

ON THE IDENTIFICATION OF EMPTY CATEGORIES*

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0. INTRODUCTION

The increasing importance, in the study of grammatical processes, of systems of principles as opposed to systems of rules in recent years is reflected on a large scale by a particular focus on properties of representations as compared with properties of derivations. The component elements of representations are considered with regard to their 'function', i.e. their relation with the structural context, rather than as results of derivations.

However, in the current framework, certain cases of indeterminacy as to the respective roles of derivations and representations exist that call for clarification. This is particularly striking in the case of empty categories (ECs).

Assume that 'the status of a particular occurrence of an EC . . . is functionally determined' (Chomsky 1982,34). There are two different ways, Chomsky suggests, of thinking of the functional identification: either in derivational terms, i.e., 'by inspecting the pair (D-structure, S-structure)' (Chomsky 1981,328), or in representational terms, i.e., 'in

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Section 1 is a revised summary of Obenauer (1983). I am grateful to Jean-Claude Anscombe, Maurice Borel, Jean-François Bourdin, Richard Kayne, and Jean-Yves Pollock for helpful discussion, as well as to Ximena Lois and Marta Lorena Zorraqino for their help with facts from Spanish and judgments. Thanks are due to the two anonymous reviewers for their valuable comments. I also gratefully acknowledge a grant from the Deutsche Forschungsgemeinschaft which enabled me to do work at MIT during the fall of 1980 and without which the present article would not exist. Last but not least, I want to thank the editors of this journal for their patience while waiting for the final version of the paper, delayed partly by my fault.

terms of properties of the structure in which [empty categories] appear' (p.323). Though Chomsky considers, in different places, that ECs can in effect be functionally identified by resorting to a single structure level, he expresses preference for the derivational identification, this being 'the principled way to proceed' (p.328), resting directly on the rule Move α and the Projection Principle.

Recent approaches to certain descriptive problems have, however, cast doubt on the adequacy of the derivational identification. Kayne (1983b), in examining cases of complex inversion in French like

- (1) *Qui a-t-il dit cela?¹
'who has-'il' said that'

has argued that in the corresponding S-structure qui_i a-t-il_i e_i dit cela, e_i, being locally bound by (inserted and leftward cliticized) il_i , is not a variable (nor is il_i itself), with the result that 'qui . . . is an operator that binds no variable', whence the exclusion of (1). In a similar vein, Pollock (1983) suggests that the ill-formedness of (3), as opposed to the acceptable (2), is to be accounted for in terms of local binding:

- (2) (Jean et Marie,) ce sont devenus de bons linguistes.
(J. and M.,) it/that have become good linguists
'(J. and M.,) they have become good linguists.'
- (3) *Jean et Marie n'étaient pas encore les linguistes que ce sont devenus plus tard.
'J. and M. were not yet the linguists that they became later.'

The relevant structure of (3) being . . . wh_i . . . [_S ce_i AGR_i devenir e_i . . .], and assuming *ce* not to be analyzable as a variable, Pollock is able to rule out the sentence under the assumption that *ce*, not the t-antecedent² wh_i of e_i, is the local binder of that empty category.

Cases (1) and (3) are analogous in that in each case a derivational relation – *qui-e* in (1), *wh-e* in (3) – becomes irrelevant. They differ, however, in that only in the latter case is the local binder *not* a t-antecedent of the EC. In other words, while Kayne's case might be interpreted simply as a principle choosing between two diverging derivational identifications of an EC, Pollock's would seem to demonstrate that the identification of the trace of *wh* in (3) in derivational terms is incorrect, and that only the representational identification, i.e., in terms of S-structure, is correct in principle. In other words, (3) seems to be one case enabling us to choose between the two a priori possible ways of 'functionally' identifying an EC.³

- (7) α is a variable if and only if
- (i) $\alpha = [_{NP} e]$
 - (ii) α is in an A-position (hence bears an A-GF)
 - (iii) there is a β that locally \bar{A} -binds α

which might be extended as follows:

- (8) α is a variable if and only if
- (i) $\alpha = [_{NP} e]$ or $[_{QP} e]$
 - (ii) α is in an A-position or (the SPEC) part of it
 - (iii) there is a β that locally \bar{A} -binds α

in order to accommodate what I shall tentatively take to be the variables in the QAD construction; I will come back to this topic at the end of this section. The clause concerning the A-GF in (7ii) has been eliminated and replaced by 'or part of it' for obvious reasons; the restriction between brackets is due to one of the anonymous reviewers.

For the rest, the past debate can be summarized as centered on the problem of the syntactic derivation of QAD structures, viz., the question whether they should be considered the result of a syntactic QP-movement process – that is, of extraction of the QP from within the postverbal NP – or whether they are generated as such in the base, with the QP already in 'preverbal' position. The latter solution, proposed in Kayne (1975,29ff) mainly for theoretical reasons having to do with restrictions on extraction operations, is plausible insofar as all of the QPs in question can appear as 'adverbs' in the preverbal position; cf.

- (9) a. Il a beaucoup rigolé.
 he has much had-fun
 'He had great fun.'
- b. J'ai trop peu dormi
 'I slept too little.'
- c. Il a trop poussé le moteur.
 'He worked the engine too hard.'

The development of trace theory has deprived this debate of much of its content. Since little seems to rest on this question – and others that have been investigated – as far as the main topic of this paper is concerned, I will simply refer the interested reader to the references cited.

1.3. *The interpretation of QAD structures*

The descriptive problem I want to address is not the derivation, but the interpretation of QAD structures, a domain of investigation not yet ap-

proached by the authors cited (with the exception of certain remarks in Milner 1978b and Haik 1982). I shall restrict myself to examining the QPs in preverbal position (cf. (5a-c)), putting aside *ne . . . pas* and the QPs in COMP; the case of *combien* will be used when necessary to highlight certain contrasts with respect to the QPs of the *beaucoup*-class. Furthermore, I will consider only NPs, which are (direct) objects, putting aside cases of moved subject NPs, as well as other, apparently prepositionless, post-verbal NPs.⁷ Correspondingly, the term QAD will henceforth be used to refer to the subdomain just delimited, unless otherwise indicated.

In accordance with the hypothesis of the central role of S-structure, particularly with regard to quantifier interpretation, it seems natural to assume that, whatever the derivation of QAD structures, it is their S-structure that should determine their interpretation – i.e., *beaucoup*, *peu*, etc. should be interpreted in the pre-verbal position. However, the answer to the question of what this means seems less clear; in other words, what is the difference in meaning between, e.g., (5a), repeated here for convenience, and the corresponding non-QAD structure (4)?

- (5) a. Max a beaucoup vendu de livres.
- (4) Max a vendu beaucoup de livres.
'Max sold many books.' (both sentences).

It seems very difficult to state the difference in a precise way. For expository reasons, I will entertain, for the time being, the opposite hypothesis:⁸ a QP outside 'its' NP is interpreted in the empty QP position of this NP. As such a hypothesis (under the assumption of previous extraction of the QP) amounts to 'putting the QP back' into its (alleged) original position, I will call it the QP Reconstruction Hypothesis. This section is devoted to demonstrating the fundamental inadequacy of the QP Reconstruction Hypothesis, and motivating another hypothesis.

1.3.1. A class of non-QAD verbs: *apprécier*, etc.

The first category of facts I shall be concerned with are the following instances of QAD, all of which are unacceptable:⁹

- (10) a. *Le critique a peu apprécié de films.
'The critic appreciated few pictures.'
- b. *Son regard a beaucoup impressionné de minettes.
'His glance impressed many girls.'
- c. *La réorganisation a beaucoup accéléré de procédures.
'The reorganization sped up many procedures.'
- d. *La nouvelle a beaucoup inquiété d'experts.
'The news worried many experts.'

- e. *Une fois installé loin de la ville, il a beaucoup regretté d'amis.
'Once settled far from the town, he missed many friends.'

These sentences are ill-formed though they are structurally identical to (5a-c). The crucial element, it turns out, is the verb: while a great many verbs can properly appear in the structure . . . QP V [QP *e*] de . . . , a certain number of verbs cannot. Such a restriction is unexpected under the QP Reconstruction Hypothesis, since reconstruction does not, in general, seem to depend on lexical properties. Notice that ill-formedness does not obtain with separate *combien*:

- (11) a. Combien a-t-il apprécié de films?
'How many films did he appreciate?'
b. Combien a-t-il impressionné de minettes?
'How many girls did he impress?'
etc.

I will return to the reason of this well-formedness later.

Clearly, the QP Reconstruction Hypothesis, claiming that the QP in (10a-e) is interpreted in the postverbal [QP *e*] position, is unable to account for the status of these sentences, unless made sensitive, ad hoc, to the presence of the verbs in question. The reason is that the parallel structures with the QP inside the object NP are perfect:

- (12) a. Le critique a apprécié peu de films.
b. Son regard a impressionné beaucoup de minettes.
c. La réorganisation a accéléré beaucoup de procédures.
d. La nouvelle a inquiété beaucoup d'experts.
e. Une fois installé loin de la ville, il a regretté beaucoup d'amis.

Another possibility that comes to mind is to assume some kind of 'opacity' created by the verbs in (10), which would prevent correct binding of the empty QPs by their antecedents in pre-verbal position. But such an approach suffers from a deficiency analogous to the one of the QP Reconstruction Hypothesis: the 'opacity' effect cannot be related, it seems, to any independently established property of the verbs, and they must therefore be marked ad hoc.

In order to *explain* the restriction at work in (10), the best possible hypothesis would be made up, it seems, of two parts:

- A. it is the S-structure position of the QP that distinguishes (10) and (12);
B. the restriction(s) on the verb follow from A.

In other words, rejecting recourse to verb marking ad hoc leads us to abandon the QP Reconstruction Hypothesis. I will therefore assume that there is a rule interpreting the separate QP *in situ*. How can this move allow us to explain (10)?

1.3.2. The QP-V relation

In order to clarify the relation between the QP and the verb, let us put aside the QAD construction for the moment and turn to the 'adverbial' use of the QP, which we have already seen illustrated in (9). Consider this use in (13) and (14):

- (13) a. Il a beaucoup vendu ce modèle.
'He sold this model a lot.'
- b. J'ai beaucoup rencontré Jean-Pierre.
'I met Jean-Pierre a lot.'
- c. Il a beaucoup photographié Linda.
'He photographed Linda quite often.'
- (14) a. J'ai beaucoup apprécié ses conseils.
'I appreciated his advice a lot.'
- b. Son regard m'a beaucoup impressionné.
'His glance impressed me a great deal.'
- c. Cela a beaucoup accéléré la procédure.
'That sped the procedure up a lot.'

Comparing (13) and (14), we find a crucial difference in the interpretation of the QP-adverbs: in (13) they have the meaning 'often' ('many times'), but in (14), they are interpreted as 'intensely', and the 'x times' interpretation is not possible. Analogously, *peu* would be interpreted, in place of *beaucoup*, as 'seldom', 'few times' in (13), but as 'little intensely' in (14), and analogous remarks apply to *trop*, *assez*, etc.

These differences in interpretation are related to certain properties of the verbs: the ones in (14) (and (10)) belong to the class of 'degree verbs' (Bolinger 1972) with which 'manifestations of degree and intensity' (p.15) can be associated by means of 'intensifiers' that 'scale . . . a quality, whether up or down or somewhere between the two' (p.17). This is not the case with the verbs in (13), and the exclusion of the 'intensely'-type interpretation with these verbs, therefore, comes as no surprise.¹⁰

On the contrary, the fact that the verbs in (10) and (14) do not accept the interpretation of *beaucoup*, *peu*, etc. as 'x times' is very surprising, as the meaning 'often' is not, of itself, in the least incompatible with these verbs: we can easily obtain it by using *souvent*, *fréquemment*, *rarement*, etc. instead of *beaucoup*, *peu*:

- (15) a. J'ai souvent apprécié ses conseils.
 b. Son regard m'a souvent impressionné.
 c. Cela a fréquemment accéléré la procédure.

(glosses the same as for (14a-c), substituting 'often' for 'a lot')

The paradigm (13)-(15) shows that, among the two possible interpretations of the QP-adverb, the verbs of what I shall call the *apprécier*-class select the 'intensely'-type interpretation, to the exclusion of the other.

Surprisingly enough, at first sight, the contrast between (13) and (14) is mirrored in the choice of verb modifiers in a language like German. Here, pre-verbal *beaucoup* has two equivalents, depending on the interpretation: *viel* ('often') and *sehr* ('intensely'; *sehr* is otherwise an adjectival modifier: *sehr alt* 'very old'):

- (16) a. Er hat dieses Modell viel verkauft.
 b. Ich bin Jean-Pierre viel begegnet.
 c. Er hat Linda viel fotografiert.

(glosses as for (13a-c))

- (17) a. Ich habe seine Ratschläge sehr /*viel geschätzt.
 b. Sein Blick hat mich sehr /*viel beeindruckt.
 c. Das hat das Verfahren sehr /*viel beschleunigt.

(glosses as for (14a-c))

- d. Diese Tatsache hat die Fachleute sehr /*viel beunruhigt.
 'This fact worried the experts a lot.'
 e. ... hat er seine Freunde sehr /*viel vermisst.
 '... he missed his friends a lot.'

Though *viel* may mean 'often', it is not possible with the verbs of (17); however, as in the French case, they accept the (non-QP) adverb *oft* with precisely this meaning:

- (18) a. Ich habe seine Ratschläge oft geschätzt.
 b. Sein Blick hat mich oft beeindruckt.
 c. Das hat das Verfahren oft beschleunigt.
 d. Diese Tatsache hat die Fachleute oft beunruhigt.
 e. ... hat er seine Freunde oft vermisst.

(glosses as for (17a-e), with 'often' instead of 'a lot')

The French and German examples show that there exists a close relation between the verb and its QP modifier, a hardly surprising fact. Less trivial is the particular restriction imposed by the verb on the modifier, and the striking parallelism between the two languages in this respect. Whatever the precise nature of the restriction, I will consider it to follow from a property, yet to be made precise, of certain verb meanings, a view supported by the observation that English exhibits an analogous restriction applying to *a lot*:¹¹

- (19) a. During that year, I saw Mary a lot.
b. I appreciated his advice a lot.

- (20) I appreciated his advice quite often.

Once more, with verbs like *appreciate*, the QP-adverb cannot mean 'often', but only 'intensely', though the adverb *often* is possible with *appreciate*.

I will assume, without going into details which are not relevant to my topic, that a device of Universal Grammar (UG) determines the possible interpretation of a QP-adverb on the basis of the relevant property P of the verb that the QP modifies, P being part of, or following from, the meaning of the verb. As a result, the QP-adverb *viel*, which can only mean 'often', will be excluded with verb meanings like that of *apprécier*; *beaucoup* (and *a lot*), being, in principle, ambiguous between 'often' and 'intensely', are admitted, but only with the latter meaning.¹²

1.3.3. The Verb Quantification Hypothesis (VQH)

Let us now turn back to the French QAD construction. We have singled out the *apprécier*-class of verb meanings in two areas: with respect to the QAD construction (cf. (10)) and with respect to the 'adverbial' QP. This allows us to formulate the following descriptive generalization: the verbs that do not allow QAD are those whose meanings impose the 'intensely'-type interpretation for *beaucoup*, *peu*, etc., excluding at the same time the 'often'-type interpretation. It seems, then, that QAD is conditioned by the 'quantifiability' of the verb meaning, i.e., its ability to lend itself to an 'X TIMES V' interpretation when combined with a QP. Now, it is easy to make the possibility of QAD follow from the relation between QP and V by introducing this relation into the analysis of the QAD construction. Consider the following informal hypothesis, which I will call the Verb Quantification Hypothesis (VQH):

- (21) In the structure: . . . QP V [_{NP} [_{QP} e] de \bar{N}] . . .
the quantified interpretation of [_{NP} e de \bar{N}] is obtained through
quantification of V (in terms of 'X TIMES').

on the verb meaning does not need to be learned, since it follows from the primitive restriction on QP interpretation that must in any case be part of the grammar.

1.3.4. Some consequences of the Verb Quantification Hypothesis

I have presented at some length, in the preceding paragraphs, the basic QAD facts and an analysis that they seem to strongly motivate. This analysis makes a certain number of non-trivial predictions which turn out to be correct, and which I have exposed in detail elsewhere (see Obenauer 1983). I will therefore restrict myself in the remainder of this section to a brief presentation of some consequences of this analysis.

Let us consider the following type of prediction, which derives from the most salient feature of the VQH, namely, that successful quantification in QAD structures requires the event denoted by the verb to occur 'MANY/FEW, etc. TIMES', i.e., a certain number of times (recall note 13). It is therefore to be expected that if multiple occurrence of that event is in contradiction with the (linguistic or pragmatic) context, the sentence will be unacceptable. Consider the following example:

- (23) a. { Dans cette marmite }
 b. { En soulevant le couvercle } il a trouvé beaucoup de pièces d'or.
 { 'In this pot }
 { 'By lifting up the cover } he found many gold coins.'

In (a) as well as in (b), the context strongly suggests uniqueness of the discovery; use of the QAD construction with pre-verbal *beaucoup* should therefore be impossible. This is indeed what we find:

- (24) a. { *Dans cette marmite }
 b. { *En soulevant le couvercle } il a beaucoup trouvé de pièces d'or.¹⁵

As the VQH does not concern the QAD with *combien*, uniqueness of the event should not be required in (25), which contrasts, as now expected, with (24):

- (25) Combien a-t-il trouvé de pièces d'or { dans cette marmite }
 { en soulevant le couvercle } ?

Observe, on the other hand, that by changing the adverbial expressions (irrelevantly to *combien*) in (23), we get the perfect (26):

- (26) a. { Dans cette caverne }
 b. { En cherchant partout } il a beaucoup trouvé de pièces d'or.
 'In this cave / By searching everywhere . . .'

which have, of course, their analogue, also well-formed, with the QP inside the object NP.

As a second consequence, the multiplicity-of-events requirement at once excludes from the QAD construction pre-verbal QPs which do not allow such an interpretation, whence, among many other cases, an explanation for the contrast between (27a) and (27b), pointed out by Milner (1978b,691); (27b) is now excluded along with (27c):

- (27) a. J'ai abondamment lu $\left\{ \begin{array}{l} \emptyset \\ *de \text{ livres.} \end{array} \right\}$
 b. 'I read abundantly \emptyset / (of) books.'
 c. *Je suis abondamment allé à la piscine.
 'I went abundantly to the swimming pool.'

Notice that this explanation is independent of the ill-formedness of the parallel form with the adverb inside the NP:

- (27) d. *J'ai lu abondamment de livres.

as evidenced by the *un peu* paradigm, mentioned in Obenauer (1978, 392ff):

- (28) a. Il a pris un peu de crème.
 'He had some cream.'
 b. *Il a un peu pris de crème.
 c. Il s'est un peu reposé.
 'He rested a little.'

(28b) is excluded though the 'canonical' form (28a) is well-formed, and though *un peu* can occur in the pre-verbal position (cf. (28c)). The ill-formedness of (28b) follows from the VQH, since *un peu* is [-count], i.e., incompatible with an 'X TIMES' interpretation ((**un peu de fois*, (**un peu de journaux*)).

Third, the multiplicity-of-events requirement determines the kind of quantificational interpretation (in the technical sense) that well-formed QAD structures are assigned. It is immediately obvious that the predicate cannot apply to a non-decomposed set of elements; hence, plurality ('group') interpretation is impossible.¹⁶ The predicate rather applies to subsets of the whole set of elements affected, corresponding to the different events. As a result, a pseudo-distributive reading obtains of which the strictly distributive reading is a possible subcase (i.e., when the cardinality of events equals that of elements); hence, the difference in interpretation between (a) and (b) in (29):

- (29) a. Le maire a $\left\{ \begin{array}{l} \text{salué beaucoup} \\ \text{beaucoup salué} \end{array} \right\}$ de sportifs.
 · 'The mayor greeted many sportsmen.'

While (b) means that there were many sportsmen (individually) welcomed by the mayor, only (a) can also be interpreted as saying that the mayor addressed his greetings to a whole crowd of people; for more details, see Obenauer (1983).

1.3.5. On enforcing VQH by Universal Grammar

In addition to (10), the original motivation of the VQH, the facts just reviewed in (23)-(29) constitute further evidence in favor of the QAD-QPs being interpreted *in situ*, rather than in the hypothetical reconstruction position. While I must leave open for the moment the question of which principle of UG excludes the second possibility, I will answer another question raised by a property of QAD with respect to UG. Under 'QP interpretation *in situ*' alone, the following contrast comes as a surprise:

- (30) a. Il en a beaucoup rencontré /*apprécié.
 'He met/ appreciated many of them.'
 b. Il les a tous rencontrés / appréciés.
 'He met / appreciated all of them.'

We should expect *beaucoup* and (leftward moved) *tous* to behave alike. As shown in Obenauer (1983,85ff), the desired distinction is drawn if we assume that *tous* is (rather like) an operator, i.e., that it resembles *combien*, as opposed to the QP-adverbs of the *beaucoup*-class, which are non-operators. *Tous*, like *combien*, then, binds a variable, and we obtain a 'for every x , . . . x . . . ' interpretation in both cases of (30b); *beaucoup* binds a non-variable, i.e. a (kind of) anaphor, such that the only possible quantification is the one expressed by the VQH, whence the contrast in (30a). In order to obtain this result, we must modify clause (iii) of the definition of 'variable' in (8) as follows:

- (8) (iii') α is locally bound by an operator.

Another argument to this effect, based on independent evidence, is given in Kayne (1983b,107f); cf. also Chomsky (1981,102; 1982,35f).

To summarize: I have argued that the QAD construction, quite specific to French, can be accounted for in a revealing way by the Verb Quantification Hypothesis, in combination with the assumption that there are (plausibly universal) restrictions on the interpretation of QP-adverbs,

restrictions which are determined by verb meanings. The status of the empty QP inside the post-verbal NP depends on its binder: bound by the operator *combien*, it is a variable; bound by the non-operators *beaucoup*, *peu*, etc., it is an anaphor, under the revised definition of variables.

2. QAD AND THE FUNCTIONAL IDENTIFICATION OF ECS

2.1.

In the introduction, I dwelt on the indeterminacy of the functional identification procedure with respect to the two a priori possible approaches. Clearly, we want to know if the two are empirically distinguishable or not, and in case they are, which should be considered the correct one.

Before turning to empirical investigation, we might ask why it should be the case that both approaches are equivalent, if this were how things are. The obvious answer is that this would follow from local binding simply reproducing movement. Potential instances of discrepancy, then, are easy to imagine: they will be cases where locality, configurationally defined on the basis of S-structure coindexing, comes into conflict with derivational relations (as in (1) and (3) in the introduction). I will be concerned here with a different case of configurational locality.

Consider the following structure:

(31) ... A ... B ... *e* ...

with A and B potential *X*-binders of the EC (therefore *c*-commanding it), and the EC the trace of A. Take Chomsky's (1981,184f) definition of '*X*-binding':

- (32) (i) α is *X*-bound by β if and only if α and β are coindexed, β *c*-commands α , and β is in an *X*-position
 (ii) α is *X*-free if and only if it is not *X*-bound
 (iii) α is locally bound by β if and only if α is *X*-bound by β , and if γ *Y*-binds α , then either γ *Y*-binds β or $\gamma = \beta$
 (iv) α is locally *X*-bound by β if and only if α is locally bound and *X*-bound by β .

By virtue of (i), the EC in (31) is *X*-bound by A if the EC is coindexed with A; by (iv) the EC is locally *X*-bound by A if B's index is different from A's (and the EC's). But if B has the same index as A (and the EC), the EC is locally *X*-bound, not by A, but by B (this is the case with (3),

above, if Pollock is correct). The same result obtains if, *contrary to (i)*, we disregard coindexing: as before, the EC is locally *X*-bound by its t-antecedent A if the derivation is taken into account; but if the EC is identified in terms of S-structure alone, its local *X*-binder is the potential binder B.

2.2. Pseudo-opacity

I will now complement the analysis of the QAD construction I began in section 1. We established there that there is good reason to think that in the QAD construction involving *combien*, this QP is not affected by the Verb Quantification Hypothesis – more precisely, that *combien* can be extracted from its NP and moved directly into COMP without the preverbal QP-position being (syntactically or interpretively) involved. Consider the following sentences containing a *combien*-object NP and a QP-adverb:

- (33) a. Combien de livres as-tu beaucoup consultés?
 'How many books did you consult a lot?'
 b. Combien de collègues a-t-il beaucoup rencontrés?
 'How many colleagues did he meet often?'
 c. Combien de voitures as-tu peu conduites?
 'How many cars did you drive rarely?'

Wh-movement of *combien* alone from the object position is a priori expected to lead to grammatical sentences. The reason is that under current assumptions about coindexing between *wh*-moved elements and their traces (cf., for example, Chomsky 1980,26,37; 1981,330), the structure resulting from such movement should be (34):

- (34) $[QP_i \text{ combien}] \dots \text{ beaucoup / peu } V [NP [QP_i e] \dots]$

However, as pointed out in Obenauer (1976,65), such sentences are ill-formed; cf. (35):

- (35) a. *Combien as-tu beaucoup consulté de livres?
 b. *Combien a-t-il beaucoup rencontré de collègues?
 c. *Combien as-tu peu conduit de voitures?

As also noted there, the demonstration of the extractability of *combien* from the object NP precludes the (imaginable) hypothesis that these sentences are ungrammatical 'because separate *combien* must originate in the pre-verbal position' (which is here filled by another QP-adverb).

We might again think of a case of 'opacity', due this time to the QP-

adverb, and preventing extraction of *combien*. However, as in the case of *apprécier*, I will not appeal to this notion. Once more, this 'pseudo-opacity' is too restricted: extraction is perfectly possible for NPs (cf. (33) or (36a), as well as (46) below) or PPs (cf. (36b,c)), to limit examples to the inside of VP:

- (36) a. Qui a-t-il beaucoup rencontré?
 b. Avec qui a-t-elle beaucoup joué?
 'Who did she often play with?'
 c. un hôtel dans lequel ils sont beaucoup descendus . . .
 'a hotel at which they often stayed. . .'

It is only extraction of another QP that the pre-verbal QP-adverb blocks. Therefore, another explanation should be sought for the role played by the QP-adverb.

Before tackling this question, it is useful to ask whether the same restriction is at work in the case of the verbs excluding the 'X TIMES' interpretation of *beaucoup*, etc. One might expect the non-quantifying QP-adverbs to behave like the manner adverbs that are semantically close to them in (37), and therefore not to interfere with the extraction of the QP *combien*. In fact, there is a clear contrast between (37) and (38):¹⁷

- (37) a. Combien a-t-il passionnément aimé de femmes?
 b. ?Combien a-t-il modérément apprécié de films?
 c. ?Combien a-t-il profondément impressionné de minettes?
 d. ??Combien la nouvelle a-t-elle fortement inquiété d'experts?
 ' . . . passionately / moderately / deeply / strongly . . . '
- (38) a. *Combien a-t-il beaucoup aimé de femmes?
 b. *Combien a-t-il peu apprécié de films?
 c. *Combien a-t-il beaucoup impressionné de minettes?
 d. *Combien la nouvelle a-t-elle beaucoup inquiété d'experts?

The pre-verbal QP-adverbs thus behave uniformly with respect to the extraction of *combien*, independently of their interpretation. What seems to follow from this observation is that the reason of the ill-formedness of pseudo-opacity structures is not to be related to the interpretation of *beaucoup*, etc., as quantifiers ('X TIMES'); rather, it should be sought in some property independent of this meaning – categorial status, as I see it.¹⁸

2.3. Local binding reconsidered. Potential binders

We are ready now to deal with the question of how to exclude (35) as well as (38). Notice first that one obvious approach is excluded, namely, the hypothesis that pseudo-opacity is a logico-semantic constraint prohibiting a quantification of a certain type (i.e., the 'X TIMES V' type) inside a quantification of the *combien . . . de N* type (whatever the potential particular properties of this type could turn out to be with respect to standard *wh* quantification). Such a hypothesis might, a priori, be able to establish the difference between (35) and (33)/(36), but it is not sufficiently general if it is correct to assume that the 'intensifier' creates the same pseudo-opacity in (38) as the 'quantifier' in (35), a view strongly suggested by the data in (38).

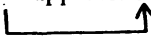
Let us therefore turn to another kind of hypothesis, and consider the following line of reasoning: the trace of a quantifier A is locally bound by its nearest *potential binder*, be it by A itself or by a closer potential binder B. If, as a consequence, the quantifier A does not bind anything, the resulting sentence is excluded on the grounds that an operator *must* bind a variable at LF.¹⁹ Under these assumptions, in (35a), with the relevant structure (39),

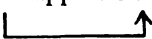
(39) [QP *combien*] ... [QP *beaucoup*̄] ... [QP *e*] ...

e, though it is the trace of *combien*, is locally (\bar{A} -)bound by *beaucoup*; *combien* binds nothing. (I will put aside for the moment the possibility of a doubly \bar{A} -bound trace; this question will be taken up in section 2.4.) We obtain the opacity-like effect as desired: since the QPs *beaucoup*, etc. are not potential binders for ECs with different categorial status, NPs, PPs, and other categories undergo (*wh*-)movement without any problem, as shown by (33) and (36). If we can sustain this approach, we get a clear argument to the effect that (\bar{A} -)binding relations are representational in nature, and, therefore, in favor of the representational, and against the derivational, identification of empty categories.

Two questions arise at this point: first, what is the status of the co-indexing requirement in Chomsky's (1981; cf. (32i)) definition of *X*-binding, with which the 'absolute' approach being developed here is in contradiction; second, how can it be that *beaucoup*, *peu*, etc., bind the trace of *combien* in (38) if they cannot quantify there? I will take up the coindexing problem in section 2.5. and turn directly to the latter question.

We are apparently faced with the following contradiction: the relation QP-*e* indicated by the arrow seems to be possible in (40), but not in (41):

(40) combien a-t-il peu apprécié *e* de films


(41) il a peu apprécié *e* de films


Binding of the EC in (40) by *peu*, not *combien*, was invoked in order to exclude that sentence (cf. (38b)); (41) is to be ruled out because there is no quantificational relation, via the verb, between *peu* and *e* (cf. (10a)).

In fact, under the local binding approach to pseudo-opacity, we have to distinguish two different relations involved in (40)-(41). The hypothesis leads us to consider that, on the one hand, syntactic binding (at S-structure) obtains in (35) as well as in (38), and that it is a necessary but not a sufficient condition for the well-formedness of QAD-structures. On the other hand, such structures require successful quantification of the V, realized conceivably at LF (or at a later stage) on the basis of the QP-V relation. Syntactic binding is not, but semantic quantification is, sensitive to the QP-V relation. When binding as well as quantification obtain, the QAD construction is well-formed.²⁰

The assumption that there exists an asymmetry between the binding relation and the quantificational relation is confirmed by the following facts. For reasons I discuss elsewhere,²¹ QAD with the QPs of the *beaucoup*-class is limited to NPs that are arguments of the verb; *combien*, however, can quantify 'into' other postverbal NPs. Consider the verb *applaudir* 'to applaud':

- (42) J'ai beaucoup applaudi Marie.
 'I applauded Marie a lot.' ('intensely' or 'many times').
- (43) J'ai beaucoup applaudi de concurrents.
 'I applauded many competitors.'
- (44) *J'ai beaucoup applaudi de fois.
 'I applauded many times.'
- (45) Combien (l')as-tu applaudi(e) de fois?
 'How many times did you applaud (her)?'

Now, if *beaucoup* induces pseudo-opacity even with respect to NPs into which it can never quantify, our assumption concerning the two different relations is reinforced. This is indeed the case:

(46) *Combien de fois (l')as-tu beaucoup applaudi(e)?*
 'How many times did you applaud (her) a lot?'

(47) **Combien (l')as-tu beaucoup applaudi(e) de fois?*²²

From their uniform behavior with respect to pseudo-opacity, we have seen that in a fundamental respect, the 'quantifying' and 'intensifying' instances of the QPs are alike: viz., with respect to their binding property. Both can bind, and moreover *must* bind, an empty QP if there is one. The absence of a difference between them strongly suggests that they are one and the same element.

We have thus been led to a maximally simple hypothesis about the lexical quantifiers at hand. Not only are the 'quantifier' and the 'intensifier' the same element with respect to pseudo-opacity, but furthermore the QP is the same, whether it binds an EC or whether it is used 'adverbially', i.e., without there being an EC bound by it – this was in effect the central assumption of the Verb Quantification Hypothesis. The notion 'potential binder', which is central in the analysis of the preceding pseudo-opacity facts (as well as of those in the following subsection) receives plausibility from this identification: these QP-adverbs can occur without binding a trace, like ordinary adverbs, or as binders of an empty QP they c-command.

2.4. Further effects of local \bar{A} -binding on QAD-structures

I have introduced the following assumptions:

(\bar{A} -bound) ECs are identified functionally, in 'absolute' representational terms, i.e., without regard to coindexing;
 potential (\bar{A} -)binders are obligatory binders for present ECs.

There are other cases besides (35) and (38) on which these assumptions bear. Consider the contrast in the interpretation of *beaucoup* in (48) and (49):

(48) *il en a beaucoup aimé* [_{NP} [QP *e*] [\bar{N} *e*]]

(49) *il en a beaucoup aimé* [_{NP} [QP *beaucoup*] [\bar{N} *e*]]

In (49), to which I turn first, the pre-verbal *beaucoup* has no empty QP to bind, and it has the preferential interpretation 'intensely': 'He loved very much many of them'. In (48), however, there is an empty QP: the potential binder *beaucoup* must bind it, QAD obtains, and the sentence is

interpreted as ‘He loved many of them’; the a priori also possible interpretation ‘He loved very much (unspecified number) of them’ is correctly excluded. In other words, for some reason *Z*, the pre-verbal *beaucoup* in (48) cannot be interpreted as ‘simple adverb’ (as it is in (49)), added to the well-formed sentence *Il en a aimé* ‘He loved (unspecified number) of them’; the reason *Z* is interpreted here as the obligatory binding of the empty QP in that object NP by *beaucoup*.²³

Let us finally consider (50), a structure largely parallel to (51), a case of pseudo-opacity as seen in section 2.3:

(50) combien il en a beaucoup aimé [_{NP} [QP *e*] [_{N̄} *e*]]

(51) combien il a beaucoup aimé [_{NP} [QP *e*] [_{N̄} de femmes]]

On the same grounds that (51) is excluded – *beaucoup* must bind *e*, there is nothing to be bound by *combien* – we would expect (50) to be ill-formed. But the sentence *Combien en a-t-il beaucoup aimé?* is well-formed for many speakers, and intermediate for others, with *beaucoup* interpreted as ‘intensely’: ‘How many of them did he love much?’ In fact, the acceptability of the sentence does not contradict the analysis of pseudo-opacity, since it has a second structure, (52), which is parallel to (53):²⁴

(52) [_{NP} combien [_{N̄} *e*]] il en a beaucoup aimé [_{NP} *e*]

(53) [_{NP} combien de femmes] il a beaucoup aimé [_{NP} *e*]

In (52), there is no empty QP to be bound by *beaucoup*: the object NP has been moved as a whole, and the resulting structure is well-formed with respect to pseudo-opacity.²⁵

The structures considered so far were all of the type

(54) A ... B ... *e*

where, speaking in derivational terms, the EC was bound by A, but it appeared to be actually bound by B. The question arises of how locality ‘works’ when there is an equal number *n* of potential binders and empty elements.

This question is interesting for another reason. Notice that a different approach than the one just outlined in terms of ‘purely local’ binding (i.e., without reference to coindexing under movement) could be consistent with the pseudo-opacity data in (35)-(53). Under this alternative approach, the QP-trace would be locally bound, by virtue of the deriva-

(56) is the starting point; (57) shows that there is no a priori semantic incompatibility between the two quantifications. The ill-formedness of (58) might follow from the assumption that *e* in *e de fois* is not governed by the verb because of the intervening NP *e de fraises*. The government requirement seems, however, to be weaker in the case of this adverbial NP, as shown by (60):

- (60) ?Combien as-tu vu Marie de fois?
 'How many times did you see Mary?'

and removal of the object NP by clitic placement in (61) seems to result in the required government relation, across the trace of the clitic:

- (61) Combien l'as-tu vue de fois?

Given (60)-(61), the total unacceptability of (59) can clearly not be attributed to a hypothetical ECP violation by the QP in *e de fois*; rather, we are forced to discard the conservative hypothesis. The trace of *combien*, we must conclude, is not locally bound by *combien*, as the hypothesis predicts, but by the intervening *beaucoup / trop*, though *beaucoup / trop* is already the local binder of the empty QP directly following the verb (this will exclude (58), too, independently of the ECP aspect). But this is precisely the result we expect under the 'absolute' hypothesis in purely representational terms: it is the closest (categorially appropriate) c-commanding element that binds e_1 as well as e_2 , but such multiple binding is (weakly) ruled out by the Bijection Principle if it is suitably generalizable to non-operator \bar{A} -binders like *beaucoup*; furthermore, and more importantly for my purpose, (58)/(59) are excluded because of vacuous quantification since *combien*, as in the preceding pseudo-opacity cases, binds no variable.

An interesting feature of the result at which we have arrived is that an S-internal trace of *combien* (and, plausibly, of any *wh*-phrase) is not recognizable by itself as a *wh*-trace. Such traces, then, do not seem to bear a feature [*wh*-] of the kind considered in Chomsky (1981, 323,330) – a conclusion supported by the analyses in Kayne (1983b) and Pollock (1983) mentioned in the introduction, above.²⁷

2.5. Coindexing and local binding

I have explicitly assumed that 'the trace of a quantifier A is locally bound by its nearest potential binder, be it by A itself or by a closer potential binder B' (cf. section 2.3). Part of this assumption was that indices assigned under movement are irrelevant to local binding, or that there are no

such indices at all; I will in fact adopt the latter position. *Local binding, then, does not depend on coindexing*, but on the presence of a potential binder; coindexing is a consequence of, and expresses, local binding. This is the basis of what I have called the 'absolute' version of the Functional Identification Hypothesis.

So far, I have considered the problem of trace coindexing only with respect to \bar{A} -binders. Let us now broaden the question and ask if a potential A-binder of a trace must bind it, under locality, in the same way an \bar{A} -binder must. The answer is no; there is a crucial difference between the two types of potential binders. Consider a sentence like (62):

- (62) a. (Je ne sais pas) qui Max a vu [_{NP} *e*]
 b. (I don't know) who Max has seen [_{NP} *e*]

Max is a potential binder of the empty NP (recall we have seen that a *wh*-trace is not recognizable as such), and it is its potential local binder, as compared with *qui / who*, by virtue of (32iii). If *Max*, as potential local binder, had to bind the trace, (62) could not be well-formed; it would be excluded both as a violation of the θ -criterion²⁸ and as an instance of vacuous quantification.

Contrary to potential \bar{A} -binders then, potential A-binders do not become obligatory binders, under locality. This is what distinguishes (62) from the derivationally similar pseudo-opacity case *combien ... beaucoup ...* [_{QP} *e*], where *beaucoup* is no more coindexed, by derivation, with the empty QP than *Max* in (62) with the empty object NP.

There do exist cases, however, where an A-binder not only can, but must, bind the trace whose potential local binder it is. Let us consider again the example from Pollock (1983), quoted in the introduction (my (3)), with the relevant structure

- (63) *wh* [_S *ce* AGR (devenir) *e*]

Recall that for the structure to be correctly ruled out, Pollock assumes it crucial that *e*, the *wh*-trace, be locally bound by the subject *ce*. But the obligatory character of this A-binding follows from an independent reason, he shows: number agreement in (3)/(63) between AGR and *e* on the one hand, and nominative assignment to *ce* on the other hand, require the existence of a chain (*ce*, *e*). We might then assume that in the ideal case, A-binding is free in the sense that potential A-binders can 'choose' to bind an empty category or not; in other words, indices can ideally be assigned freely at S-structure, and independent principles like θ -/Case theory, agreement theory, etc., insure the required filtering.²⁹

On the contrary, in the case of \bar{A} -binders, overgeneration under free

indexing at S-structure is not compensated analogously; consider again the pseudo-opacity structure, under the supplementary assumption that *beaucoup*, as a potential binder, is assigned an index freely: given the general well-formedness of structures of the form $wh_i \dots beaucoup_j \dots e_i$ – as illustrated by (33), (36), (46), (57) – nothing seems to exclude $combien_i \dots beaucoup_j \dots e_i$ if not the special property of the \bar{A} -binder *beaucoup* itself, binding independently of existing indices.

To summarize, then, I have proposed in this section that the particularly selective, category-based ‘opacity’ induced by QP-adverbs be considered a case of vacuous quantification, due to the intervention of the QP-adverbs as potential binders of the trace of *combien*. I have argued that *a*) potential \bar{A} -binders (more correctly, perhaps, scope assigning binders), contrary to potential A-binders, are obligatory binders for the EC with respect to which they meet the locality condition (32iii), independently of any indexing; *b*) empty categories are contextually (‘functionally’) identified at S-structure, in purely representational terms. These two assumptions, taken together, constitute the ‘absolute’ version of the Functional Identification Hypothesis (FIH), which gives a revealing account, I claim, of the whole range of pseudo-opacity cases and related structures I have been considering.³⁰

3. THE FUNCTIONAL IDENTIFICATION OF EMPTY CATEGORIES REVISED

3.1. An apparent counterexample

In spite of its descriptive success and a certain naturalness, the Functional Identification Hypothesis in its ‘absolute’ version might be thought to face a serious problem given the existence of constructions of the type (64) (slightly to very marginal in English, (rather) well-formed in Italian, as is well known – cf. Rizzi (1982a):

- (64) a. the man [who [I don’t know [who [e knows e]]]]
 b. l’uomo [*wh*-phrase che [non so [chi [e conosca e]]]]

(Cf. Chomsky 1981, 186, where this example is taken from, for the differing properties of (a) and (b).)³¹

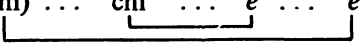
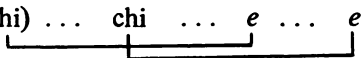
The structures in (64) seem quite parallel to (58)/(59), the pseudo-opacity cases involving two \bar{A} -binders in section 2. Under the absolute version of the FIH, the *prima facie* conclusion would be that the lower *who/chi* in (64) is necessarily the local binder of both the pre- and the post-verbal trace; consequently, there should be no means for either trace to be locally bound by the *wh*-phrase in the higher COMP (i.e., the relative

one). Both sentences seem to be incorrectly excluded in the same way, viz., because of vacuous quantification; furthermore, as a consequence of the apparently predicted \bar{A} -binding relations, the post-verbal trace, an R-expression, is A-bound by the pre-verbal trace and thereby violates Principle C of the Binding Theory (or, in the framework adopted here, cannot be operator-bound, i.e., cannot be a variable). In short, if (58)/(59) and (64) were really parallel structures, the 'absolute' version of the FIH would lead to contradictions definitely disqualifying it.

There is, however, an important difference between (64), on the one hand, and the French pseudo-opacity cases which motivated our statement of the FIH at the end of section 2, on the other hand. This difference lies precisely in the (*wh*-)island character of (64), which the previous examples do not share; I will consider it crucial for the issue and attempt to argue in favor of the correctness of such an approach. As a result, the FIH as stated in section 2 will come out that much stronger.

Let us then tentatively continue to assume the correctness of the FIH as stated. I will try to show that the hypothesis in effect does not exclude the island sentences. In doing so, I will concentrate for the moment on the case of Italian; the reason is that the ambiguity of (64b) with respect to the \bar{A} -binding possibilities is removed, irrelevantly to my purpose, in English (as in other non-pro-drop languages).³²

To begin, let us ask what it is that prevents the FIH from excluding (64) in the way 'expected'; in other words, what accounts, in the face of the pseudo-opacity cases, for this case of 'transparency', with the binding possibilities for the ECs as indicated (under the hypothesis of subject extraction from the post-verbal position (cf. Rizzi 1982a, ch. IV), the 'crossing' configuration (65b) becomes a 'nesting' one, à la (65a)):

- (65) a. (chi) ... chi ... e ... e

 b. (chi) ... chi ... e ... e


The answer we obviously have to give, according to the FIH, is this: the overt operator *chi* is not a potential binder, in the sense of the FIH, of both ECs at the same time, contrary to *beaucoup* or *trop* in (58)/(59). This partial inability of binding, which we have to account for, is what rescues the sentence from exclusion by the FIH, and should be related to its *wh*-island character. Furthermore, this of course implies that the EC not bound by *chi* can enter into a binding relation with the operator outside the island.³³

This directly leads to the assumption that one of the two ECs (the choice being open) is not a 'simple' trace. However, 'simple' trace status

is expected as the direct and minimal consequence of the application of Move α . Let us assume that some mechanism intervenes so as to change the status of the trace in question. We could think of a rule inserting an empty pronominal into gaps created by Move α , in a way comparable to the insertion of overt elements like *there* or, in French, *il* (in cases of movement to the right as well as to the left, if Kayne (1983b) is correct). The empty pronominal in A-position will be interpreted as an argument, contrary to *there* and *il*, as long as it is (part of) a chain without distinct argument. Instead of an insertion rule, free assignment of the feature [+pronominal] would achieve the same result. Assume now that this empty pronominal may be \bar{A} -free in its minimal \bar{S} . The consequence is twofold: first, the former trace need not be bound by the operator in the same \bar{S} ,³⁴ second, being a pronominal, it can now get bound at LF by the operator outside the island. These properties are reminiscent, to some extent, of the behavior of (overt) resumptive pronouns if we assume with Chomsky (1982, 13, 60) that that strategy implies no operator-binding in the minimal \bar{S} containing the pronoun (in fact no such binding at all). In other words, the hypothesized empty pronominal functions in fact as a referentially independent pronoun, i.e., a non-anaphor, and we identify it as [+pronominal], [-anaphor], i.e., *pro*.³⁵

So far, under this approach, sentence (64) is ruled out by the FIH insofar as the optional pronominal 'insertion' has not taken place. However, the sentence is (going to be) well-formed (at LF) with an S-structure in which the *wh*-island contains one variable, locally operator-bound by the island-'creating' *wh*-phrase, and one *pro*, to be bound at LF by the *wh*-phrase outside the island. I will come back in section 3.5. to the precise interaction between the FIH and the 'insertion'.

3.2. Resumptive *pro* (I)

If the present approach to *wh*-traces in (*wh*-)islands is on the right track, then there is an answer to the question: could there be empty resumptive pronominals covering the same range of positions that (overt) resumptive pronouns cover? More precisely, can resumptive *pro* occur in positions other than the position in which (non-resumptive) *pro* is allowed?³⁶ The answer is that resumptive *pro* does in effect occur in non-subject positions. More importantly, the analysis suggests that such resumptive *pros* exist even in non-*pro*-drop languages, i.e., that English and French, for example, use them though they do not have non-resumptive *pro* (the latter, following Chomsky (1982, 82 and passim), being 'restricted to subject position [of finite clauses] in the *pro*-drop languages').

I have assumed, up to now, that (64) is well-formed, in particular with respect to the FIH, because the trace of the *wh*-phrase extracted

from the *wh*-island (*T* in what follows) can be interpreted as *pro*. In configurations of the type illustrated in (65), with two categorially (and for certain other features) identical traces of the type [_{NP} *e*], the excluding effect of the FIH is thus suspended. In general, *T*s could then still be interpreted as variables, ruled out only in particular cases à la (64), and the *pro*-interpretation of *T*s would be just a supplementary option. However, the well-formedness of (64) is also compatible with a more radical hypothesis about *wh*-islands, viz., the one that a *T* can never be a 'simple trace', i.e., a variable, at S-structure, with the consequence that a correct interpretation of such sentences is available only via the (resumptive) *pro* option. I will postpone the question why things might have to be that way to section 3.4 and turn directly to the evidence relevant to this hypothesis.³⁷

Consider the following minimal assumption (which, certainly, remains to be made more precise): *pro*, as an empty element, can assume precisely the categorial status and syntactic function of its overt counterpart. We immediately derive the prediction that *pro* is possible in the place of NP-traces (here, NP-*T*s), but not, e.g., QP-*T*s, because there does not exist a pronominal QP in Italian (nor in French or English, for example). This prediction is borne out:

- (66) So accompagnare tante ragazze sulla Torre Eiffel quante
 { ne so condurre *t* }
 { so condurre *t* } al ristorante.
 'I can show as many girls on the Eiffel Tower as I can take 'ne'
 to the restaurant.'

- (67) *So accompagnare tante ragazze sulla Torre Eiffel quante so dove
 { condurre *t* }
 { condurre *t* } a ballare.
 '... as I know where ('ne') to take to dance.'

(67), as opposed to (66), contains the trace *t* of *quante* in the interrogative *wh*-island inside the comparative clause; this trace is of the category QP and cannot be interpreted as *pro*; whence the expected contrast. Parallel facts obtain in French; cf. the following interrogatives:³⁸

- (68) ??Combien de filles sais-tu où inviter?
 how many (of) girls know-you where to invite

- (69) *Combien sais-tu où inviter de filles?³⁹

Structures like (69), then, are excluded since the required logical form (70):

subjacency approach to the Italian (and English) facts, \bar{S} is not a node that counts for the condition in Spanish (or that \bar{S} does not count the way it counts in Italian). A possible argument would then run as follows: if \bar{S} does not count, movement of a bare QP should be possible from within the island, if subjacency alone were at work. On the other hand, the pro-hypothesis predicts the same ungrammaticality in Spanish as in the Italian and French examples we saw above (cf. (67) and (69)).

The sentences in question involve the quantifier *cuánto*, which can be separated from a [-count] noun it quantifies just in case this noun is preceded by the preposition *de*: *Cuánto de vino necesitabas?* / *Cuánto necesitabas de vino?* 'How much wine did you need?'. The facts seem to confirm the pro-hypothesis against the hypothesis that subjacency alone is responsible for the ill-formedness of (67) and (69): even in the simple *wh*-island configuration (75), the QP can leave its \bar{S} as part of its NP, but not alone; cf. (76a) and (76b), respectively:⁴¹

(75) [\bar{S} ... [\bar{S} ... cuánto ...]]
 +WH +WH

- (76) a. *Cuánto de vino* { *te preguntó si necesitabas?* }
 { *no sabías a quién darle?* }
 'How much wine { *did he ask you whether you needed?* }
 { *didn't you know to whom to give?* }
 b. **Cuánto* { *te preguntó si necesitabas de vino?* }
 { *no sabías a quién darle de vino?* }

I will return to the status of this potential argument in section 3.3 and show that, while the above analysis of the facts concerning the quantifier is most certainly correct, the argument in favor of the pro-hypothesis is not conclusive.

Consider, however, the contrast in (77)-(78) (due to Koster 1978 and Huang 1982a), pointed out to me by Richard Kayne, and the analogous contrast in French, in (79)-(80):

- (77) ?Who were you wondering how to photograph?
 (78) *How were you wondering who to photograph?
 (79) ??Qui te demandais-tu comment photographier?
 (80) *Comment te demandais-tu qui photographier?

where a possible answer to (78) is '(I was wondering who to photograph) sitting on this swing'. These facts cannot be plausibly explained by sub-jacency, as noted by Huang (1982b); they can, however, be explained by the pro-hypothesis, under the assumption that there is no pro of the category ADV (which is not a pronominal category; *thus, ainsi* are not pronouns). The same type of argument can be made with parallel data that may be observed in other types of islands involving *wh*-movement.⁴² Huang (1982b) presents another analysis of such data, in which a crucial role is ascribed to the ECP; I examine this analysis in some detail in the appendix and conclude that the pro-hypothesis is to be preferred.

3.3. Resumptive *pro* (II): Bounding

Let us briefly recall the perspective in which we are considering extractions from *wh*-islands. Cases like (64) of such extractions constitute *prima facie* counterevidence to the hypothesis about functional identification of ECs developed in section 2. The assumption that the EC in question, *T*, is not a simple trace allows the FIH to be consistent with the potential counterevidence. Restricting ourselves to (64), nothing seems to rule out the possibility that the trace can optionally be a *pronominal* trace, in accordance with the typology of empty categories. Pursuing further, we found some evidence from other examples to the effect that the EC in (64) not only can be, but must be, a *pro*; in fact, that any *T* in a *wh*-island must be a *pro*. Why it should be the case that a *T* can only be a *pro* even in cases different from (64) (i.e., where the island-initial *wh*-operator is, categorially speaking, not a potential binder of *T*) is a question I will address in section 3.4.

Let us now turn to the data announced in section 3.2, where I mentioned an asymmetry between *wh*-islands in Italian on the one hand and Spanish on the other: in addition to the structures that are well-formed in Italian, Spanish allows certain other cases which are unacceptable in Italian. I will illustrate the contrast with two typical examples, in fact, translations of data of Rizzi's (1982a,54,56):

- (81) a. *Questo incarico, che non so proprio chi possa avere indovinato a chi affideró, mi sta creando un sacco di grattacapi. (= Rizzi's (13b))
 'This task, that I really don't know who might have guessed to whom I will entrust, is getting me into trouble.'
- b. Esta tarea, que realmente no sé quién puede haber adivinado a quién confiaría, me está creando problemas.

- (82) a. *Il mio primo libro, che so a chi credi che abbia dedicato, mi è sempre stato molto caro. (= Rizzi's (18b))
 'My first book, which I know to whom you believe that I dedicated, has always been very dear to me.'
- b. Mi primer libro, que sé a quién crees que he dedicado, sigue siendo mi preferido.

((81) and (82) exemplify structures (74a) and (74b), respectively.)

The asymmetry is surprising in that it suggests, at first sight, that \bar{S} is a category taken into account by the bounding theory (let us assume, by subjacency) in Italian, but not in Spanish; alternatively, that subjacency constrains extraction from *wh*-islands in Italian, but not in Spanish. In fact, both interpretations of the data seem equivalent, since it is hard to see which other category, in the absence of \bar{S} , could count for subjacency in such structures: in the absence of bounding nodes the structure would simply not be constrained by subjacency. Abstracting away from data from other domains of Spanish that might, on the contrary, suggest that \bar{S} does count for subjacency (cf., for example, Torrego 1983), let us then ask if *wh*-island extraction is really not constrained by the condition in Spanish.

Notice first that, in the light of the data seen so far, we could formulate the difference between Spanish and Italian in the following way: in 'complex' *wh*-islands, Italian only allows subject resumptive *pro* – cf. (83):

- (83) ?Questo incarico, che non so proprio chi possa avere indovinato a chi è stato affidato, . . .
 ' . . . to whom has been entrusted . . . '

(= Rizzi's (22a); to be contrasted with (81a), above); Spanish, in addition, allows non-subject resumptive *pro*. On closer inspection, however, it appears that the choice of empty non-subject positions in structures (74a, b) is limited; sentences analogous to (81)/(82), but with prepositional objects, seem to be ill-formed (judgments are said to be somewhat delicate); cf. (84a, b):

- (84) a. *Esta es la persona con quien no sé quién podría decirme si se puede contar.
 'This is the person 'with' (= on) whom I don't know who could tell me whether one can count.'
- b. *Esta es la persona en quien no sé cuánta gente ya sabe que no se puede confiar.
 'This is the person 'in' whom I don't know how many people already know that one cannot trust.'

However, prepositional objects are perfect in 'simple' island structures; cf. (85):

(85) Esta es la persona en quien no sé quién podría confiar.⁴³

If these data are representative for PPs, the difference between the two languages looks less radical: it concerns only a subset of the structures that would be expected to contrast if there were a different choice in bounding nodes counting for subjacency, i.e., if \bar{S} were not a bounding node in Spanish. In fact, the difference between Italian and Spanish reduces to the positions – subject vs. non-subject positions – where empty NPs can occur. What this difference should be attributed to I cannot see at present (for a case of an apparently well-formed 'complex' *wh*-island à la (82) even in English, see Pesetsky 1982, 581).

As far as Spanish alone is concerned, however, let us note that the contrast between (81)/(82) on the one hand and (84) on the other is not surprising: empty PPs are generally excluded from certain positions where empty NPs can occur, i.e., positions that are 'inaccessible to movement', in Chomsky's (1982, 72) terms, following A. Belletti's observation reported there. It is then plausible to assume that neither of the NP ECs in question in the Spanish structures (81b) and (82b) is a trace of movement. This parallels Rizzi's analysis of (83) (where, we recall, the EC is the subject).

Empty PPs, on the other hand, are limited, inside *wh*-islands, to positions from which movement is possible, as characterized by subjacency. The contrast between simple and complex *wh*-islands in (85) vs. (84) might be related to the need for some form of reconstruction. Our earlier assumption, i.e., the null hypothesis about parallelism between overt and empty categories, predicts that in languages like Spanish (or English), where there are no pronouns of the category PP, the pro option can be used only via the NP constituent of the PP. This implies that internal structure must be available: [_{PP} [_P e] [_{NP} e]]. Such reconstruction may require a Move α relation, i.e., a bounded relation, with the PP antecedent; no reconstruction being necessary in the case of NPs, their relation with the *wh*-operator would not be subject to subjacency. Notice that the cases where only empty NPs are possible are precisely those of positions 'inaccessible to movement', while I assume movement from *wh*-islands (as well as from factive islands, where pro-PPs or PPs of the form [_{PP} P-_{NP} pro]) are also possible; see Obenauer (forthcoming)).

In summary, subjacency seems to be at work in *wh*-islands in Spanish, with \bar{S} a bounding node; however, the condition only affects traces, not 'base-generated' NPs as in (81b) and (82b). The data from Italian given by Rizzi are unexpected in that only subject pro is possible 'beyond subjacency'; the contrast with Spanish apparently concerns possibilities of locally determining base-generated empty NPs.

Given the relevance of subjacency for non-NPs, as it appears, and of \bar{S} as a bounding node, we must conclude that the unacceptability of structures involving the QP *combien* and its equivalents (cf. (67), (69), and (76b) above), does not provide an argument in favor of the pro-hypothesis. The reason, we recall, is that the NP might count as a bounding node.⁴⁴ Our evidence internal to *wh*-islands in favor of the pro-hypothesis for *T*s, then, is limited to data like (77)-(80), and those in note 42 (the NP-PP asymmetry in complex islands suggests pro-status only within this type of sentences). In the appendix, where I compare my proposal with Huang's (1982b) analysis of *wh*-islands, more evidence in favor of the pro-hypothesis will be presented.

Let us now turn to the question of what it is that allows resumptive pro to occur in the positions (and languages) we examined above. Clearly, there is a contradiction with Chomsky's (1982) view, quoted at the beginning of section 3.2, that the distribution of pro is limited to the finite clause subject position of pro-drop languages. The contradiction, I want to suggest, may be removed by a qualification of what Chomsky (p. 85f) calls the requirement of 'local determination' for pro. I will suppose that, in addition to AGR in the pro-drop languages, which suffices to locally determine the content of a subject (non-resumptive) pro, another means is available for resumptive pro, viz., local determination by an operator which binds it (this implies that the local determination requirement must be met at LF, at the latest).⁴⁵

To summarize, I have argued that, contrary to current assumptions, the trace of a *wh*-phrase extracted from a *wh*-island can be a variable only under particular circumstances, and more precisely via a resumptive pro, interpreted at LF as a bound variable. This is the only option, available exclusively in those cases where a corresponding overt pronoun exists. Crucial properties of the distribution of resumptive pro follow from independent principles – in the cases considered so far, the local determination requirement, the Bounding Theory, and the ECP. The contention that resumptive pro is not restricted to the position of non-resumptive pro amounts to positing a full parallelism, at a certain level, between this type of ECs and the corresponding non-ECs (i.e., overt pronouns).

3.4. *A digression on wh-islands and variables*

An important question left open so far is why the traces of *wh*-island extracted *wh*-phrases (our *T*s) cannot be variables (at S-structure). We might look for a way of relating the non-availability of a variable interpretation for *T*s to some peculiar property of these islands.

The discriminating factor that comes to mind immediately is the presence of a *wh*-phrase, not coindexed with *T*, in COMP; this *wh*-phrase

binds a variable at S-structure (as suggested particularly clearly by the well-formedness of (77) as against (78), or the parallel contrasts in the examples of note 42 (i.e., (i) vs. (ii), and (iii) vs. (iv))). Similarly, *si* occupies COMP as another element not coindexed with *T*. Of course, the operator locally binding a variable need not in general occupy the COMP of the minimal \bar{S} containing the variable, but the facts examined above suggest that a somewhat weaker requirement holds for (S-structure) variables: they must be \bar{A} -bound in their minimal \bar{S} / governing category. This assumption presupposes that a trace in COMP can co-occur with a [-WH]-complementizer (*que*, *that*, etc.) in such a way that the trace c-commands S.⁴⁶

Given the well-formedness of structures like (74b) in Spanish and Rumanian, the requirement for S-structure variables just formulated must be further developed: in such structures, we might find a base-generated trace in the lower COMP of the island: ... [\bar{S} *wh*-phrase ... [\bar{S} *wh*-phrase ... [$\bar{S}e'$... [S ... *e* ...]]]] ... As stated in the preceding paragraph, the requirement cannot yet exclude (S-structure) variable status for *e*. Let us then assume that in such structures – cf. (82b) or (86):

- (86) Esta es la persona [\bar{S} *wh*-phrase₂ que no sabías [\bar{S} cuándo₁ dijo Juan *e*₁ [\bar{S} *e'*que quería fotografiar *e*₂]]]
 ‘This is the person that you didn’t know when Juan had said that he wanted to photograph.’

– the ‘locally controlling’ \bar{A} -binder in COMP, if not an operator but an EC, must be locally operator-bound itself. Under our hypothesis that there is no coindexing under movement, this amounts to claiming that a (*wh*-) trace in COMP (*e'* above) must have as its closest potential binder the *wh*-phrase whose *T* (in (86), *e*₂) it binds, or a trace of that *wh*-phrase. Assuming that the set of potential binders of a (*wh*-)trace in COMP comprises, at least, c-commanding traces in COMP and operators in COMP, the permissible operator-variable configurations at S-structure are then either of type (87a) or (87b):

- (87) a. [_{COMP} *wh*-phrase] [_S ... *t* ...]
 b. [_{COMP} *wh*-phrase] ... [_{COMP} *t'* ...] [_S ... *t* ...]

where ‘...’ between the two COMPs must not contain a potential binder of *t'*; *si* (*if*, etc.) counts as a potential binder of *t'*.⁴⁷

and (86) corresponds to neither of them.

The exclusion of other *wh*-phrases (as well as of *si*) in the configuration

(87b), which follows from the absence of trace indexing under *wh*-movement, makes a clear prediction concerning the status of the $T e_2$ in the well-formed (86): though \bar{A} -bound by a trace in the COMP of its minimal \bar{S} , it cannot be a variable at S-structure, 'local control' by such a trace being a necessary but not a sufficient condition. The status of T in (86) at S-structure is therefore the same as in the less embedding two-tiered structure (88), without a trace in COMP:

- (88) Esta es la persona [que no sabías [cómo fotografiar $e_1 e_2$]].
 'This is the person that you didn't know how to photograph.'

that is, T is necessarily pro, and not a variable. We therefore expect (89b) to be on a par with (89a), though (89a) lacks the 'local control' of the trace e_2 of *como* that is realized in (89b). This expectation is borne out:⁴⁸

- (89) a. *La manera [como no sabía [a quién fotografiar $e_1 e_2$]] es la siguiente.
 'The way he didn't know who to photograph is the following.'
 b. *La manera [como no sabía [a quién dijo Juan e_1 [e que quería fotografiar a María e_2]]] es la siguiente.
 'The way he didn't know who Juan had told that he wanted to photograph María is the following.'

Notice that if, as a matter of fact, (89b) had turned out to be well-formed and on a par with (86), the 'where . . .' -clause of (87b) would have had to be dropped, a rather surprising move within the local binding approach developed here. On the contrary, the correct exclusion of (89b) confirms the success of the approach in its most natural version.

We have thus arrived at the desired result, namely, that it follows from the local ('control' and) binding requirement for S-structure variables that a T cannot be a variable unless there is a procedure following S-structure providing it with this status. Notice that this constitutes an independent locality condition which is at the same time stronger and weaker than the subjacency condition on movement: independently of the parametrized choice of the relevant bounding node(s) in a particular language, the first application of *wh*-movement can in no language, I claim, go beyond \bar{S} if the trace is to be a variable at S-structure; on the other hand, no particular restriction on further movement seems to follow from the local binding approach for configurations of the type (87b).⁴⁹

3.5. Functional identification

Let us now return to the central problem posed at the outset of this

section: why is T , the trace of the island-extracted phrase in (64), repeated here for convenience:

(64) l'uomo [*wh*-phrase che [non so [chi [e conosca e]]]]

not obligatorily bound by the potential binder *chi*, which would rule the sentence out? Recall that the problem arose because, according to our formulation of the Functional Identification Hypothesis, a potential \bar{A} -binder assigns its index to the trace(s) of which it is a potential local binder; as an operator, it identifies it/them as variable(s).

If this were automatically the case, T would simply be identified exactly in the way a t is. The insertion of the feature [+pronominal] must therefore take place before index assignment by the operator (*chi* in (64)), and it must have the consequence of blocking subsequent index assignment by *chi* at S-structure; otherwise, the required binding at LF by the *wh*-operator outside the island would be impossible. In other words, the feature [+pronominal] must be freely 'insertable' or, as I will assume, assignable to ECs, rather than being determined by the context (as proposed in Chomsky 1982, 84); successful assignment is subject to the restriction that the EC be categorially appropriate (i.e., that there exist, in the particular language, an overt pronoun of that category), and that it be able to function as a resumptive pronoun in the required position.

An EC assigned the feature [+pronominal] still being an EC, there is, then, a tension between the FIH as a principle applying to all empty categories and the now necessary assumption that the feature [+pronominal] is freely assigned. In order to guarantee that T can remain unbound by an operator (*chi* in (64)) that is a potential binder, pronominal ECs cannot be subject to the FIH; functional identification must determine only the type of [-pronominal] ECs, by assigning them the feature [\pm anaphoric] depending on the context. I have argued at length in section 2 that this type of EC identification is in effect required with the \bar{A} -binders examined there.

To come back to these data, the pseudo-opacity facts, we now have a fuller account of their ungrammaticality. The sentences in question are excluded for two reasons which complement each other: first, the [-pronominal] trace of *combien* is functionally identified as anaphor/non-variable, given that its closest potential binder (*beaucoup*, etc.) is not an operator (cf. section 1.3.5 above); second, the trace cannot be assigned the feature [+pronominal] – which would allow it to be bound from outside the scope of *beaucoup*, etc. – because there is no overt pro-QP. Turning to the grammaticality of (64) with its two interpretations in Italian, the opposite picture is correct: either NP-trace can be interpreted as pro, and bound by the island-extracted operator, i.e., it is (\bar{A} -)free in

its governing category. This is the solution promised in section 3.1; the 'partial inability to bind' of the island-initial operator follows from the FIH being restricted to [-pronominal] ECs and from the fact that pro may be \bar{A} -free in its governing category at S-structure.

The role of the FIH, it appears, reduces to distinguishing variables from NP-traces or, more generally, from traces of non-operators, which I have been led to group together with NP-traces in section 1. This important reduction is imposed on us once it is recognized that the \bar{A} -binder identifying an EC is not in principle its t-antecedent (via coindexing under movement, which I have rejected), but rather the *potential* local binder of the EC. The striking consequence at which we have arrived is that there is a bifurcation between the ECs: those that must be functionally identified and those that may not be functionally identified.⁵⁰ The latter, the pronominal ECs, then, behave like their overt counterparts both with respect to their possible categorial status(es) and syntactic function, and to functional identification.

4. CONCLUSION

I started with an examination of 'quantification at a distance', a construction quite specific to French, and motivated an 'in situ' analysis for the separate QP. This analysis was complemented by a revision of the notion 'variable' in UG, in terms of operator-binding.

On the basis of this analysis, I showed that the unexpected pseudo-opacity facts could be made to follow from an 'absolute' version of the Functional Identification Hypothesis for ECs, based on S-structure alone and making crucial use of the notion 'potential binder', thereby rejecting the idea of coindexing under movement.

Analyzing a potential counter-example to the absolute FIH as being, in fact, in keeping with it led us to the insight that the trace of a *wh*-island extracted *wh*-phrase cannot be a variable at S-structure but, if anything, pro; the distribution of pro, in principle, mirrors that of overt pronouns in these positions. The limitation on the occurrence of S-structure variables has been claimed to follow from a strong locality condition (which includes \bar{A} -binding of the variable in its governing category) and to explain particular *wh*-island facts from Spanish. Furthermore, I have argued that the Functional Identification Hypothesis, while correctly stated in purely representational terms at S-structure, must be restricted to non-pronominal ECs.

On a general level, two notions have been shown to have a particular explanatory value when used conjointly: 'local binding' and 'representation'; we may expect them to advantageously replace the (operator/QP) \bar{A} -part of Move α .

APPENDIX

THE PRO-HYPOTHESIS VS. HUANG'S ECP APPROACH TO *WH*-ISLANDS

We saw at the end of section 3.2 that the *pro*-approach correctly excludes sentences like (78) **How were you wondering who to photograph*, a type of data noted in Koster (1978) and Huang (1982a). Another analysis of the same facts is presented in Huang (1982b).⁵¹ There, contrasts like those in (77)-(80) (and, implicitly, those in note 42) are dealt with in terms of the ECP. I will now argue that the *pro*-approach is to be preferred over the ECP-approach.

Huang (1982b), after persuasively arguing against his own subadjacency approach to the problem in Huang (1982a), offers the descriptive generalization that only operators corresponding to arguments of V can be extracted from *wh*-islands, and suggests that this restriction is properly subsumed under the ECP: he argues that only traces of (V-)argument-binding operators are governed in the required way, contrary to traces of operators which bind non-arguments of V; thus, Huang claims, the contrasts just mentioned are explained in terms of violations of the ECP, with subjects and adjuncts on a par as against complements of V (I simplify somewhat, abstracting away from aspects that are not relevant to my point).

However, the impossible extraction of *combien* in

(90) **Combien sais-tu où inviter de filles?* (= (69))

presents a case which contradicts Huang's crucial assumption, namely, that the set of (lexically) governed elements is coextensive with the set of elements that can be extracted from within *wh*-islands. As Kayne (1981) argues in detail, the well-formedness of sentences like (91), repeated here:

(91) *Combien dis-tu qu'il a invité de filles?* (= (71))

implies that the trace of *combien* inside the NP *e de filles* is governed by the verb in such a way that the ECP is satisfied. Furthermore, the

combien-facts cannot be accounted for by Huang's (1982b, 551) notion of local control of a trace in A-position by a coindexed element in COMP. As for the *wh*-island case, there does not seem to be any reason to think that the trace of *combien* in (69)/(90) (nor the trace of *quante* in (67)) is any less governed by V.⁵² Rather, these examples show that there do exist lexically governed elements that are not (traces of) arguments.

Consequently, in order to account for (67)/(69) under a government hypothesis, one has to give up the ECP approach altogether and, it seems, to resort to two different notions of lexical government, one pertaining to the ECP (and including (the trace of) *combien*), another to *wh*-island extraction, under which (the trace of) *combien/quante* is ungoverned. On the other hand, the pro-hypothesis provides the desired distinction in a straightforward way.

Though I believe it is the pro-account that correctly explains why *combien* cannot be extracted from *wh*-islands, it again runs into the difficulties analyzed in section 3.2: it might be claimed that it is not the ECP itself that should rule out such extractions, but subjacency; such a claim could be maintained as long as it is not shown that (90) must be excluded independently of bounding conditions, which I cannot do here (notice, however, that the (lexically) governed status of (the trace of) *combien* runs counter to any approach which pairs lexical government and argument status.) I will therefore leave this question as it stands, and turn to two independent arguments in favor of the pro-hypothesis as against the ECP approach.

The first argument is the following: it is not possible to base extractability from *wh*-islands on the (V-)argumenthood of the extracted phrase; however, it can be based on the pro-status of the trace (our *T*). *How*, an adjunct for Huang, remains unextractable even as a V-argument; the ECP, however, should be satisfied in (92), because *how* is the subcategorized complement of *behave*:

(92) *How were you wondering whether she'd behave?

(cf. note 48 on Spanish). On the other hand, *où* 'where' is fine in French, independently of its V-argument status:

- (93) a. ?Voilà l'endroit où je ne sais pas quoi mettre.
 b. ?Voilà l'endroit où je ne sais pas quelles fleurs planter.
 'That's the place where I don't know what to put/which flowers to plant.'

Under the pro-hypothesis, this is due to the existence in French of the overt pronominal *y*. The relevant property distinguishing (92) and (93b),

then, seems to be the possibility for *T* of being a pronominal, rather than its status of (non-)argument of *V*.

Let me recall at this point that I assume that *pro* is itself subject to the ECP (or some similar condition). This, of course, does not prevent the pro-hypothesis from leading to a partition of the *wh*-words that is quite different from Huang's. In fact, the pro-hypothesis is able to exclude certain cases of extraction from a *wh*-island where the ECP as such is satisfied (as in (90)). From this it follows that we are free to assume that at least certain ill-formed cases (for which Huang had to assume adjunct status) involve governed positions, a point to which I will return below.

Turning back for a moment to Huang's own data, we may say that the pro-hypothesis constitutes a different interpretation of the contrasts which led him to choose the ECP approach. This can be seen very clearly through his comparison of extraction of PPs from *wh*-islands in Italian. Contrasts like the following

- (94) Tuo fratello, a cui mi domando che storie abbiano raccontato *e*, ...
 (=Huang's (50), originally due to Rizzi 1982a)
 'Your brother, to whom I wonder which stories they told, . . . '

- (95) *Questo è il giorno nel quale mi chiedo chi hai incontrato *e*.
 (=Huang's (49d))
 'This is the day on which I wonder who you met.'

establish, he says, that the relevant distinction is not that between NPs and non-NPs, but that between (V-)arguments and non-arguments (Huang 1982b, 541f).⁵³ In fact, as I have argued, the relevant distinction is that between NPs (and certain PPs; cf. also section 3.3, above) that are pronominalizable and those that are not (cf. **I met him on it*). This is the reason why the pro-hypothesis, as far as I can see, accounts for the whole range of Huang's examples as well as for cases like (92) and (93b) which contradict the ECP approach.

We now come to the second argument in favor of the pro-hypothesis. Its choice over the ECP-hypothesis has the consequence of ruling out a unified account of *wh*-islands and multiple-*wh* questions (in languages like English, as opposed to Chinese).⁵⁴ In other words, (96) must be excluded for different reasons than (97):

- (96) *How were you wondering who to photograph? (= (78))

- (97) a. *Tell me what you bought how.
 b. *Who remembers what we bought how?

According to Huang, the ECP approach could treat syntactic *wh*-movement (as in (96)) and multiple *wh*-questions (as in (97)) essentially alike,⁵⁵ modulo, in particular, his Condition on Extraction Domains (as well as subjacency). The parallelism between the two types of constructions, with respect to the set of 'movable' *wh*-phrases, is in fact extremely limited (i.e., limited essentially to *why* and *how*; by far most of the *wh*-phrases which are excluded in the initial position of (96) are possible in the final position of (97a, b). This striking asymmetry casts a first doubt on the value of the generalization.⁵⁶

Furthermore, and more importantly, multiple *wh*-questions provide a direct argument in favor of the claim that phrases like *where*, *when*, *on which day*, etc., must be in governed positions in sentences like (98) (=Huang's (114)):

(98) Who remembers what we bought on which day?

(with narrow or matrix scope for *on which day*) if Kayne's (1983) analysis of these constructions in terms of Connectedness is correct. The reason is that the *wh*-phrase in scope position must belong to the set of g-projections of the *wh*-phrase in situ. The government requirement for the *wh*-phrase in situ is independent of the fact that the Connectedness Condition holds at S-structure, as argued by Kayne (while Huang deals with multiple *wh*-questions at LF). Recall now our earlier statement in relation with (92) and (93) that if pro-status is the condition on *T*, syntactic movement from within a *wh*-island may be blocked even from a governed position. This is precisely what is needed to license (98), given the ungrammaticality of (99) (=Huang's (115))

(99) *_i[On which day] did you wonder what I bought *e*_i ?

as well as a large number of comparable cases. Another, parallel argument comes from French Stylistic Inversion with *wh*-phrases. This construction, as argued in Kayne (forthcoming) should be treated in terms of Connectedness; independent evidence in favor of this approach is given in Obenauer (forthcoming).

Abandoning a common account of syntactic extraction from *wh*-islands on the one hand and of multiple *wh*-questions (and relatives) on the other appears, then, clearly desirable; it is a point in favor of the pro-hypothesis that this is precisely what we must do if we adopt it for the former case.⁵⁷ Furthermore, the pro-hypothesis allows the generalizations required by the multiple-*wh* constructions (as well as by parallel cases of Connectedness, like Stylistic Inversion in French, just mentioned). The explanation available for (92) vs. (93) adds to these advantages, and I conclude that the pro-hypothesis is clearly superior to its competitor.

NOTES

1. Non-*wh* subject NPs of direct questions require the presence of a subject clitic ('complex inversion') in standard French:

- (i) Pierre a-t-il dit cela?
'Did Pierre say that?'

For recent analysis, see Kayne (1983b).

2. 'If α in S-structure has been derived by movement of β from the position occupied by α , then we will say that α is *the trace of β* and β is *the t-antecedent of α* ' (Chomsky 1981, 328).

3. To a certain extent, Rizzi's (1982b) approach to chain formation mirrors the EC identification approaches reported here, in that local binding, the basic notion in both cases, is crucially assumed there to be defined in terms of representation, not derivation. Rizzi, however, is not concerned with the identification of ECs.

4. For a list of QP-adverbs of this class, see Gross (1977, 242, column 10). The '+' sign for *un* (*tout*) *peu* should read '-'.

5. Compare (5a) with the ungrammatical

- (i) *Max beaucoup vend de livres.

which was, however, common in classical French (Gross 1977,42).

6. Cf. Haïk (1982), Milner (1978a, 1978b), Obenauer (1976, 1978), Kayne (1981).

7. Prepositional objects containing an empty QP, as in

- (i) *Elle a beaucoup participé à d'émissions.
'She participated in many broadcasts.'
(ii) *Il a trop écrit sur de sujets.
'He has written about too many topics.'

are excluded by the ECP/Connectedness (cf. Kayne 1981,1983a). On non-object, prepositionless post-V NPs, see text preceding (42) below and note 22.

8. Which was, in fact, implicit in all the earlier analyses of the construction, and is, if I understand correctly, made explicit in Haïk (1982), where it is assumed that 'the sequence' ' $\dots [AdvP Q_i] \dots [Q_j e \bar{N}]$ ' is read like any 'Q \bar{N} ' in situ'.

9. There is a certain amount of variation between speakers as to which verbs disallow QAD, and with respect to degrees of unacceptability, though cases like (10a) seem uncontroversial. This is, of course, natural in cases of syntactic consequences of semantic properties which speakers may (more or less, or not at all) associate with individual lexical items; I will assume that this correctly characterizes the case of the QAD construction – cf. the discussion in section 1.3.2 – 1.3.4 below. This situation, which I will not explore in detail here, recalls parallel ones noticed elsewhere, like the partially fuzzy judgments concerning the 'genitive of negation' in Russian, reported by Pesetsky (1982, 59f). The solution argued for below is not affected by such differences, since they are assumed to follow from variations between speakers concerning the QP-V relation, with respect to which they seem to be coherent throughout.

10. This is a slight oversimplification, but the argument is not affected. Cf. Obenauer (1983, n.4).

11. Bolinger (1972, 240) notes the contrast in examples like

- (i) He failed a lot in those exams. (cf. (19a))
 (ii) You have reassured me a lot . . . (cf. (19b))

12. In the framework of \bar{X} -theory, the relation between QP and V raises an interesting question: are there analogous relations between QP and other lexical categories? and if so, what is the nature of this analogy? I will not deal with this question here.

13. The meaning of 'X TIMES . . .' must be made more precise, in ways irrelevant to my present purpose. See Obenauer (1983, 82f).

14. And against the possible inclusion of *combien* into Kayne's (1975,29) 'adverbialist' hypothesis for the QPs of the QAD construction. – Movement of *combien* from within the object NP *through* the pre-verbal position would be imposed by subadjacency if S were a bounding node for it in French; this would seem to incorrectly entail the applicability of the VQH to (11); therefore, S cannot be a bounding node in French (cf. the independent conclusions of Sportiche (1981). Cf., however, note 44.

15. (24a) is in fact acceptable if it is assumed that the pot contains different compartments, or that it is refilled in some way after each find . . ., in short, under conditions supporting the proposed analysis.

16. I disagree here with Haïk (1982, 74), where it is claimed that 'quantifiers like *beaucoup* . . . involve a group reading' (cf. note 8 above); see also (ibid., 80). Cf. Obenauer (1983, 83f).

17. Why the acceptability of the examples in (37) should be affected, to various degrees, by the presence of the manner adverbs, is presently not clear to me.

18. There seems to exist a process of pseudo-binding, 'parasitic' on the one in (35), involving certain synonyms of QP-adverbs under their 'X TIMES' meaning, though (ii) is ill-formed:

- (i) ??Combien as-tu fréquemment consulté de livres?
 *?Combien as-tu souvent rencontré de collègues?
 ??Combien as-tu rarement conduit de voitures?

(ii) *Il a souvent rencontré de collègues.

Something along these lines is suggested by the (almost total – cf. the foregoing footnote) absence of such pseudo-binding with non-QP adverbs having an 'intensely'-type meaning. I must leave this question as it stands.

19. Cf. Chomsky (1982, 11).

20. Recall that there is a third requirement, viz., conformity with the ECP (cf. note 7).

21. In work in preparation.

22. *Applaudir*, like *aimer* (cf. (48) and (49)), is a 'mixed' verb, i.e., a verb allowing either intensifying or quantifying interpretation of the QP; cf. Obenauer (1983).

Notice that the '*' of (47) is evidence, under my analysis, that the adverbial NP *combien de fois* is c-commanded by the pre-verbal QP. Under the current definitions of c-command, this means that the adverbial NP *must* be dominated by the node VP. A parallel reasoning applies to cases of rightward NP movement like in (i):

- (i) Combien de voitures ont été peu conduites?
 *Combien ont été peu conduit de voitures?

Movement of the subject NP to a VP adjoined position is assumed for independent reasons in Kayne (forthcoming).

23. In a parallel way, *il en a beaucoup consulté* cannot be interpreted as 'He con-

sulted an (unspecified) number of them many times', but only as a QAD-structure: 'He consulted many of them'. This example, and (48) as well, contrast with *Il les a beaucoup aimées / consultés*, parallel to (49) as for the interpretation of the QP-adverb, and for the absence of an empty QP inside the object NP.

24. The fact that *Combien en a-t-il beaucoup aimé?* is not always accepted (or that it is considered less than perfect) is certainly related to the fact that the structure (52) is virtually in contradiction with the ECP, and actually violates Kayne's (1983a) Connectedness Condition. Perhaps, under reconstruction, conformity with the CC can (partially) rescue the structure; I leave this question open here.

25. The same type of analysis is not possible in the case of (48) if clitic placement of *en* can move Ns (and PPs), but not NPs, thus excluding (i):

(i) $il \left[_{NP} e \text{ en} \right] a \text{ beaucoup aimé } \left[_{NP} e \right]$

(the structure might be ruled out independently by the ECP/CC, in the absence of reconstruction; cf. note 24).

There is a second imaginable structure for (48) which must be impossible, in order to exclude the 'intensely'-type interpretation, i.e., (ii):

(ii) $il \text{ en } a \left[_{NP} \text{ beaucoup } e \right] \text{ aimé } \left[_{NP} e \right]$

This structure might be taken to be excluded by assuming the pre-verbal position to be restricted to the category adverb/QP, in some way reminiscent of Milner's (1978a, 101; 1978b, 690) proposal that movement from the object-internal position be structure-preserving. For reasons alluded to in Obenauer (1983, 80), I reject such an approach. See Obenauer (in preparation).

26. Recall that the pre-verbal QP *must* bind a present $\left[_{QP} e \right]$.

27. This conclusion raises a question about *wh*-traces in COMP which I will merely point out here. Do these traces share the behavior of *wh*-traces inside S, or do they behave in a different way, by virtue of some special status of the node COMP (e.g., because *wh*-traces in COMP might be \bar{A} -binders; cf. Chomsky 1981, 115)? In other words, is an empty element in COMP 'protected' from being bound by a non-*wh* binder? For discussion, see Obenauer (in preparation).

28. For discussion of this notion, cf. Chomsky (1981; 1982) and references cited there.

29. It is from this freedom of potential A-binders to bind or not that I propose to derive what we may call, with Rizzi (1982b), 'free chain formation'. The role of modularity in free chain formation is underscored still more strikingly by the contrast between (3) and the well-formed (i) where, as Pollock argues, a chain (*ce*, *e*) is not required:

(i) ?... les linguistes que c'est devenu plus tard.

with *est* = singular.

30. One of the anonymous reviewers notes the marginal acceptability of (i), with the interpretation (ii), which is also that of (the perfect) (iii):

(i) ??Combien il a beaucoup lu *e* de livres!

(ii) 'How many books he read!'

(iii) Comme il a beaucoup lu *e* de livres!

Sentence (i) is the exclamative counterpart of the ill-formed (35) with which I start-

ed the discussion of pseudo-opacity. The question arises whether (i) can be well-formed (with respect to pseudo-opacity) without undermining at the same time the above analysis? The answer is yes. It can be shown – though reasons of space do not allow it here in detail – that in spite of the superficial appearance to the contrary, (i) as well as (the perfect) (iv):

(iv) Combien il a peu lu *e* de livres!

follow entirely from the FIH and the prohibition of vacuous quantification. The reason is that a difference must be established, totally independently of the pseudo-opacity data, between 'exclamative' and 'interrogative' *combien*; cf. the contrast **Combien est-il fort?* 'How strong is he?' vs. *Combien il est fort!* 'How strong he is!' This difference interacts with the FIH / the prohibition of vacuous quantification in a way to allow (a) and (d) as against their interrogative counterparts. Let us simply note here that in no case can the empty QP in (i) and (iv) be interpreted as bound by *combien*, though this is perfectly possible in *Combien il a lu e de livres!* (which parallels the interrogative case); i.e., (i) and (iv) are never synonyms of (v):

(v) Combien de livres il a beaucoup/peu lus [_{NP} *e*]!

The predictions of the FIH, thus, hold entirely; a detailed discussion will be found in Obenauer (in preparation).

31. Analogues of these constructions can be found in French as well; cf. the following sentences given in Sportiche (1981, 233), where the most deeply embedded \bar{S} is untensed:

- (i) C'est à mon cousin que je sais lequel offrir.
'It is to my cousin that I know which one to offer.'
- (ii) Voilà une liste des gens à qui on n'a pas encore trouvé quoi envoyer.
'Here is a list of the people to whom we have not yet found what to send.'

The status of (iii), the French analogue of (64), is dubious, at best, as is the one of (64a):

(iii) ??L'homme que je ne sais pas qui connaît . . .

I will consider some other examples from French below.

32. By application of the ECP; cf. Chomsky (1981, 186).

33. *Wh*-islands have another 'strange' property, as shown by the following contrast noted by Rizzi (1982a). In Italian, (non-echo) multiple *wh*-questions are 'often unacceptable, and at best highly marginal' (p. 51); cf. (i) (=Rizzi's (8a,b)):

- (i) *Mi domando chi ha incontrato chi.
'I wonder who met who.'
- ??Non so ancora chi ha fatto che cosa.
'I don't know yet who did what.'

However, island questions (but not multiple *wh*-questions), unacceptable with most question words, 'are considerably improved if the *wh*-phrase which is extracted is made "heavier"' (p. 70, n. 5):

- (ii) ??{A chi
 {A quale dei tuoi figli} non ti ricordi quanti soldi hai dato?
 'To whom / to which one of your sons don't you remember how much
 money you gave?'

('Heaviness' is not required when a relative phrase is extracted). This is, of course, not a property of 'normal' operator-variable relations. The fact that the improvement depends on modifying the extracted *wh*-phrase, and not the island-initial one, is very plausibly related to the special status of the trace of the extracted element (i.e., pro-status, as I argue below). However, I don't see at present in which way 'heaviness' interferes with the operator-pro relation.

34. It may also be bound in its minimal \bar{S} , as shown by the examples in note 42.

35. With the consequence that the empty pure pronominal, if in subject position, is (correctly) excluded by the ECP in non-pro-drop languages, if PRO is the only EC not subject to the ECP.

36. I.e., the subject position as in, e.g., the CNPC examples of Rizzi(1982a, 58). Pollock (forthcoming) proposes that the subjunctive can identify subject (non-argument) pro in French.

37. The discussion of (66)-(69) takes up a proposal of Richard Kayne's (class lectures, April 1983), based on an idea of G. Cinque's.

38. I leave aside the fact that a certain number of speakers of French find extraction of PPs from *wh*-islands better than extraction of NPs. Godard-Schmitt (1980) argues for different conditions on NP and PP extraction; I will not address this question here. As in English and French, *wh*-islands are generally considered better in relatives than in questions.

39. Another ill-formed sentence is

- (i) *Combien sais-tu où en inviter?

It is excluded in the same way as (69) if the extracted *wh*-phrase is [_{QP} *combien*].

However, there exists another possibility, analogous to the movement in (52), i.e., (ii):

- (ii) [_{NP} combien [_N *e*]] sais-tu où en inviter [_{NP} *e*]

The difference with respect to (52) is that the empty object in (ii) is in an island, and that its pro-status is incompatible with the presence of *en*; see Obenauer (in preparation).

40. And in Rumanian, as Carmen Dobrovie-Sorin (p.c.) informs me.

41. The Spanish examples in this section are due to Ximena Lois.

42. Cf.

- (i) ?What_i are these men_j too stubborn to talk to_j about *e*₁?
 (ii) *How_i are these men_j too stubborn to talk to *e*_j *e*₁?
 These men are too stubborn to talk to politely.
 (iii) ?This boat I was wondering whether to paint pea green.
 (iv) *Pea green I was wondering whether to paint this boat.
 ?Pea green I decided to paint this boat.

See Chomsky (1977; 1982) for the claim that *wh*-movement is involved in these constructions.

43. For discussion of prepositional accusative and dative, see Obenauer (in preparation).

44. See, however, Godard-Schmitt (1980) for the claim that NP is not a bounding node for Subjacency in French.

45. Local determination by an A-binder is not possible:

- (i) la ragazza *wh*-phrase_i che non so se Piero ama pro_i
 (ii) *Maria_i pensa che Piero ama pro_i

{ 'the girl I don't know whether }
 { 'Maria thinks that } Piero loves pro'

Notice that the two elements we take to allow local determination are both \bar{A} -elements: (pro-drop) AGR and operators. Cf. Pollock's (forthcoming) proposal reported in note 36.

46. This is incompatible with the structure of COMP suggested in Chomsky (1980, 5). The trace in COMP can c-command S-internal traces in the configuration [\bar{S} t [\bar{S} que [\bar{S} . . . e . . .]]], but it governs none of them, whence the common \bar{ECP} effects. For a framework assuming free movement under adjunction to \bar{S} , without a designated COMP position, and where the desired restrictions on elements in pre-subject position follow from independent principles, see Kayne (1983b) (accordingly, the term COMP is to be understood, from now on, simply as a convenient name for the scope position of the (lexical or empty) *wh*-element).

47. I argue in Obenauer (in preparation) that the preceding assumptions follow naturally from interpretation of Move α in terms of representational properties, determined largely by the Extended Projection Principle as proposed in Chomsky 1982.

48. As we expect under the pro-hypothesis, analogous judgments obtain for parallel structures with subcategorized *como*:

- (i) *la manera como sé si Juan podrá comportarse . . .
 'the way I don't know whether Juan will be able to behave . . .'
 (ii) *la manera como no sabías si Juan prometió que se comportaría . . .
 'the way you didn't know whether Juan had promised that he would behave . . .'

Notice that in the starred *wh*-island examples of this section, care has been taken to avoid any instances of 'crossing phenomena', which, as shown in Pesetsky (1982, ch. 3), are liable to separate treatment. Furthermore, the ill-formed Spanish examples do not involve V-complement extraction over *wh*_A-phrases in Torrego's (1984, 106) sense, i.e., constructions subject to a distinct constraint (the ECP, as argued by Torrego 1984, section 3).

49. It is argued in Aoun (1981, ch. 1) that variables are ' \bar{A} -anaphors' and subject to (a generalized version of) Principle A of the Binding Theory, i.e., that they must be \bar{A} -bound in their governing category. This claim is quite different in its effect from the one I am making. As a consequence of Aoun's reformulation of the notion 'accessibility', which refers to Principle C of the Binding Theory, the governing category of a non-subject variable is always the root sentence; in other words, nothing in Aoun's framework leads to assuming that any of the non-subject *T*s considered above is not a variable, contrary to the result we have reached, namely, that they are all pros at S-structure.

50. The evidence provided here only concerns the EC [+pronominal, -anaphor], i.e., pro. For the claim that PRO, too, is to be excluded from functional identification, cf. Rizzi (1983).

51. Koster (1978, 197f) accounts for the data by means of his Locality Principle,

under reference to a prominence hierarchy for the different arguments inside a sentence.

52. Nor is the domain from which *combien* is extracted, namely \bar{S} , ungoverned.

53. This assumption, incidentally, forces Huang to consider that even non-arguments, i.e., phrases in ungoverned positions (for him) can be *wh*-extracted at LF provided they are PPs, in the following way:

- a. Preposition stranding is allowed, in LF, even for prepositions which cannot be stranded at S-structure
- b. traces in the context P_ need not be properly governed.

This introduces an asymmetry with respect to non-argument NPs (*how many times*) whose *raison d'être* is obscure; moreover, the possibility of resorting to empty prepositions reduces to near vacuity the formal expression of the claim that there is a significant parallelism between the phenomena in (96) and (97).

54. That the pro-hypothesis has nothing to say about movement at LF has been independently noted by H. Contreras (personal communication).

55. Under the assumption that the ECP applied (at least) at S-structure and LF.

56. Another indication that the two constructions are quite different comes from the 'heaviness' facts in Italian reported in note 33. Cf. also note 53 for the expression of the alleged generalization.

57. It follows from my approach that *how* and *why* must be excluded in non-COMP position of multiple *wh*-questions independently of their not being extractable from *wh*-islands in the syntax. But this adds no new difficulty with respect to the ECP-approach, for Huang's treatment of PPs at LF cannot exclude a sentence like (i) (vs. (ii)):

- (i) *Who was healed by moonlight in what sense?
- (ii) In what sense was he healed? (In the sense that he was able to eat mashed potatoes.)

and must therefore also resort to an independent restriction, the same, I suppose, as for *how* and *why*.

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