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TOUGH PARASITIC GAPS

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1. INTRODUCTION*

The objective of this paper is an attempt to provide a unified analysis of *TOUGH-MOVEMENT* (TM) and *PARASITIC GAP* (PG) constructions, of which two standard examples are given in (1). These constructions are analytically very similar, both being standardly analyzed in the recent principles-and-parameters literature in terms of movement of an *EMPTY OPERATOR* (EO).

- (1) a. John is easy to please.
- b. Which books did you file without reading *pg*?

The argument for an analysis in terms of empty operator movement is based in both cases on the occurrence of island effects typical of Subjacency. Thus Chomsky (1977) has noted that extraction from the infinitival clause in a TM construction is barred (cf. (2)), which can be accounted for as a *wh*-island effect (or perhaps more adequately as a violation of Pesetsky's 1982 Path Containment Condition) on the assumption that the SpecCP position of the infinitival CP is occupied by an empty operator. Internal to the *tough* infinitival, Subjacency effects can also be observed. As (3) bears out, embedding a CP with a *wh*-filled specifier in the *tough* infinitival yields a typical *wh*-island violation. This can again be made to fall out from an empty operator movement analysis of TM constructions. The latter argument for empty operator movement can be reiterated for the case of parasitic gap constructions. As Chomsky (1986b) points out, in PG constructions, too, Subjacency effects such as *wh*-island violations can be found. This is shown by the example in (4).

- (2) *Which sonatas is this piano easy to play on?
- (3) ?*These sonatas are not easy to remember who played.
- (4) ?*Which sonatas did you play without remembering who composed *pg*?

Apart from this conspicuous analytical similarity between TM and PG constructions, however, there are important differences between the two construction types, which is why the analytical parallelism generally does not extend beyond this basic analogy. In particular, PG constructions are well known to be subject to the requirement that they parasitize on a 'real' gap (whence their name), and that this 'real' gap be left behind by \bar{A} -movement in a position which does not c-command the parasitic gap (the so-called *anti-c-command condition*; cf. esp. Engdahl 1983). These constraints are illustrated in (5)-(6). No such restrictions apply to TM constructions.

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- (5) *I talked to Mary before you met *e*.
 (6) *Who *e* talked to Mary before you met *pg*?

Subscribing to the empty operator movement analysis of TM and PG constructions, we will present a unified account which is based in the insight that it makes a crucial difference whether the EO is itself *bound* by an operator or not. If it is, it will be functionally indistinguishable from an intermediate trace, and the variable it binds can be interpreted as a term. If, on the other hand, the moved EO remains unbound, the minimal constituent that harbors it will contain a variable which, although syntactically licensed by being \bar{A} -bound, has no semantic range assigned to it (cf. Chomsky 1986a:85). Movement of an *unbound* empty operator thus renders predicative the constituent internal to which this movement takes place.¹ This predicativity will be exploited to endow the subject of TM constructions with a θ -role under predication (cf. section 2).² It will also be shown to capture the differences between TM and PG constructions. In the absence of a suitable candidate to be predicated of, the constituent featuring internal empty operator movement must be prevented from turning into a predicate in PG constructions. This will be shown—in section 3—to derive the fact that parasitic gaps must be licensed by pre-LF operator movement, as well as the anti-command condition on PG constructions. In section 4, we then focus on the theoretical result that only \bar{A} -movement may license parasitic gaps, and proceed to an investigation of really “tough parasitic gaps”, occurring in contexts where PGs would not normally be expected, i.e. apparent A-movement constructions. We will argue that these sentence types, which typically have the semantics of *modality*, are only apparent counterexamples to our theoretical claim that PGs may be licensed by \bar{A} -movement only, and motivate a functional projection headed by modality whose \bar{A} -specifier position functions as the appropriate landing-site for a PG-licensing empty operator in such constructions. The paper is closed by a brief summary of our major findings, in section 5.

2. TOUGH-MOVEMENT

Subjacency effects of the type in (2)-(4) provide good evidence for the view, which is now standard in the principles-and-parameters framework, that TM constructions (7a) feature an empty operator-variable relationship, just like PG constructions (7b) and ‘complement object deletion’ constructions of the type in (7c-e).³ There is one non-trivial difference, however,

¹ Our notion of *predication* is essentially the same as the one in Williams (1980), although we have further constrained it in two ways: (a) “predicate variables” must be \bar{A} -bound (excluding Williams’ 1986 analysis of NP-movement in terms of predication), and (b) the relation between a predicate and its subject is configurationally confined to a Small Clause.

² This idea is very much akin to the central idea of Browning (1987), although it differs from her account in several important respects. First of all, in our analysis only movement of an *empty* operator may make the constituent internal to which movement has applied into a predicate. Secondly, it crucially does so *only* if the empty operator is unbound; as will be discussed at some length below, adjuncts containing a parasitic gap are *not* predicates. Thirdly, and perhaps most importantly, Browning allows two ways to license the newly emerged predicate. According to Browning, either (a) the subject discharges the external argument of the predicate, or (b) the subject agrees with a chain contained in the predicate (Browning 1987:62, ex. 19). Our account disposes of the second way, which seems a desirable result: the subject being in an A-position, and the moved empty operator being in an \bar{A} -position, the structure needed to license the subject-predicate relation in the second way typically violates the Binding Theory.

³ We leave it a moot point whether this involves movement or a base relationship between a base-generated operator and *pro*, as on Cinque’s (1990) assumptions. Nothing crucially turns on this issue.

between the empty operator movement constructions in (7b-e) on the one hand, and *tough*-movement on the other. While in (7b-e) the empty position *e* may be lexicalized by a pronoun, there is no such alternation between a gap and a lexical pronoun in TM constructions (cf. Cinque 1990:152-3).

- (7)
- a. This book is tough to read *e*/**it*.
 - b. Which book did you file without reading *e*/*it*?
 - c. They gave this book to me to review *e*/*it* by tomorrow.
 - d. This book is too offensive for CUP to publish *e*/*it*.
 - e. This book is not interesting enough to read *e*/*it*.

Not only may the gap in the *tough* infinitival not be lexicalized by a pronoun coindexed with the matrix subject, but the *tough* infinitival must, in Cinque's (1990:153) terms, be an "open sentence"—it *must* contain a variable, as the ill-formedness of a putative TM construction like (8a) in contrast to the acceptability of corresponding PG or 'complement object deletion' constructions in (8b-e) bears out. Apparently, then, the matrix subject of a TM construction does not independently receive a θ -role from the *tough* adjective, but is thematically dependent on there being a gap in the *tough* infinitival.

- (8)
- a. *This book is tough for the students to pass the exam.
 - b. Which book did you burn after passing the exam?
 - c. They gave the book to me for the students to pass the exam.
 - d. This book is too sketchy for the students to be able to pass the exam.
 - e. This book is not explicit enough for the students to be able to pass the exam.

Several recent approaches to TM constructions (cf. Bennis & Wehrmann 1987, Bennis 1990, Wilder 1991) hold that the matrix subject in such constructions is θ -marked by the *tough* adjective, the infinitival CP being an adjunct rather than a complement of the adjective. On such an analysis, the fact that the infinitival CP obligatorily contains a gap is surprising. We consider this to be important evidence against an account of TM along these lines.

Instead, we would like to argue that movement of an empty operator originating in the infinitival CP of TM constructions is necessary in order to turn the constituent internal to which empty operator movement obtains into a *predicate* that θ -marks the matrix subject which would otherwise, in violation of the θ -Criterion, fail to receive a θ -role, since the *tough* adjective itself does not θ -mark the subject. Rather than following Cinque (1990:153) in taking the variable in the infinitival CP to be predicated of an antecedent in the matrix subject position, however, let us start out from the plausible assumption that the notion of *predicate* is defined as naming a property of a variable object (9). Let us in addition state the basic hypothesis in (10):

- (9) A *predicate* names a property of a variable object.
- (10) The minimal XP containing the landing-site of an *unbound* empty operator functions as a *predicate*.

The hypothesis in (10) directly fits into the general assumption about predicativity in (9). After all, the range of an unbound empty operator is not restricted by a binder, as a consequence of which the range of the entire constituent internal to which movement of an unbound empty operator obtains is likewise variable. An XP featuring internal movement of an unbound empty operator thereby comes to name a property of a variable object, and as

a result qualifies as a predicate. With the aid of the hypothesis in (10) we may now account for the contrasts between TM and PG constructions noted in the introduction.

Following the basic insights of Chomsky (1977) we assume that internal to the infinitival CP of TM constructions, empty operator movement takes place. Specifically, we argue that the empty operator object of the infinitival verb in a canonical TM construction such as *John is easy to please* (1a) moves successive cyclically, via SpecCP, to the specifier position of a constituent containing the *tough* adjective, as illustrated in (11). Internal movement of this empty operator—which is not bound, thereby giving the constituent labeled 'XP' in (11) a variable range—turns XP into a predicate (cf. (10)). It is this predicate which, under predication, θ -marks the subject of the TM construction, which is base-generated *in situ*.⁴

(11) John_i is [_{XP} EO_j ... easy [_{CP} *t_j* PRO to please *t_j*]]_i

This analysis of TM yields a synthesis of the proposals of Chomsky (1977), in which empty operator movement is motivated, and Chomsky (1981), in which the *tough* adjective is argued to form a complex predicate with the infinitival CP.⁵

⁴ We will address the nature of the constituent labeled 'XP' in (11) in more detail in section 4.

⁵ Recall that on our assumptions the *tough* adjective does not itself assign an external θ -role. The uniformly monadic nature of *tough* adjectives allows for analytical unification of *This book is tough to read* and *It is tough to read this book*: in both constructions, *tough* assigns precisely one (propositional) θ -role. The conclusion that the subject of the *tough* adjective is not theta-marked by it can be corroborated by the following observation, from the domain of nominal *tough*-predicates, such as *a drag, a bore, a bitch*. The relevant case is *a bitch*. For most people at least, *a bitch* requires a feminine subject, when that subject is an NP (i a). In the presence of an infinitival, however, *John* is perfectly normal as the subject (i b). This is readily explained if in that case, not *John*, but the proposition of which *John* is the subject is implied to be a bitch:

- (i) a. {Mary*John} is a bitch.
b. John is a bitch to have to deal with.

It might be thought that the assumption that the adjective does not assign a θ -role to the subject of a TM construction is threatened by such examples as *Mary is pretty to look at*, which have no variant with 'expletive' *it* (cf. **It is pretty to look at Mary*). There is ample reason, however, to distinguish between genuine TM predicates and, in Lasnik & Fiengo's (1974) terms, 'pure object deletion' (OD) predicates like *pretty*. Apart from the (non)paraphrasability with *it*, TM and pure OD predicates also differ in that the former, but not the latter, occur with a fairly unrestricted set of infinitival complements (ii) and allow the gap in the infinitival to be, in principle, unboundedly distant from the predicate (iii) (cf. Schachter 1981:446). Moreover, even though the paradigm OD case of *pretty* does not, many such OD constructions allow the gap in the infinitival clause to be lexicalized (iva), something which, as we saw in (7)-(8), is impossible in TM constructions. As for the unacceptability of Dutch **Marie is mooi om ernaar te kijken* 'Marie is pretty to look at her', we conjecture that this is caused by the fact that R-pronouns cannot refer to persons. A similar sentence with a non-animate object, as in (ivb), seems o.k.

- (ii) a. Mary is *easy* to look at. Mary is *easy* to work for.
b. Mary is *pretty* to look at. *Mary is *pretty* to work for.
c. *Mary is *tyrannical* to look at. Mary is *tyrannical* to work for.
(iii) a. Mary is *easy* to get John (to get Bill) to avoid looking at.
b. *Mary is *pretty* to get John (to get Bill) to avoid looking at.
(iv) a. Deze hamer is *handig* om (er) spijkers mee in de muur te slaan.
this hammer is handy COMP (there) nails with into the wall to hit
b. Dit relief is niet alleen *mooi* om (er) naar te kijken.
this relief is not only pretty COMP (there) at to look.

While Schachter (1981:448) believes that there is "no way—and also no need—to syntacticize the semantically based distributional difference" between the two cases, we submit that the structure of 'pure OD' constructions is different from that of TM constructions. We believe that an approach along the lines of the account of TM proposed in Bennis & Wehrmann (1987), Bennis (1990) and Wilder (1991), though undesirable for TM, is correct for 'pure OD' constructions of the *pretty* type. In any event, our analysis of TM (especially the claim that the *tough* adjective assigns no θ -role to the matrix object) is not endangered by the facts of 'pure OD' constructions.

We would like to emphasize at this point that our analysis of TM constructions is perfectly compatible with a strictly configurational interpretation of the concept of predication, in agreement with the central tenets of the small clause (SC) analysis, to which we subscribe. If predication is the exclusive property of SC constructions, SCs being the sole 'incarnation' of subject-predicate relationships, we should identify, in the structure of TM constructions in (11), a SC constituent of which XP is the predicate and *John* is the subject. The SC in question naturally finds itself in the complement of the copula, as illustrated in (12):

- (12) John_i is [_{SC} t_i [_{XP} EO_j ... easy [_{CP} t_j PRO to please t_j]]_i

By appealing to the concept of predication (conceptualized in a configurational fashion, as elucidated above), the analysis of TM constructions eliminates the need for the notion *strong binding* of Chomsky (1986a:85). In current approaches to TM (in which the subject of the *tough* adjective binds the variable left behind by empty operator movement) Principle C of Chomsky's (1981) Binding Theory must be weakened so as to allow A-bound R-expressions, at least under certain circumstances.⁶ Not just theoretically but empirically as well, there is reason to assume that the matrix subject of a TM construction should not be taken to entertain a direct relationship (of binding) with the gap in the infinitival CP. As Wilder (1991:123) has noted, the matrix subject of a TM construction can be a constituent which cannot normally be selected by the head governing the gap in the *tough* infinitival. The example he quotes is reproduced here as (13a), which should be contrasted with the unacceptable (13b) which shows that *believe* may not be subcategorized for an infinitival CP with a lexical complementizer:

- (13) a. For him to be top of the class is hard to believe.
 b. *I cannot believe for him to be top of the class.

The acceptability of (13a) would be surprising from the point of view of an analysis in which the matrix subject of a TM construction is coindexed with the gap in the infinitival CP, for on such an analysis one would expect the matrix subject to have to be compatible with the selectional restrictions imposed by the governor of the object gap. On the account of TM presented here, these facts are straightforward, there being no relationship between the matrix subject and the object gap in (13a).⁷

⁶ In order to prevent Strong Binding from violating the Binding Theory of Chomsky (1981), Principle C has to be reformulated to only exclude A-antecedents of a variable in the domain of the operator that binds it. Our objections are threefold: (a) the weakening of Principle C is motivated only by constructions involving empty operator movement, and is therefore construction-specific. (b) It does not automatically give the required result. Notice that it is crucial that the A-antecedent does not bind the empty operator itself, but rather the variable, which is in its turn bound by the empty operator. The bulk of the pertinent constructions, however, involve object extraction from a sentential complement, which contains a subject. This subject, also being in an A-position, should intervene between the variable and its intended A-binder outside the infinitival, effectively barring Strong Binding in all cases that involve an infinitival complement. (c) If Strong Binding is allowed in principle by the theory, the anti-c-command condition for parasitic gaps is hard to make sense of without stipulating.

⁷ That featural identity between an empty operator and its binder is required in other contexts is shown by the Dutch PG examples in (i) (cf. Bennis & Hoekstra 1984). These examples involve extraction from PPs, which in Dutch is restricted to apply to elements bearing or being compatible with the feature [+R] (Van Riemsdijk 1978)—so-called R-pronouns and empty operators.

- (i) a. Een blikje waar ik [alvorens EO uit te drinken] in geroerd heb.
 a can where[+R] I before EO[+R] out-of to drink in stirred have
 b. ??Een blikje dat ik [alvorens EO uit te drinken] geschud heb.
 a can that[-R] I before EO[+R] out-of to drink shaken have

On the other hand, there would also appear to be evidence in favor of the view that there is a direct relationship between the matrix subject and the gap in the infinitival clause in a TM construction. The evidence would come from *connectivity* effects in TM constructions, noted by Pesetsky (1987) and Dave Lebeaux (p.c.):

- (14) a. His_i car is tough for every man_i to have to part with.
b. Pictures of himself_i are tough for John_i to have to look at.

In an analysis of connectivity effects in terms of *reconstruction*, examples of this type may be interpreted as showing that the matrix subject may be reconstructed into the position of the gap in the *tough* infinitival. This would minimally presuppose that the matrix subject bears the same index as the gap in the infinitival CP, for reconstruction into a position bearing a different index is not permissible. Since on the analysis propounded here, the empty operator undergoing movement from the position of the object gap is not bound by, hence not coindexed with, the matrix subject, it is clear that an account of the connectivity effects in (14) in terms of reconstruction is not available to us.

Two points should be made in this connection. Recall first of all that it now appears to be generally accepted that in TM constructions the matrix subject never actually moves from the position of the gap in the *tough* infinitival to the matrix subject position; rather, in the bulk of recent approaches to TM empty operator movement is taken to obtain internal to the *tough* infinitival. In this respect, TM is on a par with PG constructions as analyzed in the *Barriers* framework (cf. section 1). Now notice that PG constructions present evidence that strongly suggests that the binder of an empty operator may never actually reconstruct into the base position of the empty operator. As Kearney (1983) (also cf. Chomsky 1986b:60) has pointed out, an anaphor contained in the *wh*-binder of the empty operator in a PG construction may not be bound by an NP contained in the 'parasitic adjunct' and c-commanding the base position of the operator:

- (15) a. Which books about himself_i did John_i file *t* [before Mary_j read *pg*]?
b. *Which books about herself_i did John_i file *t* [before Mary_j read *pg*]?

If TM is to be analyzed in terms of empty operator movement, and if the binder of an empty operator may not be reconstructed into the D-structure position of the operator at LF, as shown by (15b), the conclusion that is forced upon us is that reconstruction cannot be the key to the explanation of the connectivity effects in (15).

That an appeal to reconstruction for cases like (14) is probably misdirected is also suggested by the fact that connectivity effects similar to those found in (14) occur in contexts in which one cannot resort to reconstruction—after all, predicative NP constructions like (16) are not normally conceived of as involving movement of the matrix subject (or an empty operator bound by the matrix subject) from a position c-commanded by the binder of the subject-contained bound variable or anaphor (also cf. Higgins 1973).

- (16) a. His_i car is every man_i's pride and joy.
b. Pictures of himself_i are John_i's private kingdom.

We will argue in section 4 that in PG constructions—in contrast to TM constructions—the empty operator is \bar{A} -bound by the 'real' operator in SpecCP. As the deviance of (1b) shows, the binder of the empty operator in the adjunct clause must be *identical* with its binder with respect to the feature [$\pm R$].

There is a more than superficial resemblance between the TM examples in (14) and the predicative NP cases in (16). As Lebeaux has noted, (the controller of) the subject of a *tough* infinitival does not necessarily or automatically bind (into) the matrix subject of a TM construction—in Lebeaux's terms, 'reconstruction' is not obligatory. The grammaticality of (17a) alongside our earlier examples in (14) bears this out. In this respect, too, predicative NP constructions such as (16) are parallel to TM. The example in (17b) shows that in such constructions the predicate-contained NP does not necessarily bind (into) the predicate's subject either.

- (17) a. John_i's mother is tough for him_i to endure.
b. A man_i's pockets are his_i own private kingdom.

In the domain of binding, then, TM and predicative NP constructions are completely on a par. Especially with regard to the 'optionality of reconstruction' illustrated in (17) (where 'reconstruction' is used as a convenient shorthand for what should, in the light of the foregoing, arguably not be conceived of in terms of actual reconstruction), TM and predicative NP constructions contrast as a group with run-of-the-mill 'reconstruction' cases involving *wh*-movement and topicalization, for which the counterparts of the examples in (17) invariably result in crossover violations:

- (18) a. *Whose_i mother does he_i love?
b. *John_i's mother, he_i really loves.

It is important to point out that on our analysis, there is a way to generalize over the examples in (14) and (16)-(17) to the exclusion of classic 'reconstruction' cases. Recall that we have analyzed TM constructions in terms of predication: due to the fact that the empty operator in a TM construction is not bound, the constituent internal to which empty operator movement obtains qualifies as a predicate, and θ -marks the subject of the TM construction *in situ*. In this respect, TM constructions are on a par with predicative NP constructions.

A rough initial generalization covering the 'reconstruction' effects in (14) and (16) might state that a predicate-contained NP may (optionally) bind into the predicate's subject NP. This tentative generalization is probably both too weak and too strong. On the one hand it appears that there are restrictions on the type of predicate to which the appropriate generalization should refer. In particular, the occurrence of 'connectivity effects without movement' seems to be sensitive to the stage-level/individual-level distinction. This is apparent from the adjectival examples in (19), of which (19a), with a typical stage-level predicate, is bad while (19b,c) seem acceptable:

- (19) a. *Their_i wives are *angry* with all men_i.
b. Their_i quest for independence is *characteristic* of all Baltic republics_i.
c. These pictures of himself_i are *indicative* of John_i's depressive state of mind.

On the other hand, such 'connectivity effects without movement' can even be found in constructions that apparently do not feature non-verbal predication at all. To see this, compare (20a), which contains a predicative NP as before, to (20b), a verbal paraphrase of (20a):⁸

⁸ Note that an example like (20a) also shows that the binder of the subject-contained variable may be fairly deeply embedded in the predicative NP. The examples in (i) further testify to this. It is interesting to note that here, too, the predicative NP construction runs parallel to TM, as a comparison of (i) and Lebeaux' examples in (ii) bears out.

- (20) a. Its_i sensitivity to ECP effects is proof that every intermediate trace_i must be present at LF.
 b. Its_i sensitivity to ECP effects proves that every intermediate trace_i must be present at LF.

An amalgamation of (20a) and (20b) might be established by analyzing (20b) as copular constructions of the type in (20a) underlyingly. Since they clearly fall outside the scope of this paper, however, we will leave the finer details of the analysis of 'connectivity effects without movement' for future research.

What is important to reiterate here is that, far from being refuted by connectivity effects of the type in (14), which arguably do not involve LF-reconstruction, our analysis of TM constructions according to which there is no binding relationship between the gap in the *tough* infinitival and the matrix subject may actually gain support from such connectivity effects, which seem somehow connected to (secondary) predicativity.⁹ The non-existence of a binding relation between the subject NP and the object gap in a TM construction was further shown to be corroborated by selectional mismatches of the type in (13). We conclude, then, that there is sufficient support for the central tenets of our analysis of TM constructions.

3. PARASITIC GAPS

Returning to the relationships and differences between TM and PG constructions (and restricting ourselves to adjunct-contained PGs), let us now proceed to showing how, with the aid of the hypothesis in (10), the anti-c-command condition on PG constructions can be derived from the θ -Criterion. In (21) (cf. (6)) t_i finds itself in an A-position c-commanding the adjunct internal to which empty operator movement has taken place. The Binding Theory prohibits a binding relationship between this trace and the empty operator: an R-expression must be A-free.

- (21) *Who_i t_i talked to Mary [_{PP} before [_{CP} EO_j you met t_j]]?

Since the empty operator in (21) cannot be bound, the minimal constituent that contains its landing-site qualifies as a predicate, by our hypothesis in (10). Following Hoekstra (1988) and Frampton (1990), among others, we assume that adjunction of the empty operator to the adjunct-PP is excluded (for otherwise the adjunct island effect would be inexplicable), so that the highest position that the empty operator may reach is SpecCP. By (10), CP hence

- (i) a. This picture of himself_i at the scene of the crime is evidence that the defendant_i is guilty.
 b. This picture of his_i car at the scene of the crime is evidence for the defendant_i's guilt.
 (ii) a. Pictures of himself_i nude are tough for me to think that any man_j would like.
 b. Pictures of his_i wife nude are tough for me to think that any man_j would show his friends.

⁹ Cinque's (1990:114) observation that in Italian TM constructions, agreement between the matrix subject and an adjective contained in the *tough* infinitival is possible (i) might be another piece of evidence for a relationship between the gap in the *tough* infinitival and the matrix subject. Here again, however, similar agreement facts can be reproduced in contexts in which no direct relation between the adjective and the NP it agrees with can be established, as in the French cleft construction in (ii) (cf. Higgins 1973 on the analysis of (pseudo-)clefts).

- (i) Questa macchina non è facile da rendere competitiva sul mercato.
 this car(F sg) is not easy to render competitive(F sg) on the market
 (ii) C'est belle qu'elle est!
 it is pretty(F sg) that she(F sg) is

becomes predicative. It is impossible for CP to actually play its part as a predicate, however, there being no NP to which it could assign a θ -role. Recall that we have assumed a strictly configurational approach to predication: external θ -roles are assigned within the bounds of a small clause, to the subject of the SC. In order for CP in (21) to be able to exert its predicativity, it would therefore have to be the predicate of a SC (with an invisible PRO subject) in the complement of *before*. Since, apart from *with* and *without* in absolute constructions, prepositions never select SC complements, however, this option is excluded. The structure in (21) hence inevitably violates the θ -Criterion, and is filtered out accordingly.¹⁰

It is important that the empty operator does not adjoin to the adjunct-PP. If such adjunction were possible, an account of examples of the type in (6) would present itself according to which the *before*-PP (the minimal XP containing the landing-site of the unbound empty operator) is analyzed as the predicate of an adjunct-SC with a PRO subject to which the predicate's external θ -role could be assigned and which would be controlled by some constituent of the matrix clause, much as in constructions featuring depictive secondary predicates (e.g. *John ate the meat raw/nude*).¹¹ That the empty operator in (21) does not adjoin to PP can be ensured by stating (as in Chomsky, class lectures, Fall 1991) that movement is only allowed if it contributes to the licensing of morphological properties (including a feature like [+operator]). Fully licensed elements not being allowed to move, and EO's [+operator] feature being licensed in SpecCP in (21), it follows that adjunction of EO to PP is illicit.

Suppose, however, that the preposition introducing the adjunct containing the parasitic gap occupied the C⁰ position, as has been argued by Bennis & Hoekstra (1984) to be the case for Dutch Ps (though not for English ones) introducing infinitival CPs. The question then is why a Dutch anti-c-command case of the type in (22) is ungrammatical:

- (22) *Wie *t* sprak met Marie [na te hebben ontmoet *pg*]?
who talked to Marie after to have met

¹⁰ A potential threat to our analysis is presented by object deletion constructions other than TM, such as those in (7c-e) and (8c-e). For these constructions, empty operator movement is equally well motivated as for PG and TM constructions. These constructions resemble TM in that there is no higher *wh*-phrase to bind the empty operator. This forces us to the conclusion that the constituent internal to which empty operator movement has taken place is a predicate. They differ from TM constructions, however, in that the NP that would be the subject of this predicate, is already θ -marked. On the face of it, this type of construction should be ruled out by the θ -Criterion, by the same reasoning that explains the anti-c-command condition for PGs.

As a solution we propose the derivation that we excluded in the domain of PGs (cf. the previous note): the minimal XP containing the landing-site of the unbound empty operator is the predicate of an adjunct SC with a PRO subject to which the predicate's external θ -role is assigned. This PRO subject is controlled by a constituent in the matrix clause:

- (i) This book_i is not interesting enough [_{SC} PRO_i [_{CP} EO_i PRO_i to read *t_i*]]

Some evidence that the infinitival constituent containing the empty operator is indeed an adjunct derives from the fact that they can be stacked (as observed by Bennis & Wehrmann 1987), as illustrated in (ii). This possibility is typically absent with TM.

- (ii) a. This book is too expensive to buy to read.
b. This book is not interesting enough to read to buy.

The first infinitival is an adjunct that modifies the adjective proper (*expensive to buy, interesting to read*). The second infinitival modifies the complex consisting of the DegP (cf. Browning 1987 and also Corver 1990 for an analysis of the degree word as a functional head), the adjective, and the first infinitival: *too expensive to buy, not interesting enough to read* (notice that in (ii b), the negation is inside the scope of the second infinitival). This shows that the second infinitival must be an adjunct. For a discussion of the status of the first infinitival (which is of the *pretty to look at*-type), cf. note 5.

¹¹ This possibility was pointed out to us by Ad Neeleman.

The 'standard' analysis, in which the parasitic gap is assumed to be bound by the matrix subject trace, derives the deviance of (22) both from the anti-c-command condition and from Principle C, since the matrix subject necessarily controls the PRO subject of the infinitival CP and at the same time binds the parasitic gap, so that the variable left by movement of the parasitic gap ends up A-bound by the PRO subject of the infinitive. Consider now the structure that our analysis of PG constructions would assign to (22):

(22') *Wie_i t_i sprak met Marie [_{SC} PRO_i [_{CP} EO_i [_C na [_{IP} PRO_i te hebben ontmoet t_i]]]]_i

The infinitival CP (with *na* 'after' as its head) is the predicate of an adjunct-SC with a PRO subject controlled by the matrix subject, and in its turn controlling the PRO subject of the infinitival clause. Notice, crucially, that the empty operator moving across this lower PRO bears a different index from PRO (cf. the analysis of TM in section 2)—the ill-formedness of (22) hence cannot be attributed to the Binding Theory. It *can* be made to follow from the θ -Criterion, however, if we assume Bennis & Hoekstra's (1989) chain formation algorithm, according to which any empty category (including PRO) is linked to a c-commanding NP unless (in the case of A-chains) a CP intervenes. In (22') a CP would indeed at first sight seem to intervene between the lower PRO and its antecedent, the higher PRO. Recall, however, that the CP in question is the predicate of a SC. Arguably, SCs are categorially non-distinct from their predicates. CP in (22') hence is a *segment* of SC, and will, given Chomsky's definition of a barrier, fail to intervene between the two tokens of PRO. Bennis & Hoekstra's chain formation algorithm now predicts that the two PROs will form an A-chain. This chain violates the θ -Criterion since it is θ -marked twice. In this way, (22') is ruled out, as required.

The θ -Criterion, in conjunction with the hypothesis in (10), also accounts for the dependence of a PG on the presence of a 'real' gap. Consider our earlier example in (5), repeated here—slightly modified—as (23):

(23) *I talked to Mary [_{PP} before [_{CP} EO_i you met t_i]].

Principle C of the Binding Theory prevents the empty operator in the adjunct-PP from being bound by any constituent in the matrix clause. By (10), the CP contained in the adjunct-PP in (23) will hence become predicative. As before, however, there is nothing for it to be predicated of. As a consequence, a θ -Criterion violation is unavoidable.

In a similar vein, the fact that (S-structure) parasitic gaps can be licensed by pre-LF \bar{A} -movement only can be made to fall out from the analysis. Consider the contrast in (24a,b):¹²

¹² The fact that PGs must be sanctioned at S-structure has not, to our knowledge, been satisfactorily accommodated in previous accounts of PG constructions. Chomsky's (1986b) claim that chain composition (i.e. the composition of the 'real' and parasitic chains) must obtain at S-structure is not independently motivated. Tellier (1988:130-1) strives to derive the obligatory S-structure application of chain composition from her Universal Licensing Principle, according to which maximal projections must be licensed at all levels of representation. Empty operators must, on Tellier's assumptions, be identified by an antecedent both at S-structure and at LF. In TM constructions, in which predication is involved, the empty operator can be identified at S-structure and LF by an argument via "predication coindexing", but since in PG constructions there is no predication, this strategy is inapplicable to PG constructions. Instead, chain composition, "the means by which an operator unlicensed by predication acquires an identifier" (Tellier 1988:391), must ensure the S-structure licensing of the empty operator. It now follows that chain composition must be executed no later than at S-structure. Although we are quite sympathetic to her appeal to the notion of *predicativity*, we would like to point out that Tellier does not derive the difference in predicativity between TM and PG constructions, but takes it as given. Notice that our claim that predicativity in empty operator movement constructions is the result of leaving the empty operator unbound is incompatible with Tellier's assumption that *all* empty operators must be identified by an antecedent.

- (24) a. Who did they talk to [_{PP} after [_{CP} EO_i they met *t_i*]]?
 b. *Who talked to whom [_{PP} after [_{CP} EO_i they met *t_i*]]?

While in (24a), in which the complement of *to* undergoes pre-LF *wh*-movement, the parasitic gap is licensed (cf. below for discussion), it is not in (24b), in which movement of *to*'s object does not obtain until at LF. Let us assume that the demands of the θ -Criterion must be met at D-structure or in any event no later than at S-structure.¹³ The contrast between (24a,b) then falls out immediately from the analysis given that postponing movement of the matrix object in (24b) until LF will induce a θ -Criterion violation in much the same way as in a non-movement case such as (23).¹⁴

Finally, let us address the grammatical PG construction in (24a). Why doesn't this example involve a violation of the θ -Criterion as well? The crucial difference between ungrammatical PG constructions such as (23) and (24b) on the one hand, and a well-formed case like (24a) on the other lies in the fact that pre-LF *wh*-movement of the intended licenser of the parasitic gap takes place in the latter but not in the former. In the former examples, the intended licenser of the parasitic gap cannot bind the parasitic gap (or, more accurately, the empty operator binding the parasitic gap). For one thing, there is no c-command relationship between *to*'s object and the parasitic chain, and even if the c-command condition were met, Principle C of the Binding Theory, requiring R-expressions to be A-free, would still be violated. Since binding of the empty operator is therefore excluded, the adjunct-PP is rendered predicative, and a violation of the θ -Criterion ensues, as discussed above.

In (24a), syntactic *wh*-movement moves the licenser of the parasitic gap into an \bar{A} -position. Since A-binding of R-expressions is perfectly licit, a relationship of binding can therefore be established between the *wh*-phrase in the matrix SpecCP and the empty operator in the adjunct-PP in a grammatical PG construction. *Who* thus binding the empty operator in (24a), the adjunct-PP internal to which empty operator movement obtains in this example consequently does not have predicative status. No violation of the θ -Criterion will hence arise, and the example is predicted to be grammatical, as required.¹⁵

¹³ Note that, on a derivational approach (which we have tacitly adopted throughout), we cannot require the θ -Criterion to be met entirely at D-structure, for in our analysis of TM constructions, the matrix subject will be θ -marked only after the application of movement of the unbound empty operator within the constituent labeled 'XP'. On an analysis according to which operator-variable relations are base-generated at D-structure, however, there may be a way to adhere to strict D-structure satisfaction of the θ -Criterion while at the same time adopting the analysis of TM presented in this paper. It is of course not just a theoretical issue whether the θ -Criterion should be taken to have to be met already at D-structure, under all circumstances, or whether S-structure satisfaction of the θ -Criterion will do (in some cases). In the absence of clear results in this domain, we cannot draw any firm conclusions on the derivational vs. representational debate on the basis of our analysis of *tough*-movement.

¹⁴ Notice that the point here is not that there can be no LF-licensed parasitic gaps; the point is rather that parasitic gaps which are gaps already at S-structure cannot be licensed by LF \bar{A} -movement, for reasons just outlined. That is, Kayne's (1984) treatment of the grammatical triple *wh*-question in (ib), which contrasts to the unacceptable double *wh*-question in (ia) which instantiates a Superiority violation, as a parasitic gap construction at LF (the subject-*wh* being parasitic on the dative-*wh*) can be maintained.

- (i) a. *What did who give to Mary?
 b. What did who give to whom?

Since (ib) does not at any point in the derivation from D-structure to S-structure feature a constituent that is potentially rendered predicative as a result of empty operator movement, no violations of the θ -Criterion will ever ensue in examples of this type, not even when analyzed as LF parasitic gap constructions.

¹⁵ One might object that our account fails to furnish an explanation for sentences where the parasitic gap appears to be too deeply embedded inside the adjunct, which would be regular Subadjacency effects on other analyses:

4. ON APPARENT CASES OF A-LICENSED PARASITIC GAPS

The present account of PG constructions (in contrast to Chomsky's 1986b) provides a principled answer to the question of whether parasitic gaps can be licensed by \bar{A} -movement only, or by A-movement as well. The theoretical answer must clearly be that only \bar{A} -movement will do. After all, only \bar{A} -movement (from a position that does not c-command the 'parasitic chain') will furnish an \bar{A} -binder for the parasitic empty operator which will prevent the constituent internal to which empty operator movement takes place from becoming predicative. With this theoretical conclusion in mind, let us now proceed to an inspection of the facts.

Though it is commonly held, in the light of the unacceptability of examples such as (25a) or its Dutch counterpart in (25b),¹⁶ that only \bar{A} -movement may license parasitic gaps, there is a set of apparent A-movement cases in which parasitic gaps are not at all bad. We illustrate them in (26):

- (25) a. *This book was understood [after {reading/they read} *pg* only once].
 b. *Dit boek werd [na slechts een keer *pg* te lezen] begrepen.
 this book was after only one time to read understood
- (26) a. *Passives with a modal adverb*
 ?This book is easily misunderstood [after reading *pg* only once].
 ?Dit boek wordt [na slechts een keer *pg* te lezen] gemakkelijk verkeerd begrepen.
 this book is after only one time to read easily wrongly understood
- b. *Passives with a modal auxiliary*
 ?This book cannot be fully understood [after reading *pg* only once].
 ?Dit boek kan [na slechts een keer *pg* te lezen] niet volledig worden begrepen.
 this book can after only one time to read not fully be understood
- c. *-able/-baar adjectives*
 ?This poem is not interpretable [without reading *pg* aloud].
 Dit gedicht is [zonder hardop *pg* voor te lezen] niet interpreteerbaar.
 this poem is without aloud PRT to read not interpretable

- (i) a. *Which books, did you buy t_i [after [EO [PRO reading a newspaper article that discussed e]]]?
 b. *Which books, did you buy t_i [after [EO [PRO leaving home [without PRO reading e]]]]?

Since all that we require on the part of EO is that it be \bar{A} -bound, and since binding is not normally taken to be subject to Subjacency, our account would seem to allow EO to move only to the nearest available operator position, and not all the way to the position indicated in the structures (i). Then, the Subjacency Condition would be complied with. There are two lines of argument open to us in response to this point. We may either assume (with Hoekstra 1988) that Subjacency holds of *all* \bar{A} -dependencies (not just those arising from movement), so that (i) can be ruled out even if EO moves only to the nearest available SpecCP, or we may force EO to move to the position indicated in (i), Subjacency being violated in the process. In the latter case, we may resort to a condition of the type advocated by Frampton (1990) (incorporating the basic insight of Kayne's 1984 Connectedness theory) to the effect that there should be a local connection between the 'real' and parasitic chains. We leave open which of these scenarios should be preferred.

¹⁶ For Dutch it has been claimed (cf. Broekhuis 1990, De Hoop & Kosmeijer 1991) that examples of the type in (25b) are grammatical. Broekhuis interprets this as evidence in favor of the view that raising to subject position in Dutch is not an instance of A-movement, which would be in keeping with the analysis of PG constructions developed here. De Hoop & Kosmeijer (1991), on the other hand, construe the alleged well-formedness of cases like (25b) as evidence for their claim that A-movement does license parasitic gaps. We disagree with the grammaticality judgments presented by these authors. To us, examples of the type in (25b) are unacceptable, on a par with English (25a). We do agree, however, that in *specific contexts*, apparent A-movement may license parasitic gaps (cf. *infra*).

- d. *Modal passives* (not found in English)
Dit boek is [zonder drie keer *pg* door te lezen] niet te begrijpen.
this book is without three times through to read not to understand
[semantics essentially on a par with (26b)]
- e. *Middles*¹⁷
?This book reads easily [even without translating *pg* first].
?Dit boek leest gemakkelijk [zelfs zonder eerst *pg* te vertalen].
this book reads easily even without first to translate

Some of the examples in (26) are clearly more felicitous than others. All contrast markedly, however, with the ungrammatical standard A-movement cases in (25).

What distinguishes the five cases in (26) from the ungrammatical A-movement examples in (25) is the presence in the former of an *aspect of modal semantics*. We would like to capitalize on this observation in our account of the (relative) acceptability of the examples in (26). In particular, we would like to assign this aspect of modal semantics *structural* status by making it a head feature of a functional projection, and assume that the specifier position of this functional projection may harbor empty operators.¹⁸

- (27) Modality is the head of a functional projection ('Mood & Modality Phrase') whose A-specifier may serve as the landing-site of empty operator movement.

With this in mind, the analysis of the PG constructions in (26) is now straightforward, and essentially parallel to that of TM constructions. We assume that the object of the passivized verb or *-able* adjective in (26) is an empty operator undergoing \bar{A} -movement to SpecM&MP. The empty operator in question will not be bound; binding by the matrix subject, which in constructions of this type is base-generated *in situ*, would result in a violation of Principle C of the Binding Theory (cf. section 2). The constituent featuring internal movement of this unbound empty operator (M&MP) will hence, by (10), become predicative, and θ -mark the matrix subject in much the same way as in our analysis of TM constructions. The core structure of the examples in (26) hence reads as in (28):

- (28) This book_i ... [_{SC} t_i [_{M&MP} EO_j ... V t_j]_i]

The empty operator, which occupies the \bar{A} SpecM&MP position at S-structure, will license the parasitic gap in the adjunct clause (i.e., it binds the empty operator undergoing movement internal to the parasitic adjunct).

¹⁷ The judgments with middles are admittedly more subtle, for reasons unclear to us. Several native speakers have confirmed, though, that PGs are in principle possible in middles. Some more examples are given below ((i a) is provided to us by Diane Massam):

- (i) a. ?This wall paints easily without scraping first.
b. ?This car drives nicely even without tuning.
c. ?Deze auto rijdt zelfs zonder op te voeren lekker.
this car drives evenwithout up to V nicely

¹⁸ For a brief overview of recent proposals for a functional projection harboring mood and modality, we refer to Den Dikken (1991:section 3), where it is also proposed that SpecM&MP serves as the landing-site of empty operator movement.

We clearly require the specifier position of the Mood & Modality Phrase to be an \bar{A} -position. This can be made to follow both from Rizzi's (1990) view on the A/ \bar{A} -distinction (SpecM&MP not being an agreeing specifier) and from Hoekstra & Mulder's (1990) (SpecM&MP not being a Case position A-linked to a θ -position).

This analysis of apparent A-movement licensing parasitic gaps allows us to fill in the final lacuna in the structure of TM constructions in (12). We so far ignored the status of the constituent labeled 'XP' internal to which empty operator movement obtains. The obvious move to make at this point is to identify this 'XP' as our Mood & Modality Phrase. The analysis of TM, given in its full form in (29), thus comes to run quite parallel to that of the examples in (26).

(29) John_i is [_{SC} t_i [_{M&MP} EO_j ... easy [_{CP} t_j PRO to please t_j]]_i

The analytical parallelism between TM constructions and the examples in (26) is supported by the following observation.¹⁹ Recall that one of the arguments advanced in support of our analysis of TM in section 2 was the fact that the matrix subject of a TM construction need not comply with the selectional restrictions imposed on the gap in the *tough* infinitival (cf. (13a), repeated here as (30a)). A similar case for an analysis in terms of unbound empty operator movement can be made for examples of the type in (26). As Ken Safir (p.c.) has pointed out to us, while *for ...to* infinitivals are normally odd as the subjects of passive *believe* type constructions, such examples tend to improve noticeably once a modal auxiliary is added, as the acceptability of (30b) bears out:

- (30) a. For him to be top of the class is hard to believe. (= (13a))
 b. ?For him to be top of the class would not have been believed by his parents, if the teacher hadn't confirmed it.

5. CONCLUSION

In this paper we have presented a unified analysis of *tough*-movement and parasitic gap constructions. In both constructions there is internal empty operator movement, which, given certain assumptions on the nature of the concept of *predication*, potentially renders predicative the constituent internal to which empty operator movement takes place. This predicativity was exploited to endow the subject of TM constructions with a θ -role under predication, and to derive the anti-c-command condition on PG constructions, as well as the fact that parasitic gaps can be licensed by pre-LF operator movement only.²⁰

We also briefly addressed a number of apparent A-movement constructions in which a parasitic gap can be licensed, and tentatively suggested an analysis of such constructions

¹⁹ There are also a number of differences between TM and apparent A-movement constructions of the type in (26), which space prevents us from discussing here; we refer to the longer manuscript version of this paper for details.

²⁰ It might be thought that our account of TM wrongly predicts cases of Superraising from object position to be grammatical, on an analysis as schematically represented in (i), according to which there is movement of an unbound operator internal to the embedded CP, which hence comes to qualify as a predicate capable of θ -marking the subject in the specifier position of the SC:

(i) John_i seems [_{SC} t_i ... [_{CP} EO_j that Bill saw t_j]]_i

On our analysis, however, the deviance of Superraising constructions of this type can be related to that of TM constructions featuring a tensed complement to the *tough* adjective (cf. **This book is tough that Bill read*). We suggest that, by way of lexical specification, *tough* adjectives and raising verbs like *seem* fail to select a finite CP complement. Note that cases for which some analyses might adopt a complementation structure (*It seems that ...* and *It is tough that ...*) arguably do not involve CP-complementation at all (cf. Bennis 1986 for arguments that 'expletive *it*' is not a dummy but a θ -role bearing expression, CP being generated in adjoined position).

—which typically feature an aspect of modal semantics—in terms of empty operator movement to the specifier position of a functional projection harboring modality, the Mood & Modality Phrase. While opening up a whole new array of empty operator movement constructions, an approach to these apparently A-licensed PG constructions modeling them on TM constructions raises a number of important questions which further research should look into more fully. It seems, however, that if, as the theory leads us to conclude, parasitic gaps can be licensed by \bar{A} -movement only, an analysis of those apparent A-movement constructions in which parasitic gaps are licit must involve empty operator movement, along the lines sketched here in section 4.

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