as variables. Such a condition is, however, crucial for the licensing of the pronouns; its violation gives rise to clear crossover effects in (59), even though the possessive can be syntactically bound at D-structure:

- (59) La sua salute preoccupa ogni ragazzo  
 His health worries every boy

A potential problem for the approach we are proposing is represented by the w.c.o. effects arising in Japanese in sentences containing the long-distance anaphor *zibun*. Consider the contrast between (60) and (61):

- (60) [<sub>IP,NP</sub> Hanako-ga zibun-o kiratteiru koto]-ga [<sub>VP</sub> Ziro-o yuutu-ni siteiru]  
 NOM self-ACC dislike fact NOM ACC depressed make  
 The fact that Hanako dislikes him, depressed Jiro,  
 (61) ?\* [<sub>IP,NP</sub> Hanako-ga zibun-o kiratteiru koto]-ga [<sub>VP</sub> daremo-o/dareka-o yuutu-ni siteiru]  
 \*The fact that Hanako dislikes him<sub>i</sub> has depressed everyone<sub>j</sub>/someone<sub>j</sub>

The presence of w.c.o. effects seems to indicate that '*zibun*' is subject to the Scope Condition as far as it is bound by a quantified antecedent. However, this fact is not so surprising if we consider that pronouns cannot be bound by *true* quantifiers in Japanese (see Saito and Hoji (1983)), as shown by (62), where '*karere*' cannot be licensed as a bound variable:

- (62) Daremo-ga [<sub>CP</sub> \*karere-ga Mary-ni kirawateiru to] omonkondeiru (koto)  
 NOM he NOM by be-disliked COMP be-convinced fact  
 Everyone is convinced that he is disliked by Mary

Since pronouns are never licensed as variables bound by a *true* quantifier in Japanese (quite independently of the requirements imposed by the Scope Condition on LF-representations), it might be suggested that the Scope Condition becomes relevant for anaphors such as '*zibun*' (the only lexical elements that may be bound in Japanese) whenever they turn out to be bound by true quantifiers. Another possibility is that '*zibun*' counts as lexically ambiguous, in that it is a true pronominal in contexts in which it appears to be bound by a QNP. If '*zibun*' is selected instead of '*karere*' in Japanese whenever a pronoun is interpreted as a bound variable, the presence of w.c.o. effects in (62) is immediately accounted for: as a pronoun, '*zibun*' is subject to the Scope Condition. Other facts seem to give further empirical support to the assumption that '*zibun*' is a pronoun in certain contexts; as noticed in Farmer, Hale and Tsujimura (1986), '*zibun*' may be construed with a discourse-topic (i.e. have a non-linguistic definite antecedent) in configurations such as (63):

- (63) Go -zibun-ga sono e -o okaki-ni natta soyo  
 HON self NOM that picture ACC painted I hear  
 I hear that self painted the picture

However we are not forced to the conclusion that '*zibun*' counts as independently referential in (63); another solution might be exploiting the construct *empty topic* posited in Huang (1984) for the Mandarin Chinese in accounting for the cases in which '*zibun*' does not appear to be linked to a linguistic antecedent. Further research is required in order to choose between the alternatives I have sketched above.

Summarizing, it seems that the contrast between (52) and (54) with respect to weak crossover can be easily accounted for if we exploit the independently well-motivated assumption than anaphors are licensed as bound variables at levels prior to LF (hence are not subject to the Scope Condition), even though it is quite possible that this principle has to be parametrized (as data from Japanese seem to suggest).

#### 4. Conclusions.

I have argued that pronouns do not count as syntactic variables in the unmarked case, in that they may not be directly linked to operators in order to be interpreted as bound variables. Weak crossover effects have been reduced to the interaction of independently well-motivated principles on *scope assignment* and *linking* (having to do with conditions on backward pronominalization). Backward violations seem to play an important role in many languages: right-left asymmetries have received recently great attention in the literature (see among other Sells 1986, Epstein 1988, Koopman and Sportiche 1988).

Finally, it is important to underline that our framework provides a straightforward account for the absence of crossover effects in contexts containing *resumptive* pronouns. The resumptive use can be identified with the

application of a marked strategy according to which pronouns are directly linked to operators (i.e. behave as syntactic variables), so that no backward violation is predicted to arise.

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