ON THE NATURE OF THE NULL OPERATOR IN TOUGH CONSTRUCTIONS

NAOSHI NAKAGAWA
Nagoya Sangyo University

This paper is concerned with the idiosyncratic nature of the null operator in tough constructions and its effects on their derivation. The null operator is a nonspecific bare NP and cannot be interpreted at LF. I propose that the null operator is therefore deleted and the trace in the infinitival clause is reanalyzed as an anaphor at LF. This analysis accounts for the fact that tough constructions show SSC effects, which are peculiar to A-bound elements. Furthermore, it interacts with complex-adjective formation at LF and explains the fact that SSC effects show up only when the infinitival clause has a lexical subject.*

Keywords: tough construction, null operator, non-specificity, deletion, complex-adjective formation

0. Introduction

In tough constructions such as in (1), we would intuit that there is a null element, which has the same reference as that of the matrix subject, in the complement position of the infinitive.

(1) Johni is easy to please ei.

* This paper is a much revised version of the paper presented at the 70th General Meeting of the English Literary Society of Japan held at Kyoto University on May 23, 1998, part of which has already appeared in Central Japan English Studies. I am grateful to the following people for their invaluable comments and encouragement: Hirozo Nakano, Masachiyo Amano, Yoshinobu Niwa, Kenji Kondo, Hiroshi Yonekura, Yuichi Oguri, Koichiro Hamasaki, Toshiya Tanaka, Masatoshi Koizumi, Hiroshi Terada, Kay Nakago, Hiroyuki Nawata, and Tomohiro Yanagi. For extremely insightful comments on previous versions I am indebted to anonymous reviewers of Central Japan English Studies and English Linguistics. I am also indebted to Bruce Vorland, who kindly corrected stylistic errors. Remaining errors are my sole responsibility.

English Linguistics 17: 2 (2000) 276-304 — 276 —
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There is a good deal of discussion in the literature (cf. Nakamura (1991), Lasnik and Stowell (1991), etc.) as to the null element. It is standardly assumed that the element is a trace of the null operator (OP, henceforth), but opinions vary as to the categorial status of the trace. Nakamura (1991) argues that tough constructions involve null-anaphor movement. Contreras (1993) and Postal (1994) identify the OP as pronominal. Lasnik and Stowell (1991) assume that it is a null, non-variable R-expression, corresponding to a null version of an epithet.

The aim of this paper is to explore a little further into the nature of the OP in tough constructions. The main proposals are as follows:

(2) a. Syntactically, the OP in tough constructions is a bare NP, but not a DP.
   b. The OP is referentially nonspecific (=indefinite and non-generic).
   c. The OP must be deleted when it is identified with the matrix subject. Then, the trace in the infinitival clause is interpreted as an anaphor bound by the matrix subject.

The proposals in (2a) and (2b) will be considered in sections 2 and 3, respectively. Section 4 and section 5 will be devoted to presenting the proposal in (2c) and discussing its consequences. Section 6 concludes the paper.

1. Theoretical Assumptions

This paper is based on the recent minimalist (MP, henceforth) framework (Chomsky (1995, 1998, 1999)), but we will find one departure from the MP framework in section 5.

In Chomsky (1995), the conditions on binding are stated as follows.

(3) Binding Principles
   A. An anaphor must be bound in a local domain.
   B. A pronoun must be free in a local domain.
   C. An r-expression must be free. (Chomsky (1995: 96))

(4) \( \alpha \) binds \( \beta \) if \( \alpha \) c-commands \( \beta \), and \( \alpha, \beta \) are coindexed. (ibid.: 93)

(5) \( \alpha \) c-commands \( \beta \) if \( \alpha \) does not dominate \( \beta \) and every \( \gamma \) that dominates \( \alpha \) dominates \( \beta \). (ibid.: 35)

Although the definition of the "local domain" is crucial for the applica-
tion of the rules noted above, Chomsky (1995) does not give a precise definition of the local domain. Hence, I adopt the definition of Chomsky (1981) for convenience: the local domain is a “governing category” defined as follows:

(6) $\beta$ is a governing category for $\alpha$ if and only if $\beta$ is the minimal category containing $\alpha$, a governor of $\alpha$, and a SUBJECT accessible to $\alpha$. (Chomsky (1981: 211))

(7) $\alpha$ is accessible to $\beta$ if and only if $\beta$ is in the c-command domain of $\alpha$ and assignment to $\beta$ of the index of $\alpha$ would not violate (73) [our (8)]. (ibid.: 212)

(8) *$[\gamma \ldots \delta \ldots]$, where $\gamma$ and $\delta$ bear the same index. (ibid.: 212)

Needless to say, the notion “government” is not a fundamental notion in the MP framework. However, whatever definition the “local domain” is given, it will be compatible with the governing category. The “governor” will be replaced with some other comparable element, but the essential function of the governor would be maintained. Hence, it seems reasonable to adopt the standard local domain for ease of explanation. Of course, my argument itself is unaffected by the adoption of the governing category.

One of the remarkable differences between the MP framework and the standard GB framework is that the former allows only two sorts of constraints, those that hold at the “interface” levels, LF and PF, and those that govern derivations. Since S-structure and D-structure are not directly related to cognitive systems, they are not assumed to be independent levels in the MP framework. This means that no rule or constraint can be applied to S-structure/D-structure. In the GB framework, some constraints (including Binding Principles) are applied at S-structure/D-structure, but all of them must be applied at LF in the MP framework.

My arguments basically and crucially depend on the above MP assumptions. Some of the other parts of the MP framework will be presented at the relevant points in the following discussion. For further details of the MP framework, see Chomsky (1995, 1998).

2. The Bare-NP Analysis

2.1. Background

This section is inspired by the proposal in Bianchi (1999: 41ff.),
which adopts Kayne's (1994) raising analysis of relative clauses, and argues that the trace within a restrictive relative is interpreted as indefinite even when the modified noun phrase is introduced by a definite determiner (cf. Browning (1987: 129-131)). As it shows the generality of the analysis of this paper, it is worthwhile to review her analysis here.

Following Kayne (1994), Bianchi (1999: Ch. 2) assumes the following derivation for relative clauses (the elaborate structure of the complementizer system is omitted; cf. Bianchi (1999: Ch. 6)):

(9) [DP the [CP book; [that I read it]]] (Bianchi (1999: 41))

In Bianchi's (1999: Ch. 2) framework, the nominal phrase modified by the relative clause is divided into two parts: the external determiner (the in (9)) and the "head" (book in (9)). Bianchi does not adopt the null OP movement. The antecedent of the gap is a bare NP (book),¹ which is moved directly to [Spec, CP] adjacent to the external determiner.

This analysis is called "raising analysis." Bianchi argues that the gap in the relative clause is indefinite, and therefore the definite determiner and the "head" do not form a constituent. Here I discuss two pieces of evidence presented by Bianchi (1999: Ch. 2).

2.1.1. Idiom Chunks

When the idiomatic object, which is obligatorily indefinite, is relativized, it can be introduced by a definite determiner:

(10) a. *They made the fun of me.
    b. the fun that they made of me (Bianchi (1999: 44))

This follows from the hypothesis that the external definite determiner is not reconstructed in the complement position of the idiomatic verb.

¹ Bianchi (1999: Ch. 6) departs from the Kayne's (1994) approach, and analyzes the "head" as DP headed by a "null relative determiner." This reanalysis of the "head" does not affect the analysis of this paper, because the DP is not semantically distinct from the bare NP. This reanalysis is based on the assumption that "only a DP projection, but not an NP can be an argument" (p. 168). Now it is difficult to judge clearly whether the assumption is collect or not (cf. Borsley (1997)). However, if this assumption is on the right track, with the assumption that the OP in tough constructions, unlike the counterpart in relative clauses, is a bare NP, it might provide a good reason for the deletion of the OP, which will be discussed in section 4.
within the relative clause. In other words, the fun in (10b) is not a constituent.

2.1.2. Scope Assignment under Reconstruction

Another piece of evidence comes from scope assignment under reconstruction. Consider the following pair of Italian sentences:

(11) a. Ogni medico visiterà due pazienti.
    ‘Each doctor will examine two patients.’

b. Ogni medico visiterà i due pazienti.
    ‘Each doctor will examine the two patients.’

(Bianchi (1999: 45-46))

The indefinite object in (11a) is in the scope of the universally quantified subject and allows a distributive reading (namely, there may be two different patients for every doctor). In (11b), on the other hand, the definite object denotes a set with exactly two members, and the distributive reading is impossible.

Surprisingly enough, the judgements are reversed in the restrictive relative corresponding to (11b):

(12) Ho telefonato ai due pazienti che ogni medico visiterà domani.
    ‘I phoned the two patients that every doctor will examine tomorrow.’

(ibid.: 46)

In (12), where the “head” is introduced by the definite determiner, the distributive reading possible in (11a) is available. According to Bianchi, the contrast between (11b) and (12) is parallel to the contrasts in (10). In (12) the definite determiner is external to the relative clause, and the raised head is the indefinite phrase due pazienti, which can be interpreted in the scope of the universally quantified subject.

I will not adopt the raising analysis of restrictive relatives because the trace in tough construction can be discourse-licensed (see 3.2). The “indefinite” is replaced by “nonspecific” in this paper (see 4.1). However, what will be made clear in the following sections is that the gap in tough constructions is similar to that in restrictive relatives, at least in some respects. The analysis in what follows is not a straightforward extension of Bianchi’s (1999: Ch. 2) analysis, but maintains its essence: the OP is generated as a bare NP lacking a determiner (see note 1).

2.2. Reconstruction for Binding

In this paper I assume the following standard DP structure (cf. Bian-
chi (1999: 37, Abney (1987)):

(13)

\[
\text{DP} \\
\text{NP} \quad \text{D'} \quad \text{D} \quad \text{NP}
\]

NP and DP have distinct semantic functions. NP is a predicative category denoting a set. D determines the referentiality (or the specificity) of the complement NP.

Based on the surface position of the reconstructed elements, we can identify three types of reconstruction: "head" reconstruction, determiner reconstruction, and complement reconstruction. The binding theory reveals differences in behavior among these three types.

2.2.1. Principle C Effects

Let us examine the data in (14):

(14) a. John is easy for Bill to please.
    b. Pictures of John are hard for him to like.
    c. *Pictures of John are hard for him to take.

    ((b)-(c): Munn (1993: 403))

    d. John's mother is tough for him to endure.

    (Mulder and Den Dikken (1993: 309))

    e. John's picture is tough for him to take.

First, consider the paradigm in (14b–e). Based on the examples in (14b–c), Munn (1993: 403ff.) argues that Principle C reconstruction is not obligatory. The acceptability of (14b) supports this argument. The ungrammaticality of (14c) shows that Principle C violations will arise, if the idiomatic interpretation of the downstairs verb is required. The contrast between (14b) and (14c) leads Munn to conclude that the idiomatic interpretation requires the reconstruction. This analysis itself is necessary. However, it is not enough to account for the full paradigm in (14b–e). If we take into account the accurate structure of the antecedent, the situation is slightly more complex. The significant point here is the grammaticality of the sentence in (14e), which has the idiomatic interpretation in the infinitival clause. As far as I consulted, the sentence in (14e) seems to be acceptable with the idiomatic interpretation. This judgement might be strange, because the reconstruction of the whole phrase predicts a Principle C violation. However, this problem is overcome, if the OP is the bare NP corresponding to
the complement NP of the antecedent DP.

Next, consider the sentence (14a). If the null operator is the full copy of the antecedent, the LF structure of the sentence (14a) is as follows:

(15) John\textsubscript{i} is easy for Bill to please John\textsubscript{i}\textsuperscript{2}

This structure violates Principle C. If the OP is a nonspecific anaphor at LF, we need not assume LF structures such as in (15).\textsuperscript{3}

One might argue that the reconstruction of the "head" itself is blocked. However, as far as the antecedent is related to the gap, the semantic content of the antecedent should be recoverable in the gap. This argument is supported by the following example:

(16) ?Headway is easy to make on problems like these.

(Lasnik and Fiengo (1974: 540))

According to Lasnik and Fiengo (1974), the sentence in (16) is questionable at best.\textsuperscript{4} In order to make idiomatic interpretation, headway must be interpreted in the complement position of make. Under the assumption that the reconstruction of the full copy of the antecedent induces a Principle C violation, some anaphoric element is necessary in the gap.\textsuperscript{5}

\textsuperscript{2} I omit the OP in [Spec, CP] for ease of explanation.

\textsuperscript{3} It must be noted here is that the element in the complement position of please in (15) is not a trace of the matrix subject. As an anonymous EL reviewer points out, the reconstruction of the moved category into its trace is irrelevant to Principle C.

\begin{itemize}
  \item[(i)] John\textsubscript{i} was hit [Trace John\textsubscript{i}]
  \item[(ii)] John\textsubscript{i} hit John\textsubscript{i}
\end{itemize}

In (15), the antecedent and the reconstructed element are in different thematic positions. In this respect, the representation in (15) is parallel to that in (ii):

\begin{itemize}
  \item[(i)] John\textsubscript{i} was hit [Trace John\textsubscript{i}]
  \item[(ii)] John\textsubscript{i} hit John\textsubscript{i}
  \item[a.] *Advantage was easy to take of Bill.
  \item[b.] *Tabs were easy to keep on Mary. (Lasnik and Fiengo (1974: 541))
\end{itemize}


\textsuperscript{4} Note that not all of the idiom chunks can be the antecedents of the OP:

\begin{itemize}
  \item[(i)] If an A-position X A-binds a category Y as a result of Predication (or control), then Condition C does not apply to A-binding of Y (or its chain) by X.
\end{itemize}

This explanation is descriptively adequate, but this assumption itself is the fact to be explained.
Following Longobardi (1994), Bianchi (1999: 304) assumes that the proper name originates in the N position of the relative "head" and incorporates to the external D⁰ where it acquires referential uniqueness. If this assumption is on the right track, we can explain the non-specificity of the OP, which is a bare NP.

2.2.2. Principle A Effects

The paradigm of the reconstruction for Principle A is as follows:

(17) a. Pictures of himselfi are hard for Johni to like.

(Munn (1993: 403))

b. *Himselfi is hard for Johni to please.

c. *Himselfi's picture is hard for Johni to take.

(17c) is ruled out by morphological reasons. (17a) shows that the complements of the null-operator head can be reconstructed in the infinitival clause. The effects illustrated in (17b) are also found in psych-verb constructions and raising constructions (cf. Belletti and Rizzi (1988: 317ff.), Lasnik (1999: 62), Pesetsky (1987: note 4)). There is, however, no consensus with regards to the unified account of these effects. From the viewpoint of the present discussion, we can say that the anaphoric nature of the trace is incompatible with that of the antecedent that is anaphoric by itself in (17b).

2.2.3. Principle B Effects

Apparently, some behaviors of pronouns might give us good evidence to show that the OP is a bare NP. However, its authenticity remains uncertain. Consider the following sentences:

(18) Hisi car is tough for every mani to have to part with.

(Mulder and Den Dikken (1993: 308))

In (18), the pronoun his can refer to every man. If his in the surface position c-commands every man, they cannot be coreferential. Hence, the matrix subject must have the following structure:

---

6 This might imply that the matrix subject of psych-verb constructions is not base-generated in that position, but moved into it. See Belletti and Rizzi (1988), Pesetsky (1995), among others for related discussion.
(19)  
```
  DP
    NP  D'
      he  D  NP
          s  car
```
Since the DP dominating the NP (he) is dominated by the matrix CP, *he* cannot c-command *every man*. Hence, *every man* does not violate Principle C. If the DP *his car* does not count as the governing category for *his*, the reconstruction of the whole DP induces a Principle B violation.

(20)  
```
for every man\textsubscript{i} [IP \text{PRO}i to have to part with his\textsubscript{i} car].
```
Since PRO can be counted as an accessible subject, the governing category of *his* is the infinitival IP. In this governing category, *his* is bound, violating Principle B.\(^7\)

The above observation might lead us to conclude that *his* in (18) cannot be reconstructed in the complement position of the infinitive, whatever mechanism we adopt for the reconstruction.\(^8\) However, the governing category for *his* in (20) is the whole DP *his car*, and *his* is not bound in this domain. Hence (20) is no more ruled out as a violation of Principle B, any more than (21) is.\(^9,10\)

\(^7\) As an anonymous EL reviewer points out, *his* in (20) might be a bound variable identified with *every man*. Bound variables are not subject to Principle B. In (i), the bound variable *his* can refer to *no man* in its governing category.

(i)  
```
No man hates his daughter.
```
Therefore, we should replace *every man* in (20) with some referential NP. Fortunately, the sentence using *John* instead of *every man* in (18) is acceptable.

(ii)  
```
His\textsubscript{i} car is tough for John\textsubscript{i} to have to part with.
```
\(^8\) In Chomsky (1995), reconstruction effects are explained by the copy theory: traces are copies of antecedents. However, I will leave the accurate mechanism of the reconstruction for future research (see 3.2).

\(^9\) I am grateful to an anonymous EL reviewer for drawing my attention to this issue.

\(^10\) If a pronominal is reconstructed into the infinitival clause, it might induce a violation of Principle B. However, it is also difficult to demonstrate this. Consider the following sentence:

(i)  
```
*He\textsubscript{i} was easy for anyone John\textsubscript{i} knew to take advantage of.
```
(Levine (1984: 9))
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(21) I love my life.

2.3. Reconstruction of the Quantifier

Further support for the bare-NP analysis of the OP comes from the quantitative element preceding the antecedent NP. Consider the following sentences:

(22) a. No problem is easy to solve.
   b. It is not easy to solve any problem.

The sentence in (22a) is thematically equivalent to the sentence in (22b). However, if we reconstruct the whole of the matrix subject, the derived LF structure cannot have the same meaning as that of (22b).\(^{11}\)

(23) No problem is easy to solve no problem.

One might argue that the element that is applied reconstruction is not the full copy of the antecedent, but the element without the quantifier. This assumption would make the LF structure as follows:

(24) [No x] is easy to solve [x problem]

From the viewpoint of the MP framework, the reconstruction is preferred. The definition is cited from Lasnik (1999: 61):

(25) Try to minimize the restriction in the operator position.

The fully reconstructable element is not the head of the moved element, but the restrictive term of the head. In (24) the restriction

If the matrix subject he in (i) is reconstructed intact in the complement position of the infinitive, it induces a violation of Principle B. (I tentatively assume that the PP headed by for is transparent for binding.)

However, the ungrammaticality of (i) is not due to the violation of Principle B. In (i), he in the matrix subject position binds John and induces a violation of Principle C, because the subject DP is a projection of he, and therefore has the same index as that of he. (The co-indexing is necessary for the referential uniqueness of the whole DP. See Bianchi (1999: 304), Longobardi (1994).) This argument is supported by the sentence interchanging John and he in (i). In (ii), John c-commands he, and therefore can bind it.

(ii) John was easy for anyone he knew to take advantage of.  (ibid.: 9)

\(^{11}\) This argument based on the assumption that the representation in (23) is not parallel to that in (i):

(i) no problem has been solved [Trace no problem]

The reconstruction of no into its own trace does not induce the double negative reading. In this respect, the interpretation of (23) is parallel to that of (ii):

(ii) nobody solved no problem.

See note 3.
problem is fully reconstructed and the operator no is not. This situation is compatible with the requirement in (25).

However, adopting the null-operator analysis, we cannot get the intended interpretation of (22a). A more concrete structure of (24) is as follows:

(26) [No problem] is easy [[no x] [to solve [x problem]]]

Including two occurrences of no, the structure gets a contrary interpretation to that of (22). We can get the intended interpretation only when the null operator does not have a determiner. In other words, the null operator must be a bare NP lacking a determiner, and therefore a nonspecific element.\[^{12}\]

The same argument can be made with respect to the reconstruction of many. According to Epstein (1989: 651), the quantified subject in tough constructions must be interpreted as having wider scope than the matrix predicate. Thus, (27a) is obligatorily interpreted as (27b):

(27) a. Many people are easy to talk to.

b. There are many people \(x\), such that it is easy to talk to \(x\).  

(Epstein (1989: 651–652))

In (27a), a narrow-scope interpretation is impossible; the sentence cannot be interpreted as It is easy to talk to a large group of people. This phenomenon is also compatible with the bare-NP analysis.

To sum up, the reconstruction phenomena indicate that the OP in tough constructions lacks a determiner. This suggests the possibility that the OP is nonspecific. In the next section, I will examine the behavior of the trace of the OP in this respect.

3. Non-Specificity of the OP

After pointing out that D might be associated with referentiality in some sense, not just treated as an automatic marker of “nominal category”; Chomsky (1999: note 10) suggests that nominals (nonspecifiers, quantified and predicate nominals, etc.) need not be assigned automatic D. One thing we notice from this suggestion is that the bare NP could

\[^{12}\] I am grateful to an anonymous EL reviewer for pointing out that we can rule out (24) straightforwardly if the quantifier is assumed to be accompanied with the restriction (cf. Kennedy (1997)).
be nonspecific. The aim of this section is to make clear the nonspecificity of the OP in tough constructions.

3.1. Overt vs. Covert

It is well-known that the infinitival wh-relative (28a) is impossible.

(28) a. *I found a topic which to work on. (Bianchi (1999: 168))
   b. the book which I read

According to Bianchi (1999: 308), one possible answer is that overt relative determiners [pronouns]\(^{13}\) induce a specific interpretation of the relative “head,” and this is incompatible with the intensional interpretation of infinitival relatives, whose “head” is obligatorily indefinite and nonspecific. Since this analysis incorrectly rules out the pied-piping relative in (29), Bianchi finally rejects it.

(29) I found a topic on which to work. (Bianchi (1999: 168))

However, apart from the implementation in relative clauses, this analysis can be extended to tough constructions. In tough constructions, the OP cannot be realized overtly, nor can it pied-pipe prepositions:

(30) a. *John is easy whom to please. (Contreras (1993: 1))
   b. John is hard to talk about.
   c. *John is hard about 0 to talk.

The grammaticality of (29) would take us beyond the scope of this paper, but it seems that it does not imply the specificity of the OP, but rather the possibility that the overt wh-relative can replace the null operator, which is nonspecific originally. What is interesting here is that the adjective in tough constructions can be replaced by the string Adj-NP:

(31) a. Mary is an easy woman to please.
    b. Mary is easy to please.

In (31a), woman does not refer to any particular person, but denotes some properties (e.g. \([-\text{male}], [-\text{child}]\)) attributed to Mary. It is unclear whether the two sentences in (31) are transformationally related.

\(^{13}\) In the framework of Bianchi (1999), it is assumed that the relative pronoun (not including that (cf. Bianchi (1999: Ch. 6)) is generated as the D taking the relative “head” as the complement. After the relative DP is moved to [Spec, CP], the “head” raised to the left of the relative pronoun.
However, we can deduce the semantic contents of the OP from them.\(^{14}\)

### 3.2. Discourse License and Right Node Raising

According to Contreras (1993: 24), the OP in *tough* constructions can be discourse-licensed:

\[
\begin{align*}
(32) & \quad \text{What kind of person is John?} \\
& \quad \text{Easy OP}_1 \text{ to please } t_i. \quad (\text{Contreras (1993: 24)})
\end{align*}
\]

The above example implies that the referential specification of the OP is provided at the level of the interpretation (i.e. LF). This leads us to conclude that the OP is nonspecific in the domain of syntax.

Against this analysis, one might speculate that there is a null (or deleted) subject of the *tough* adjective as an antecedent. However, this idea is refuted by right-node-raising sentences as in (33):

\[
(33) \quad \text{John is difficult, and Mary is impossible, to please.}
\]

(Levine (1984: 16))

If the contents of the OP is referentially specified (i.e. identified with *John* or *Mary*), one of the two conjuncts cannot be interpreted. This implies that the OP is a nonspecific element such as pronominal *one* and quasi-pronominal *person* (see note 14).

Contreras (1993: 13ff.) argues that the null operator in *tough* constructions may surface as [+p(ronominal)]. In section 4, I will argue that the null operator is reanalyzed as an anaphor at LF.

### 3.3. Idiom Chunks

As we have seen in section 2.2.1, *tough* constructions can co-occur with some idiomatic expressions, in which direct objects are obligatorily nonspecific.

\[
(16) \quad \text{?Headway is easy to make on problems like these.}
\]

(Lasnik and Fiengo (1974: 540))

\(^{14}\) In this respect, the OP is kin to "epithet." In addition to standard epithets such as *the bastard*, almost any simple definite NP that functions quasi-pronominally counts as an epithet in Lasnik and Stowell (1991: 708).

\[
(\text{i}) \quad \text{All of Bill’s friends love the guy.} \quad (\text{Lasnik and Stowell (1991: 708)})
\]

Moreover, Lasnik and Stowell consider the OP as a null epithet. My analysis is different from that of Lasnik and Stowell in that the OP is not definite, nor is it subject to Principle C at LF (see section 4).
Lasnik and Fiengo (1974: 541) argue that the example in (16) is not representative, and present many examples in which the realization of the idiom chunk as the matrix subject leads to ungrammaticality (see note 4).

Therefore, the sentence in (16) cannot be strong evidence of the non-specificity of the null operator, but it suggests that at least the null operator is not [+specific].

Before concluding this section, let us briefly discuss a potential problem concerning the reconstruction of the OP: the nonspecific OP could not be a copy of anything. This problem is essentially intrinsic to the copy theory (cf. Munn (1993: 401ff.)), since the OP is not identified with the antecedent until LF. To discuss the copy theory as a whole is beyond the scope of a brief paper. The basic assumption I take in this paper is that the OP is referentially nonspecific, but semantically equivalent to the antecedent. This implies that the OP has the same semantic features as the antecedent, but does not have the same reference (or “index” in the early version of MP). At least in tough constructions, the reconstruction of the OP is an interpretation procedure at LF.

To summarize this section, the OP in tough constructions is referentially nonspecific. This is supported by some pieces of empirical evidence involving the covertness of the operator, discourse license and right node raising. The next section is devoted to some consequences of this analysis.

4. Reanalysis of the Trace

4.1. Deletion of the OP

In the previous section I demonstrated that the OP in tough constructions is nonspecific.15 This drives us to the question of whether the OP is a necessary element or not at LF, since the nonspecific OP is supposed to be uninterpretable at LF. At least as an anaphoric element, the OP in tough constructions must be specific at the level of interpretation.16 Are there any strong reasons to support the existence of the

15 Here I insist on the non-specificity of the OP but not indefiniteness, because there are some elements that are indefinite but interpretable at LF (see note 18).
16 In this paper, “specific” means “definite” or “generic.” Following Longobardi (1994), Bianchi (1999: 37) assumes that reference (which the specificity of NP crucially depends on) and quantification are properties of the D position, and argues
OP at LF?

In the MP framework, the operator is moved in order to form an operator-variable chain and satisfy Full Interpretation (FI) at LF. However, there is no reason for the OP in tough constructions to form an operator-variable chain since it is not required to take scope at LF. As Lasnik and Stowell (1991) point out, the operator is semantically nonquantificational, and therefore the trace of the OP movement is not a true variable. Given the guarantee of the identity of reference, the OP is a superfluous symbol in the LF representation because its semantic import is recoverable from the trace. It seems natural that such an element cannot be present at LF.

Furthermore, there is considerable evidence that implies the existence of an A-bound relation headed by the matrix subject and terminating in the gap in the infinitival clause. This is incompatible with the analysis presupposing the operator-variable chain that is a sort of A'-chain.

The above discussion leads us to the following assumption:

(34) The OP must be deleted when it is co-indexed with the matrix subject. Then, the trace in the infinitival clause is interpreted as an anaphor bound by the matrix subject.\(^{17}\)

The above analysis has empirical support. Consider the following sentence:

(35) \{ *A man/*Someone/John \} would be easy to kill with a gun like that. (Lasnik and Fiengo (1974: 541))

(35) shows that tough constructions prohibit indefinite NPs from appearing in matrix subject positions.\(^{18}\) This restriction does not apply that the bare NP cannot be an argument. This implies that the bare NP itself is an illicit element at LF. See note 1.

\(^{17}\) For discussion, see Nakamura (1991). He proposes that the OP is base-generated and moved to IP-specifier position. This analysis presupposes that the [Spec, IP] is an A- and non-theta position.

\(^{18}\) Indefinite subjects can appear in this position, if they have generic interpretations:

(1) An elephant would be easy to kill with a gun like that. (Jackendoff (1975: 442))

Therefore, the unacceptable feature in this position is [–specific], but not [–definite]. The accurate specification of the “nonspecific,” then, is “indefinite and non-generic.”
to the complement position of the verb, as we saw in section 3. This implies that either a specific or nonspecific interpretation must be unavailable at LF. It is natural that the nonspecific interpretation must be deleted at the final stage of interpretation, since the matrix subject is in a \( \theta \)-position (see Kaneko (1996: 16ff.)), and therefore cannot be deleted.

If the OP is not quantificational, what drives the OP movement? My intuition is that some kind of locality is necessary to identify the reference of the OP. This intuition accords with Chomsky’s (1998: 22) Phase-Impenetrability Condition:

\[
(36) \text{In phase } \alpha \text{ with head H, the domain of H is not accessible to operations outside } \alpha, \text{ but only H and its edge.}
\]

\[
(37) \text{A phase is CP or } vP, \text{ but not TP or a verbal phrase headed by H lacking } \phi \text{-features ...} \quad \text{(Chomsky (1998: 20))}
\]

Let us assume here that the identification of the OP is a sort of operation. If we adopt Phase-Impenetrability Condition, the OP must be in the uppermost [Spec, CP] of the infinitival clauses. Given cyclicity of derivation, the OP must be attracted before the merge of the infinitival clause (\( \alpha \) in (36)) and the matrix clause. This accounts for the overt-ness of the OP movement.

The OP is distinct from other concrete categories such as wh-operators in that it consists only of abstract features, and the sole purpose of the OP movement in tough construction is to guarantee identity with an antecedent. It is conceptually natural that such an element is deleted as a whole in the final level of interpretation. However, it might mean the deletion of the “term,” which is illegal in the MP framework. This problem will be discussed in section 5.3.

The aim of this section is to give a principled explanation, on the basis of the assumption in (34), to the A-bound character of the gap in tough construction, maintaining the OP movement. This attempt will give us another argument in support of the assumption in (34).

Before moving to a more detailed discussion of the consequences of this assumption, for the ease of discussion, let us review the history of generative treatments of tough constructions.

4.2. Background of the Null-Operator Analysis

Tough constructions have been one of the major topics of research, especially in generative grammar. In the framework of the classical transformational grammar (cf. Postal (1971), Rosenbaum (1967)), a
tough construction such as (38a) is assumed to be derived by tough-movement as in (38b):

(38) a. John is easy to please.
    b. John$_i$ is easy to please $t_i$.
    c. It is easy to please John.

Tough movement directly relates the position of the trace to that of the antecedent. Although this analysis captures some parallelisms between (38a) and (38c), it also raises a number of serious theoretical difficulties.

In the GB framework tough-movement has three problems. First, a chain made by tough-movement has two $\theta$-roles if the landing site of a tough-movement is a $\theta$-position (see Kaneko (1996), among others). One is assigned in the landing site and the other is assigned in the complement position of the infinitive. This induces a violation of the $\theta$-criterion. Second, an argument, which mimics the above argument, can be made in terms of Case theory: a chain may not include more than one case position. Third, an NP trace left by the tough-movement cannot be bound in its governing category (i.e. the infinitival clause containing the trace). This induces a violation of Principle A, since the trace left by the tough-movement is supposed to be a sort of anaphor.

To avoid the difficulties noted above, Chomsky (1981) argues that the derivation of tough constructions involves the OP movement exemplified in (39):

(39) John$_i$ is easy [CP OP$_i$ [IP PRO to please $t_i$]]

The OP approach assumes that the matrix subject and the complement of the infinitive are involved in two different chains: one is headed by John and the other is headed by the OP. The $\theta$-role of the subject is assigned to the chain headed by John and the $\theta$-role of the object is assigned to the one headed by the OP. Since the trace in the complement position of the infinitive is an A$'$-trace, it need not obey Principle A; hence, the OP analysis does not raise the problems noted above. There are many pieces of empirical evidence, which support the OP-movement analysis in tough constructions (cf. Kaneko (1996: 10–12), Nakagawa (1997: 232–233)).

However, there are instances of a phenomenon that is not compatible with the OP-movement. Consider the following example:

(40) a. *This bed$_i$ is impossible [CP [c for] your letter to be under $t_i$]
b. *That school is difficult for John [CP [C for] his children to go to ti]  

(40) *That school is difficult for John [CP [C for] his children to go to ti]  

(41) *The men expected [IP the soldier to shoot each other]  

In tough constructions, a subject cannot intervene between the matrix subject and the trace. This constraint is widely known as Specified Subject Condition (henceforth, SSC). SSC is assumed to be a constraint on A-movement. Insofar as we assume the OP-movement (or A'-movement), it is strange that we find SSC effects in tough constructions.

Numerous attempts have been made by scholars to offer explanations for the problem noted above. However, it is still in controversy.

4.3. Explanation of SSC Effects in Tough Constructions

The assumption in (34) can provide the account of SSC effects exemplified in (40). Since the early works in the GB framework, SSC is subsumed under the functional determination of empty categories and Principle A.

(41) *The meni expected [IP the soldier to shoot each otheri]  

(42) a. *John believes that himself is clever.  

b. *John was believed that ti is clever. (Lasnik (1988: 43))  

Since the A-bound trace is an anaphor, the sentence in (42b) is ruled out as a violation of Condition A.

(43) John is easy [CP (OPi) [to please ti]]  

A-bind

To summarize, the deletion of the OP in tough constructions is well-
motivated by the MP framework, and leads us to the correct prediction of SSC effects in tough constructions.\textsuperscript{19} The above arguments do not require an alternative analysis of the basic characters of the OP-movement (wh-island sensitivity among others),\textsuperscript{20} because they can be reduced to the constraints on derivation (e.g. Minimal Link Condition (MLC)).\textsuperscript{21}

\textsuperscript{19} As an anonymous EL reviewer points out, the analysis in this paper can account for Tensed-S effects in the complement clause of tough adjectives (the example in (i) is given by the reviewer):

\begin{quote}
(i)?*These flowers would be easy for you [to say [that you had found it]]
\end{quote}
\small
(Ross (1967: 228))

Nakagawa (1997: 246) has offered another account of this effect.

\textsuperscript{20} An anonymous EL reviewer points out that the deletion of the OP might be impossible in the sentence in (33) repeated here as (i):

\begin{quote}
(i) John is difficult, and Mary is impossible, to please.
\end{quote}

It seems that the deletion of the OP itself is possible, since it is driven by the intrinsic property of the OP (i.e. non-specificity). However, the concrete mechanism of the A-binding of the trace in the infinitival clause is not clear. If the trace is not A-bound and therefore remains as a variable, we might expect that an infinitival (or tensed) clause with the lexical subject can be seen in a sentence like (i). However, this expectation is not correct. Note that the grammaticality of the sentence in (ii) does not imply the disappearance of SSC effect. The sentence in (iii) is an example of the right node raising of AdjP. (see the diagram in (56)).

\begin{quote}
(ii) a. *John is difficult, and Mary is impossible, for Roy for Bill to please.
b. *John is difficult, and Mary is impossible, that Bill please.
c. John is difficult, and Mary is impossible, for Bill to please.
\end{quote}

The ungrammaticality of the sentences in (iia, b) does not contradict the assumption that the trace is an anaphor and must be A-bound even in a sentence like (i). We should find further empirical support for the existence of the A-binding in the configuration shown in (i). Furthermore, we must show how the structural requirements of A-binding are satisfied in this configuration. The same problem would arise for the configuration in (32). Needless to say, the structural license of the traces in these configurations is crucially dependent upon their syntactic structures, on which conclusive research has not been done (cf. McCawley (1988), among others). I leave these problems open for future research.

Apart from the structural license of the trace, one possibility of ruling out the sentences in (iia, b) might be to assume that the trace is reanalyzed as an anaphor because of the default interpretation (cf. the discussion in 5.3), which can be formalized as follows:

\begin{quote}
(iii) The trace must be A-bound unless it is structurally A'-bound.
\end{quote}

\textsuperscript{21} It is well known that the trace of the OP can license parasitic gaps:

\begin{quote}
(i) These letters are tough $OP_1$ to discard $t_i$ [without opening $e_i$]
\end{quote}
\small
(Nakamura (1991: 377))
5. Further Considerations

In this section, let us explore the solution of the problems peculiar to the *tough* movement analysis that are noted in 4.2.

5.1. Specified Subject Condition and PRO

First, let us address the third problem mentioned in 4.2: An NP trace left by the *tough*-movement cannot be bound in its governing category (i.e. the infinitival clause). Although we do not adopt the *tough* movement, this problem is inherited in the analysis of this paper.

5.1.1. Complex-Adjective Formation and PRO

Consider the following sentence:

(44) *They persuaded John [IP PROj to kill each otherj]

As far as we assume that the PRO is an accessible SUBJECT, we can rule out the sentence in (44) straightforwardly: the anaphor (i.e. each other) cannot be bound in its governing category (i.e. the embedded IP).

Under this assumption, we have to explain why *tough* constructions show SSC effects only when subjects of the embedded infinitives are lexical.

(45) a. The work is pleasant for the rich [PRO to do t]

b. *The work is pleasant for the rich [for poor immigrants to do t] (Nakamura (1991: 351))

As an anonymous EL reviewer points out, the reanalysis of the trace of the OP requires parasitic gaps to be licensed in the overt syntax, since only the trace of A'-movement can license them.

(ii) *This book was understood [after reading ei only once]

(Mulder and den Dikken (1992: 314))

What is interesting here is that only the trace of overt A'-movement can license parasitic gaps:

(iii) a. Who did they talk to [after they met ei]

b. *Who talked to whom [after they met ei] (ibid.: 313)

According to Mulder and den Dikken (1991), the parasitic gap in (iib) cannot be licensed, since the movement of the licensor whom does not obtain until at LF. Apart from the concrete mechanism of the license, we may say that the trace of the OP in (i) can license the parasitic gap in overt syntax. In other words, the fact that the trace of the OP in *tough* constructions can license parasitic gaps does not contradict the deletion of the OP at LF.
Assuming that we cannot reject PRO as an accessible SUBJECT, let us consider the governor of the gap in tough constructions. In Nakagawa (1997), it is argued that English tough adjectives have a [-interpretable] feature [+affix] which is marked [±strong], and that the derivation of tough constructions includes a step that derives a complex head made of a tough adjective and the features of infinitival complements. This is illustrated in (46).23,24

(46) a. John\(_\text{i}\) is easy [OPT \[PRO [to please] \(t_i\)]\] \[SPELL-OUT\]

b. John\(_\text{i}\) is easy-[to please] \[OPT \[PRO \(t_i\) \(t_i\)]\]\[LF\]

If this argument is on the right track, given the presupposition that Binding Theory must be applied to the LF structure, the governor of the gap in tough constructions must be a complex adjective as in (46b). Since the complex adjective is in the matrix clause, the governing category for the gap must be the matrix IP even if PRO is an accessible SUBJECT.

What is crucial here is the fact that the intervening lexical subject in [Spec, IP](s) prevents complex-adjective formation. This is exemplified in (47) and (48). Most of the examples in (47) and (48) are cited from Nanni (1980).

(47) a. John is easy for the children to tease.
   b. *How easy for the children to tease is John?
   c. *How easy for the children to tease John is!

(48) a. The problem is easy for Bill to finish.
   b. *an easy for Bill to finish problem

22 It seems natural to think that the counterpart of the governor should be determined even in the MP framework.

23 In Chomsky (1998, 1999), covert movement is replaced by Agreement. This does not require any essential change of the analysis in the text. MLC is now a condition on Agreement, but not Move.

24 As an anonymous EL reviewer points out, it is difficult to show how the complex adjective is formed in right node raising contexts such as (33). I leave this problem open for future research. See note 20.

25 An LF movement approach to anaphora, which assumes that the anaphor must be criticized to some predicate to be interpreted, can also explain the fact that \(t_i\) is bound by John (46b), because \(t_i\) criticized to the infinitive is moved to the matrix predicate easy by complex-adjective formation. I am grateful to an anonymous EL reviewer for drawing my attention to this approach.
Without *for*-NP, the examples in (47b, c) and (48b) are acceptable. Note that PROs intervening between the adjectives and the infinitives do not appear overtly.

(49)  
 a. How easy to tease is John?
 b. How easy to tease John is!
 c. an easy-to-finish problem

The above examples imply that PRO in the [Spec, IP] of infinitival clause does not prevent complex-adjective formation, while the lexical NP does.

Now, let us assume the following descriptive generalization:

(50) The intervening lexical subject in [Spec, IP] of the infinitival clause prevents complex-adjective formation.

Let us return to the explanation of SSC effects.

(51) *The work is pleasant for the rich [CP for [IP poor immigrants to do t]]

In (51), *poor immigrants* cannot be outside the infinitival IP because of the presence of *for the rich*. Hence, *poor immigrants* must be in [Spec, IP]. Following (50), *poor immigrants* prevents the covert complex-adjectival formation. Then, the governor of the gap must be *do*, and therefore the governing category of the gap must be the infinitival clause. In this governing category, the gap cannot be bound. Hence, the sentence in (51) is ruled out.

It must be noted here that the assumptions in (50) will not prevent the covert complex-adjective formations of grammatical sentences such as (52):

(52) The rock is easy for Bill to move.

The relevant LF structure for (52) is (53):

(53) The rock is easy for Bill [IP PRO [I' to move]]

As noted above, PRO in [Spec, IP] has no effect on the complex-adjective formation. There are some pieces of empirical evidence that the *for*-NP in *tough* constructions is outside the infinitival IP.

(54)  
 a. For whom is the rock easy to move?
 b. For Bill, the rock is easy to move.
 c. The rock is easy to move for Bill. (Kaneko (1996: 21))

In the grammatical sentence with *for*-NP, the *for*-NP and the infinitive do not make a single constituent. Therefore, we can conclude that the *for*-NP is outside the infinitival IP and PRO is in [Spec, IP].

It is natural that the *for*-NP outside the infinitival clause does not prevent covert complex-adjective formation: the *for*-NP is irrelevant to
complex-adjective formation (cf. (56)).

(55) The rock is easy-[to move] for Bill [IP PRO [r ti]]

\[ \text{feature movement} \]

To speak precisely, the features of the infinitive can be attracted over the for-NP outside the infinitival clause.

Here, we must explain why the for-NP in the infinitival clause prevents covert complex-adjective formation.

5.1.2. Complex-Adjective Formation and MLC

Essentially, following Kaneko (1996: 33), let us assume the “AP shell” structure for tough constructions:

(56)

\[ \text{AP} \]

\[ \text{NP} \]

\[ \text{A'} \]

\[ \text{A} \]

\[ \text{PP} \]

\[ \text{P} \]

\[ \text{NP} \]

\[ \text{A} \]

\[ \text{CP} \]

\[ \text{Op} \]

\[ \text{C'} \]

\[ \text{IP} \]

\[ \text{I'} \]

\[ \text{C} \]

\[ \text{for} \]

\[ \text{NP} \]

\[ \text{for} \]

In the grammatical sentence, the for-NP is in the specifier position of the lower AP. In the sentence showing an SSC effect, for is in the complementizer position and NP is in [Spec, IP].

What is worthy of note here is that for in the complementizer position c-commands to-infinitive but for in [Spec, AP] does not. This means that the former is a potential landing site for the feature attraction of the infinitive, but the latter is not.\(^{26}\) Hence, the feature attrac-

\(^{26}\) This means that the overt C and for have the \([+\text{affix}]\) features. This implication would be empirically justified. In most Germanic languages, a complementizer blocks the verb movement to C. In cases of embedded V2, the class of verbs in
tion over the *for* in COMP violates MLC but the feature attraction over the *for* in [Spec, AP] does not. The definitions of the relevant conditions are as follows:

(57) **Minimal Link Condition**
K attracts $\alpha$ only if there is no $\beta$, $\beta$ closer to K than $\alpha$, such that K attracts $\beta$.  
(Chomsky (1995: 311))

(58) If $\beta$ c-commands $\alpha$ and $\tau$ is the target of raising, $\beta$ is *clos*-er to K than $\alpha$ unless $\beta$ is in the same minimal domain as (a) $\tau$ or (b) $\alpha$.  
(Chomsky: 356)

(59) Suppose $\alpha$ is a feature or an X\textsuperscript{0} category, and CH is the chain ($\alpha$, t) or (the trivial chain) $\alpha$. Then
a. Max ($\alpha$) is the smallest maximal projection including $\alpha$.

b. The domain $\delta$ (CH) of CH is the set of categories included in Max ($\alpha$) that are distinct from and do not contain $\alpha$ or t.

the matrix clause is roughly the class of bridge verbs:
(i) vi vet [at [caffee drinker Peter aldrig]]  
we know that coffee drinks Peter never  
(Danish)
Roberts (1993: 58))

In German, the embedded V2 can be seen only when a bridge verb takes a sentential complement without da\text{"{f}}:\n
(ii) a. Er sagte, er komme morgen.  
He said he come(subj.) tomorrow

b. Er sagte, gestern ware er schon arriviert.  
He said yesterday have(subj.) he already arrived  
(Chomsky: 57)

The examples in (ii) show that the complementizer and the verb are in complementary distribution with one another in [Spec, CP], and therefore share a common feature [+affix].

The argument that the complementizer is [+affix] would have another implication: the complementizer could be attracted by the *tough* adjective, and generate a complex adjective. However, this attraction is blocked by one of the selectional restrictions of *tough* adjectives: adjectival morphemes cannot be attached to a preposition.

Now, another problem arises. In the sentences with multiply embedded infinitival clauses, how does the movement of [+affix] avoid the violation of MLC? In this paper, let us assume that the [+affix] of the most deeply embedded infinitive raises along with the features of the root infinitive(s). This implies that the features of the uppermost infinitive, to which the features of the most deeply embedded infinitive are attached, is attracted to the *tough* adjective. Since the [+affix] of the infinitive is interpretable at LF, it is not problematic that the raised features have more than one [+affix].
c. The minimal domain \( \text{Min}(\delta(CH)) \) of \( CH \) is the smallest subset \( K \) of \( \delta(CH) \) such that for any \( \gamma \in \delta(CH) \), some \( \beta \in K \) reflexively dominates \( \gamma \). (ibid.: 299)

In the MP framework, PRO is assumed to bear Null Case and licensed by the checking of Null Case by the non-finite INFL. This implies that we do not have to assume \( for \) (or null counterpart of \( for \)) in COMP, and therefore covert complex-adjective formation is not prohibited.

To summarize, SSC effects in tough constructions are due to the impossibility of covert complex-adjective formation. If covert complex-adjective formation is prohibited, the governing category for the gap must be the infinitival IP. In this category, the gap, which is subject to Principle A, cannot be bound and induces unacceptability. The productivity of covert complex-adjective formation depends on whether \( for \) is present in COMP or not. The behavior of \( for \) as an opacity factor can be derived by widely-accepted principles (e.g. MLC) and the syntactic structure. Now, we do not have to stipulate that PRO is not an accessible SUBJECT only in tough constructions.

5.2. The \( \theta \)-Criterion and Case Theory

Now, let us consider the remaining problems noted in 4.2. They are repeated here:

(a) A chain made by the tough-movement has two \( \theta \)-roles if the matrix subject position is a \( \theta \)-position. One is assigned in the matrix subject position and the other is assigned in the complement position of the infinitive. This induces a violation of the \( \theta \)-criterion.

(b) An argument, which mimics the above argument, can be made in terms of the Case theory: a chain may not include more than one case position.

In recent literature (cf. Hornstein (1999)), there has been heated controversy over whether the \( \theta \)-Criterion is dispensable or not. To derive the main effects of the \( \theta \)-criterion in the MP framework is beyond the scope of this paper. However, it is worth pointing out that the \( \theta \)-criterion should not be a constraint on chains. If we interpret the inclusiveness condition in the strict sense, the existence of the chain itself and the rule depending on the existence of the chain might be doubtful.

(60) The Inclusiveness Condition:
Any structure formed by the computation is constituted of
elements already present in the lexical items selected for N; no new objects are added in the course of computation ...

(Chomsky (1995: 228))

Note that the chain is a sort of product of computation. Chomsky (1999: 8) argues that "chains are determined by identity, with no need for indices or some similar device to distinguish chains from repetitions, also violating the inclusiveness condition."

Therefore, following Hornstein (1999: 78), I adopt the following assumptions:

(61) a. \theta\text{-roles are features on verbs.}
    b. A D/NP "receives" a \theta\text{-roles by checking a \theta\text{-feature of a verbal/predicative phrase that it merges with.}

These assumptions can avoid the problem (a).

In the case of Case theory, the analysis might work in the same way. The reanalysis of the trace does not imply the formation of an A-chain. Note that SSC effects in tough constructions reflect a property of the trace (anaphor).

5.3. A Remaining Problem

Let us now turn to the problem left open in 4.1: the deletion of the OP might mean the deletion of the "term." Chomsky (1995: 280) reformulates the operations of checking and deletion as in (62):

(62) a. A checked feature is deleted when possible.
    b. Deleted \alpha is erased when possible.

The deleted features are invisible at LF but accessible to the computation. Erasure is a stronger form of deletion, eliminating the element entirely so that it is inaccessible to any operation, not just to interpretability at LF. Erasure of an entire term of a syntactic object \Sigma produces an illegitimate object. Therefore, Chomsky concludes as follows:

(63) A term of \Sigma cannot erase.

If we erase the OP entirely, this operation violates condition (63).

What must be noted here is that the reanalysis of the trace does not mean A-chain formation.

If we assume a kind of chain formation between the matrix subject and the gap in the infinitival clause, we must erase the null operator; since the operator is accessible to the operation (computation) even if it is deleted.

However, in the framework of this paper, the reanalysis of the gap in
the infinitival clause is a sort of interpretation, but not operation (cf. the discussion in 5.2). The OP in tough constructions, therefore, must be deleted, but it need not be erased. To put this more simply, the deletion of the OP does not mean the erasure of the "term."

6. Conclusion

In this paper, I have argued that the OP in tough constructions is a nonspecific bare NP, which is reanalyzed as an anaphor at LF. The reconstruction effects and the discourse license prove the former arguments. The latter argument, interacting with complex-adjective formation at LF, explains SSC effects in tough constructions, which appear only in the infinitival clauses with lexical subjects.

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Nagoya Sangyo University
3255–5 Arai-cho, Owari-Asahi-shi
Aichi 488–8711
e-mail: n.nakagawa@nagoya-su.ac.jp