PREDICATION, NULL OPERATOR INFINITIVES AND FOR-DELETION

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Abstract

Recent analyses have differentiated infinitival relatives and/or purpose clauses in English with subject gap (SIR: *the man to fix the sink* / SPC: *he brought John along to be examined*) from those with object gap (OIR: *the man to talk to* / OPC: *he brought John along to talk to*). I propose that SIRs/SPCs are syntactically parallel to OIRs/OPCs, i.e. are full S' clauses derived via *wh*-movement of a null operator. In SIR/SPC the *for*-complementiser supplies Case for the null-operator-bound subject variable at S-structure, deleting prior to PF. A way of overcoming Case-theoretical objections to free *for*-deletion post S-structure (also found in: *who did you want very much (#for) t to win?*) is suggested. The absence of SIR from languages without a Case-assigner for the infinitive subject position, and evidence from English *tough*-movement infinitives, support the claim that control of infinitival PRO subjects cannot license a predication relation, which rules out the alternative analysis of SIR involving controlled PRO.

1. Introduction

The analysis first proposed in Chomsky (1977), which takes the infinitives in (1) to be full clauses (S' or CP) that undergo *wh*-movement of a phonetically empty *wh*-pronoun or 'null operator' as in (2), remains the standard within the Government-Binding paradigm [1] :

(1) a. the man (for us) to talk to is John   object-gap
                                                         infinitive
                                                         relative   OIR

b. she brought John along (for us) to talk to object-gap
                                                            purpose clause
                                                            OPC

(2) a. $[_{CP}$ Op$_j$ for $[_{IP}$ us to talk to t$_j$]]

b. $[_{CP}$ Op$_j$ e $[_{IP}$ PRO to talk to t$_j$]]

Such clauses are interpreted as predicates of the NP in the higher clause that is construed with the operator-variable chain inside the infinitive; and since Chomsky (1977) it has been recognised that *wh*-movement in these clauses (as in tensed relatives) is a reflex of their status as predicates.

The infinitives of (3) share many properties with those in (1), including their interpretation as predicates of an external NP.

(3) a. the man to be examined has arrived   subject-gap
                                                     infinitive
                                                     relative SIR

     b. she brought John along to be examined   subject-gap
                                                     purpose clause
                                                     SPC

Intuitively, these differ from (1) mainly in that it is the highest
subject of the infinitive, rather than a nonsubject constituent, that
is construed with the external noun phrase.

Williams (1980) analyses the internal structure of the SIR and
SPC differently from the object-gap type, maintaining that the former
are neither full clauses, nor derived by *wh*-movement, but instead are
reduced clauses of category S (=IP), containing a controlled PRO
subject:

(4)   NP$_j$ ... [$_{IP}$ PRO$_j$ to be examined]

This analysis is repeated for SPC in Jones (1985), and for SIR in
Browning (1987), each within its own version of predication theory.

Our goal is to defend a version of the symmetrical analysis of
these infinitives that was originally proposed in Chomsky & Lasnik
(1977) for SIR, in which the SIR/SPC type are full clauses derived by
wh-movement, differing from OIR/OPC only in the position in which the
wh-phrase originates:

(5)   NP$_j$ ... [$_{CP}$ Op$_j$ for [$_{IP}$ t$_j$ to be examined]]

We propose that operator movement in (5) is licensed much as in
(2), by the status of the infinitive as a predicate. The *for*-
complementizer is argued to be subject to obligatory deletion in the
environment (5), i.e. where it immediately governs a *wh*-trace. We
further propose that control of an infinitival PRO subject cannot
license a predication relation - in effect ruling out (4) as a possible
derivation.

There are three main advantages to our proposal. The first lies
in the symmetry introduced into the derivation of the Infinitival
Relative / Purpose Clause paradigms.

Secondly, the analysis provides a basis for accounting for why
SIR-type infinitives are found only in English. That such infinitives
are ungrammatical in Dutch, French, German, Swedish and Italian falls
out from the fact that none of these languages possesses a Case-
assigning complementizer that would permit operator movement from the
infinitival subject position.

Thirdly, our approach has interesting consequences for the
analysis of *tough*-movement constructions.

2. Predication and null operators

Before assessing the analysis (5) in detail, I discuss how null
operator constructions are licensed by predication theory, following
closely Browning's (1987) account, in which *wh*-movement in the object-

gap infinitives is a consequence of predication requirements. This theory includes an account of why null operators are possible in these constructions, though it remains unclear why with the exception of a subclass of infinitival relatives, they prohibit overt *wh*-movement.

2.1 Predication

The basic concept in predication theory is the syntactic relation that links a predicate phrase XP - where X can in principle be any category - and an argument phrase, which is generally a referential NP; this relation is expressed as coindexation, and is subject to a locality restriction of mutual c-command - Williams (1980).

(6) $NP_j ... XP_j$ condition: mutual c-command

A predicate is not a referring expression, so the index it bears has purely syntactic significance with respect to its interpretation; XP in (6) does not wind up being coreferential with its external argument, since it does not refer in the first place. It follows that predicates are not θ-role recipients, and will be in complementary distribution with arguments, i.e. restricted to A'-positions. Syntactic predication can be understood as the means by which a phrase that is not θ-marked is integrated into a structure, and by which its interpretation is licensed (cf Rothstein (1983)).

The standard view on how the syntactic predication relation comes to be interpreted (so that the purely formal relation is fleshed out as a semantic predicate-argument relation) involves one of two separate mechanisms: transmission of a θ-role from the predicate to its subject; or through the binding of an operator. The transmission of a θ-role is what licenses clause-level (primary) predication: the subject NP is assigned either the external θ-role of the VP (7a) or forms an A-chain terminating in a θ-position within the VP (7b):

(7) a.   John [$_{VP}$ coughed]

     b.   John [$_{VP}$ seemed t to cough]

It is uncontroversial that clausal predicates (relatives, purposives) do not assign θ-roles. In these cases, the open place within the predicate is a syntactic argument (already assigned a θ-role) whose referential value is fixed by a coreference relation being established with the external subject of the predicate. This relation is established by means of a *linking category* (what Williams (1980) terms a "predicate variable"). This is the function of the null (or overt) *wh*-phrase that heads a clausal predicate - to mediate interpretation of a syntactic predication relation that does not involve θ-role transmission.

2.2 Null operators: Browning's (1987) proposal

One characteristic of the linking function of the null operator is obligatory coindexation with the external NP. A second characteristic is that it must occupy the highest specifier of the

predicate CP (wh-movement within a CP, does not create a predicate, unless movement is to the highest specifier):

(8) a.   * the man [that I believe who I saw t] ...

     b.   the man [who I believe that I saw t] ...

Browning (1987) neatly captures both generalisations by borrowing from Chomsky (1986b) the notion that agreement (usually abstract), understood as coindexation, holds automatically between the clausal heads Comp and Infl and their respective specifiers. The effects of assuming specifier-head agreement in a clausal predicate are illustrated in (9):

(9) she brought John$_j$ along [$_{CP_j}$ Op$_j$ for$_j$ [us to talk to t$_j$]]
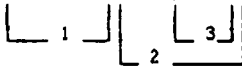
     1.   predication NP - XP
     2.   X' - Xmax agreement
     3.   SPEC head agreement

To SPEC-head agreement (marked '3') are added the standard assumption that a head is coindexed with its maximal projection ('2'), and the relation of syntactic predication ('1') we have already discussed, to derive the result that the highest specifier of a clausal predicate cannot fail to be coindexed with the external argument of the predication.

Browning suggests that null operators are empty pronominal NPs - i.e. pro (p. 123). This contrasts with earlier views of null operators as overt wh-phrases that are subsequently deleted (Chomsky 1977), or as PRO (Williams 1980; Chomsky 1980,1981), but allows a natural assimilation to overt (bare) wh-NPs such as what, who, that are traditionally classified as pronouns (rather than eg as 'reflexive' anaphors).

Pro is elsewhere assumed to be subject to an 'identification' condition - for example, null tensed clause (pro) subjects in Italian are possible since they can be identified by the overt agreement element contained within the Infl with which they are coindexed. Browning proposes that the features that identify the operator-pro are supplied ultimately by the NP that is the external argument of the predicate phrase itself, which is able to function as an identifier by virtue of the chain of agreement relations illustrated in (9). The actual identifier of pro in this case as elsewhere is the head (= the complementizer-for in (9)) with which pro agrees. Though this (SPEC-head) agreement relation is abstract, and therefore of itself insufficient to identify pro, the fact that the features involved stem ultimately from an independent and visible source - the external NP - enables the complementizer to identify pro.

Nothing in this approach forces the moved wh-phrase to be null, so the construal relations in relative clauses with overt wh-movement can be handled in the same manner, as indicated (Browning, pp.127ff.):

(10)   the woman, [$_{CP}$, who, e, [$_{IP}$ he saw t,]]

The specifier-head agreement relation plays the same role as the percolation mechanisms of earlier treatments, in getting the *wh*-phrase to agree with the relative clause itself. For the approach based on SPEC-head agreement is to succeed, however, further provisions are necessary to handle cases of pied-piping, where the *wh*-phrase does not itself constitute, but is contained within, the specifier phrase of the relative clause (see Browning, pp.137-9 for discussion).

The syntactic predication relation we are assuming is well-formed regardless of the relation between the specifier phrase of a predicate and the external NP. We need therefore to rule out structures such as (11), in which a syntactic predication does not yield a link with a suitable category in the specifier of the predicate:

(11)   * the man, [$_{CP}$, for John to cough]

To do this, we might invoke an interpretive requirement such as (12):

(12)   Predication cannot be "semantically vacuous"

- which would form a subcase of Chomsky's (1986a) principle of Full Interpretation.   This should be sufficient to ensure obligatory *wh*-movement in clausal predicates such as relative clauses and purposives. Without movement, no position within a clause can connect (non-accidentally) with its topmost projection.   For example, binding of a pronoun within a clause directly by the external NP subject of the predication is not sufficient to license the predication:

(13) a.   ?? the man for John to hope to meet him

    b.   the man, [$_{CP}$, for John to hope to meet him,]   = *

To the extent that (13a) is interpretable, we assume that a null operator in the specifier of the topmost CP projection mediates the binding relation, acting as closest binder of the (resumptive) pronoun:

    c.   the man, [Op, for John to hope to meet him,]

Browning, assuming the standard 'mixed' theory with respect to the licensing of predication relations, imposes the following condition on predication (p. 62):

(14) A subject-predicate relation is licensed if:

   a. the subject discharges the external θ-role of the predicate

   or:

   b. the subject agrees with a chain contained within the
      predicate

The chain mentioned in (14b) is the chain of agreement relations in
(9) above. As clauses do not assign θ-roles, (14a) excludes examples
like (11) - in effect, forcing *wh*-movement in relative clauses etc. If
our line of reasoning concerning the role of the Principle of Full
Interpretation goes through, we should be able to dispense with
reference to "agreeing with a chain" in any principle licensing
syntactic predication.

2.3 *Tough*-movement infinitives

By tying the identification requirement on the null operator to
the establishment of the predication relation, this theory makes an
interesting predication concerning their distribution. A null operator
will not be permitted in the SPEC CP of a complement clause that
undergoes *wh*-movement, such as the interrogative in (15), since there
is no predication relation that would permit identification:

(15) a.   he asked who she saw t

    b.   * he asked [Op she saw t]

We predict a strict correlation between null operator movement in a
clause, and adjunct status of that clause, as we wish to maintain that
predicates, being non-referential, cannot be θ-marked and so cannot be
complements.

However, the correlation fails to hold, if we follow the standard
position, that *tough*-movement infinitives, like that in (16a), are
actually complements of the relevant adjective, to be identified with
the infinitive complement in (16b):

(16) a.   [this book] is easy [Op [to read e]]

    b.   it is easy [to read War and Peace]

In fact, apart from capturing the formal similarity of TM with other
adjunct infinitives (ie OPC), and keeping the theory of null operators
maximally simple, to treat the infinitive in (16a) as an adjunct
also has the advantage of permitting resolution of the paradox
concerning the argument structure of *tough*-adjectives, discussed by
Chomsky (1981:308ff) [2] .

Chomsky assumes that the adjective selects for an infinitive
complement in both examples (16). (17) then shows that this adjective
selects an argument subject only where the infinitive has undergone
internal *wh*-movement:

(17)   * [this book] is easy [to read War and Peace]

A lexical property of the adjective - selection or not of an argument subject - depends on the operation of a rule of the syntax inside the adjective's complement; paradoxically, for a theory in which θ-marking configurations are determined prior to the operation of syntactic rules.

The paradigm (16-17) is incomplete. As (18a) illustrates, an argument subject does not depend on the appearance of an infinitive at all:

(18) a.   [this book] is easy

     b.   * it is easy [to read e]   (it = expletive)

The appearance of the null operator infinitive on the other hand depends on an argument subject being present (18b).

Suppose we start by pairing both the infinitive in (16b) and the NP in (18a) with one and the same argument slot (θ-role) determined by the adjective:

(16b)'   it is easy   CP   =   (18a)'   NP is   easy
          ⌊___θ___⌋   ⌊___θ___⌋

We can then analyse (16a) by assuming that the NP is the argument of the adjective as in (18a), while the infinitive bears no θ-role at all, being an adjunct, a sort of secondary predicate.

(16a)'   NP is   easy [$_{CP}$ Op ...]
                ⌊___θ___⌋

This adjunct requires to be predicated of an independently θ-marked NP, which accounts for (18b). In fact, such adjuncts can be predicated of the argument of the adjective where the option of a full infinitive (instead of NP) argument is selected:

(19)   [for him to be top of the class] is hard [to believe e]

The infinitive cannot be the complement of the embedded verb in this example, as *believe* does not select *for*-to infinitives.

In similar fashion, we claim the postnominal infinitive in (20), also standardly thought to be the complement of the prenominal *tough*-adjective, to be not a complement to the adjective, but an adjunct to the NP as a whole - in effect a relative clause [3]

(20)   an [easy] book [to read e] is ...

Two additional pieces of evidence apply in this case. Unlike the *tough*-movement infinitive, true complements to adjectives cannot appear in postnominal position where the adjective appears prenominally:

(21) a.   * an eager man to please John   cf: he is eager to VP

     b.   * a sure man that you like him   cf: he is sure that S

Instead, the postnominal infinitive of (20) patterns with ordinary infinitival relatives, in allowing an overt *wh*-phrase just in case a preposition is pied-piped:

(22) a.   a topic [about which to write]

     b.   an [easy] topic [about which to write]

Our approach might be argued to give rise to problems in analysing the interpretation of *tough*-sentences. Many have the intuition that the adjective in a *tough*-sentence modifies the predicate (i.e. the infinitive), and not the NP subject - much as the adverb *easily* in (23b):

(23) a.   the book was easy to read

     b.   the book was [easily [read t]]

We have to maintain that the θ-role the adjective assigns to the matrix subject is sufficiently 'vague' to permit the full range of subjects found - including even *wh*-clauses (24). The infinitival adjunct serves to restrict possible interpretations:

(24)   why he did it is hard to fathom

Implicit in our position is the claim that the oddity of examples like (25) is not due to incompatibility of θ-role assigner and assignee:

(25) ?? why he did it is hard

Though I believe such objections can be met (by manipulating the extra-linguistic context, (25) can be made more acceptable) to defend this in detail would take us too far afield here [4] .

Tough-movement infinitives are therefore to be identified with the object-gap type predicate infinitives OIR and OPC, in accordance with our proposal that *wh*-movement in these clauses is a consequence of their non-θ-marked status. Admittedly, there are differences between *tough*-infinitives and ordinary purposive infinitives - we address some of these below (§4.4) - but with respect to predication theory and the licensing of null operator movement, they are essentially of the same type.

3.   Subject-gap infinitives

The reason why Williams (1980:230) originally departed from Chomsky & Lasnik's approach and proposed that the subject-gap infinitives have a PRO subject lay in the problems caused by assuming a *wh*-trace in the subject position for the (then current) version of Case theory [5] :

(26) a.   the man to fix the sink has arrived

     b.   she brought John along to fix the sink

c.   NP, [$_{IP}$ PRO, to fix the sink]

A *wh*-derivation seems not to have been considered in Browning (1987). The motivation for categorizing such infinitives as bare S (IP) is more theory-internal - in Williams' case, having to do with his control theory. For Browning, the IP analysis is dictated by requirements on predication (we discuss this below).

Nevertheless, the PRO subject is not the only option for the subject position in English infinitives. Suppose a predicate CP is generated with *for* in Comp (the object-gap constructions indicate that *for* is available in CP predicates). Assuming Case-assignment is determined on S-structure configurations, the subject of IP may then *wh*-move to SPEC CP leaving a correctly Case-marked *wh*-trace, to yield the S-structure representation (27), which, like the OPC (9) above, meets the requirements of predication:

(27)   the man, [$_{CP}$, Op, for, [t, to fix the sink]]

To obtain the surface string that we need for SPC or SIR, all we need to assume is that *for* deletes in the mapping from S-structure to PF. If we can establish the existence of such a *for*-deletion rule, it is difficult to see what would prevent the derivation (27) being available for CP predicates - quite independently of whether the analysis (26c) is also a possibility.

In the following sections, I discuss the evidence for *for*-deletion, and other issues bearing on the feasibility of (24); before moving on to argue that the analysis (26c) is incorrect.

3.1   Complementizer deletion

Data suggesting that complementizer-*for* must delete if the subject it governs is extracted is found in complements to verbs like *want*.

(28) a.   who does she want t to quit his job?

b.   * who does she want for t to quit his job?

The effect is partially obscured by the fact that the complementizer often deletes where the subject of the infinitive has not been extracted:

(29) a.   she wants him to quit his job

b.   ??she wants for him to quit his job

But there is still a contrast here; leaving *for* undeleted where the subject has been extracted (28b) results in a significantly worse sentence than (29b).   The contrast sharpens in examples where an adverb intervenes between want and its clausal complement.   In such cases, *for* has to appear where the lexical subject is in place, but

must delete if the subject is extracted (Chomsky & Lasnik (1977:478), Chomsky (1981:281)):

(30) a.   she wants very much for him to quit his job

     b.   * she wants very much him to quit his job

     c.   * who does she want very much for t to quit his job?

     d.   who does she want very much t to quit his job?

Deletion of *for* permits extraction of the subject of a *for-to* infinitive governed by a verb like *want*, but not by an adjective or noun:

(31) a.   she was anxious for the book to be banned

     b.   they discussed her anxiety for the book to be banned

     c.   * which book was she anxious t to be banned ?

     d.   * which book did they discuss her anxiety t to be banned?

This situation is mirrored by corresponding tensed clause complements, where *that*-deletion fails to license complement subject extractions:

(32) a.   * what was she anxious that should be banned ?

     b.   * what did they discuss her anxiety that should be banned?

     c.   ?? what was she anxious should be banned ?

     d.   * what did they discuss her anxiety should be banned?

The relevant generalisation would seem to be, that complementizer deletion is rarely if ever possible, with or without extraction, in θ-marked complements to lexical heads other than verbs [*] :

(33) a.   ?? she was anxious the book should be banned

     b.   * her anxiety the book should be banned

The only other environment where complementizer deletion appears to be possible is in non-complement clauses - eg in tensed relatives:

(34)   the film she saw

What I propose is that the *for*-deletion rule that obligatorily follows subject extraction is available only in environments where (unforced) complementizer deletion is independently possible - namely, in complements to verbs, and in non-complement clauses.

(35) a.   I believe (that) she saw the film

b.   the film (that) she saw

c.   who does she want [t (#for) [t to quit his job]]

d.   the (only) man [Op (#for) [t to quit his job]]

The question arises as to what forces *for*-deletion. The parallel
in (36) raises the interesting possibility that we are dealing with a
Comp-trace effect in both cases - that is, it is the Empty Category
Principle that forces *for*-deletion as it does deletion of *that* [7] :

(36) a.   # what did she say that t should be banned

b.   # what did she want for t to be banned

The contrast in (37), however, counts against this idea:

(37) a.   the book [that t should be banned]

b.   # the book [for t to be banned]

Since the Comp-trace effect is suspended in relative clauses with
that, it is puzzling that *for* still has to delete (why *that* cannot
delete in (37a) is a separate issue.) If the ECP is not involved in
determining *for*-deletion, I can for the present do no better than
resort to Chomsky & Lasnik's Filter:

(38)   # *for to*   (Chomsky & Lasnik 1977)

3.2   *For*-deletion and case theory

Since, in the spirit of our theoretical framework, we must assume
that *for* deletion is a free operation, the question of overgeneration
has to be tackled. The scope of the rule is already restricted   by
independant constraints (whatever they may turn out to be) on
complementizer deletion;   the   main   case   outstanding   concerns
complements to V and noncomplement clauses where the subject has not
moved. Consider first the latter:

(39) a.   # the book [her to ban] ...

b.   the book for her to ban ...

c.   # she brought John in [the doctor to examine]

d.   she brought John in for the doctor to examine

Such examples are standardly ruled out by the Case Filter (or
θ-criterion, if one adopts the Visibility Hypothesis). However, if the
Case Filter is met at S-structure, as we assume, then (39a,c) pose a
problem for the assumption of free *for*-deletion *post* S-structure (see

note 5).   The problem is not avoided by adopting an alternative view
of Case-assignment which assumes that Case is assigned / checked at
PF; if we continue to assume that *wh*-trace requires Case, it then
becomes unclear how *for*-deletion in SIR is possible at all (at any
level).
     A   possible   approach   to   this   problem   is   suggested   by   the
following examples:

(40) a.   * she believed sincerely [John to be the murderer]

     b.   who did she believe sincerely [t to be the murderer]

It has been suggested that (accusative) Case assignment in English
underlies a locality requirement that needs to be stated in terms of
linear adjacency - presumably as a subcase of the structural relation
'government'.   (40a)   represents   a   violation   of   the   adjacency
requirement, since the adverb intervenes between the NP *John* and the
verb which assigns Case to it. Significantly, (40b) indicates that
wh-trace does not underly the same adjacency requirement.
     We have already noted that verbs like *want* permit *for* to delete
when the subject has not moved; and that this process is subject to an
adjacency requirement that does not hold for the case where the
subject is extracted:

(41) a.   * she wants very much him to quit his job

     b.   who does she want very much t to quit his job?

Here too *wh*-trace behaves asymmetrically with respect to lexical NPs.
     A source for (40b) in which verb and *wh*-trace are adjacent could
be argued to exist, if examples like (42) are judged grammatical under
the interpretation in which the adverb modifies the matrix VP:

(42) ?? she believed John *sincerely* to be the murderer

This counterargument does not apply to the examples involving *want*-
type verbs, where this reading is definitely out (excluding the
irrelevant SPC reading of the infinitive):

(43)   she wanted John *very much* to help her

The *for*-deletion analysis extends to the following examples from Kayne
(1984:pp.xiii & 5) ° - S-structures indicated:

(44) a.   who did they assure you to be a hard worker?

          who ... assure you [t for t to be ...

     b.   John Smith, who I've been assured to be one of the best
          students in the class ...

          who ... be assured t [t for t to be ...

Here, it is a matrix argument (or NP-trace) that intervenes between
the verb and the *wh*-trace. To suggest the trace to be adjacent to
the verb in (44) presupposes a situation impossible where the
embedded subject is unmoved:

(45)   a.   # they assured (for) him *me* to be a hard worker
    cf:
        b.   they assured me for him to be a hard worker

A way of capitalising on this asymmetry would be to assume two
separate requirements for successful (accusative) Case-assignment:

(46) a.   NP must be governed by a Case-assigner

    b.   NP must be linearly adjacent to a Case-assigner

(46a) applies at S-structure to all argument NPs, and feeds the
θ-criterion at LF.   (46b) applies at PF (as a "phonological visibility"
requirement),   its   domain   of   application   hence   restricted   to
phonologically overt elements (assigners / assignees).
    (46a) is met in the standard fashion for all examples. (46b)
interacts with *for*-deletion to derive (39a),(39c),(40a),(41a).   The
deleted *for* we assume is not visible to (40b), and so fails to license
overt NPs.   In this way we can restrict the output of *for*-deletion at
PF to those instances where no overt NP requires to be licensed.
    Perhaps the contrast in (47) is also explicable in these terms:

(47) a.   she wants him to quit his job

    b.   # she wants very much him to quit his job

Koster & May (1982) observe that predicates permitting *for*-deletion in
their complements when the subject remains in situ are (potential)
Case-assigners. Passivised verbs do not permit *for*-deletion here:

(48) a.   they preferred (for) him to leave

    b.   # it was preferred him to leave

    c.   it was preferred for him to leave

Assuming the verb *want* to be a Case-assigner, in (47a) it can license
with respect to (46b) an overt NP to which it is adjacent at PF, but
which it does not govern at S-structure (*him* being licensed at
S-structure by *for*, which is present at that level).   This option is
not available in (47b), which violates the adjacency requirement at PF.
    Clearly, much more needs to be said concerning nominatives,
double objects, heavy NP Shift phenomena, verb gapping etc.; a
reasonable account seems nevertheless to be attainable.

3.3 The failure of *Wh*-movement diagnostics

The very nature of the analysis we propose makes it difficult to
argue for; its crucial elements - the deleted *for*-complementizer and
the null operator - are both inaudible, so the evidence and arguments
that can be brought to bear are by and large of an indirect nature.
The absence of any tangible indication of *wh*-movement, in particular,
may cause our approach to appear suspect. Of the standard
diagnostics for *wh*-movement - subjacency violations (long movement),
the licensing of parasitic gaps, and of course, the presence of overt
wh-phrases - it appears that none yields positive results for our
approach. The following discussion explores why this should be so.

Firstly, the local nature of the movement hypothesised renders
standard subjacency arguments for *wh*-movement irrelevant.

Concerning the failure in SIR/SPC of the second diagnostic - the
appearance of overt *wh*-phrases - I have no solution to offer. This
problem is however not restricted to the subject-gap predicates - the
OIR type also bans overt *wh*-phrases, unless a preposition is pied-
piped (a possibility that could not arise in SIR).

(49) a.   the man (*who) to fix the sink

b.   the man (*who) to speak to

c.   the man to whom to speak

The ban holds independently of those cases of OIR where the *for*-
complementizer is generated, which could be argued to be regulated by
the Doubly-Filled Comp filter (DFC) of Chomsky & Lasnik (1977)).
Purpose clauses do not have even the possibility of an overt *wh*-moved
PP, allowing only covert *wh*-movement in both subject-gap and object-
gap types.

The fact that we find no interrogative *for-to* infinitives formed
through extraction of nonsubjects falls under the DFC generalisation:
a *for*-complementizer and an overt *wh*-phrase cannot cooccur in the
same C projection (recall that null operators are not licensed in
interrogatives in any case).

(50)   * I wonder who for me to visit

If we consider cases like (50) to be ruled out only as Doubly-Filled
Comp Filter violations, (51) could, within the present approach, be
used as evidence for the view that the deleted *for*-complementizer
counts as an overt element in the application of the Filter, like the
overt *that*-complementizer in (52):

(51)   * I wonder who t to come   (with deleted *for*)

(52) a.   the man that came

b.   the man who came

c.   * the man who that came

We could then appeal to the DFC to account for the absence of overt *wh*-movement in subject-gap predicates. It is also possible however, that examples like (50-1) are ruled out independently by the exclusion of the [-*wh*]-complementizers *that* and *for* from interrogative CPs generally.

We might expect to be able to demonstrate *wh*-movement in SIR/SPC by finding (or creating) examples containing parasitic gaps. It appears that no such examples exist; though if, as I shall suggest, this may due to other factors, our analysis is not unduly threatened.

Examples of local *wh*-extraction of a subject licensing a parasitic gap are in any case hard to come by (owing to the anti-c-command restriction); the following is cited in Chomsky (1986b:54):

(53) a man who [whenever I meet e] t looks old

The adjunct clause in (46) directly follows the *wh*-phrase, and, so the anti-c-command restriction predicts, precedes its trace. Assume that the adjunct is adjoined to IP, and is not c-commanded by the subject trace in this position. A corresponding postverbal adjunct cannot host a parasitic gap:

(54) * a man who t looks old [whenever I meet e]

If we take an SIR and add an adjunct containing a gap on the pattern of (55), the result is likewise unacceptable:

(55) a. * the puzzle to be solved by Sarah without her looking at

b. the puzzle to be solved by Sarah without her looking at it

The only configuration in which a parasitic gap licensed by the subject gap in SIR might be expected, therefore, is where a suitable adjunct is left-adjoined to the IP projection indicated in (56).

(56) the puzzle [Op (for) [$_{IP}$ t to be solved]]

Given that this projection is separated from neither its mother nor its daughter by overt material, it seems all we can do is place the adjunct between the noun head and *to* of the infinitive, and hope for the best:

(57) a. * the puzzle [without her looking at e] to be solved by Sarah

b. * the puzzle [without her looking at it] to be solved by Sarah

The example with the gap is hopeless, but, the fact that plugging the gap, (57b), does not improve the example, suggests that there may be a general problem with pre-IP adjuncts in this construction – though the reason for this is unclear to me [9]

4.   Against a Control analysis

We hope to have established (58) as a possible derivation for the
English SIR / SPC predicates; however, success here is independent of
whether the analyses in (59) involving a PRO subject are also possible
derivations:

(58)   the man [$_{CP}$ Op for [$_{IP}$ t to fix the sink]]]

(59) a.   the man$_j$ [$_{CP}$ [$_{IP}$ PRO$_j$ to fix the sink]]

     b.   the man$_j$ [$_{IP}$ PRO$_j$ to fix the sink]

The representation (59a), where the predicate is a CP, could be
argued to be ill-formed, given our assumptions concerning predication,
as there is no non-accidental coindexation (agreement) linking the
predicate CP with the PRO subject, the specifier of IP (see Browning
(1987:73):

(59a)'   * the man$_j$ [$_{CP_j}$ [$_{IP_k}$ PRO$_k$ to$_k$ [fix the sink]]]

As the external NP subject of the predicate fails to connect with the
intended linking category within the predicate, (59a) will be
interpreted as a vacuous predication. If the clause is a bare IP, as
Browning proposes (1987:73), the subject of IP is correctly coindexed
with the external NP:

(59b)'   the man$_j$ [$_{IP_j}$ PRO$_j$ to$_j$ [fix the sink]]

Nothing we have said so far excludes the derivation (59b) - as
an alternative to the analysis (58).   Moreover there are strong
grounds for believing that the configuration (59b) is involved in the
licensing of a variety of other predicate phrases - including post-
nominal reduced relatives (gerunds, participle phrases, APs).   The
possibility for a raising predicate to head such phrases argues
strongly for ascribing such phrases a small clause structure:

(60) a.   the bomb [e [likely t to explode]] is over there

     b.   the woman [e [believed t to have died]] is in the kitchen

     c.   the woman [e [appearing t to be angry with her sons]] ...

Not to assume a subject position inside the predicates in (60) would
give rise to serious problems with respect to the theory of NP-
movement (notice that the external NP subject occupies a θ-position,
and so cannot function as the head of the chain of the NP-trace inside

the predicate). Many authors suppose the null subject of such phrases
to be an instance of PRO (cf. Chomsky 1981, Stowell 1982).

(60)'   the woman$_j$ [PRO$_j$ appearing t to be ...]

On this view, the predication in (60) is established by the
(obligatory) control of a PRO subject by the external NP, as suggested
by Williams (1980) for SIR/SPC.
     Our approach to (59b) might then consist in simply allowing it
alongside (58) as a possible representation of SIR/SPC. Alternatively,
we might wish to claim that a to-infinitive clause is automatically
dominated by CP unless lexically selected as IP (by Raising and
Exceptional Case-Marking verbs), in order to exclude (59b). Then, with
the derivation (59a) ruled out along the lines indicated, the operator
movement derivation remains as the only option.
     I propose that (59) has to be excluded for more fundamental
reasons than these. The coreference of PRO subjects is standardly
assumed to be determined by a theory of Control; so it is implicit in
the analyses (59) that the predication relation linking the infinitive
with an external NP is simultaneously a Control relation. This claim
is made explicit in the attempt by Williams (1980) to subsume Control
theory under Predication Theory (within which his account of SIR / SPC
is embedded).   I take the position here that standard Control
phenomena, concerning PRO subjects of argument clauses, are not to be
accounted for by treating the clauses concerned as (complex)
predicates, on the basis that the clauses concerned are arguments
(θ-role recipients), thus falling outside the domain of predication
theory [10] .
     Though I adopt no explicit theory of Control here, I propose to
rule out the analyses (53) by claiming that Control and predication
are mutually incompatible; i.e. that something like (61) is true:

(61) Control of an infinitival PRO subject cannot license a predication
     relation

Independent evidence for assuming (61) is presented in 84.3 and 84.4;
in the absence of an explicit theory of Control, I leave unanswered
for the present the question of how or why (61) holds.

4.1   Small clause predicates

     The data in (60) can be reconciled with (61) if the relation
linking the null internal subject of a small clause predicate with its
external subject is not a Control relation (in the sense of being
determined by Control theory).   Notice that the null subject functions
here analogously to a null operator, as the linking category that
establishes a semantic link between the predicate phrase and its
subject. Moreover, as in the case of the null operator, linking in
(60) is characterised by being obligatory, and restricted to the
'highest specifier' of the predicate phrase.   This suggests a
straightforward extension of Browning's treatment of null operators to
small clause predicates.   We must assume that specifier-head
agreement holds in all projections that can form "small clauses", and
not just in projections of Comp and Infl (alternatively, perhaps small

clauses are projections of an abstract Infl-type head). The null
subject of the small clauses in (60) is now understood to be pro (not
PRO as in Chomsky (1981)), identified in a similar fashion to the null
operator '' .

62)   the woman$_j$ [$_{VP}$ pro$_j$ [$_{V'}$ appearing$_j$ t to be ...]]

4.2   Rationale clauses

Examples like (63) might be construed as counterevidence to (61):

(63) he$_j$ worked hard [PRO$_j$ to be able to feed his family]

This is an example of the subtype of purposive adjunct known as
Rationale Clause (RatC - see Jones (1985)).   If this infinitive is a
predicate (it is clearly not an argument of the verb) then according
to our predication theory, it has to have an external subject ^{12} .
The matrix subject - which controls the PRO subject of the infinitive
may seem a likely candidate.
        Notice that Control is not obligatory here. Firstly, as observed
by Williams (1985), a PRO subject need not be controlled by an NP
argument of the matrix clause:

(64) grass is green [PRO to promote photosynthesis]

Williams proposes that the controller of the PRO subject in such cases
is the matrix clause itself (he terms this type of Control "event
control").   This analysis predicts that the VP in the RatC takes a
clausal subject, (to permit interpretations of the form '(the fact)
that grass is green promotes photosynthesis').   Obviously, this
mechanism will not apply in   examples of type (63) (cf. *John's
working hard was able to feed his family).
        Secondly, there need not be a PRO subject at all, in Rationale
Clauses of either type, as the complementizer *for* is available in both:

(65) a.   he worked hard [for there to be a good harvest]

     b.   grass is green [for there to be photosynthesis]

        RatC constructions of all three types (63-65) share a common
interpretation, which we might express as follows: the proposition
expressed by the RatC denotes the rationale for the event or state
denoted by its matrix clause.   If there is a predication relation
linking RatC with its matrix, we assume that it is an obligatory
relation; and it seems reasonable to suppose that this relation is
what gives rise to the common RatC interpretation. On this view, the
control of the PRO subject in (63) and (64) is incidental to the
predication relation that licenses all RatCs.
        One way of implementing this idea might be to suppose that the
predication is mediated through an adjunct operator in the specifier
of CP. We might interpret the notion of "event control" as predication

of "Infl", and have the adjunct operator bound by Infl [13] :

(66)   NP   Infl$_j$ VP   [$_{CP_j}$ Op$_j$ [$_c$. ... t ...]]

This proposal would allow for all the examples of RatC with PRO
subject, whether controlled (63) or not (64), to be assimilated to
cases with *for* and overt subject (65). Control of the PRO subject of
RatC has similar status to control in infinitival relatives and OPC, in
being 'incidental' to the predication licensing the clause. The null
operator of RatC, binding a trace in an adjunct position, would of
course leave no detectable gap in the lower infinitive, unlike the
operator heading SPC / OPC. Its parallel can be argued to be involved
in the derivation of infinitival satellites to NPs such as 'way/reason',
as in (67) (cf *the reason why he should fix the car.*):

(67) a.   the way to fix the car
     b.   the reason to fix the car

Whether the admittedly ad hoc assumption of an adjunct operator inside
RatC finds any independent motivation remains to be seen.

4.3   Cross-linguistic asymmetry

English is to my knowledge the only language in which clauses of
the SIR type are grammatical.   It is an attractive feature of the
analysis proposed here, that it relates this fact to another unique
property   of   English,   namely   the   presence   of   an   infinitive
complementizer with the capacity to Case-mark the infinitive subject.
Dutch, French and Swedish all possess infinitival relatives, but
these are exclusively of the object-gap type:

(68) Dutch:

   a.   de bal   om   mee te spelen   object-gap
        the ball   COMP with to play
        "the ball to play with"

   b. * de jongen om   met jou te spelen   subject-gap
        the boys   COMP with you to play
        "the boys to play with you"

(69) French:

   a.   les lettres à   donner à Jean   object-gap
        the letters COMP   to-give to J.

   b. * une fille à   donner les lettres à Jean   subject-gap
        a   girl COMP to-give the letters to J.
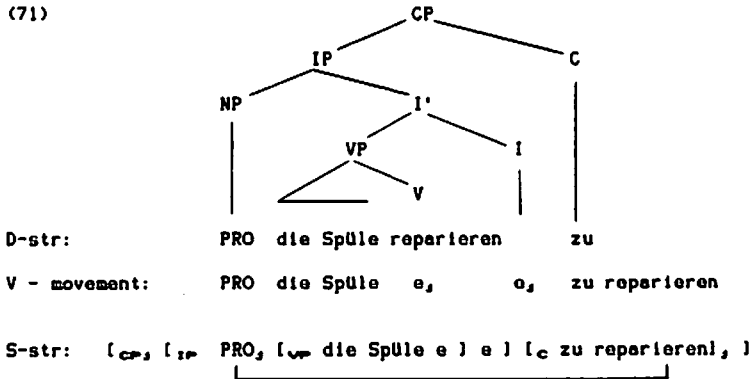
(70) Swedish:

    a.   det finns en bil att reparera   object-gap
         there is a car COMP to-fix

    b. * det finns en bil att bli reparerad   subject-gap
         there is a car COMP to-be fixed

This pattern is repeated in Italian (R. Manzini, p.c.). These languages all differ from English in possessing a non-Case-assigning infinitival complementizer. In an ungoverned infinitive predicate, PRO is the only possible subject, and it appears unable to license a predication; so the data in (68)-(70) is consistent with (61).

    The data might be accounted for without recourse to (61), however, by appealing to the presence of an overt infinitival complementizer, which is not coindexed with the PRO subject of the IP it governs. Utilising the argument made by Browning with respect to (59a), we might rule out the b. examples of (68)-(69) as vacuous predications.

    The picture presented by German is rather different. The structure of German infinitivals is outlined in (71) (see Wilder (1988) for details). The infinitive marker zu is base-generated as a clause-final complementizer morpheme. The infinitive verb raises to the Comp position in the syntax, as an instance of head-to-head movement in the sense of Chomsky (1986b), where it adjoins to zu, yielding the S-structure indicated.

(71)

D-str: PRO die Spüle reparieren   zu

V - movement: PRO die Spüle   e$_j$ o$_j$ zu reparieren

S-str: [$_{CP}$ [$_{IP}$ PRO$_j$ [$_{VP}$ die Spüle e] e] [$_C$ zu reparieren]$_j$]

                 "die Spüle zu reparieren" = "to fix the sink"

    A significant consequence of this verb movement is that the Comp position, containing the zu + verb complex, is coindexed, at S-structure, with the infinitive subject in every case. This is precisely the situation we have assumed not to obtain in PRO-infinitivals in English and the other languages discussed. (Recall that specifier-head agreement holds in all clausal projections, including tenseless IP. By the Head Movement Constraint (Chomsky

1986b), the infinitive verb must, en route to Comp, move through Infl,
where it 'picks up' the index of the PRO subject.)
    It turns out that there are no infinitival relative clauses in
German, of either object-gap or subject-gap variety (Tappe (1984),
Guisti (1986)).

(72)a. * die Spüle [zu reparieren] steht da drüben   OIR
        the sink   to fix   stands over-there

    b. * der Mann [die Spüle zu reparieren] steht an der Tür SIR
         the man   the sink to fix   stands at the door

Our predication theory successfully excludes OIR, but fails to predict
the ungrammaticality of SIR, without invoking (61).
    The S-structure representation for the NP containing the OIR
(72a), following wh-movement and V-movement inside the infinitive, will
be:

(73)   NP [$_{CP}$ Op$_j$ [$_{IP}$ PRO$_j$ [$_{VP}$ t$_j$ e] e] [zu reparieren]$_j$]

As indicated, the Comp position is agrees with the PRO subject as a
consequence of verb-movement. As the head of CP, it agrees with the
specifier (= the operator) of CP (and so participates in the agreement
chain that identifies the operator-pro and licenses the predication).
As a side effect of these twin agreement requirements, the downstairs
PRO subject ends up locally binding the wh-trace of the operator, in
the classic strong crossover configuration:

(74)   ... [$_{CP}$ Op$_j$ [$_{IP}$ PRO$_j$ [$_{VP}$ ... t$_j$ ...

Thus, any relative clause formed by movement (from an A-position) to
the specifier position of a zu-infinitive will automatically yield a
structure in violation of Binding Condition C.
    The only case where Binding Condition C is not violated is where
the PRO subject itself constitutes the linking category in the
predication. The representation (75) should represent a well-formed
predication structure, with the PRO subject nonaccidentally coindexed
with the CP predicate that contains it, and the external subject of the
predication:

(75)   der Mann$_j$ [$_{CP_j}$ [$_{IP}$ PRO$_j$ die Spüle] [zu reparieren]$_j$]

The ungrammaticality of examples such as (72b), therefore, constitutes
persuasive evidence that (61) does hold.

4.4   Tough-movement infinitives again
    The symmetrical wh-movement approach to the IR and PC paradigms
relies on the fact (see §3. above) that the for-complementizer is
independently available in purposives and relatives.   One prediction

that emerges from (61) is that if the *for*-complementizer were not available, neither would the subject gap variant of the predicate be possible.

In the case of *tough*-movement this prediction is borne out. It has been observed that *tough*-infinitives appear not to permit the *for*-complementizer (Chomsky 1981:312; unlike Kayne (1981:110) I find (76c) to be ungrammatical):

(76) a. * the hard work is pleasant for the rich for the poor to do

b. it is pleasant for the rich for the poor to do the hard work

c. * this room would be easy for there to be an orgy in

The ungrammaticality of doubled *for* + NP sequences in *tough*-constructions, as well as the impossibility for a pleonastic NP to follow *for*, argues for assigning every such sequence the status of a matrix PP. The conclusion is that, in contrast to ordinary purpose clauses and relatives, the *for*-complementizer is not available in the *tough*-movement infinitive. Whatever the reason for this may be, it immediately falls out under our analysis that we will not find subject-gap infinitives in *tough*-constructions:

(77) a. * the book$_j$ was easy e$_j$ to be read

b. * John$_j$ was pleasant e$_j$ to talk to us

The null subject e in (77) cannot be *wh*-trace, since it lacks Case. If it is PRO, the examples will be ruled out as illicit predications by (61), following our conclusion that the infinitives are adjunct clauses subject to predication [14].

This argument is supported by contrasting sentences headed by the adjective *suitable* with *tough*-sentences. *Suitable* differs from *easy* in permitting examples of OPC parallel to (76a) and (76c), suggesting complementizer-*for* is available in the adjunct:

(78) a. this room would be suitable for there to be an orgy in

b. this room would be suitable for Peter and Jane for their luggage to be dumped in

As predicted, *suitable* also occurs with SPCs:

(79) a. this room would be suitable [e to house our luggage]

b. this book is suitable [e to be read in class]

We are thus able to unite two properties of *tough*-constructions that have hitherto appeared disparate. At the same time, we derive a further argument, this time English-internal, in support of (61), and favouring the operator movement plus *for*-deletion analysis of SIR/SPC that we have advocated.

Footnotes

I presented an earlier version of this paper in London, and at an LAGB meeting in Exeter, in September 1988. I thank those audiences, and also Hagit Borer, Rita Manzini, N.V. Smith, and especially Michael Brody, for helpful comments.

1.   The SPC / SIR / OPC / OIR terminology is due to Jones 1985. Jones takes a different view of the internal structure of OPC, assigning it bare VP status. See Browning (1987) for a rebuttal.

2.   Jones (1985) treats *tough*-infinitives as adjuncts with similar properties to the OPC, though he does not discuss Chomsky's paradox in this connection. Our approach has implications for the treatment of other null operator infinitive types (eg degree clauses - Chomsky (1977)) that I do not pursue here.

3.   We thus predict that the subject of a *tough*-nominalisation cannot be related to a postnominal infinitive:

    (i)   * John's easiness [to please e]

(i) is ruled out on two grounds. The infinitive will be interpretable only nonsensically, as a predicate of the whole NP *John's easiness*. Notice also that infinitival relatives are always restrictive, and restrictive relatives are in any case incompatible with NPs with genitive subjects.

4.   Our proposal shows an interesting contrast with the approach advocated in Pesetsky (1987). Like us, Pesetsky takes issue with Chomsky's paradox, though the conclusion he reaches is that the infinitive in (i) is to be identified in (ii) not with the NP but with the infinitive.

    (i)   it was easy [to read the book]
                   L__θ_J

    (ii) the book was easy [to read]
                   L__θ_J

He suggests that the NP subject is not an argument of the adjective, and that it (or its θ-role) originates within an infinitive in all cases - a phonologically null infinitive in (iii):

    (iii) PF: the book was easy
           LF: the book was easy [PRO to (read/find/talk about/...)]

This theory faces a similar problem to ours with respect to pairs such as:

    (iv)   why he did it is hard to fathom
    (v)   ?? why he did it is hard

Since (iv) is ok, it is unclear why (v), which can contain a phonologically null equivalent of the infinitive in (iv), is bad.

5.   The question was irrelevant to Chomsky & Lasnik (1977), which predates the introduction of Case theory. Williams' reference is to Chomsky (1980:30), where the Case-assigning complementizer *for* is assumed to be undeletable, largely in order to prevent post-S-structure *for*-deletion operating on an S-structure like (i), to yield (ii):

    (i)   it is necessary [for him to come]
    (ii) *it is necessary him to come

The problem this creates with respect to the *wh*-movement derivation of SIR is noted also by Chomsky (1980:31, fn. 35)).

6.   Our claim that *for*-deletion is not blocked wherever *that*-deletion is possible is threatened by examples like (i), pointed out to me by A. Cormack (cf. also (32c) and (33a) in the text.), which contrasts with (ii):

    (i)   ? the book [Op she was anxious t should be banned]
    (ii) * the book [Op she was anxious t to be banned]

It appears that with some (but by no means all) adjectives, the unacceptability of *that*-deletion in their complement is mitigated:

    (iii)   it isn't likely he'll be coming
    (iv)   ? it's sad he isn't here
    (v)   * it's annoying you are coming

By contrast, in no complement of an Adjective is *for*-deletion possible. I have no explanation for this.

7.   Since *for* must be present at S-structure to assign Case, the *for*-trace violation would provide interesting evidence for the position defended in Aoun et. al. (1987) that the locality constraint responsible for Comp-trace effects - a subcase of the standard ECP - holds not at LF but at PF.

8.   Kayne proposes that the *wh*-trace subject in (i) is in a Caseless position, on the basis of (ii), but that it is licensed via its immediate antecedent t', which is assigned Case by the verb which governs it:

    (i)   John Smith, who I assure you [t' [t to be ...]]
    (ii) * I assure you John Smith to be ...

The assumption of underlying *for* in (i) renders this move unnecessary. Though the unmoved variant (iii) of (i) appears barely acceptable, this may be due to the interaction of the 'unreal time/mood' semantics of a *for*-to infinitive with the factivity of the (declarative) verb. (iv) is far better:

(iii) ?? they assured me for John to be a good worker
(iv)   he wouldn't have assured me for John to be such a good
       worker, if he'd known what you just told me

9.   An adjunct left-adjoined to IP in a *for-to* infinitive with
unmoved subject is explainable as a Case-adjacency violation:

(1)   * a problem for [without him looking at it] John to solve

- but this account does not extend to the SIR, given our conclusion
above that *wh*-trace is exempt from the adjacency requirement.

10.   Control theory will on the other hand have to account for the
interpretation of PRO in OPC / OIR - for example, why it is that the
subject in (i) but the dative in (ii) obligatorily controls PRO:

(i)   she brought it in [PRO to look at e]
(ii) she gave it to us [PRO to look at e]

11.   The formal differentiation of small clauses from infinitives by
the nature of the null subject begs the question of what determines
the respective distributions of *pro* and PRO.   The substance of our
position is that the infinitive subject only underlies requirements
(= Control Theory), different from the identification requirements on
pro.   Borer (1987) argues that the null subject of infinitives is in
fact *pro*.   In her theory, Control effects are mediated by the binding
of an anaphoric AGR element in Infl, which transmits its features to
the *pro* subject as a side-effect of its role in identifying it.   Our
proposal could be adapted to that theory by claiming that it is
predication of an infinitive of an NP and the binding of infinitival
AGR by that NP that are mutually incompatible.

12.   This case is to be kept separate from examples introduced by *in
order*, which are arguably PPs containing a θ-marked CP.   The case
where the RatC is not introduced by *in order* is to be analysed as a
bare CP unless, as in some treatments, an empty prepositional governor
is postulated:

(1)   he worked hard [pp P [cp ...]]

13.   Rothstein (1983:112) suggests some PP predicates take an "event
argument" located in Infl as their external subject:

(1)   it rained *for two hours*

14.   *Easy* is not a member of the class of adjectives selecting IP
complements, so a subject-Raising derivation for (70) on the basis of
the θ-role-assignment configuration (i) is excluded:

(i)   it was easy   CP
       θ' |__θ__|

(ii) * the book was easy t to be read

The impossibility for *for* to occur also characterises OPCs accompanying the experiencer verbs (*amuse*, *annoy*, etc.) discussed in Pesetsky (1987):

(iii) this book amuses me (*for Mary) to read e
(iv) * this book amuses me to be read

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