languages

MDPI

Article

Syntax of the *Tough*-Construction: A Derivation by Modification

Xiaoshi Hu * and Ruiyang Chen

Department of Foreign Languages and Literatures, Tsinghua University, Beijing 100084, China; cry23@mails.tsinghua.edu.cn
* Correspondence: xvictorhu@mail.tsinghua.edu.cn

Abstract

This paper proposes a new analysis for the syntactic structure of English *tough*-construction (henceforth TC). The main idea is three-fold. First, the *tough*-construction involves a base-generated matrix subject and a moved null operator. In this aspect, our analysis is in line with the base-generation approach to the *tough*-constructions as proposed in the literature. Second, contrary to what is proposed in most of the previous analyses, we argue that the landing site of the moved operator should be the edge of the *tough*-predicate in the matrix clause rather than the edge of the embedded infinitival clause. Third, the constituent which involves the null-operator movement is a modifying adjunct to an empty nominal rather than the main predicate. This revised analysis not only rescues the original derivation of the TC from the violation of anti-c-command condition and the Binding Condition C, but also fits in the distributional pattern of other null-operator constructions such as relative-clause construction and parasitic-gap construction. Through the discussion on the syntax of the TC, we aspire to deepen our understanding of different types of null-operator constructions and null-operator licensing in general.

Keywords: *tough*-construction; null operator; binding condition C; anti-c-command condition

1. Introduction

The so-called *tough*-construction (TC), as exemplified in (1), has garnered extensive attention within the formal linguistic framework, particularly due to its intriguing syntactic and semantic properties. This construction has been a focal point of linguistic inquiry for several decades, with researchers delving into its intricate syntactic architecture.

(1) John$_i$ is tough to please e$_{i/*j}$.

As it can be observed from the example, a defining characteristic of the TC is the presence of an empty object (marked as 'e'), which obligatorily bears the same interpretation as the matrix subject. A central challenge in analyzing the TC lies in establishing the syntactic dependency between this empty object and the matrix subject. Various approaches have been proposed in the literature, such as movement analysis (see Rosenbaum, 1965; Postal & Ross, 1971; Berman, 1973; Brody, 1993; Hicks, 2009; Hartman, 2011; Longenbaugh, 2017; among others), base-generation analysis (Chomsky, 1977; Rezac, 2006; Fleisher, 2013; Keine & Poole, 2017; Gluckman, 2018, 2021, 2022; Hu, 2022; among others), object-deletion analysis (see Akmajian, 1972; Lasnik & Fiengo, 1974; etc.), the infinitival adjunct approach proposed by Williams (1983), Wilder (1991), and Hornstein (2001), and the reanalysis approach (see Nanni, 1980; Chomsky, 1981; etc.), as in (2).

(2) a. Movement approach:
John$_i$ is tough [$_{CP}$ ~~John~~$_i$ [$_{TP}$ PRO to please ~~John~~$_i$]].

Check for updates

Academic Editor: Jaklin Kornfilt

Received: 23 June 2026
Revised: 18 November 2026
Accepted: 19 November 2026
Published: 27 November 2026

Copyright: © 2026 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license.

b. Base-generation approach:
John$_i$ is tough [$_{CP}$ OP$_i$ [$_{TP}$ PRO to please ~~OP~~$_i$]].
c. Object deletion approach:
John$_i$ is tough [$_{CP}$ [$_{TP}$ PRO to please ~~John~~$_i$]].
d. Infinitival adjunct approach:
[$_{TP}$ [$_{TP}$ John$_i$ is tough] [$_{CP}$ OP$_i$ C [$_{TP}$ PRO to please ~~OP~~$_i$]]].
e. Reanalysis approach:
John is [$_A$ tough-to-please].

In this paper, we propose a modificational structure for the TC, which is essentially a revised version of the base-generation analysis. Our analysis not only avoids the problems of improper movement, object deletion, and infinitival adjunct analyses and the limitation of reanalysis, but also overcomes the technical issues in terms of Binding Condition C violation as inherent in previous base-generation approaches.

The present article is organized as follows. Generally, Section 2 argues against the movement, object-deletion, infinitival-adjunct, and reanalysis approaches. In turn, Section 3 clarifies the definition of Binding Condition C and generalizes the distributive pattern of the null operator in different constructions (such as relative clause and parasitic-gap construction), based on which we point out the theoretical problems of the canonical base-generation analysis. Afterwards, Section 4 presents our proposal for the syntax of the TC: the null operator is moved to a position higher than the *tough*-predicate, and the predicative constituent involving null-operator movement functions as a modifier to a null NP rather than the predicate of the matrix subject. This proposed structure can circumvent the problems of other approaches to the TC. It will also be shown in Section 5 that our proposed structure can maintain the assumption of a uniform lexical entry for *tough*-predicate and provide a fine explanation for the intervention effect discussed by Hartman (2009, 2011). The implication of our analysis on the properties of null-operator movement in general will be discussed in Section 6. Finally, Section 7 concludes this paper.

2. Previous Studies on the Tough-Construction

This section critically evaluates the different analytical frameworks proposed for characterizing the structural properties of the TC. It will be revealed that the base-generation approach provides a more coherent and empirically grounded explanation for the TC compared with the four alternative approaches listed in (2), among which the movement analysis is the most competitive framework. Therefore, we will focus on the arguments supporting the movement analysis, with object deletion and infinitival adjunct approaches briefly reviewed.

The object deletion approach posits that the empty object in the TC is formed by deletion through the outdated rule of Equi (see Grinder, 1970; Ladusaw, 1977; among others). However, this analysis is easily refuted by the evidence in terms of island effect noted by Chomsky (1977), and the overall framework permitting the deletion by Equi is no longer adopted.

As for the infinitival adjunct analysis, it hinges on the assumption that the *tough*-predicate only thematically selects the subject, while the infinitival clause serves as an adjunct. However, typical adjuncts such as the purpose clause *to eat* in (3a) can be freely omitted without affecting the entailment between the remnant sentence and the original sentence, while the entailment relation cannot be established between the TC and the construction without the infinitival clause, as in (3b).

https://doi.org/10.3390/languages11120248

(3) a. Tartalo bought the pig [to eat e] ⊂ Tartalo bought the pig.
b. The stone is tough to lift. ⊄ The stone is tough.
(Rezac, 2006, p. 291)

Furthermore, a typical TC can have a semantically equivalent expletive construction, as in (4a); while other constructions as in (4b) which are seemingly similar to the TC do not. This contrast indicates that *tough*-predicates do not share a similar thematic property with the *pretty*-predicates, which indeed thematically select the subject only, and this contradicts the basic assumption of the infinitival adjunct analysis.

(4) a. The stone is tough [to lift e]./It is tough to lift the stone.
b. The flower is pretty to look at./*It is pretty to look at the flower.

The reanalysis approach argues that a string consisting of a *tough*-predicate followed by a single infinitive is structurally ambiguous: in addition to the syntactic derivation, a sequence like *tough to please* can be derived wholly in the lexicon as a complex adjective, formed by a word-formation rule. The lexical derivation is indeed empirically motivated. As in (5), such adjective-infinitive strings may occur prenominally, a position that does not tolerate APs with post-adjectival complements (e.g., *a proud-of-his-son father).

(5) a. an easy-to-take laxative
b. rare and hard-to-find manuscripts
c. an easy-to-sew pattern
d. a tough-to-please boss
(Nanni, 1980, p. 573)

We agree with Nanni (1980) that the lexical derivation is genuinely available for the simple form of the TC. According to the Lexical Integrity Hypothesis (Di Sciullo & Williams, 1987), however, lexically formed words are opaque to syntactic operations, and thus the word-formation rule combines no more than a single adjective and a single infinitive, excluding *for*-phrases or other materials in-between. It follows that the "complex" forms of the TC—for example, those involving an intervening *for*-phrase—can never arise from a lexical derivation and can only be derived in the syntax. Not surprisingly, these complex TCs in (6) fail to occur as prenominal adjectives, in sharp contrast with the simple adjective-infinitive sequences.

(6) a.*an easy-to-quickly-clean room
b. *an easy-to-expect-to-finish problem
c. *an easy-for-Bill-to-finish problem
(Adapted from Nanni, 1980, p. 575)

Since the theoretical issues addressed in this article concern the syntactic derivation of the TC, we will consistently exemplify the construction under analysis with its "complex" forms, where only the syntactic derivation is available. The simple form of the TC, by contrast, is taken to be genuinely ambiguous between the lexical and the syntactic derivation. We will return to this point in Section 4.2.

2.1. Against the Movement Analysis on Empirical Ground

The movement approach posits that the matrix subject moves from its embedded object position. Were it the case that the matrix subject indeed undergoes movement, a reconstruction effect on the matrix subject in the TC would be anticipated (see Postal & Ross, 1971; Hicks, 2009; Longenbaugh, 2017; among others), and evidence related to the reconstruction effect includes anaphoric binding and interpretation of idiom chunks.

https://doi.org/10.3390/languages11120248

2.1.1. Reconstruction in Binding Reexamined

Foremost, the reconstruction effect appears to be found in the anaphoric binding relation, as observed by Postal and Ross (1971) and Hicks (2009). Their argument hinges on the necessity of reconstruction to satisfy Binding Condition A in (7a), as the anaphor *herself* would otherwise lack an antecedent. Similarly, Hicks (2009) posits that the matrix subject *pictures of himself* in (7b) must reconstruct to a position below its binder, the quantifier *every photographer*, to fulfill the quantificational binding requirement.

(7) a. Getting herself$_i$ arrested on purpose is hard for me to imagine Betsy$_i$ being willing to consider ~~getting herself$_i$ arrested on purpose~~.
(Postal & Ross, 1971, p. 545)
b. Pictures of himselfi are hard for every photographeri to ignore ~~pictures of himself$_i$~~.
(Hicks, 2009, p. 552)

However, we argue that the interpretation of these examples is misleading. Specifically, in order to satisfy the argument structure of *get*, the subject of the subject clause in (7a) is actually filled by a PRO, as illustrated in (8). The reflexive is bound by PRO, while the latter is controlled by *Betsy* without appealing to a c-command relation. This perspective challenges the claim that *tough*-movement is necessary, as the presence of PRO can account for the otherwise unexplained antecedent requirement.[1]

(8) [PRO$_i$ getting herself$_i$ arrested on purpose] is hard for me to imagine Betsy$_i$ being willing to consider.

Now let us turn to (7b). The reconstruction effect observed in this example appears to support the movement analysis of the TC, particularly since the matrix subject does not contain a PRO. However, a closer examination reveals that the reflexive element within such a DP subject, as identified by Pesetsky (2012) as "picture-noun reflexive", functions as a logophor in the sense described by Reinhart and Reuland (1993). Reinhart and Reuland (1993) have highlighted three key properties of logophors: First-Person Logophors can freely occur as picture-noun reflexives without requiring an explicit antecedent, as demonstrated in (9a); Third-Person Logophors can function as perspective logophors, operating independently of a local antecedent, as shown in (9b); and Logophors in nominal structures even allow co-reference with elements that do not c-command them, as illustrated in (9c). Therefore, it is fair to say that the reflexive in (7b) is in fact a logophor, whose co-indexation with the embedded subject *every photographer* does not have to abide by the classical binding conditions. The logophoric analysis provides an alternative explanation for the reconstruction effect in (7b), suggesting that the reflexive's behavior can be accounted for without invoking movement.[2]

(9) a. A picture of myself would be nice on that wall.
b. Luciei thought that a picture of herselfi would be nice on that wall.
c. Heri pleasant smile gives most pictures of herselfi an air of confidence.
(Reinhart & Reuland, 1993, p. 682)

The movement approach also fails to account for the lack of quantificational scope reconstruction in the TC. This is evident when comparing the TC with expletive and raising constructions. In expletive constructions such as (10a), quantificational scope interaction is possible. Similarly, the typical raising construction allows quantificational scope reconstruction of the raised subject, as in (10b, c).

(10) a. It would be difficult for Jim to talk to few girls. (few > difficult; difficult > few)
(Postal, 1974, p. 224)
b. Few girls are likely to be sick. (few > likely; likely > few)
(Epstein, 1989, p. 648)

c. Some child seems to be intelligent. (some > seem; seem > some)
(Epstein, 1989, p. 648)

Were it the case that the matrix subject moves from the embedded clause in the TC as predicted by the movement approach, then quantificational scope reconstruction should also be observed in the TC as in raising or expletive constructions. However, empirical fact shows that quantificational scope interaction is not allowed in the TC, as noted in the literature (cf. Postal, 1974; Fleisher, 2013; Poole et al., 2024; among others). Specifically, different from the example in (10a) which can be ambiguously interpreted as "Few girls are such that Jim would have difficulty talking to them" or "Jim would have difficulty in only talking to few girls", the TC example in (11) only bears the former reading. The observed lack of such reconstruction suggests that the movement approach is insufficient to explain the behavior of quantifiers in the TC.

(11) Few girls would be difficult for Jim to talk to. (few > difficult; *difficult > few)
(Postal, 1974, p. 224)

2.1.2. Interpretation of Idiom Chunks Reexamined

Another piece of evidence supporting the movement analysis of the TC pertains to the interpretation of idiom chunks. As demonstrated by Hicks (2009), the behavior of idiom chunks in the TC mirrors what is observed in passive constructions, as illustrated in (12) and (13). Since passivization in English is achieved through syntactic movement, Hicks (2009) posits that the similar behavior of idiom chunks in both the TC and passive construction suggests that the TC is derived in the same manner as the passive construction.

(12) Idiom chunks in the passive construction
a. **The bucket* was *kicked* (by them).
b. **My hat* will be *eaten* (by me).
c. ?*The hatchet* was *buried* (by us).
d. ?*Headway* was *made* (by us).
(Hicks, 2009, p. 23)

(13) Idiom chunks in the *tough*-construction
a. **The bucket* was easy (for them) to *kick*.
b. **My hat* will be easy (for me) to *eat*.
c. ?*The hatchet* was difficult (for us) to *bury*.
d. ?*Headway* was difficult (for us) to *make*.
(Hicks, 2009, p. 23)

However, we argue that idiom chunks cannot be considered as a compelling argument for the movement analysis. Crucially, the tolerance to idiom chunks in the TC is not uniform, as demonstrated by the above examples. This variation arises because different idioms exhibit distinct behaviors concerning the adhesion of their internal elements. For some VO idioms, the idiomatic meaning necessitates that the verb and object remain closely bound, while for others, the idiomatic reading can be achieved through the independent idiomatic interpretation of the verb or the object. For instance, as discussed in Nunberg et al. (1994), the idiomatic meaning of *make headway* predominantly resides in the nominal *headway*, with *make* being almost dispensable. Consequently, regardless of whether the TC involves syntactic movement akin to passivization, *headway* can independently function as the TC subject. In contrast, the verb and object in *kick the bucket* are so intricately intertwined that any separation would disrupt the idiomatic meaning. This variability in the acceptability of idiom chunks within the TC suggests that their behavior cannot be uniformly attributed to syntactic movement. The contrast between *make headway* and *kick the bucket* can be adequately explained without invoking the movement hypothesis. If VO idioms like *make headway*

are compositional, the separation of the verb and nominal components, whether achieved through syntactic movement or not, is permissible. Conversely, *kick* and *the bucket* must remain conjoined to preserve the idiomatic meaning. In sum, the presence of idiom chunks, when examined independently, provides no definitive insight into the syntactic derivational strategy—whether through movement or base-generation—of the TC.

Furthermore, according to Hicks (2009), the behavior of idiom chunks in the TC should mirror that in the raising construction, as both the TC and the raising construction are derived through syntactic movement. However, examples (14) and (15) noted by Chomsky (1981) contradict this prediction. Specifically, while idiom readings are preserved in the true raising constructions in (14), they are excluded in the TC as in (15). This discrepancy challenges the assumption that the behavior of idiom chunks is identical across both constructions.

(14) Idiom chunks in the raising construction
  a. *Good care*$_i$ seems t_i to have been *taken* ~~*good care*~~$_i$ *of the orphans*.
  b. *Too much*$_i$ seems t_i to have been *made* ~~*too much*~~$_i$ *of that suggestion*.
  (Chomsky, 1981, p. 309)

(15) Idiom chunks in the *tough*-construction
  a. **Good care*$_i$ is hard to *take* ~~*good care*~~$_i$ *of the orphans*.
  b. **Too much*$_i$ is hard to *make* ~~*too much*~~$_i$ *of that suggestion*.
  (Chomsky, 1981, p. 309)

What is more, in examining the behavior of idiom chunks, the TC exhibits a closer resemblance to relative clauses than to raising constructions. Building on the head-external analysis of relative clauses as outlined by Quine (1960), Chomsky (1977), Bianchi (1999), and Hulsey and Sauerland (2006), the following examples further support the claim that the matrix subject in the TC is better characterized as being base-generated, akin to the relativized nominal in relative clauses. This alignment underscores the distinct syntactic derivation of the TC, as opposed to constructions involving syntactic movement.

(16) Idiom chunks in the relative clause
  a. **The tabs* that we *kept* paid off.
  b. **The advantage* that we *took* of Mary was frowned upon.
  c. **The heed* that we *paid to* that warning was slight.
  d. **The attention* that we *paid* to the lecture was careful.
  (Lasnik & Fiengo, 1974, p. 541)

(17) Idiom chunks in the *tough*-construction
  a. **Tabs* were easy to *keep* on Mary.
  b. **Advantage* was easy to *take* of Bill.
  c. **Heed* is important to *pay to* such warnings.
  d. **Attention* is difficult to *pay* to boring lectures.
  (Lasnik & Fiengo, 1974, p. 541)

2.2. Against the Movement Analysis from the Theoretical Perspective

The movement approach is not only empirically ungrounded, but also theoretically problematic. Putting aside the outdated analysis proposed by Rosenbaum (1965), recent movement analyses such as Brody (1993) and Longenbaugh (2017) are not essentially different, for they all assume that the matrix subject of the TC is A'-moved to the edge of the embedded clause and then somehow further A-moved to the matrix SpecTP position, as in (18). However, this derivation is typically banned as an improper movement configuration for it creates an A-A'-A chain and is also ruled out by doubly Case-marking.

(18) a. [$_{TP}$ T-is easy ... [$_{TP}$ PRO to please John]].
b. [$_{TP}$ John$_i$ T-is easy ... [~~John~~$_i$ [$_{TP}$ PRO to please ~~John~~$_i$]]].

Later analyses within the movement approach have attempted to circumvent the improper movement violation and the doubly Case-marking problem. For instance, following Hornstein (2001) and Collins (2005a, 2005b), Hicks (2009) argues for a smuggling analysis for the TC, whose basic idea is that the matrix subject in the TC is moved from within a complex DP predicate, as in (19). Nevertheless, although Hicks' (2009) smuggling analysis breaks the A-A'-A chain, it is theoretically problematic in that a DP always forms a strong phase without providing any escape hatch. In other words, the movement of the subject should be ruled out by Phase Impenetrability Condition (PIC).

(19) a. John is easy (for Mary) to please.
b. [$_{DP1}$ D$_{[i\text{-}j,\ u\text{-}Case,\ i\text{-}Q,\ u\text{-}wh]}$ [$_{NP}$ N-OP [$_{DP2}$ D$_{[i\text{-}j,\ u\text{-}Case]}$-John]]].
c. [$_{TP}$ John is [$_{PredP}$ easy (for Mary) [$_{CP}$ [$_{DP1}$ D [$_{NP}$ OP [$_{DP2}$ ~~John~~]]]$_i$ C [$_{TP}$ PRO to please [~~$_{DP1}$ D [$_{NP}$ OP [$_{DP2}$ John]]]~~$_i$]]]].

2.3. Interim Summary

Given the above discussion, we claim that the base-generation approach is more appropriate for the syntax of the TC. The central idea of this analysis is that the matrix subject in the TC is base-generated and licenses the embedded object through predication via null-operator movement, as structurally represented in (20).

(20) John$_i$ is tough [$_{CP}$ OP$_i$ [$_{TP}$ PRO to please ~~OP~~$_i$]]. (= (2b))

Generally speaking, the base-generation approach can avoid the problems of movement analysis, since no direct movement is assumed between the matrix subject and the embedded object. It can also avoid the problems of the infinitival adjunct analysis, for the *tough*-predicate only thematically selects the embedded infinitival clause as its argument. Furthermore, the null-operator movement can also be empirically justified by the following examples: as noted by Chomsky (1977), the TC cannot be formed when the empty object is included in a complex-NP island, as in (21a); and *wh*-movement and relativization are excluded in the TC, as in (21b) and (21c). Finally, the base-generation approach and the reanalysis approach are complementary rather than competing: the latter is confined to the simple forms of the TC (without any intervening materials between the *tough*-predicates and the infinitival clause), whereas the former covers the full range of cases, including the complex forms that constitute the focus of the present study.

(21) a. *John$_i$ is easy (for us) to convince Bill of [$_{DP}$ the need for him to meet ~~John~~$_i$].
b. * What$_j$ is John$_i$ fun (for us) [to give ~~what~~$_j$ to ~~John~~$_i$]?
c. *[The sonatas$_i$ that this violin$_j$ is easy [to play t$_i$ on t$_j$]] are in your book.
(Chomsky, 1977, pp. 104–105)

3. Syntactic Restriction on Null-Operator Licensing

In the preceding section, we have critically examined the shortcomings of previous analyses concerning the TC, and empirical evidence strongly supports the base-generation analysis represented in (20). In this structure, the movement of the null-operator transforms the infinitival clause into a one-place predicate, hence the phrase *tough to please* can be taken as a complex predicate which waits to be saturated. Afterwards, the matrix subject is merged and serves as the antecedent of the variable in the infinitival clause, and the complex predicate is saturated accordingly.

However, despite its merits, the current base-generation analysis of the TC is not without problems. Most critically, the licensing of the null operator in the current version of

the base-generation analysis appears to violate anti-c-command condition and Chomsky's (1981) Binding Condition C.

3.1. Anti-C-Command Condition in Null-Operator Licensing

Let us start from the anti-c-command condition in null-operator licensing, which is mostly discussed in parasitic-gap constructions. According to Chomsky's (1986a) canonical analysis, two empty categories are contained in a parasitic-gap construction, each participating in a separate operator-variable chain. As in (22), the gap in the matrix clause (i.e., the host gap) and the one in the adjunct clause (i.e., the parasitic gap, marked as t_{PG}) obligatorily bear the same index, and the licensing of the parasitic gap in the adjunct clause is dependent on the host gap in the matrix clause.

(22) $[_{CP}$ Which article$_i$ C-did $[_{TP}$ you $[_{vP}$ $[_{vP}$ file $t_i][$without $[_{CP}$ OP_{PGi} PRO reading $t_{PG_i}]]]]$?

Interestingly, despite the close relation between the parasitic gap and the host gap, the c-command relation must be excluded between them, as exemplified in (23). As it is firstly discussed in Taraldsen (1981) and further developed in Chomsky (1986a), Engdahl (1983), and Browning (1987), such a requirement is generalized as the anti-c-command condition.

(23) a. Which papers$_i$ did John decide to $[_{vP}$ $[_{vP}$ tell his secretary $[_{CP}$ t_i were unavailable$]][$before $[OP_{PGi}$ PRO reading $t_{PG_i}]]]$?
b. The article $[_{CP}$ OP_i that I $[_{vP}$ $[_{vP}$ read ~~OP_i~~$][_{PP}$ before $[_{CP}$ OP_{PGi} $[_{TP}$ PRO filing $t_{PG_i}]]]]]$
c. *Which papers$_i$ $[_{TP}$ t_i were $[_{AP}$ $[_{AP}$ unavailable$][_{PP}$ before $[_{CP}$ OP_{PGi} you discovered $t_{PG_i}]]]]$?
d. *The book $[_{CP}$ OP_i that $[_{TP}$ ~~OP_i~~ $[_{vP}$ $[_{vP}$ fell out the window$][_{PP}$ before $[_{CP}$ OP_{PGi} $[_{TP}$ you could catch $t_{PG_i}]]]]]]$.
(Browning, 1987, p. 203)

The sentences in (23) are largely parallel in their structures, except that the host gaps (i.e., the object in the matrix clause) do not c-command the parasitic gaps in (23a) and (23b), while the host gaps in (23c) and (23d) are subjects which always c-command the corresponding parasitic gaps. Crucially, although the host gap and the parasitic gap do not match with respect to their grammatical positions (i.e., the host gaps and the parasitic gaps in (23c) and (23d) are subject and object respectively), the ungrammaticality of the relevant sentences cannot be simply attributed to the distributional asymmetry. As shown below, the sentence in (24) is grammatical even though the host gap in the matrix clause is the subject of the direct object clause, for the parasitic gap can be licensed as long as it is not c-commanded by the host gap.

(24) Which papers$_i$ did John decide, $[_{CP}$ $[_{PP}$ before reading t_{PG_i},$][_{CP}$ PRO to tell his secretary [~~which papers~~$_i$ were unavailable$]]]]$?
(Browning, 1987, p. 203)

Although the anti-c-command restriction in the parasitic-gap construction can be empirically justified, it must be theoretically explained as well. Browning (1987) points out that the anti-c-command condition underlyingly follows from the Binding Condition C. Specifically, (23c) and (23d) are ruled out by the fact that the parasitic gaps are c-commanded by the coindexed subject.

3.2. Binding Condition C in Null-Operator Licensing

As pointed out by Chomsky (1986b), binding theory is essentially a theory of referential dependency. Given the definition given by Chomsky (1980) as in (25), the notion of binding can be understood as the co-reference between two elements on the basis of the structural relation of c-command.

(25) An anaphor α is bound in β if there is a category c-commanding it and coindexed with it in β; otherwise, α is free in β.
(Chomsky, 1980, p. 10)

Binding Conditions are further specifications of different ways of referential interpretations of different types of nominals, among which the Binding Condition C governs the distribution and interpretation of overt and covert R-expressions such as referential DPs and variables. Two versions of Condition C are documented in the literature. The earlier version represented in Chomsky (1981) is given in (26a), which requires that A′-bound variables must not be A-bound anywhere. The later version represented in Chomsky (1986a, 1986b) is given in (26b), which states that a variable does not have to be free anywhere but only in the c-commanding domain of its corresponding operator.

(26) a. Binding Condition C (version 1):
An R-expression must be A-free.
(Chomsky, 1981, p. 188)
b. Binding Condition C (version 2):
An R-expression must be A-free (in the domain of the head of its maximal chain).
(Chomsky, 1986b, p. 165)

The two versions of the condition have distinct implications for the syntax of the TC. Given the base-generation analysis in (20), as repeated in (27), the matrix subject c-commands the variable in the embedded clause (marked as t), and the variable is obligatorily co-indexed with the subject, for the subject serves as the antecedent of the variable to satisfy the complex predicate. This entails that the variable in the TC is A-bound by the matrix subject.

(27) John_i is tough (for Mary) $[_{CP}\ \text{OP}_i\ [_{TP}\ \text{PRO to please } t_i]]$.

As per the earlier version of Binding Condition C, this derivation is problematic, since the variable is not A-free. Things are different if the version of (26b) is adopted, since the A-binder of the variable (i.e., the matrix subject) is outside the c-commanding domain of the operator in (27), the variable is A-free in the domain of the head of its maximal chain, thus no Condition C violation will arise. Exactly which version is true can be subject to empirical tests, and we resort to independent evidence from parasitic-gap constructions to determine it. Recall the discussion on the anti-c-command restriction observed in the parasitic-gap construction in the previous section, it is the version of the Binding Condition C in (26a) that should be adopted. Specifically, the examples in (23c) and (23d) are ungrammatical even though the parasitic gap in the adjunct clause is indeed free in the domain of the corresponding null operator in these cases. In other words, if the version of Binding Condition C in (26b) were adopted, (23c) and (23d) should not be ruled out. In turn, the contrast in (23) indicates that variables must be unbounded regardless of the scope of their operators, and it follows that we should adopt the version of Binding Condition C in (26a) in the following discussions. Accordingly, in order to avoid the violation of the Binding Condition C, the structure of the TC in (20) has to be revised, and this will be further explored in Section 4.

In addition to the TC and the parasitic-gap construction, the null operator is also involved in the derivation of such constructions as relative clauses (cf. Chomsky, 1977) and gapped purpose clauses (cf. Browning, 1987) in English, as shown below.

(28) a. Relative clause:
The $[_{NP}\ [_{NP}$ book$][_{CP}\ \text{OP}_i\ [_{TP}$ John likes ~~OP_i~~$]]]$.
b. Gapped purpose clause:
They $[_{vP}\ [_{vP}$ brought John_i along$][_{CP}\ \text{OP}_i\ [_{TP}$ PRO to talk to ~~OP_i~~$]]]$.

https://doi.org/10.3390/languages11120248

In a broad sense, the anti-c-command condition/Binding Condition C is not unique to parasitic gaps but also holds for all the other null-operator constructions. Specifically, the relative clause containing null-operator movement is an adjunct to the NP, as in (28a);[3] and in the gapped purpose clause construction, the adjunct purpose clause involving null-operator movement is adjoined to the preceding vP, as in (28b). The point is that the null operator and the corresponding variable cannot be c-commanded by their co-indexing argument, for the combination of co-indexation and c-command in an A-chain equals A-binding. In other words, the anti-c-command condition on null-operator licensing suggests that the variable bound to the null operator is subject to the Binding Condition C. As a result, the constituents involving null-operator movement are always modifying adjuncts. This generalization is also independently noted by Wilder (1991), who makes a theory-internal observation that nonfinite clauses with null-operator movement never occur as arguments to lexical heads, but only as adjuncts. Following this line, it is quite unexpected if we assume that the complex predicate containing null-operator movement is directly saturated by the matrix subject in the TC, as this amounts to saying that the grammatical position of the predicate including null-operator movement is not consistent across different constructions. In other words, when compared to other null-operator constructions, the previous base-generation analyses of the TC will render this construction an exception. In the next section, we aim to propose a solution which can fit the TC into the general distributional pattern of other null-operator movement constructions.

4. Our Proposal

The last section presents the problem of the classical analysis of the TC within the base-generation approach, according to which the licensing of null-operator movement violates the anti-c-command condition and the Binding Condition C. Based on the review of the structures of other constructions including null-operator movement, it can be generalized that null-operator movement should be licensed in an adjunct clause only, and the null operator and its bound variable can never be directly co-indexed with the matrix subject. Based on this remark, in this section, we will propose a revised structure for the TC. The central task is to propose a modificational structure for the TC, wherein the null operator is not bound by the matrix subject.

4.1. Position of the Null Operator in the Tough-Construction

Given the discussion in the previous sections, a dilemma that we are confronted with is that on the one hand, the *tough*-predicate selects the TC infinitival clause as complement (see the discussion in Section 2); and on the other hand, the infinitival clause involves null-operator movement and it serves as an adjunct (see the discussion in Section 3). One of the two assumptions has to be abandoned, and we argue that it is the latter one that is on the wrong track. Namely, the null-operator movement does not target the edge of the infinitival clause in the TC, and the infinitival clause indeed serves as the complement of the *tough*-predicate.

In Section 2.3, we have reviewed the evidence indicating that there is a covert A'-movement in the embedded infinitival clause in the TC. However, the landing site of the null operator is still debatable. Following Browning (1987), Mulder and den Dikken (1992) and Longenbaugh (2017), we argue that the null-operator movement in the TC should be extended into the matrix clause, and hence the structure given in (20) is not plausible.[4] We will review their ideas and provide new arguments for the revised position of the null operator from a semantic perspective.

One piece of empirical evidence in support of the position of the null operator has been invoked from *wh*-extraction and parasitic gaps, as discussed in Longenbaugh (2017).

https://doi.org/10.3390/languages11120248

First, given that null-operator movement creates an island for *wh*-movement, the availability of *wh*-extraction can be used to diagnose the scope of null-operator movement. Suppose that the null operator is positioned in the embedded clause in the TC, as in (20), it follows that the null-operator movement in the adjunct clause should not have interfered with the *wh*-extraction from the PP in the matrix clause. However, this prediction is falsified by the example in (29a), in which the movement of *who* from the PP in the matrix *tough*-predicate of the TC (cf. *clever of*) is not allowed. It deserves to be further mentioned that the examples in (29b) and (29c) are all grammatical, and this indicates that the ungrammaticality of (29a) cannot be attributed either to its basic declarative form or to the *wh*-extraction from the *of*-PP phrase. Rather, (29a) can be explained by assuming that the null operator is moved to a position higher than the matrix PP, namely the edge of the projection headed by the *tough*-predicate. In this case, the movement chain of the null operator and that of the *wh*-movement overlap, resulting in the ungrammaticality of (29a).

(29) a. *Who$_i$ was Sue$_j$ clever [of t$_i$][OP$_j$ to hire t$_j$]?
b. Sue$_i$ was clever [of Bill][to hire t$_i$].
c. Who$_i$ was it clever [of t$_i$][to hire Sue]?
(Longenbaugh, 2017, p. 17)

The other evidence comes from the distribution of possible parasitic gaps in the TC. Parasitic gaps can be used to diagnose the location of the null operator in the TC because of one of its structural conditions: according to Engdahl (1983), the operator of the licensing chain must c-command the parasitic chain. To be specific, the licensing of parasitic gaps in the TC can be used to test whether the chain created by null-operator movement extends into the matrix clause. Given the examples in (30a) and (30b), the PP adjunct and the parasitic gap therein should be excluded from the A'-chain of null-operator movement in the matrix clauses, and it should follow that parasitic gaps cannot be c-commanded by the licensing operator in the matrix clause of the TC. However, the well-formedness of (30a) and (30b) suggests that this is not the case.[5] By contrast, the parasitic-gap chain can be licensed if the structures of (30c) and (30d) are adopted, wherein the licensing null operator moves to the edge of the *tough*-predicate in the matrix clause.

(30) a. These books were tough [[OP$_{PGi}$ for critics of t$_{PGi}$][OP$_i$ to praise t$_i$ sincerely]].
(Hukari & Levine, 1990, p. 142)
b. Parties like this are easy [[OP$_{PGi}$ for the organizers of t$_{PGi}$][OP$_i$ to set up t$_i$]].
(Longenbaugh, 2017, p. 17)
c. These books were [OP$_i$ tough [OP$_{PGi}$ for critics of t$_{PGi}$][t$_i$ to praise t$_i$ sincerely]].
d. Parties like this are [OP$_i$ easy [OP$_{PGi}$ for the organizers of t$_{PGi}$][t$_i$ to set up t$_i$].

Again, the relevant evidence suggests that the null operator occupies a higher position than the PP adjunct to the matrix clause. Accordingly, we provisionally propose that a typical TC bears the structure as follows:

(31) John$_i$ is [$_{AP}$ OP$_i$ [$_{AP}$ tough (for Mary) [$_{CP}$ ~~OP~~$_i$ [$_{TP}$ PRO$_j$ to please ~~OP~~$_i$]]]]$_i$

The structure in (31) has already been proposed by Mulder and den Dikken (1992) on theoretical grounds. As discussed earlier, the *tough*-predicate and the infinitival clause form a complex predicate, which theta-marks the TC subject. According to Mulder and den Dikken (1992), the minimal XP containing the landing-site of an unbound empty operator functions as a predicate. In other words, the movement of the null operator in effect turns the constituent to which it adjoins into a predicate. Therefore, if it is the complex predicate *tough to please* that theta-marks the subject, the null operator has to land higher than the *tough*-predicate, and it follows that the null operator cannot stop at the edge of the embedded CP.

https://doi.org/10.3390/languages11120248

However, even though the null operator is reanalyzed at the edge of the *tough*-predicate in the TC, the structure in (31) still circumvents the earlier mentioned dilemma rather than solving it. Given the new landing site of the null operator, the infinitival clause in the TC no longer contains any null operator at its edge, and thus it can serve as the complement of *tough*-predicate. However, following this analysis, the anti-c-command condition and the Binding Condition C are still violated regardless of the position where the null operator lands in the TC. According to these conditions, the infinitival clause involving null-operator movement is required to be an adjunct in the TC, and thus our proposal will differ from Mulder and den Dikken's analysis that the phrase containing the moved null operator directly functions as a predicate.

4.2. Status of the Constituent Containing the Null Operator in the Tough-Construction

The discussion in the last section reveals that further modification is still needed for the structure of the TC. Crucially, taking the parasitic-gap construction as an example, the anti-c-command condition and the Binding Condition C require that the null operator and its bound variable cannot be further bound to another element in an argument position. Following this line, the current structural analysis of the TC as given in (31) is not plausible. Specifically, following the rule of predication proposed by Williams (1980), the matrix subject obligatorily co-indexes with the projection which functions as a predicate. In other words, when the predicate contains a trace, the index of the gap is necessarily the same as the index of the relevant predicate. Taking passivization as an example, the index of the gap following the passivized verb in (32) is the same as the index of the predicate *be criticized*. Therefore, to say that the subject saturates the predicate created by passivization amounts to the claim that the index of the subject is identical to the index of the predicate, and thus identical to the index of the object following the passivized verb.

(32) John_i $[\text{is criticized } t_i]_i$

Of course, the gap left by the A-movement of *John* in (32) is anaphoric and subject to the Binding Condition A. Nevertheless, were it a fact that the TC bears the structure in (31) wherein the matrix subject directly saturates the complex predicate created by the movement of the null operator, the saturation of the complex predicate by the matrix subject amounts to their co-indexation, which equals the co-indexation between the subject and the empty object in the infinitival clause. In this case, the paradox is that the empty object in the embedded infinitival clause cannot be simultaneously an A-trace and an A'-trace: it is considered an A-trace for the relation between the bound variable in the embedded clause of *tough* and the matrix subject would be syntactically akin to an A-chain, while it is also counted as an A'-trace because the null-operator movement creates an A'-chain. This is precisely the problem of all the analyses under the movement approach. A further point to be noticed is that the gap left by the null-operator movement in the TC can only be analyzed as a bound variable. First, the empty object in the TC is not anaphoric because a typical anaphoric empty category such as the original copy of the A-movement cannot be Case-valued, while the empty object in the TC does not satisfy this requirement.[6] Second, the empty object in the TC is not pronominal because it can neither be lexicalized as a typical pro, nor can it be analyzed as a controlled PRO for the controlled PRO cannot be Case-valued.[7] Third, recall the examples in (21), the empty object in the TC is referentially equal to an A'-bound variable which is subject to the Binding Condition C, for island effect can be observed. Given that the matrix subject always c-commands the bound variable in (31), the relevant structure must be ruled out by the Binding Condition C.

Revision to the structure of the TC is therefore required, and it can be inspired by other constructions involving null-operator movement. For instance, consider the relative clause in (33), its syntactic structure is analogous to that of the TC in that it also contains a null

operator and an A'-bound variable, yet no Binding Condition C violation is involved in this relative clause. We argue that this is because the subject *John* in (33) satisfies the entire complex NP predicate *a man that Mary likes* rather than the embedded gap in the relative clause, and the relativization gap cannot be directly co-indexed with the matrix subject due to the presence of the head noun *man*. In other words, the index of the subject is carried by an NP layer over the relative clause.

(33) John_j is $[_{\text{NumP}}$ a $[_{\text{NP}}$ $[_{\text{NP}}$ $\text{man}_i][_{\text{CP}}$ OP_i that $[_{\text{TP}}$ Mary likes ~~OP_i~~$]]]]_j$.

Similarly, we speculate that the projection containing null-operator movement in the TC does not directly serve as a predicate of the matrix subject either. Instead, its grammatical status is comparable to the relative clause in (33). Accordingly, we propose the revised syntactic structure for the TC as in (34): the structure containing the null operator is essentially a reduced relative clause (i.e., an adjunct clause) modifying a null NP which semantically denotes an arbitrary nominal, and it is the complex NP that predicates of the matrix subject. In turn, the null operator and the bound variable are not co-indexed to the matrix subject. Since no co-indexation is directly established between the subject and the null-operator movement chain, the Binding Condition C will not be violated.

(34) John_j is $[_{\text{NP}}$ $[_{\text{NP}}$ e$][_{\text{AP}}$ OP_i tough (for Mary) $[_{\text{CP}}$ to please ~~OP_i~~$]]]_j$.

Given our revised structural analysis as in (34), the TC involves a nominal shell which covers the predicate created by null-operator movement. Such an analysis essentially renders the TC a special case of relative clause. We argue that this analogy is reasonable. First, intuitively, the following example is an equivalent paraphrasis of the TC in (34), they only minimally differ in the overtness of the relativized head noun and the presence of the resumptive pronoun.[8]

(35) John_i is such a person that it is tough to please him_i.

As a matter of fact, assuming the existence of the null nominal in the TC is not so ad hoc as it appears to be. Given the example in (35), the following example in (36) can be expected when the head noun of the relative clause is phonologically elided. Based on the assumption that *such* always categorially modifies nominal phrases, it is natural that there is a covert nominal in (36), which heads the embedded relative clause. In parallel, the TC as a special case of reduced relative-clause construction can involve a null nominal as well.

(36) John_j is [such $[_{\text{NP}}$ $[_{\text{NP}}$ $\text{e}_i][_{\text{CP}}$ OP_i that $[_{\text{TP}}$ it is tough $[_{\text{CP}}$ to please $\text{him}_i]]]]]_j$.

The new structure of the TC has the following advantages. First, the empty variable in the TC does not co-index with the matrix subject, and thus the Binding Condition C is not violated. Second, the complex predicate created by null-operator movement is an adjunct to a covert NP, and this is consistent with the general distributional pattern of the other null-operator constructions.

Third, our proposed structure is also in line with Hornstein's (2001) observation that the island created by the TC is "quite a bit stronger" than typical *wh*-islands. Consider the contrast in (37). Although these examples all involve null-operator movement in the derivation of the relative clause, they differ in that the null-operator movement of relativization is extracted from a *wh*-island in (37a) and (37b), while that in (37c) and (37d) is extracted from a TC. According to Hornstein (2001), (37a) and (37b) are better than (37c) and (37d), respectively. However, the classical base-generation approach of the TC cannot provide a reasonable explanation for this contrast. If TC bears the subject-$\text{AP}_{\text{predicate}}$ structure as in (31), there is no reason why null-operator movement creates a stronger island than wh-movement. In other words, recall the structure of the TC in (20) as proposed in the literature, since the TC essentially involves a covert *wh*-movement, the island violation triggered by ordinary *wh*-island and that triggered by the TC should be the same, and

no acceptability difference should be observed in (37).[9] Meanwhile, our analysis of TC as in (34) can perfectly explain this acceptability difference: (37c, d) are worse than (37a, b) for an NP layer is involved in the structure of TC, which itself intrinsically constitutes islandhood. This means (37c, d) involve a double-island structure: one created by the null-operator movement, the other created by the null NP layer; meanwhile, (37a, b) only involve one island created by the wh-movement.

(37) a. ??The book [OP_i that I wondered [who_j [~~who~~$_j$ read ~~OP~~$_i$]]] was on display.
b. ??The book [OP_i that I wondered [$when_j$ [to give ~~OP~~$_i$ to Paul $when_j$]]] was ...
c. *The sonata [OP_i that the violins are [OP_j [easy to play ~~OP~~$_j$ on ~~OP~~$_i$]] is ...
d. *The people [OP_i that this book is [OP_j [easy to convince ~~OP~~$_i$ to read ~~OP~~$_j$]] are ...
(Hornstein, 2001, p. 109)

Fourth, the current analysis of TC involves a null NP shell. This means TC should be distributed as nominal predicates rather than adjective predicates. However, as pointed out by one of the reviewers, TC appears analogous to AP predicates, as shown below.

(38) a. ?John got/turned/grew tough to please.
b. *John got/turned/grew a tough one to please.
c. *John got/turned/grew one whom it is tough to please.
(39) a. *John turned into tough to please.
b. John turned into a tough one to please.
c. John turned into one whom it is tough to please.

We agree with the reviewer that auxiliaries such as get, turn, and grow can only select an AP as predicative complement. However, this does not amount to rejecting the claim that TC involves a nominal predicate rather than an adjectival one. We argue, according to Nanni's (1980) idea reviewed in Section 2, that the TC examples in (38) and (39) have been reanalyzed into complex adjectives, but such reanalysis results in slight degradation. This explains the marginal status of (38a), which is also acknowledged by the reviewer. Additionally, reanalysis is not productive. As reported by the native speakers we have consulted, the examples turn bad when a more complex form of TC is involved, as in (40). In these cases, the possibility of reanalysis is blocked, and thus the predicates have to be analyzed as nominal phrases, which cannot be selected by *get*, *turn*, *and grow*.

(40) a. *John got/turned/grew tough for Mary to please.
b. *John got/turned/grew tough to try to please.

Additional evidence for the reanalysis comes from *how*-questions. It is well known that *how* can only modify adjectival predicates, not nominal ones (*How an idiot is John?). The grammaticality of (41a, b) therefore indicates that the fronted part is an A(P), namely the reanalyzed compound adjective. Crucially, *how*-questioning is restricted to the simple forms of the TC (see (41c, d)).

(41) a. How easy to read is that book?
b. How easy to please is John?
c. *How easy to try to read is that book?
d. *How easy for Mary to please is John?

This restriction is unexpected under the classical base-generation analysis of Chomsky (1977): given that analysis, *easy to try to read* and *easy for Mary to please* are ordinary APs (an adjective with a complement), and APs can generally be questioned by *how* and fronted, as in (42). Under our analysis, by contrast, the restriction follows immediately: in the complex forms of the TC, the relevant string is not an AP, but a nominal or a reduced relative clause embedded in an NP island, so it can neither be questioned by *how* nor extracted.

https://doi.org/10.3390/languages11120248

(42) a. How fond of his children is he?
b. How satisfied with the results are you?

Additionally, it should be noticed that turn into is not compatible with TC either, though the complement of turn into is indeed nominal. However, we argue that in (39), turn into should select a DP complement, while the incompatibility of TC with turn into results from the fact that TC involves a nominal predicate.

5. On Tough-Predicates

In this section we will determine the thematic properties of *tough*-predicates in the TC. Two semantic issues of *tough*-predicates will be discussed. The first issue concerns the semantic type of *tough*-predicates. Secondly, we will examine the intervention effect discussed in the literature, which will be considered a secondary effect of the thematic property of *tough*-predicates.

5.1. On the Semantics of the Tough-Construction

The study of the syntax of the TC is relatively well-documented in the literature, yet the semantics of the TC remains underexplored, with notable exceptions such as the work by Keine and Poole (2017). According to Keine and Poole (2017), *tough*-predicates exhibit systematic ambiguity. In expletive constructions, the *tough*-predicate functions as a <st, st> type predicate by selecting a propositional complement. However, given the structure proposed by Chomsky (1977), assigning the semantic type <st, st> to the *tough*-predicate in the TC will lead to a semantic type mismatch, for the *tough*-predicate should further select the matrix subject in addition to the propositional complement. To address this issue, Keine and Poole suggest an alternative approach: given the syntactic structure proposed by Chomsky (1977), *tough*-predicates should select for both a property of individuals (<e, st> type) and an individual argument (<e> type), subsequently passing the individual argument to the selected clause. Consequently, the resulting semantic type of *tough* will be determined as «e, st>, <e, st». To illustrate this more concretely, the semantics of *tough* in both expletive constructions and the TC are outlined below. For the sake of simplicity, here we only focus on the essential skeleton of the original denotation.

(43) a. $[\![\text{tough}_{\text{EXPL}}]\!] = \lambda p_{st}\, \lambda w.\ \forall <w', j'> \in \text{Acc}_{w,j}\ [\text{TOUGH}_{w',j'}\ ([\![p]\!]^{j'})]$
b. $[\![\text{tough}_{\text{TC}}]\!] = \lambda Q_{<e,st>}\, \lambda x\, \lambda w.\ \forall <w', j'> \in \text{Acc}_{w,j}\ [\text{TOUGH}_{w',j'}\ ([\![Q]\!]^{j'}(x))]$
c. $\text{TOUGH}_{w,j}\ (p) \Longleftrightarrow$ p is tough to j in w
d. $\text{ACC}_{w,x} = \{<w', y>$: it is compatible with what x believes in w for x to be y in w'$\}$
(Keine & Poole, 2017, p. 315)

Although Keine and Poole's (2017) approach can derive the correct semantics for the TC, it rests on an unnatural assumption that *tough* in expletive construction and that in the TC must differ in terms of semantic type. Consequently, either there are two separate lexical entries of *tough* despite their bearing essentially the same lexical meaning, or an ad hoc type-shifting rule has to be introduced for the *tough*-predicate in the TC.

An alternative proposal against Keine and Poole (2017) is given by Gluckman (2021), which suggests that the *tough*-predicate involves a uniform semantics. According to Gluckman (2021), the *tough*-predicate in the TC and its counterpart in the expletive construction are uniformly of the semantic type <v, st>. Leaving technical details aside, Gluckman (2021) proposes that the *tough*-predicate is merged to a Voice head via Event Identification. The infinitival clause including the null-operator movement then adjoins to Voice' via predicate modification, and finally the formed complex predicate is saturated by the matrix subject, as in (44).

(44) $[_{\text{VoiceP<v,st>}}$ $[_{\text{DP<e>}}$ this article$][_{\text{Voice'2}}$ $[_{\text{Voice'1 <e,<v,st»}}$ $\text{Voice}_{\text{participant}}$ $[_{\text{AP<v,st>}}$ difficult$]]$ $[_{\text{CP<e,<v,st»}}$ OP_{x} for John to read x$]]]$

Despite the feasibility of Gluckman's (2021) proposal, we argue nonetheless that the occurrence of the Voice head in the TC lacks independent evidence and thus seems ad hoc. As a matter of fact, the Voice as in (45a) can almost be viewed as an operator shifting the *tough*-predicate from the <v, st> type to the type <e, <v, st», as in (45b) and (45c). However, the type shifting operation is redundant from our perspective, for the merger of Voice and *difficult* can essentially be viewed as another lexical entry of *difficult*.

(45) a. $[\![\text{Voice}_{\text{Participant}}]\!] = \lambda x \lambda e \lambda w.\ \text{PARTICIPANT}(x)(e)(w) = 1$
b. $[\![\text{difficult}]\!] = \lambda e \lambda w.\ \text{difficult}(e)(w)$
c. $[\![\text{Voice'}_1]\!] = \lambda x \lambda e \lambda w.\ \text{PARTICIPANT}(x)(e)(w) = 1 \wedge \text{difficult}(e)(w)$

In this study, we also argue for the uniform semantics of the *tough*-predicate, but our proposal differs from Gluckman's (2021) in that the infinitival clause in the TC is the argument of the *tough*-predicate rather than an adjunct. Specifically, we propose that the semantics of the TC can be composed based on an unambiguous *tough*- predicate of <st, st> type: the semantic type of *tough* in the TC is the same as the counterpart in the expletive construction variant as proposed by Keine and Poole (2017).[10] Recall our analysis in (34), as reproduced below with the semantic types specified, a different landing site is assigned to the moved null operator in the TC, which is higher than the *tough*-predicate.

(46) $[_{\text{NP<e,st>}}$ $[_{\text{NP}}$ $e_i]$ $[_{\text{XP<e,st>}}$ OP_i $[_{\text{AP<s,t>}}$ tough $[_{\text{CP<s,t>}}$ PRO_k to please ~~OP_i~~$]]]]$.

As in (47), the semantic composition produces the desirable semantics for the TC without resorting to a separate $tough_{TC}$ with the semantic type of «e, st>, <e, st».[11] Thus, the revised analysis is superior to previous analyses in maintaining the uniformity of the lexical entry of *tough*-predicates.

(47) a. $[\![\text{CP}]\!]^j = \lambda w.\text{PLEASE}\ (i)(j')(w)$
b. $[\![\text{AP}]\!]^j = \lambda w'.\ \forall < w'', j' > \in \text{Acc}_{w',j}\ [\text{TOUGH}_{w'',j'}\ (\lambda w.\text{PLEASE}\ (i)(j')(w))]$
(FA between *tough*-predicate and the embedded clause)
c. $[\![\text{XP}]\!]^j = \lambda x.\ \lambda w'.\ \forall < w'', j' > \in \text{Acc}_{w',j}\ [\text{TOUGH}_{w'',j'}(\lambda w.\text{PLEASE}(x)(j')(w))]$
(λ-abstraction triggered by null-operator movement)
d. $[\![\text{NP}]\!]^j = [\![\text{XP}]\!]^j$ (due to the semantic emptiness of the null-NP)
e. $[\![[_{\text{vP}}$ John tough to please$]]\!]^j = \lambda w'.\ \forall < w'', j' > \in \text{Acc}_{w',j}\ [\text{TOUGH}_{w'',j'}\ (\lambda w.$ $\text{PLEASE}(\text{John})(j')(w))]$

The semantic composition of the TC introduces another caveat that warrants careful consideration. Specifically, it might be contended that the embedded-gap position is ultimately realized by the matrix subject, implying that the variable in question is bound by the subject after all, as evidenced by (47e). Consequently, a violation of the Binding Condition C should be falsely anticipated. On this point, we argue that a clear distinction must be drawn between syntactic binding and semantic binding. To put it simply, semantic binding can be understood as the result of λ-reduction, which essentially transforms an unsaturated predicate into a saturated proposition. In this sense, all the null-operator movement constructions involve semantic binding. The null-operator movement transforms a proposition into a predicate which waits to be saturated, while the semantic binding of the variable means the saturation of the predicate. Such kind of binding, in itself, does not typically result in ungrammaticality or semantic anomaly; otherwise, all the constructions involving null-operator movement would be predicted to be universally unacceptable. Syntactic binding, on the other hand, characterizes a referential dependency relation and operates under a distinct set of constraints. Together with binding conditions, it imposes an independent restriction on the licensing of the null operator and its corresponding variable. It is syntactic

binding, specifically, that gives rise to the anti-c-command condition in parasitic gaps and rules out sentences like (23c) and (23d).

A seeming counterexample of our analysis is raised by one of the reviewers, as in (48a). In this case, *nightmare* serves as a nominal *tough*-predicate, which also takes an infinitival clause as its complement, as shown by the availability of the expletive counterpart in (48b). Crucially, the nominal *tough*-predicate does not directly select the matrix subject as an argument: (48c) is not entailed by (48a).

(48) a. John is a nightmare to buy presents for.
b. It is a nightmare to buy presents for John.
c. John is a nightmare.

Our analysis in (34) cannot be simply applied to TCs such as (48a), since it would require the nominal phrase *a nightmare to buy presents for* to serve as a reduced relative clause. However, predicative NP/DPs normally cannot be reduced relatives (*someone a professor, *someone an idiot).[12]

(49) John_j is $[_{NP}\ [_{NP}\ e][_{NP}\ OP_i$ a nightmare $[_{CP}$ to buy presents for $\sout{OP_i}]]]_j$

We would like to argue first that for nominal predicates in (48a) and (48b), it is the nominal head *nightmare*, rather than the phrase *a nightmare*, that selects the clausal complement. The reason is largely syntactic: only heads can select arguments. Therefore, the structure of the expletive construction (48b) should be as follows (only the relevant parts are represented): *nightmare* first merges with the infinitival clause, and then the resulting constituent merges with the article.

(50) $[_{DP<st>}$ a $[_{NP<st>}$ $\text{nightmare}_{<st,st>}$ $[_{CP<st>}$ to buy presents for John]]]

This structure gives rise to such an analytical possibility for the TC in (48a): the null operator is raised to somewhere above the NP predicate but below the article, as illustrated in (51a). This structure is semantically calculable and also maintains the uniform semantics of the *tough*-predicate *nightmare* (cf. the semantic types in (51a)). Additionally, given our analysis, the null operator and its corresponding variable do not co-index with the matrix subject, which is co-indexed with the entire NumP predicate instead (see the indices in (51b)). Hence, the Binding Condition C is not violated, as is the case for (34).

(51) a. $[_{NumP<e,st>}$ a $[_{NP\ <e,st>}$ OP_x $[_{NP<st>}$ $\text{nightmare}_{<st,st>}$ $[_{CP<st>}$ to buy presents for x]]]]
b. John_j is $[_{NumP}$ a $[_{NP}$ OP_i nightmare $[_{CP}$ to buy presents for $\sout{OP_i}]]]_j$.

5.2. More on the Thematic Valency of the Tough-Predicate and the Intervention Effect

In this section, we further examine the thematic property of *tough*-predicates by investigating the intervention effect in the TC as invoked by Hartman (2009, 2011). Intervention effect in the TC refers to the observation that no *for*-PP can intervene between the *tough*-predicate and the embedded infinitival clause. As in (52a), two *for*-phrases can co-occur in the expletive construction, among which one can be analyzed as an experiencer PP, the other the combination of the complementizer and the embedded subject. However, as observed by Chomsky (1977), only one *for*-phrase can appear in the TC, as in (52b).[13]

(52) a. It is easy $[_{PP}$ for the rich$][_{CP}$ for the poor to do the work].
b. *The work_i is easy $[_{PP}$ for the rich$][_{CP}$ for the poor to do t_i].

Under the movement approach, Hartman (2009, 2011) attributes this contrast to the defective intervention by the experiencer *for*-PP on the A-movement of the matrix subject. Crucially, Hartman's (2009, 2011) analysis relies on the assumption that the PP *for the rich* in (52) is an experiencer adjunct, and he has further made reference to other instances of unambiguous PP to justify the intervention effect. For example, *to Mary* and *on me* in (53) seem to be unambiguous instances of experiencer PP, and the unacceptability seems to

suggest that experiencer PP is generally forbidden in the TC, for its occurrence results in the intervention effect.

(53) a. Cholesterol$_i$ is important (**to* Mary) to avoid t$_i$.
b. Sugar$_i$ was very hard (**on* me) to give up t$_i$.
(Hartman, 2011, p. 125)

Meanwhile, there are in fact counterexamples against Hartman's (2009, 2011) analysis. Consider the cases in which the matrix predicates in the TC are those of the attribution of mental properties such as *clever.* They are typically followed by *of*+DP phrases, which also have to be analyzed as instances of PP. However, as in (54), the relevant sentence is in fact acceptable.

(54) Sue was clever of Bill to hire.

There is also evidence indicating that when the *for*-phrase is unambiguously forced to be a complementizer+subject sequence, as noted by Fleisher (2008), the resulting sentence is ungrammatical. Specifically, expletives such as *there* or *it* cannot be interpreted as experiencers since they are not referential, and for the same reason they cannot function as the controller of the PRO in the embedded clause. On the other hand, expletives are always fine as subjects of infinitival clauses. The following examples show that the *for*+expletive strings make the TC sentences unacceptable, and this can be explained if we assume that the TC only allows PP-affectee but does not license embedded complementizer and overt embedded subject.[14]

(55) a. ??This building is tough [$_{CP}$ for there to be a riot in t].
b. ??July is unusual [$_{CP}$ for it to snow in t].
(Fleisher, 2008, p. 163)

Another simple but effective argument contradicting Hartman's observation is as follows. Suppose that the *for*-DP in the TC is an experiencer PP, then it should form a constituent and pass the constituency tests. To see the validity of this test, consider (56). As predicted, *for John* cannot undergo topicalization without distorting its original meaning. Alternatively, the *for*-phrase in the TC can be moved to various positions of the sentence while maintaining its original semantics besides the position between *tough*-predicate and the infinitival clause. Furthermore, (56c) shows that the sentence-initial position and sentence-final position in the TC are also available for the *for*-phrase. The flexibility of the position of *for*-phrase indicates that the PP in the TC is an instance of experiencer constituent rather than an accidental adjacency of the complementizer and the embedded subject.

(56) a. I want [for John to come].
b. *For John, I want to come.
c. (For Mary) John is tough (for Mary) to please (for Mary).

The above discussion suggests that the optional *for*-phrase in the TC is indeed a PP experiencer, as suggested by Lasnik and Fiengo (1974) and Rezac (2006), while a true PP adjunct does not trigger any blocking effect. The conclusion invalidates Hartman's movement analysis of the TC, according to whom the *for*-PP blocks the movement of the subject in the TC. Of course, the relevant unacceptable examples call for another way of explanation. In this study, we offer a completely different way of explaining the sentences in (53) and (54). We argue that the ungrammaticality of the relevant examples should be attributed to the thematic valency of the *tough*-predicate rather than intervention effect. Specifically, we argue that such *tough*-predicates as *important* and *hard* as in (53) can have two possible thematic/argument structures, as exemplified in Table 1.

Table 1. Thematic property of *important* and *hard*.

	Argument 1	Argument 2
important$_1$	theme	Ø
important$_2$	theme	affectee
hard$_1$	theme	Ø
hard$_2$	theme	affectee

Crucially, take *important* as an example, the following examples are relevant to the two thematic structures of the *tough*-predicate:

(57) a. To avoid cholesterol is important.
b. It is important to avoid cholesterol.
c. To avoid cholesterol is important to Mary.
d. It is important to Mary to avoid cholesterol.

The *tough*-predicate *important* in (57a) and (57b) has the first type of theta-grid: it is a one-place predicate which only selects a proposition or an entity as argument. Given that the merger of {a, b} and {b, a} is not distinctive, examples in (57a) and (57b) bear the same thematic structure, with (57b) further involving insertion of the expletive to satisfy the EPP feature of the clause. Under this assumption, when (57b) further involves null-operator movement, a typical TC is derived, as in (58a). Meanwhile, the second instance of *important* in (57c) and (57d) is a two-place predicate, which simultaneously selects a theme and an affectee as the external and the internal arguments, respectively. In this case, (57d) is assumed to be derived from (57c) by a rightward extraposition of the sentential subject and expletive insertion. Since the subject position in (57d) has already been occupied by the trace of the propositional theme, it is not open to any other argument. Therefore, having another base-generated argument in the matrix subject position will result in the violation of theta-criterion, as in (58b). Furthermore, it should be noticed that the null-operator movement in (58b) can only target the edge of the extraposed infinitival clause.

(58) a. Cholesterol is ... [OP$_i$ important [to avoid t$_i$]].
b. [t$_j$/*cholesterol is ... [important [to Mary]]][OP$_i$ to avoid t$_i$]$_j$.

In other words, the alleged intervention effect has nothing to do with the movement blocked by the intervening PP. Furthermore, given the following examples, two kinds of PP should be identified in the TC according to the thematic property of the *tough*-predicate. On the one hand, *for Mary* in (59a) is a true PP experiencer which syntactically functions as a modifier, in this case the *tough*-predicate only subcategorizes for one argument. On the other hand, *to Mary* in (59b) is syntactically the complement of the adjective predicate, as in this case *important* is a two-place predicate which selects both the PP *to Mary* and the subject *this issue* as arguments.[15]

(59) a. [[This issue is important][for Mary]].
b. [This issue is important [to Mary]].

This distinction between the two types of PP can well explain the discrepancy in grammaticality of (60). Specifically, the PP-experiencer headed by *for* in (60a) does not trigger any blocking effect, though the PP complement headed by *to* in (60b) results in ungrammaticality of the sentence.

(60) a. Cholesterol is important for Mary to avoid.
b. *Cholesterol is important to Mary to avoid.

Similar explanations can also be given to the contrast in (52), wherein easy selects both the proposition *for the poor to do the work* and the PP complement *for the rich*, as in (61a). In this case, the preposition *for* in the infinitival clause is a complementizer, while

the other heads the prepositional complement. After extraposing the clausal subject, the null-operator movement can only target as far as the edge of the extraposed infinitival clause, and it is no longer possible to base-generate another argument in the matrix subject position, as in (61b).

(61) a. [For the poor to do the work] is easy [for the rich].
b. [t_i/*the work is easy [for the rich]][OP_j for the poor to do t_j]$_i$.

6. Further Implications

This section focuses on the difference among the three types of movements instantiated in natural language, which are A-movement, *wh*-movement, and null-operator movement. The distinction between A-movement and null-operator movement is syntactic in the first place. For instance, A-movement is clause-bounded, while null-operator movement is not.[16] As shown by the following contrast, the A-movement in (62a) crosses a finite CP boundary, leading to ungrammaticality; by contrast, the null operator in (62b) can be moved across a finite clause.

(62) a. *$John_i$ seems [$_{CP}$ it is likely [t_i to win]].
b. Mary is [$_{NP}$ [$_{NP}$ e_i][OP_i tough for me to believe [$_{CP}$ that John would ever marry t_i]]].
(Kaplan & Bresnan, 1982, p. 78)

Beyond clause-boundedness, their difference also lies in their semantic implication. Overall, null-operator movement will create an unsaturated predicate out of a proposition, as sketched in the lambda-abstraction below. The moved null operator is interpreted in its landing position as a predicate abstract that binds the corresponding variable.

(63) [OP_i [...t_i...]] → LF: λx [...x...]
(Nissenbaum, 2000, as cited in Keine and Poole (2017))

A-movement also creates a predicate in the local sense, but this predicate differs from the predicate with null-operator movement in that it will be immediately saturated by the moved argument itself. For example, *seems to win* in (64) is rendered into a complex predicate semantically by the A-movement of *John*, and this complex predicate enters a predicate-argument relation with the raised subject, forming a saturated proposition.

(64) $John_i$ seems [t_i to win].

Null-operator movement differs from overt *wh*-movement mainly with regard to the nature of the moved element. This difference is reflected in the possible range of reference of their corresponding variables. To illustrate, *a wh-phrase* is a true quantifier in the sense of Lasnik and Stowell (1991), in that the value of the variable bound by it ranges over a series of alternatives. Accordingly, it is impossible for the *wh*-variable to be bound (i.e., referentially dependent on) by any A-position antecedent. By contrast, as pointed out by Lasnik and Stowell (1991), the reference of the variable bound to the moved null operator is relatively fixed. In other words, the variable bound to the moved null operator can be *potentially* bound by an argument. Following this observation, we can assign an explanation to the anti-c-command condition of null-operator constructions, i.e., why null-operator licensing must be involved in a modificational structure. Suppose the constituent including null-operator movement indeed directly predicates over a c-commanding argument, as in (65), then the embedded variable (i.e., the original copy left by the moved null operator) will inherit the referential value from the c-commanding argument. As a result, the variable will be coindexed with the relevant c-commanding argument and Binding Condition C will always be violated.

(65) *DP_i [$_{PredP}$ OP_i [... ~~OP_i~~ ...]].

The above discussion suggests that the subject-predicate relation is never appropriate to license the null operator. In other words, the null operator can only be valued by co-indexation without c-command. On the one hand, although null-operator movement forms a one-place predicate as the predicate formed by A-movement, null-operator movement differs from the A-movement in that the relevant predicate cannot be directly saturated by an argument. On the other hand, the variable bound to the moved null operator differs from *wh*-variables in that its reference is relatively fixed, and this is because the complex predicate with null-operator movement and its modified predicate will create a fixed intersection.[17] In this way, the argument in the matrix subject position saturates the entire predicate of modification rather than the predicate with null operator. Accordingly, the constituent involving null-operator movement can only serve as an adjunct, which is exactly the distributional pattern identified in previous sections.[18]

7. Conclusions

The present study concentrates on the syntactic derivation of the TC. Specifically, our analysis adopts the base-generation approach, arguing that the matrix subject in the TC is base-generated rather than derived from the embedded clause. Building on empirical evidence from the scope of island effect and parasitic-gap licensing in the TC, we further demonstrate that the proper landing site of the moved null operator is the edge of the *tough*-headed complex predicate rather than the embedded infinitival complement clause selected by *tough*. This revised placement of the null operator aligns well with the uniform semantic type of *tough*-predicates. Additionally, we argue that the null operator in the TC is licensed within a modificational structure; otherwise, the Binding Condition C and anti-c-command condition will be violated. This conclusion has profound implications for a broader topic: the syntactic licensing of null-operator constructions in general is rooted in the interaction between the Binding Condition C and the syntactic and semantic properties of null operator in natural languages.

Author Contributions: Conceptualization, X.H. and R.C.; methodology, X.H. and R.C.; formal analysis, X.H. and R.C.; investigation, X.H. and R.C.; writing—original draft preparation, X.H. and R.C.; writing—review and editing, X.H. and R.C.; visualization, X.H. and R.C.; supervision, X.H.; project administration, X.H.; funding acquisition, X.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by Tsinghua University Initiative Scientific Research Program, project number 2025THZWJC33.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The original contributions presented in the study are included in the article. Further inquiries can be directed to the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

Notes

[1] The presence of PRO naturally satisfies the binding requirement of the reflexive, shifting the focus from binding to control. Manzini (1983) argues that in infinitival subject clauses, control does not require a c-commanding relation between the controller and the controlee. As illustrated in (i), the reflexive *himself* can be co-referenced with *Bill*, but this co-reference is not achieved through direct binding: the reflexive is bound by the controlled PRO, which is itself controlled by the object *Bill*. Importantly, *Bill* does not c-command PRO at any level of derivation. Crucially, this analysis in terms of control explains the grammaticality of (i) without requiring reconstruction.

(i) [PRO_i to behave himself$_i$ in public] would help $Bill_i$.
(Manzini, 1983: 424)

[2] Likewise, Bruening (2012) further argues that a logophor can be referentially licensed in the TC without requiring the c-commanding relation. Specifically, as illustrated in (ii), even if the subject containing *herself* is reconstructed, there is still no c-commanding relation between *herself* and its co-referenced element, *Sarah Palin*.

(ii) [This aspect of herself$_i$] was tough for [Sarah Palin$_i$'s autobiography] to present ~~this aspect of herself~~ in a good light.
(Bruening, 2012: ex. (11), as cited in Poole et al. (2024))

[3] We do not consider the possibility of the raising analysis of the relative clause here. Nonetheless, even the raising analysis is adopted, the anti-c-command condition still holds. We illustrate this point by adopting Kayne's (1994) seminal analysis with the following example.

(iii) the $[_{NP}\ [_{NP}$ book$]_j [_{CP}$ [OP/which $t_j]]_i$ C John likes $t_i]]$

On the one hand, the head noun *book* indeed c-commands its trace, but the indexes on them are only for illustrating movement process, for non-referential bare nominals simply cannot bear index. Therefore, no binding relation can be acknowledged between book and its trace. On the other hand, the complex NP [OP/which t_j] is in an A'-position, though it indeed c-commands its trace and coindexes with it, thus no A-binding relation is ever involved. Taken together, raising analyses of relative clauses are still compatible with the anti-c-command condition.

[4] Longenbaugh (2017) has endorsed a movement analysis, but with regards to whether the movement (of an overt argument or a null operator) is extended to the matrix clause, our view is more aligned with Longenbaugh (2017).

[5] It should be noted that the example in (30a) was used by Hukari and Levine (1990) to demonstrate the movement inside the infinitival clause. According to their analysis, (30a) should be structured as in (iv), where *for* serves as the complementizer, and *critics of* serves as the subject of the infinitival clause.

(iv) These books were tough $[_{CP}\ OP_i$ for $[_{DP}\ OP_{PG_i}$ critics of $t_{PG_i}]$ to praise t_i sincerely].

However, in the following section, we will argue that the *for*-phrase such as *for critics of* in the TC should be analyzed as a real PP rather than the combination of the complementizer and the infinitival subject. This example is also consistent with and happens to support our analysis in which the null-operator movement targets the edge of the *tough*-predicate in the matrix clause.

[6] The contrast between a typical anaphoric A-movement trace and the empty object in the TC is given below. In (va), the subject John undergoes A-movement from the object position, for it cannot be valued the accusative Case by the passivized verb *criticized*. Meanwhile, the empty object in the TC as in (vb) is indeed valued the accusative Case by the embedded verb *please*.

(v) a. $John_i$ is criticized t_i.
b. $John_i$ is tough to please e_i.

[7] The contrast between a typical pronominal empty category and the empty object in the TC is given below. On the one hand, given the Italian example in (via), a pro can be optionally lexicalized, and it can be interpreted as a free pronoun. On the other hand, a controlled PRO can never be licensed in a Case position, as in (vib). However, as in (vic), neither of these properties is satisfied by the empty object in the TC.

(vi) a. $Gianni_i$ ha detto che $pro_{i/j}$/Paolo ha telefonato.
Gianni has said that Paul has phoned
'$Gianni_i$ has said that $he_{i/j}$/Paul has phoned.'
b. *$John_i$ said that PRO_i will come.
c. $John_i$ is tough to please $e_{i/*j}$/*him.

[8] Following the seminal work of Quine (1960), the pronoun in *such*-relative is an overt bound variable and thus has a resumptive status.

[9] We have consulted a number of native speakers, and most of them have the intuition aligned with Hornstein's. Of course, we admit that it may be hard to pick the worst sentence when all the sentences are poorly accepted.

[10] Following Gluckman (2021), the semantic type of *tough*-predicates can also be formulated as <v, st>. We remain neutral regarding the specific type of the *tough*-predicates, though we maintain the claim that they are one-place predicates that select an infinitival clause.

[11] The LF representation in (46) only contains one moved copy of the null operator at the edge of the reduced relative clause. However, this does not mean that the null operator lands onto that position in one swoop; rather, following Chomsky (2001, 2008), the null operator is moved cyclically, leaving an intermediate copy at the edge of the embedded CP and vP projection, both of which constitute a phase. Nevertheless, the intermediate copies are invisible in LF (cf. Lasnik and Saito (1984)), so they are omitted from the LF representation in (46) and do not play a role in the semantic composition in (47).

[12] We thank one of the reviewers for pointing this out.

https://doi.org/10.3390/languages11120248

[13] Regarding the status of the overt *for*-phrase in the TC as in (viia), the traditional assumption posits that the *for*-PP functions as an experiencer (for the detailed discussion, see Lasnik & Fiengo, 1974 and Rezac, 2006), as in (viib). The other way of analyzing the structure would be treating *for* and *Mary* as the embedded complementizer and the embedded subject, as in (viic).

(vii) a. John is tough for Mary to please.
b. John_i is tough $[_{PP}$ for $\text{Mary}_j]$ ... $[_{TP}$ PRO_j to please $t_i]$.
c. John_i is tough [CP for $[_{TP}$ Mary_j to please $t_i]]$.

[14] The ungrammaticality of (55) cannot be attributed to the inability of expletives to serve as infinitival subjects. Expletives can indeed appear in infinitival clauses, as shown by the following examples.

(viii) a. I expected there to be a simpler solution.
b. We found all the elements for there to be a sustained ecosystem.

[15] It should be noticed that the preposition heading the PP complements varies with respect to different *tough*-predicates and is not limited to *to*. For instance, the PP complement selected by *hard* in (ix) is headed by *on*.

(ix) $[t_i$/*sugar was ... [very hard_2 *on* me]][OP_j to give up $____j]_i$.

[16] The syntactic difference between A-movement and null-operator movement (or A'-movement in general) also includes Crossover effect, licensing of parasitic gap, and island effect for other A'-movement. Since the syntactic discrepancy is not the focus of this part, we only name the difference in terms of clause-boundedness as an example.

[17] Here the term "fixed" means that the element denoted by the predicate involving null operator movement is a fixed set. Following this line, the overt *wh*-operator in a relative clause, whose variable also has a fixed reference, is deviant from the behavior of ordinary *wh*-phrases and should be analyzed as the externalized form of a null operator.

[18] The structure of nominal TCs as in (51) might be considered as a counterexample, as reproduced below. The null-operator constituent in (x) is not an adjunct and serves as a complement to the article. This configuration is possible due to the following fact: the null-operator constituent is embedded in a NumP, and this NumP layer constitutes a "shield" that prevents the co-indexation between the matrix subject and the null operator.

(x) John_j is $[_{NumP}$ a $[_{NP}$ OP_i nightmare $[_{CP}$ to buy presents for ~~OP_i~~$]]]_j$.

References

Akmajian, A. (1972). Getting tough. *Linguistic Inquiry*, *3*(3), 373–377.

Berman, A. (1973). A constraint on tough-movement. In C. Corum, T. C. Smith-Stark, & A. Weiser (Eds.), *Proceedings from the annual meeting of the Chicago linguistic society* (pp. 34–43). Chicago Linguistic Society.

Bianchi, V. (1999). *Consequences of antisymmetry: Headed relative clauses*. Mouton de Gruyter.

Brody, M. (1993). q-theory and arguments. *Linguistic Inquiry*, *24*(1), 1–23.

Browning, M. A. (1987). *Null operator constructions* [Ph.D. thesis, Massachusetts Institute of Technology].

Bruening, B. (2012). *Two-step tough movement?* Blog post. Available online: https://lingcomm.blogspot.com/2012/05/two-step-tough-movement.html (accessed on 1 June 2026).

Chomsky, N. (1977). On wh-movement. In P. Culicover, T. Wasow, & A. Akmajian (Eds.), *Formal syntax* (pp. 77–132). Academic Press.

Chomsky, N. (1980). On binding. *Linguistic Inquiry*, *11*(1), 1–46. [CrossRef]

Chomsky, N. (1981). *Lectures on government and binding*. Foris.

Chomsky, N. (1986a). *Barriers*. The MIT Press.

Chomsky, N. (1986b). *Knowledge of language: Its nature, origin, and use*. Praeger Publishers.

Chomsky, N. (2001). Derivation by phase. In M. Kenstowicz (Ed.), *Ken hale: A life in language* (pp. 1–52). The MIT Press.

Chomsky, N. (2008). On phases. In R. Freidin, C. P. Otero, & L. Zubizarreta (Eds.), *Foundational issues in linguistic theory: Essays in honor of jean-roger vergnaud* (pp. 133–166). The MIT Press.

Collins, C. (2005a). A smuggling approach to raising in English. *Linguistic Inquiry*, *36*(2), 289–298. [CrossRef]

Collins, C. (2005b). A smuggling approach to the passive in English. *Syntax*, *8*(2), 81–120. [CrossRef]

Di Sciullo, A.-M., & Williams, E. (1987). *On the definition of word*. The MIT Press.

Engdahl, E. (1983). Parasitic gaps. *Linguistics and Philosophy*, *6*(1), 5–34. [CrossRef]

Epstein, S. D. (1989). Quantification in null operator constructions. *Linguistic Inquiry*, *20*(4), 647–658.

Fleisher, N. (2008). A crack at a hard nut: Attributive-adjective modality and infinitival relatives. In C. B. Chang, & H. J. Haynie (Eds.), *Proceedings of the 26th west coast conference on formal linguistics* (pp. 163–171). Cascadilla Proceedings Project.

Fleisher, N. (2013). On the absence of scope reconstruction in tough-subject A-chains. *Linguistic Inquiry*, *44*(2), 321–332. [CrossRef]

Gluckman, J. (2018). *Perspectives on syntactic dependencies* [Ph.D. dissertation, University of California].

Gluckman, J. (2021). The meaning of the tough-construction. *Natural Language Semantics*, *29*(3), 453–499. [CrossRef]

Gluckman, J. (2022). Taking time with the tough-construction. *Journal of Linguistics*, *58*(2), 233–268.

Grinder, T. J. (1970). Super equi-NP deletion. In B. J. Darden, & M. Ziolkowski (Eds.), *Papers from the sixth regional meeting of Chicago linguistic society* (pp. 297–317). University of Chicago.
Hartman, J. (2009). Intervention in tough constructions. In S. Lima, K. Mullin, & B. Smith (Eds.), *Proceedings of NELS 39*. GLSA.
Hartman, J. (2011). (Non-)intervention in A-movement: Some cross-constructional and cross-linguistic considerations. *Linguistic Variation*, *11*(2), 121–148.
Hicks, G. (2009). Tough-constructions and their derivation. *Linguistic Inquiry*, *40*(4), 535–566. [CrossRef]
Hornstein, N. (2001). *Move! A minimalist theory of construal*. Blackwell.
Hu, X. (2022). Predicate formation in the XS-Model. In L. Stockall, L. Marti, D. Adger, I. Roy, & S. Ouwayda (Eds.), *For Hagit: A Celebration (QMUL Occasional Papers in Linguistics, No. 47)* (pp. 1–12). Queen Mary University of London.
Hukari, T., & Levine, R. D. (1990). The complement structure of tough constructions. In Y. No, & M. Libucha (Eds.), *Proceedings of the 7th annual eastern states conference on linguistics* (pp. 124–135). The Ohio State University.
Hulsey, S., & Sauerland, U. (2006). Sorting out relative clauses. *Natural Language Semantics*, *14*(2), 111–137. [CrossRef]
Kaplan, R., & Bresnan, J. (1982). Lexical-functional grammar: A formal system for grammatical representation. In J. Bresnan (Ed.), *The mental representation of grammatical relations* (pp. 173–281). The MIT Press.
Kayne, S. R. (1994). *The antisymmetry of syntax*. The MIT Press.
Keine, S., & Poole, E. (2017). Intervention in tough-constructions revisited. *The Linguistic Review*, *34*(2), 295–329. [CrossRef]
Ladusaw, A. W. (1977). Super equi NP deletion and the direct discourse analysis. *Linguistic Inquiry*, *8*(4), 742–744.
Lasnik, H., & Fiengo, R. (1974). Complement object deletion. *Linguistic Inquiry*, *5*(4), 535–571.
Lasnik, H., & Saito, M. (1984). On the nature of proper government. *Linguistic Inquiry*, *15*(2), 235–289.
Lasnik, H., & Stowell, T. (1991). Weakest crossover. *Linguistic Inquiry*, *22*(4), 687–720.
Longenbaugh, N. (2017). *Composite A/A'-movement: Evidence from English tough-movement*. Universitetet i Tromsoe.
Manzini, M. R. (1983). *Restructuring and reanalysis* [Ph.D. dissertation, Massachusetts Institute of Technology].
Mulder, R., & den Dikken, M. (1992). Tough parasitic gaps. *North East Linguistic Society (NELS)*, *22*(1), 303–317.
Nanni, D. L. (1980). On the surface syntax of constructions with easy-type adjectives. *Language*, *56*(3), 568–581. [CrossRef] [PubMed]
Nissenbaum, W. J. (2000). *Investigations of covert phrase movement* [Ph.D. dissertation, Massachusetts Institute of Technology].
Nunberg, G., Sag, I. A., & Wasow, T. (1994). Idioms. *Language*, *70*(3), 491–538. [CrossRef]
Pesetsky, D. (2012). Phrasal movement and its discontents. In L. Cheng, & N. Corver (Eds.), *Diagnostics in syntax*. Oxford University Press.
Poole, E., Mendia, J. A., & Keine, S. (2024). More on (the lack of) reconstruction in English tough-constructions. *Linguistic Inquiry*, *55*(4), 871–884. [CrossRef]
Postal, M. P. (1974). On certain ambiguities. *Linguistic Inquiry*, *5*(3), 367–424.
Postal, M. P., & Ross, J. R. (1971). Tough movement si, tough deletion no. *Linguistic Inquiry*, *2*(4), 544–546.
Quine, V. W. (1960). Variables explained away. *Proceedings of the American Philosophical Society*, *104*(3), 343–347.
Reinhart, T., & Reuland, E. (1993). Reflexivity. *Linguistic Inquiry*, *24*(4), 657–720.
Rezac, M. (2006). On tough-movement. In C. Boeckx (Ed.), *Minimalist essays* (pp. 288–325). John Benjamins.
Rosenbaum, P. S. (1965). *The grammar of English predicate complement constructions* [Ph.D. dissertation, Massachusetts Institute of Technology].
Taraldsen, K. T. (1981). On the theoretical interpretation of a class of "marked" extractions. In A. Belletti, L. Brandi, & L. Rizzi (Eds.), *The theory of markedness in generative grammar* (pp. 475–516). Scuola Normale Superiore di Pisa.
Wilder, C. (1991). Tough movement constructions. *Linguistische Berichte*, *132*, 115–132.
Williams, E. (1980). Predication. *Linguistic Inquiry*, *11*(1), 203–238.
Williams, E. (1983). Semantic vs. syntactic categories. *Linguistics and Philosophy*, *6*(3), 423–446. [CrossRef]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.