

## Article

**Predicate NP Movement in *Tough*-Constructions\***

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A new analysis of the derivation of *tough*-constructions in English is proposed in terms of what I will call “predicate NP movement” and an additional A-movement, supplemented by the late merger of D. The idea that the NP part of the subject DP of *tough*-constructions has its origin in the “gap” position in the infinitival complement clauses of *tough*-predicates is not a new one: Sportiche (2006) and Messick (2012). The proposal to be pursued here is different from Sportiche’s in that the extraction of an NP out of a DP occurs basically in the original gap position. This enables us to give a parallel and systematic analysis to the formation of infinitival relative constructions and *tough*-constructions. It is also shown that the restricted distribution of gaps in subject positions in these constructions observed and analyzed by Postal (1974), Nakamura (1976), Stowell (1987), Takahashi (1997), Maruta (2013), among many others, are systematically accounted for.

**1. Introduction**

This paper proposes a new analysis of the derivation of *tough*-constructions in English as in (1a, b) in terms of what I will call “predicate NP movement” and an additional A-movement of a predicate NP to the subject position of the constructions, with a supplementary late merger of D, as outlined in the schematic derivation in (2a-c) for the sentence (1a).

- (1) a. The book is easy to put on the table  
       b. The assignment is an absolute pain to do
- (2) Derivation for sentence (1a)
- a. [<sub>VP</sub> PRO put [<sub>DP</sub> D [<sub>NP</sub> book]] on the table]
- ↓ A<sup>2</sup>-movement of “predicate NP” to Spec,C

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- b. [<sub>α</sub> [<sub>NP</sub> book] [<sub>CP</sub> C [<sub>TP</sub> PRO to [<sub>vP\*</sub> t<sub>PRO</sub> put [<sub>DP</sub> D t<sub>NP</sub>] on the table]]]]]  
 ↓ A-movement of NP to the matrix Spec,T
- c. [<sub>NP</sub> book] is easy [<sub>α</sub> t<sub>NP</sub> [<sub>CP</sub> C [<sub>TP</sub> PRO to [<sub>vP\*</sub> t<sub>PRO</sub> put [<sub>DP</sub> D t<sub>NP</sub>] on the table]]]]]  
 ↓ Late merger of D (= *the*) to the raised NP
- d. [<sub>DP</sub> the [<sub>NP</sub> book]] is easy [<sub>α</sub> t<sub>NP</sub> [<sub>CP</sub> C [<sub>TP</sub> PRO to [<sub>vP\*</sub> t<sub>PRO</sub> put [<sub>DP</sub> D t<sub>NP</sub>] on the table]]]]]

The idea of this A'-movement of a predicate NP stems from the promotion/raising analysis of relative clause structures and quite similar analyses have been entertained by Sportiche (2006) and Messick (2012). They, however, suggest that the extraction of NP out of DP occurs not in the original gap position (typically, object positions) but in the Spec,C position created by A'-movement of the relevant DP operator.

The paper shows that our analysis of NP extraction from within the original gap in *tough*-constructions has interesting consequences for the account of the restricted distribution of gaps in subject positions observed and/or analyzed by many researchers (see Postal (1974), Nakamura (1976), Stowell (1987), Takahashi (1997), Maruta (2013) and references therein). Specifically, our analysis accounts for the unavailability of subject gaps in (3a), just on a par with the account offered by Takahashi (1997), and for the contrast between ungrammatical (3b) and grammatical (3c).

- (3) a. ?\*John is easy to believe \_\_ to have kissed Mary (Takahashi 1997)  
 b. \*John is difficult \_\_ to solve these problems (Browning 1987)  
 c. The room is easy \_\_ to be heated (Nakamura 1976)

In what follows, I will motivate in section 2 the derivation of *tough*-constructions in terms of an A'-movement of a predicate NP and its subsequent A-movement to the matrix Spec,T, followed by a supplementary late merger of D. Section 3 examines consequences of this analysis with respect to the restricted distribution of subject gaps in the constructions. Section 4 is a conclusion.

## 2. Predicate NP movement in relative clauses and *tough*-constructions

This section motivates the derivation of *tough*-constructions in English in terms of predicate NP movement as outlined in (2a-d) above. Section 2.1 is concerned with the categorical status of the obligatory “gap” in the constructions. Section 2.2 turns to an A-movement of predicate NPs into the matrix Spec,T and gives a couple of pieces of evidence in favor of this analysis, which include new ones not provided in Sportiche (2006).

## 2.1. DP/NP inconsistency in relative clause formation

As noted in section 1, our analysis is motivated by the promotion/raising analysis of relative clause formation. This subsection aims to introduce a “direct” promotion/raising analysis of infinitival relative clause constructions so as to provide the foundation for the proposal of the derivation of *tough*-constructions. Infinitival relative clauses share some important properties with *tough*-complement clauses: they are infinitival, do not allow overt *wh*-operator of nominal type (*who*, *which*), show Subject Condition effects (see Browning 1987). The unavailability of overt *wh*-operator of nominal type in infinitival relative clauses strongly suggests a “direct” raising/promotion analysis of the head/antecedent of the relevant relative clauses (without the mediation of null operators), which I will adopt in this paper. Since this direct promotion/raising analysis was proposed by Schachter (1973) for finite relative clauses, I will start with the discussion of finite relative clauses under the “direct” promotion/raising analysis.

Analyses of relative clause structures are always tied with an issue of the apparent categorical mismatch between the original gap and the head/antecedent of the relevant relative clause.

Given the DP/NP dichotomy in the DP analysis of noun phrases (see e.g. Abney 1987), it is a common practice to treat a DP as an element denoting an individual and an NP as one denoting a property (i.e., predicate). In this tradition it is quite natural to assume that the gap (\_\_\_) in the relative construction in (4) is a DP rather than an NP because the verb *put* semantically selects an individual rather than a property/predicate.

(4) the book that John put \_\_\_ on the table

When we turn our attention to the syntactic category of the head/antecedent of the restrictive relative clause, on the other hand, we have good reason to assume that it is an NP rather than a DP. The structure for (4) should be (5).

(5) [<sub>DP</sub> the<sub>D</sub> [<sub>NF</sub> [<sub>NF</sub> book] [<sub>CP</sub> that John put \_\_\_ on the table]]]

Discussions of syntactic differences between restrictive relatives and non-restrictive (appositive) relatives in Jackendoff (1977) favor this analysis strongly. In the tradition of semantics as well, the treatment of the head/antecedent of the restrictive relative clause as a predicate (namely, type <e,t>, rather than type e for an individual) is common. Thus, Heim & Kratzer (1998) assign to (6a) the structure in (6b) and state that both [<sub>NF</sub> house] and relative clause [which is empty] are <e,t> (namely, predicates) and they are combined by

their rule of Predicate Modification (p. 88).<sup>1</sup> The NP part *house which is empty*, thus, denotes the function (6c), where  $D_e$  = set of individuals.

- (6) a. the house which is empty  
 b.  $[_{DP} \text{the}_D [_{NP} [_{NP} \text{house}] [_{CP} \text{which is empty}]]]$   
 c.  $\lambda x \in D_e . x \text{ is a house and } x \text{ is empty}$

This NP analysis of the head/antecedent of restrictive relative clauses provides a straightforward account for the ungrammatical status of sentences like (7a): proper nouns are superficially Ds and hence have no ability to serve as the head/antecedent of relative clauses due to categorical mismatch (NP vs DP) and/or semantic mismatch ( $\langle e, t \rangle$  vs  $e$ ). When a proper noun is converted to a common noun, henceforth, it can serve as a legitimate head/antecedent both syntactically and semantically, as shown by (7b), where it means “person by the name of Sue Jones.”

- (7) a. \*John that came to dinner (Jackendoff 1977)  
 b. She is obviously not the Sue Jones they are looking for.  
 (Huddleston & Pullum 2002 (hererafter, H&P 2002))

Similarly, the contrast between (8a) and (8b) follows from this NP analysis. *John's book* in (8a) is a full-fledged DP denoting an individual and, hence, inappropriate as a head/antecedent, whereas *book of John's* is an NP serving as a predicate of the semantic type  $\langle e, t \rangle$ , legitimate as the relevant head/antecedent.

- (8) a. \*John's book that you read  
 b. the book of John's that you read. (Both examples from Chomsky 1986)<sup>2</sup>

These considerations strongly suggest that the head/antecedent of relative clauses are NPs rather than DPs.

Returning to the syntactic analysis of the internal structure of the relative construction (4), we now have a DP/NP inconsistency: while the gap (\_\_\_) is best analyzed as a DP from the viewpoint of semantic selection, syntactic and semantic evidence points to an NP status of its purported antecedent occupying the

<sup>1</sup> The rule of Predicate Modification is given in (i), where  $\| \delta \|$  = denotation of  $\delta$ ,  $D_{\langle e, t \rangle}$  = set of all functions from  $D_e$  to  $D_e$ , 1 = “true.”

(i) Predicate Modification (Heim & Kratzer 1998, p. 65)  
 If  $\alpha$  is a branching node,  $\{\beta, \gamma\}$  is the set of  $\alpha$ 's daughters, and  $\| \beta \|$  and  $\| \gamma \|$  are both in  $D_{\langle e, t \rangle}$ , then  $\| \alpha \| = \lambda x \in D_e . \| \beta \| (x) = \| \gamma \| (x) = 1$ .

<sup>2</sup> See also Jackendoff (1977, p. 181) for a similar contrast.

head/antecedent position.

A simple solution we pursue here is a variant of the direct promotion/raising analysis whereby an NP is extracted out of a DP and undergoes an A'-movement to adjoin to CP, as illustrated in the structural change from (9a) to (9b) (see Schachter 1973).<sup>3</sup>

- (9) a. [<sub>CP</sub> that [<sub>TP</sub> John put [<sub>DP</sub> D [<sub>NP</sub> book] on the table]]  
 b. [<sub>α</sub> [<sub>NP</sub> book] [<sub>CP</sub> that [<sub>TP</sub> John put [<sub>DP</sub> D t<sub>NP</sub>] on the table]]]  
 c. [<sub>DP</sub> the<sub>D</sub> [<sub>α</sub> [<sub>NP</sub> book] [<sub>CP</sub> that [<sub>TP</sub> John put [<sub>DP</sub> D t<sub>NP</sub>] on the table]]]]]

In (9b),  $\alpha$ , with an  $\langle \text{NP}, \text{CP} \rangle$  structure, is somehow permitted in the light of the labeling algorithm (LA) (Chomsky 2013).<sup>4</sup> One possibility worth pursuing is that C in relative clauses is endowed with a [Predicate]-feature, which is checked by a predicate of an appropriate type: namely NP (but not VP or adverb, for example). The  $\langle \text{NP}, \text{CP} \rangle$  under consideration, then, could be labeled as  $\langle \text{Pred}, \text{Pred} \rangle$  by means of feature sharing.

Let us suppose this is the case and proceed to the examination of the next stage of the derivation illustrated in (9c) above, where *the<sub>D</sub>* is merged with  $\alpha$ . In the tradition of the semantic treatment of definite descriptions it is a common practice to treat *the* as a function that maps the set of  $\langle e, t \rangle$  denoted by the relevant NP to exactly one individual *e*. Thus, if *the* is applied to *president of the US*, it yields *Donald Trump* (at the time of writing) (see Heim & Kratzer 1998, p. 74). A similar analysis is applied to the interpretation of (9c), where the set of denotations of type  $\langle e, t \rangle$  corresponding to *book that John put on the table* is defined (narrowly) by the discourse/world of the relevant speaker/hearer. Therefore, it is natural to assume that D has a function to map a predicate  $\langle e, t \rangle$  to an individual (*e*), insofar as the resulting DP

3 For analyses of relative clause formation, see also Kayne (1994), Sauerland (1998), Hulseley & Sauerland (2006), among many others.

4 Throughout the paper I will assume that raised nominals such as *book* in (9b) are actually phrasal rather than heads with the consequence that they cannot provide the label of the dominating constituent (e.g.  $\alpha$  in (9b)) in the light of LA, unlike the analysis of *that*-relative clauses proposed by Donati & Cecchetto (2011), as correctly observed by an anonymous reviewer.

The assumption that *book* in (9b) is phrasal is not implausible at all, given that what we have been referring to as an NP here is actually a combination of a nominalizer *n* and its complement N. “NP-movement,” then, is actually *nP*-movement. However, I will continue to use the simplified representation [<sub>NP</sub> book<sub>N</sub>] as a shorthand for the formal [<sub>nP</sub> *n* book<sub>N</sub>].

Since the head/antecedent of relative clauses is uniformly phrasal, our analysis departs from Donati & Cecchetto’s (2011), where *book<sub>N</sub>* in (i) is a head (rather than a phrase) and transmits its label to  $\alpha$ .

(i) the<sub>D2</sub> [<sub>α(-NP)</sub> book<sub>N</sub>] [<sub>CP</sub> that you saw [<sub>DP1</sub> D<sub>1</sub> t<sub>N</sub>]]]

The head status of the head/antecedent of relative clauses is quintessential for their labeling purposes. Notice that if the head/antecedent is phrasal, as in (iib), it is unable to label  $\alpha$ . In cases like this, they appeal to a late merge of *of John to picture* after the latter transmits its label to  $\alpha$  as depicted in (iic).

(ii) a. the picture of John that I prefer \_\_\_ is on the top  
 b. [<sub>α</sub> [<sub>NP</sub> picture of John] [<sub>CP</sub> that I prefer [<sub>DP1</sub> D<sub>1</sub> t<sub>N</sub>]]]  
 c. [<sub>α(-NP)</sub> [<sub>N</sub> picture] [<sub>CP</sub> that I prefer [<sub>DP1</sub> D<sub>1</sub> t<sub>N</sub>]]]

They argue that the analysis predicts that constituents “late merged” in this way cannot reconstruct and that this prediction is borne out correctly. The lack of reconstruction effects is, however, empirically incorrect; for related phenomena see footnote 11.

denotes an individual (or put differently, insofar as it is referential). In the case of nominal expressions appearing in the complement position of *be*, things are a little complicated. Consider the following examples.

- (10) a. She's secretary of the bushwalking club.  
 b. She's the secretary of the bushwalking club. (Both examples from H&P 2002, p. 271)

In (10a), *secretary of the bushwalking club* denotes a property (namely, serves as a predicate) and does not accompany an overt determiner. It could be said that syntax and semantics coincide in a sense: property/predicate reading  $\leftrightarrow$  absence of D. This correlation is not bijective, however. This is explicitly demonstrated by (10b), which has an occurrence of *the* and can still retain the same property/predicate meaning as (10a).<sup>5</sup> We will understand this in the following way.

- (11) a. Every NP is merged with D, projecting DP.  
 b. D has two variants from a semantic point of view:  
     (i) a function that maps  $\langle e, t \rangle$  to  $e$ ,  
     (ii) a semantically vacuous element that maps  $\langle e, t \rangle$  to  $\langle e, t \rangle$ .<sup>6</sup>

Both (10a) and (10b) have a DP as the complement of *be*; in the former the empty D is semantically vacuous and expresses a property that the complement NP originally has (namely, serves as a predicate), whereas in the latter the D could be understood either as a semantically vacuous element or as a function that maps  $\langle e, t \rangle$  to an individual  $e$ . This semantic-vacuity option is available in the complement position of *be* but is strictly prohibited in the object position of, say, *put*, where an individual  $e$  (rather than a predicate  $\langle e, t \rangle$ ) is required for semantic reasons.

An additional comment is now in order on the status of the D that merges with the relative clause ( $[_a$  NP CP]) constructed by A'-movement of a predicate NP. We are assuming that this D is a different element from the empty D stranded by the predicate NP movement. To put it differently, the numeration for *the book that John put on the table* contains four different Ds: (i) empty D that takes *book*, (ii) *the* that takes *table*, (iii) empty D that takes *John*, and (iv) *the* that takes *book that John put on the table*.<sup>7</sup>

5 H&P (2002, p. 271) observe that (10b) is ambiguous between a predicative interpretation of *the secretary of the bushwalking club* just as in (10a) and its specifying interpretation. No comparable ambiguity holds for the NP without an overt D in (10a).

6 As examples of semantically vacuous elements, Heim & Kratzer (1998, pp. 61f) give *be* in predicative sentences, *of* in "proud of John," and an indefinite article *a(n)*.

7 The fourth instance of D here, which introduces  $[_a$  NP CP], has two variants in the sense of (11b), too. (11bi) is instantiated by common referential restrictive relative constructions as well as the example in (ia) below, where  $[_{NP}$  scholar] comes from the predicate complement of the predicative verb *be* and the whole DP denotes an individual. (ib) can be seen as an example

This supposition of the presence of the fourth D in this list is inevitable in the predicate NP promotion/raising analysis and is shared by Schachter. From a semantic point of view, the function of this D is to turn  $\langle e, t \rangle$  to  $e$ . This would mean that the presence of this D is required by the presence of the  $\langle e, t \rangle$  that needs to be turned into  $e$ . Since the  $\langle e, t \rangle$  that needs to be turned into  $e$  is the relative clause itself, I will conclude here that this D is somehow introduced into the relevant numeration by the [Predicate]-feature on C.

Let us summarize our direct promotion/raising analysis of relative clauses.

(12) Restrictive relative clause formation

Syntactic operations	Semantic processes
i. A'-movement of NP out of DP	Variable introduction ( $\lambda$ -abstraction)
ii. NP-CP merger; Labeling	Predicate Modification (see fn. 1)
iii. D-NP merger; Labeling	Mapping from $\langle e, t \rangle$ to $e$ <sup>8</sup>

An essentially similar analysis is extended to infinitival relative clause formation. Take (13a) as an example. It is derived through the steps in (13b-d). As noted at the outset of this subsection, infinitival relative clauses of (13a) type do not tolerate overt *wh*-operators. In this light, the direct promotion/raising analysis is the simplest and most appropriate approach.

(13) a. the book to put on the table

- b.  $[_{VP^*} \text{PRO put } [_{DP} \text{D } [_{NP} \text{book}]] \text{ on the table}]$   
 ↓ A'-movement of NP to Spec,C; Variable introduction ( $\lambda$ -abstraction)
- c.  $[_{\alpha} [_{NP} \text{book}] [_{CP} \text{C } [_{TP} \text{PRO to } [_{VP^*} \text{t}_{PRO} \text{put } [_{DP} \text{D t}_{NP}] \text{ on the table}]]]]]$   
 ↓ Merger of D; Mapping from  $\langle e, t \rangle$  to  $e$
- d.  $[_{DP} \text{the } [_{\alpha} [_{NP} \text{book}] [_{CP} \text{C } [_{TP} \text{PRO to } [_{VP^*} \text{t}_{PRO} \text{put } [_{DP} \text{D t}_{NP}] \text{ on the table}]]]]]]]$

For the discussion that follows, the stage (13c) is important because it is shared by the derivation that yields *tough*-constructions.

of (11bii) since the whole DP denotes a (non-)property attributed to *the interview*.

(i) a. Her book displays the fine skeptical intelligence of  $[_{DP} \text{the scholar she is}]$

b. The interview turned out not to be  $[_{DP} \text{the ordeal that I had thought it would be}]$  (Both examples from H&P 2002)

8 This is achieved in Heim & Kratzer (1998) by the rule of Functional Application (p. 44).

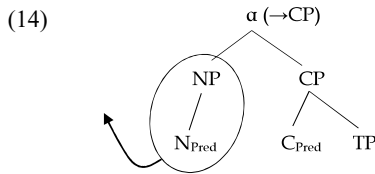
(i) Functional Application

If  $\alpha$  is a branching node,  $\{\beta, \gamma\}$  is the set of  $\alpha$ 's daughters, and  $\|\beta\|$  is a function whose domain contains  $\|\gamma\|$ , then  $\|\alpha\| = \|\beta\| (\|\gamma\|)$ .

2.2. The derivation of *tough*-constructions

Suppose that we have arrived at the stage (13c) above, where  $[_{NP} \text{ book}]$  has merged with CP to satisfy the [Predicate]-feature on C. In the preceding section we assumed that this  $[_{\alpha} \text{ NP CP}]$  structure is labeled thanks to the shared feature [Predicate].

Let us now hypothesize that this labeling in terms of the [Predicate]-feature sharing is optional. If this feature-sharing option is not taken, then  $[_{\alpha} \text{ NP CP}]$  is unlabelable as it is. This type of labeling problem is typically avoided by movement operations (see Moro 2000, Chomsky 2013, Tomizawa 2016, among many other implementations of this idea). In our present case, NP is moved out of  $\alpha$ , with the consequence that  $\alpha$  is labeled as CP.



We now have two points to make clear: (i) the destination of the movement of the extracted NP and (ii) the treatment of a D that remains in the numeration. Remember that we have a D in the relevant numeration, which would have merged with  $\alpha$  if  $\langle \text{Pred}, \text{Pred} \rangle$  feature-sharing had occurred as outlined in the preceding subsection for the derivation of relative clause structures. It is quite plausible to expect that, in the derivation involving (14), this D is ultimately merged with the extracted NP; otherwise, the relevant derivation either would not terminate (because the D remains unmerged) or would yield an unintelligible interpretation (e.g., the D is directly merged with CP in (14): *the to put on the table*).

How is this merger of D and the extracted NP made possible, then? Drawing upon the suggestions by Sportiche (2006) and Messick (2012), I will pursue the possibility that the D is “late” merged with the extracted NP after the latter moves into Spec,T of the matrix clause whose predicate consists of a *tough*-predicate such as *easy*, *an absolute pain*. This derivation is illustrated in (15), which corresponds to the sentence *the book is easy to put on the table*.

- (15) a.  $[_{\alpha} [_{NP} \text{ book}] [_{CP} C [_{TP} \text{ PRO to } [_{VP^*} t_{\text{PRO}} \text{ put } [_{DP} D t_{\text{NP}}] \text{ on the table}]]]]]$  (=13c)  
 ↓ A-movement of  $[_{NP} \text{ book}]$  to the matrix Spec,T  
 b.  $[_{\beta} [_{NP} \text{ book}] [_{TP} T \text{ is easy } [_{\alpha(=CP)} t_{\text{NP}} [_{CP} C [_{TP} \text{ PRO to } [_{VP^*} t_{\text{PRO}} \text{ put } [_{DP} D t_{\text{NP}}] \text{ on the table}]]]]]]]]]$   
 ↓ Late merger of D to NP in the matrix Spec,T  
 c.  $[_{\beta} [_{DP} \text{ the}_D [_{NP} \text{ book}]]] [_{TP} T \text{ is easy } [_{\alpha(=CP)} t_{\text{NP}} [_{CP} C [_{TP} \text{ PRO to } [_{VP^*} t_{\text{PRO}} \text{ put } [_{DP} D t_{\text{NP}}] \text{ on the table}]]]]]]]$



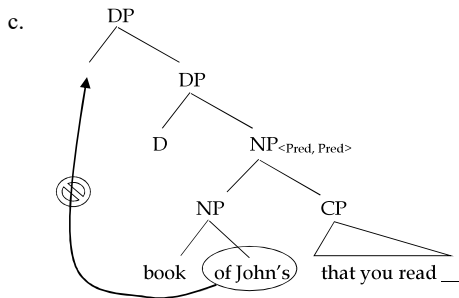
This analysis of *tough*-constructions has a number of direct consequences. First, the extracted NP can live a “DP” life independently of the DP life of the NP in original gap position, just as the promoted/raised NP does in relative clause formation. Overt quantifiers like *no*, being D, can be added to the extracted/promoted/raised NP, so that both instances of *nothing* in (16a, b) can never be understood in the original gap positions (= no scope reconstructions).

- (16) a. Nothing is hard for Melvin to lift \_\_ (Postal 1974)  
 b. nothing that I eat \_\_ (Schachter 1973)

(16a) does not mean that it is hard for Melvin not to lift anything; nor does (16b) imply that I do not eat anything.

Second, just because the NP in *tough*-constructions is extracted from [<sub>α</sub> NP CP], it can lead a more independent “DP” life than does the NP that stays within *α* in relative clauses. Given an NP of the form *book of John’s*, the possessor cannot raise to Spec,D in a relative clause structure as seen in (8a, b), repeated here as (17a, b), presumably due to some form of inactivity condition stemming from the <Pred, Pred> feature-sharing.

- (17) a. \*John’s book that you read  
 b. the book of John’s that you read.



In the case of an NP moved into the matrix Spec,T of *tough*-constructions as in (18a), on the other hand, no such obstruction to possessor raising exists, so that we can derive (18b).<sup>9</sup>

- (18) a. [<sub>TP</sub> [<sub>NP</sub> book of John’s] is an absolute pain [<sub>CP</sub> t<sub>NP</sub> [<sub>CP</sub> to read [<sub>DP</sub> D t<sub>NP</sub>]]]]

9 For the need of a similar possessor raising operation, see Takahashi & Hulsey (2009, fn. 10).

- b. [<sub>TP</sub> [<sub>DP</sub> John's D [<sub>NP</sub> book \_\_\_]] is an absolute pain [<sub>CP</sub> t<sub>NP</sub> [<sub>CP</sub> to read [<sub>DP</sub> D t<sub>NP</sub>]]]]

The distributional differences of proper nouns and pronouns can be accounted for in a similar fashion:

- (19) a. \*John/he that came to dinner

- b. John/he is easy to please

Let us assume that both proper nouns and pronouns are inherently Ns and they are obligatorily combined with Ds. In relative clause formation, [<sub>N</sub> John/he] merges with CP with a resulting label <Pred, Pred>, just as in (17c) above. Movement of N to D, which is required for proper interpretation of proper nouns and pronouns, is blocked in this structure, again due to some inactivity condition derivative from this feature sharing. In the matrix Spec,T in *tough*-constructions, no comparable constraint is imposed on the raising of N to D.

The unique behavior of the elements in the edge of D in the Spec,T of *tough*-constructions is the highlight of Sportiche's (2006) analysis: in DP, the edge does not exhibit reconstruction effects (as glimpsed above with respect to quantifier *no* and possessors), whereas the interior shows reconstructions. Therefore, we will list the following reconstruction effects as the third immediate consequence of our analysis.

- (20) a. Pictures of his<sub>i</sub> friends are easy to persuade [every photographer]<sub>i</sub> to sell \_\_\_

- b. Pictures of [each other]<sub>i</sub> would be easy to persuade them<sub>i</sub> to sell \_\_\_

(Both examples from Sportiche 2006)

Since *his* and *each other* occur in the interior of NP, they have copies of their own within the original gaps (\_\_\_). Therefore, *his* in (20a) can be understood as a variable bound to *every photographer*; *each other* in (20b) refers to *them*.<sup>10, 11</sup>

A fourth immediate consequence of predicate NP movement is the suppression of weak crossover

10 As an anonymous reviewer correctly observes, addition of quantifiers to the subjects in (20a, b) results in ill-formedness. Thus, Sportiche (2006) reports:

- (i) a. \*Most pictures of his<sub>i</sub> friends are easy to persuade [every photographer]<sub>i</sub> to sell \_\_\_  
 b. \*Most pictures of [each other]<sub>i</sub> would be easy to persuade them<sub>i</sub> to sell \_\_\_

The matrix subject DPs cannot satisfy two conflicting requirements simultaneously. Bound pronoun interpretation and Binding Condition (A), on the one hand, require the subject DPs to reconstruct; the quantifier *most*, on the other, requires the DPs to remain in the matrix clauses because it has no reconstruction site within the gap positions in the embedded clauses.

11 A similar reconstruction effect is observed in restrictive relative clauses. The following example from Hulsey & Sauerland (2006, p. 121) contains a reflexive variable bound to the quantifier *everybody*:

- (i) The picture of himself that everybody sent in \_\_\_ annoyed the teacher

For *himself* to serve as a bound pronoun, reconstruction is needed. Therefore, Donati & Cecchetto's (2011) late merge analysis of PPs like *of himself* is untenable and their claim that the head/antecedent of relative clauses are uniformly heads is weakened.

effects as observed by Lasnik & Stowell (1991):

- (21) a. John<sub>i</sub> should be easy for his<sub>i</sub> wife to love \_\_\_  
 b. John<sub>i</sub> was hard to persuade his<sub>i</sub> boss to vouch for \_\_\_

The element that moves over the pronouns in our analysis is not [<sub>DP</sub> John] but [<sub>NP</sub> John], which is not referential by definition. Binding is a relation holding between referential expressions and, hence, the structures in (21a, b) do not fall under the genuine weak crossover configurations. The same analysis could be applied to the lack of weak crossover effects in restrictive relative constructions as in (22), though the judgement is not uniform among speakers (see Lasnik and Stowell 1991, p. 698).

- (22) the man who his mother loved best (Chomsky 1982, p. 91)

A fifth immediate consequence of predicate NP movement is concerned with the A-movement of an NP that comes from within a predicative complement to *be*, *become*. It is often claimed that such examples do not make well-formed *tough*-constructions. Thus, H&P (2002, p. 1245) state that (23a) is marginal at best.

- (23) a. ?An ideal husband is not easy to be \_\_\_ (H&P 2002)  
 b. \*The best doctor in Boston isn't easy to become \_\_\_ (Longenbaugh 2017)  
 c. \*The strongest woman in the universe is not easy to become \_\_\_  
 d. \*The world's cheapest full professor is difficult to turn into \_\_\_ (c/d from Postal 1990)

However, it does not seem to be right to conclude that these are uniformly ungrammatical, because we have acceptable examples as shown in (24):

- (24) a. What is the hardest type of doctor to be \_\_\_  
 b. A neurosurgeon is the hardest type of doctor to become \_\_\_  
 c. What type of doctor is much easier to become \_\_\_  
 d. The chancellor of that university is (the) most difficult to become \_\_\_

The example in (24c) is very suggestive about the semantic property of the subject expressions in these examples: it denotes the type/kind of a doctor rather than the identity of a particular doctor. This semantic characterization of the subject expression is extended to other examples. Thus, for (24d), let us suppose

that the chancellor of that university is John Smith. Then, what is being talked about in (24d) is not the identity of the chancellor of that university (= John Smith) but the type/kind/character of the social position (= chancellor) occupied by John Smith at that university.

The type/kind that the subject expressions denote in (24) is not the denotation type of <e,t>; rather, it can be viewed as a subcase of individuals (e). Hence, this type/kind reading of the subject expressions is a good solution to accommodate apparently conflicting semantic requirements imposed on the two DPs involved. Since the original gaps are predicative complements of *be/become*, they are <e,t>; the subject DPs, on the other hand, are e by definition.

Insofar as this line of reasoning holds, it lends additional support for the promotion/raising analysis of a predicate NP supplemented by late merger of D.

Returning to the examples in (23), consider source(s) of their ungrammaticality. One is the difficulty to imagine a context appropriate for a type/kind interpretation of the subject DPs. Given *an ideal husband* in (23a) and *the strongest woman in the universe* in (23c), it seems that we are more inclined to seek for the individuals that satisfy the descriptions. Similar considerations seem to apply to *the best doctor in Boston* in (23b) and *the world's cheapest full professor* in (23d). Because of the superlative forms, we tend to seek for the individuals appropriate for the descriptions.

Let me add here that an infinitival relative clause is also possible with a gap in the predicative complement of *be*, as observed by H&P (2002, p. 1067).

(25) A systems analyst wouldn't be such a bad thing to be \_\_\_<sup>12</sup>

The following (more or less idiomatic) examples can be viewed as further instances of infinitival relative clauses with an original gap in the predicative complement of *be*.

- (23) a. a mother to be
- b. a new owner soon to be
- c. a feeble James Dean wannabe

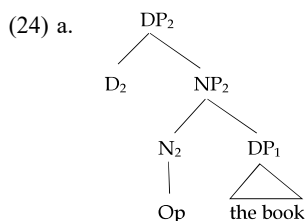
This concludes the motivation for A-movement of a predicate NP into Spec,T and a subsequent late merger of D for the derivation of *tough*-constructions.

Before turning to consequences for the restricted distribution of subject gaps in *tough*-constructions, I would like to make a short, critical comment on Hicks' (2009) "smuggling" analysis of the constructions.

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<sup>12</sup> Although H&P treat this example as an infinitival relative construction, it could be analyzed as an instance of *tough*-constructions insofar as the type/kind reading of *a systems analyst* is available.

He proposes that null operator is a DP consisting of a D head and its N complement, which has a null operator feature and obligatorily selects a DP that serves as the antecedent. In the case of *the book is easy to put \_\_\_ on the table*, the empty object position of *put* is originally occupied by the DP<sub>2</sub> in (24a).



- b. [<sub>CP</sub> [<sub>DP2</sub> D<sub>2</sub> N<sub>2</sub> [<sub>DP1</sub> the book]]] [<sub>TP</sub> to put t<sub>DP2</sub> on the table]]
- c. [<sub>TP</sub> [<sub>DP1</sub> the book] is easy [<sub>CP</sub> [<sub>DP2</sub> D<sub>2</sub> N<sub>2</sub> t<sub>DP1</sub>]] [<sub>TP</sub> to put t<sub>DP2</sub> on the table]]]

This DP<sub>2</sub> undergoes operator movement to Spec,C as illustrated in (24b); at a later stage of the derivation, DP<sub>1</sub> is extracted out of DP<sub>2</sub> and moves into the matrix Spec,T, as shown in (24c). This smuggling analysis has both a control-related problem and a “look-ahead”-type problem. Look at the following example.<sup>13</sup>

- (25) Among them, John is quite difficult for us to persuade to be easy to please.

In order to generate this “double” *tough*-construction, we have, first of all, to prepare two instances of complex null operators in (26ai) and (26aii). The null operator (26ai) is inserted in the complement position of *please* as indicated in (26b). The whole DP<sub>2</sub> undergoes operator movement to adjoin to Spec,C of *to please* and, later, DP<sub>1</sub> moves out of DP<sub>2</sub> to become the subject of *to be easy to please*, as in (26c). The resulting structure is combined with *persuade*, whose direct object position is filled by the second null operator in (26aii), as indicated in (26d). DP<sub>4</sub> in (26d) undergoes operator movement to Spec,C of *to persuade to be easy to please* and, at the next stage of the derivation, DP<sub>3</sub> is extracted out of DP<sub>4</sub> and moves into the matrix Spec,T, as in (26e).

- (26) a. i. [<sub>DP2</sub> D<sub>2</sub> [<sub>NP2</sub> N<sub>2</sub> [<sub>DP1</sub> PRO]]]
- ii. [<sub>DP4</sub> D<sub>4</sub> [<sub>NP4</sub> N<sub>4</sub> [<sub>DP3</sub> John]]]
- b. to please [<sub>DP2</sub> D<sub>2</sub> [<sub>NP2</sub> N<sub>2</sub> [<sub>DP1</sub> PRO]]]
- c. [<sub>DP1</sub> PRO] to be easy [<sub>CP1</sub> [<sub>DP2</sub> D<sub>2</sub> [<sub>NP2</sub> N<sub>2</sub> t<sub>DP1</sub>]]] to please t<sub>DP2</sub> ]

<sup>13</sup> Examples of this sort came to my attention during the discussions exchanged with Kotoe Onodera in 2012.

- d. persuade [<sub>DP4</sub> D<sub>4</sub> [<sub>NP4</sub> N<sub>4</sub> [<sub>DP3</sub> John<sub>i</sub>]]] [[<sub>DP1</sub> PRO] to be easy [<sub>CP1</sub> [<sub>DP2</sub> D<sub>2</sub> [<sub>NP2</sub> N<sub>2</sub> t<sub>DP1</sub>]]] to please t<sub>DP2</sub> ]]
- e. [<sub>DP3</sub> John<sub>i</sub>] is difficult [<sub>CP2</sub> [<sub>DP4</sub> D<sub>4</sub> [<sub>NP4</sub> N<sub>4</sub> t<sub>DP3</sub>]]] to persuade t<sub>DP4</sub> [[<sub>DP1</sub> PRO] to be easy [<sub>CP1</sub> [<sub>DP2</sub> D<sub>2</sub> [<sub>NP2</sub> N<sub>2</sub> t<sub>DP1</sub>]]] to please t<sub>DP2</sub> ]]

In this sentence PRO should be understood as *John*; however, this control is not expected, since the direct object of *persuade* is not *John* but [<sub>DP4</sub> D<sub>4</sub> [<sub>NP4</sub> N<sub>4</sub> [<sub>DP3</sub> John<sub>i</sub>]]]. In addition, a “look-ahead”-type problem will arise, if a single element can undergo *tough*-movement twice, for example. In this case, we have to prepare a null operator that selects another null operator such as: [<sub>DP3</sub> D<sub>3</sub> N<sub>3</sub> [<sub>DP2</sub> D<sub>2</sub> [<sub>NP2</sub> N<sub>2</sub> [<sub>DP1</sub> John]]]]. If a single element can undergo *tough*-movement three times, then we have to prepare a null operator like [<sub>DP4</sub> D<sub>4</sub> N<sub>4</sub> [<sub>DP3</sub> D<sub>3</sub> N<sub>3</sub> [<sub>DP2</sub> D<sub>2</sub> [<sub>NP2</sub> N<sub>2</sub> [<sub>DP1</sub> John]]]]]]. These considerations show that the smuggling analysis is not a solution but a restatement of the problem to be solved.

### 3. Restricted distribution of subject gaps in *tough*-constructions

This section shows that the predicate NP movement analysis proposed here provides a neat account for the restricted distribution of subject gaps in *tough*-constructions. In section 3.1, the present analysis is shown to accommodate the distributional facts of gaps in ECM subject positions discussed in Takahashi (1997). In the discussion, we make a speculation about a possible parameterization of Chomsky’s (2008) generalized inactivity condition. Section 3.2 shows that the availability/unavailability of “local” subject gaps follows essentially from our analysis.

#### 3.1. Gaps in ECM subject positions

Takahashi (1997) discusses two interesting phenomena found in *tough*-constructions. First, when a gap appears in the ECM subject position, the resulting *tough*-constructions are degraded (see e.g. Postal 1974, Browning 1987, Stowell 1987, among many others). Takahashi (1997) takes the degradation as an indication of a Subjacency Condition violation (Subject Condition effects) and pursues a feature movement analysis of null operator movement, according to which the traditional null operator movement is reformulated as a movement of a [null operator]-feature out of the feature bundle that makes up a null operator. The account is very simple and elegant. The degraded status of the *tough*-construction in (27a) below, where [<sub>F<sub>1</sub>,..., \_\_, ..., F<sub>n</sub></sub>] is a null operator and \_\_ is the trace of the [null operator]-feature (= [<sub>F<sub>NO</sub></sub>]) adjoined to the infinitival CP, is attributed to the general prohibition of extraction from within nominal phrases in subject position (namely, Subject Condition effects) and is argued to be comparable to the degradation of regular *wh*-extraction in (27b).

- (27) a. ?\*John is easy [F<sub>NO</sub>] to believe [F<sub>1</sub>,..., \_\_, ..., F<sub>n</sub>] to have kissed Mary  
 b. ?\*Who did you believe [a picture of \_\_] to be on sale  
 (Both examples from Takahashi 1997)

Our predicate NP movement analysis accounts for the same range of phenomena, since an NP is extracted from within a larger DP. Thus, (27a) has the structure in (28), where extraction of [<sub>NP</sub> John] from within DP<sub>1</sub> (which is a subject) yields a Subject Condition effect.

- (28) [<sub>DP2</sub> D<sub>2</sub> [<sub>NP</sub> John]] is easy [<sub>α</sub> t<sub>NP</sub> [<sub>CP</sub> to believe [<sub>DP1</sub> D<sub>1</sub> t<sub>NP</sub>] to have kissed Mary]]

This account carries over to the degraded status of the gaps in ECM subject positions in infinitival relative clauses as in (29a, b), cited from Browning (1987, p. 235).

- (29) a. \*He is not [a man (for us) to expect \_\_ to succeed]  
 b. ??They found [a man to believe \_\_ to be the Messiah]

I will take this successful account of the degraded status of these examples as a welcome consequence of the predicate NP movement analysis proposed here. However, the grammatical status of extraction from within ECM subjects is not invariant among researchers. Thus, Chomsky (2008) observes an obviation of Subject Condition effects in the *wh*-extraction in (30).

- (30) Of which car did they believe [the driver \_\_] to have caused a scandal

Since the analysis that Chomsky offers to extractability of elements out of DPs bears a close connection to the second phenomenon Takahashi (1997) discusses, to which we turn later, let us review his analysis and consider a possible way out from the (presumably) dialectal variation we now have in front of us: a Subject Condition effect in (27b) and its obviation in (30).

Chomsky (2008) claims that the paradigm in (31a-d) below follows from his phase theory on the basis of the two restrictions in (32) and (33).

- (31) a. \*[Of which car] did [the driver] cause a scandal  
 b. [Of which car] was [the driver] awarded a prize  
 c. [Of which car] is [the driver] likely to cause a scandal  
 d. [Of which car] did they believe [the driver] to have caused a scandal (= 30)

(32) Anti-deep-search<sup>14</sup> (p. 154)

Search that goes too deeply into a phase already passed is disfavored.

(33) Generalized inactivity condition (p. 154)

Extraction from matrix Spec,T is barred.

The contrast between (31a) and (31b) reminds us of Stowell's (1987) ECP-based account, on which Takahashi's analysis is constructed, but Chomsky's phase-based analysis makes a different prediction about (31c, d). Anti-deep-search (31) disfavors extraction from within a phase edge. The structures for (31a-d) are given in (34a-d), respectively, where both  $t_\alpha$  and  $t_\beta$  mark the original or intermediate positions that *the driver* drops at on the way to its ultimate destination.

- (34) a. \* $[_{CP} \text{ [of which car] did } [_{TP} \text{ } [_\gamma \text{ the driver}] T \text{ } [_{vP}^* \text{ } t_\alpha \text{ cause a scandal}]]]]$   
 b.  $[_{CP} \text{ [of which car] was } [_{TP} \text{ } [_\gamma \text{ the driver}] T \text{ } [_{vP} \text{ awarded } t_\beta \text{ a prize}]]]]$   
 c.  $[_{CP} \text{ [of which car] is } [_{TP2} \text{ } [_\gamma \text{ the driver}] T_2 \text{ } [_{vP} \text{ likely } [_{TP1} \text{ } t_\beta \text{ to } [_{vP}^* \text{ } t_\alpha \text{ cause a scandal}]]]]]]]$   
 d.  $[_{CP} \text{ [of which car] did } [_{TP2} \text{ they } T_2 \text{ } [_{vP2}^* \text{ } t_\delta \text{ believe } [_{TP1} \text{ } [_\gamma \text{ the driver}] \text{ to have } [_{vP1}^* \text{ } t_\alpha \text{ caused a scandal}]]]]]]]$

In these examples, Anti-deep-search disfavors extraction of *of which car* from the containing DP at the stage of the derivation where the latter occupies the positions marked by  $t_\alpha$ , since  $t_\alpha$  is an edge of the relevant phase head ( $v^*$ ). In (34a),  $\gamma$  is not the right place from which *of which car* can be successfully extracted, because it violates the inactivity condition (33). As a result, (34a) is an inappropriate expression. In (34b), on the other hand, *wh*-extraction out of the containing DP is legitimately carried out at the stage of the derivation where the latter occupies  $t_\beta$  because  $t_\beta$  and its (immediate) destination (Spec,C) reside in the same phase domain of C, giving rise to no violation of Anti-deep-search. In a similar fashion, *wh*-extraction is permitted in (34c) from within the containing DP that occupies  $t_\beta$ . In (34d), *of which car* can be extracted from  $\gamma$ , without inducing an Anti-deep-search violation, because  $\gamma$  and its immediate destination (=  $t_\delta$ ) are in the same phase domain of the matrix  $v^*$ . This *wh*-extraction from  $\gamma$  in (34d) does not violate the inactivity condition (33) because  $\gamma$  is an embedded Spec,T.

Chomsky's analysis in terms of Anti-deep-search and the generalized inactivity condition has the following generalization: Extraction from within a subject DP is possible if the DP occupies a *non-matrix* Spec,T. This generalization, however, is easily falsified by the lack of an improvement of acceptability

14 This falls under the general conditions of economy. When a phase head  $\alpha$  searches for a goal, it can access a term that occupies the edge of another phase head  $\beta$  insofar as the Phase Impenetrability Condition is respected. Exactly in this environment,  $\alpha$  can in principle access a term *within* the edge of  $\beta$ , which is a typical instance of extraction from within subject we are concerned here. However, this "deep" search is more costly than a regular search targeting the edge of  $\beta$  itself.



expected of the embedded version (35b) as compared to the non-embedded one in (35a), both from Huang (1982).

- (35) a. \*Who did pictures of please you (p. 486)  
 b. \*Who do you think pictures of would please John (p. 497)

Given this inadequacy, it seems to be plausible to drop the reference to “matrix clauses” in the definition of the inactivity condition (33) and seek for a more appropriate notion. An idea that might come to mind is to replace “matrix Spec,T” with “finite Spec,T,” with the consequence that both (35b) and (35a)/(34a) are excluded but not (34d)/(34c). However, I will adopt a different reformulation: replacement of “matrix Spec,T” with “the Specifier of T selected by C”:

(36) Generalized inactivity condition (revised)

Extraction from the Specifier of T selected by C is barred.

This revised version singles out the subject of the infinitival complement to ECM/raising predicates as a legitimate extraction site, with the consequence that (34c)/(34d) are good whereas (34a)/(35a)/(35b) are not.

Let us now return to the (presumably) dialectal variation concerning the Subject Condition effect in (27b) and its absence in (30). On the basis of the shared infinitival ECM complement to *believe* in these examples, let me speculate that the revised inactivity condition (36) has a parameter in the choice of the restriction [selected by C]. For those speakers who choose the value [selected by C], the subject of the infinitival complement to ECM verbs (and raising predicates) is a legitimate extraction site, with an absence of Subject Condition effects as in (30). On the other hand, those who do not choose the value treat every instance of extraction from Spec,T as degraded, as in (27b).

With this in mind, we will proceed to the second phenomenon discussed by Takahashi (1997). Referring to Stowell (1987) and Browning (1987), he reports that there are speakers who judge (37a, b) to be better than (37c) (= 27a).

- (37) a. John is easy to believe \_\_ was arrested by the police  
 b. John is easy to believe \_\_ to have been arrested by the police  
 c. ?\*John is easy to believe \_\_ to have kissed Mary (= 27a)

The contrast now follows directly from the combination of Anti-deep-search (32) and the revised inactivity

condition (36), irrespectively of the parameter value to be chosen for the latter condition. The derivations for (37a) and (37b) are represented schematically in (38a, b), respectively, where the position marked  $t_\delta$  must be filled by a predicate NP. Therefore, the predicate NP must be extracted at  $t_\alpha$  or  $t_\beta$  or  $t_\gamma$ .

- (38) a.  $[_{DP} D [_{NP} John]]$  is easy  $[_{CP2} t_\delta [ C_2 PRO$  to  $[_{VP^*} t_\gamma [_{VP^*} believe [_{CP1} t_\gamma C_1 [_{TP1} t_\alpha$  was arrested  $t_\beta$  by ...]]]]]]
- b.  $[_{DP} D [_{NP} John]]$  is easy  $[_{CP2} t_\delta [ C_2 PRO$  to  $[_{VP^*} t_\gamma [_{VP^*} believe [_{TP} t_\alpha$  to have been arrested  $t_\beta$  by ...]]]]]]

For those who do not choose the parameter value [selected by C], the inactivity condition prohibits NP extraction at  $t_\alpha$ ; Anti-deep-search disfavors extraction from within  $t_\gamma$ . Neither the inactivity condition nor Anti-deep-search, however, prohibits extraction from within  $t_\beta$ . For those who do choose the parameter value [selected by C], not only  $t_\beta$  but also  $t_\alpha$  in (38b) (but not in (38a)) is a legitimate extraction site for a predicate NP. Therefore, both (38a) and (38b) are predicted to be acceptable, irrespectively of the parameter value for the inactivity condition.<sup>15</sup>

### 3.2. Gaps in “local” subject positions

It seems to be a general consensus that the subject of *tough*-constructions does not have its derivational root in the subject of the infinitival clauses selected by the relevant *tough*-predicates. Various ungrammatical examples are reported as in (39a-d).

- (39) a. \*John is hard \_\_ to laugh (Longenbaugh 2017, fn. 17)  
 b. \*Bob is hard \_\_ to come (Quirk et al. 1985, p. 1229)  
 c. \*John is difficult \_\_ to solve these problems (Browning 1987, p. 66)  
 d. \*John is easy \_\_ to like Mary (Chomsky 1981, p. 314)

This prohibition of “local” subject gaps in *tough*-constructions is not an inviolable one, however. Grammatical examples are also reported:

- (40) a. The room is easy \_\_ to be heated (Nakamura 1976, p. 231)  
 b. Short love poems are easy \_\_ to be read and understood (Maruta 2013)

This subsection shows that the contrast we now have essentially follows from the analysis proposed in this

<sup>15</sup> A question, however, remains about the restricted acceptability of these examples as noted by Takahashi (1997), which will be left untouched here.

paper, along with general semantic properties imposed on the constructions. In addition, a small breakdown in expected parallelism between *tough*-constructions and infinitival relative clauses occurs, which is to be dealt with by appealing to a matching version of infinitival relative clause formation.

Let us start with the ungrammatical example with an unergative verb in (39a), which has a schematic structure in (41).

(41) \* $[_{DP} D [_{NP} \text{John}]]$  is hard  $[_{CP} [_{NP} \text{John}]]$   $[_{CP} C [_{TP} t_a \text{ to } [_{vP} t_y \text{ laugh}]]]$

Since  $t_y$  is an edge of  $v^*$ , extraction of the predicate NP (=  $[_{NP} \text{John}]$ ) from within it is disfavored by Anti-deep-search (32);  $t_a$ , on the other hand, is in the Specifier of T selected by C and, hence, extraction from within it is prohibited by the inactivity condition (36) irrespectively of the parameter value chosen. Hence, (41) is illegitimate.

An essentially similar analysis applies to the examples with transitive verbs in (39c) and (39d), whose schematic structures are given in (42a, b), respectively.

(42) a. \* $[_{DP} D [_{NP} \text{John}]]$  is difficult  $[_{CP} [_{NP} \text{John}]]$   $[_{CP} C [_{TP} t_a \text{ to } [_{vP} t_y \text{ solve } \dots]]]$   
 b. \* $[_{DP} D [_{NP} \text{John}]]$  is easy  $[_{CP} [_{NP} \text{John}]]$   $[_{CP} C [_{TP} t_a \text{ to } [_{vP} t_y \text{ like } \dots]]]$

Extraction from within  $t_y$  is disfavored by Anti-deep-search; extraction from  $t_a$  is barred by the inactivity condition.

It is predicted, therefore, that when the relevant verb is passivized, a legitimate extraction from an (apparent) subject position is possible. This is embodied by the examples in (40a, b). (40a) has the following structure.

(43)  $[_{DP} \text{the}_D [_{NP} \text{room}]]$  is easy  $[_{CP} [_{NP} \text{room}]]$   $[_{CP} C [_{TP} t_a \text{ to be } [_{vP} \text{heated } t_b ]]]]$

Here, extraction of  $[_{NP} \text{room}]$  from within  $t_b$  is neither disfavored by Anti-deep-search nor blocked by the inactivity condition. Extraction from within  $t_a$  is barred by the latter condition, but we have a legitimate extraction site at  $t_b$ . Therefore, grammatical *tough*-constructions with “local” subject gaps can be constructed, insofar as the apparent subject originates from an object position. We will return to the reduced productivity of this type of examples later.

It is also expected that an unaccusative verb provides another environment for a legitimate extraction of a predicate NP. This prediction, however, is not borne out, as the ungrammatical status of the example in (37b) shows. This sentence has the following structure.

(44) \*<sub>[DP D [NP Bob]]</sub> is hard <sub>[CP [NP Bob] [CP C [TP t<sub>α</sub> to [VP [VP come t<sub>β</sub> ]]]]]</sub>

Here, *Bob* originates within t<sub>β</sub>, extraction from which is neither disfavored by Anti-deep-search nor barred by the inactivity condition. Since this reasoning seems to be sound, the inability of the sentence corresponding to (44) should come from some semantic factor.

As stated in Lasnik & Fiengo (1974, pp. 553f), “controllable actions” are the relevant semantic notion. Just as *try* and *convince* require their infinitival complements to denote actions that are controllable by the subject and object, respectively, as shown by the incompatibility of stative events (= uncontrollable actions) denoted by *to resemble Harry* in (45a, b), the infinitival complement in *tough*-constructions must also denote an action that can be controlled by the experiencer of the *tough*-predicates, as shown by the unavailability of *to resemble* in (45a), where the relevant experience is implicit.

- (45) a. \*John tried to resemble Harry  
 b. \*Mary convinced John to resemble Harry  
 c. \*Harry is easy to resemble (All examples from Lasnik & Fiengo 1974)

Returning to the ungrammatical sentence in (37b) *\*Bob is hard to come*, the event denoted by *Bob to come* is usually quite difficult to interpret as an event to be controlled by a person other than Bob. This accounts for the illegitimacy of (37b).

In relation to the controllability of actions denoted by infinitival complement clauses of *try* and *convince*, Lasnik & Fiengo also note that passive complement clauses are less compatible with these verbs. This is because passive clauses generally denote states, which are usually uncontrollable. Thus, (46a, b) are ungrammatical.

- (46) a. \*John tried to be arrested by the police.  
 b. \*Mary convinced John to be arrested by the police.

However, similar examples are not always judged to be ungrammatical. Insofar as the reading for a controllable action is contextually established, passive complement clauses can appear, as in (47).

(47) The patient tried to be examined by the doctor.

It seems to be natural to extend this consideration to *tough*-constructions. Thus, in order for a passive

infinitival complement to appear in *tough*-constructions, establishment of a context that enables the “controllable action” reading of the event denoted by the passive infinitival complement is necessary. This will account for the reduced productivity of sentences like (40a, b).

As a last topic, let us turn our attention to infinitival relative constructions with gaps in “local” subject positions, as in (48a-c) cited from Quirk et al. (1985, pp. 1267ff). The verb in (48a) is ambiguous between unergative and transitive.

- (48) a. He is the last man to choose (ambiguous)  
 b. He is the best man to be chosen  
 c. They were the last guest to arrive  
 d. the man to fix the sink

Let us suppose that (48d) has the structure below.

- (49) [ [<sub>NP</sub> man] [<sub>CP</sub> C [<sub>TP</sub> t<sub>α</sub> to [<sub>VP\*</sub> t<sub>γ</sub> fix the sink]]]]

Extraction of [<sub>NP</sub> man] from within t<sub>γ</sub> is disfavored by Anti-deep-search; extraction from t<sub>α</sub> is barred by the inactivity condition. Therefore, we have a problem in the case of subject gaps of transitive verbs. A similar problem arises with the subject gaps of unergatives as in (48a). The rest, namely passive (48b) and unaccusative (48c), could be predicted correctly if the object positions of the relevant verbs are chosen as the extraction sites for predicate NPs.

The problems presented by transitives and unergatives as in (48d) and (48a) are not readily accommodated within the present analysis. As a speculation, let me suggest that these examples are formed by what is called “matching operation” for relative clause formation, where no promotion/raising of a predicate NP is involved:

- (50) [ [<sub>NP</sub> man] [<sub>CP</sub> C [<sub>TP</sub> PRO to [<sub>VP\*</sub> t<sub>PRO</sub> fix the sink]]]]

To summarize, this section shows that the restricted distribution of gaps in *tough*-constructions and infinitival relative clauses are basically derived systematically from our proposal of predicate NP movement along with a modified (parameterized) version of Chomsky’s (2008) inactivity condition, Anti-deep-search, and a semantic requirement of controllability in the case of *tough*-constructions.

#### 4. Conclusion

This paper has proposed that in both *tough*-constructions and infinitival relative construction, a predicate NP is extracted from the containing DP at an arbitrary stage of its derivation, insofar as this extraction is not disfavored/blocked by Anti-deep-search and the revised inactivity condition originally proposed by Chomsky (2008).

The infinitival complement clauses in *tough*-constructions and infinitival relative constructions are analyzed as sharing the same numeration, with the difference lying in the optionality of the <Pred, Pred> feature-sharing. If the features are shared, the resulting structure is merged with a D, projecting a DP. If the features remain unshared, LA forces further movement of the NP, which (with a subsequent late merger of D) leads ultimately to the formation of *tough*-constructions.

The contrast between the unavailability of scope reconstruction (due to the edge property of D) and the availability of bound pronoun interpretation and anaphoric reconstruction effects (due to the interior of NP) is shown to follow just as in Sportiche's original analysis. In addition, the lack of weak crossover effects and the availability of a kind/type reading of the subject stemming from the predicate complement to *be* are shown to follow from this proposal.

The degraded status of gaps in the subject position of the infinitival clausal complements to ECM verbs and the availability of "local" gaps in the case of passive clauses and their unavailability in transitive and unergative clauses are also shown to derive from this proposal.

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## Predicate NP Movement in *Tough*-Constructions

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### Abstract

A new analysis of the derivation of *tough*-constructions in English is proposed in terms of what I will call “predicate NP movement” and an additional A-movement, supplemented by the late merger of D. The idea that the NP part of the subject DP of *tough*-constructions has its origin in the “gap” position in the infinitival complement clauses of *tough*-predicates is not a new one: Sportiche (2006) and Messick (2012). The proposal to be pursued here is different from Sportiche’s in that the extraction of an NP out of a DP occurs basically in the original gap position. This enables us to give a parallel and systematic analysis to the formation of infinitival relative constructions and *tough*-constructions. It is also shown that the restricted distribution of gaps in subject positions in these constructions observed and analyzed by Postal (1974), Nakamura (1976), Stowell (1987), Takahashi (1997), Maruta (2013), among many others, are systematically accounted for.

