

Legibility Conditions on *Tough*, *Too-to*, and *Enough to* Constructions

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This paper is concerned with *tough*-constructions, *too-to* constructions, and *enough to* constructions in framework of Chomsky (2000). We will show that the licensing mechanism of a null operator discussed in Sugawara (2003) can extend to the three constructions: the value of the ϕ -set of a null operator can be specified from its antecedent through predication, proposed by Williams (1980). Although each construction has its own idiosyncrasies with various aspects of the principles to produce different behaviors, we will sketch some ideas for dealing with these constructions.

Furthermore, we focus on the idiosyncrasy of the construction: these constructions show tensed-S condition. We will demonstrate that, by using the notion of phase, a sentence which gives rise to the violation of tensed-S condition is excluded as an instance of improper movement.

1. Introduction

This paper will be concerned with *tough* constructions, *too-to* constructions, and *enough to* constructions. All three constructions are said to be associated with the null operator movement, assuming Chomsky (1981). If so, in the framework of Minimalist Program, the value of the ϕ -set of the null operator embedded in these constructions must be determined in some way, or their derivations would violate legibility conditions in the sense of Chomsky (2000). The way of specifying the value of the null operator is to associate with its antecedent via predication relation in the sense of Browning (1987). In other words, a derivation precludes the violation of legibility conditions only if predication relation holds between the null operator and its antecedent.

The purpose of this paper is to show that the licensing mechanism of a null operator discussed in Sugawara (2003) can extend to the three constructions: to offer how predication relation is operative in the constructions. Although each construction has its own idiosyncrasies with

various aspects of the principles to produce different behaviors, we will sketch some ideas for dealing with these constructions. In so doing, we will assume that the second type of null operator (*Top*) is involved in *tough*, *too-to*, and *enough to* constructions; which, in turn, contain the same type of null operator as the one in purpose clause constructions.

This paper is organized as follows. In section 2, we will show the licensing mechanism of null operator in *tough* constructions by using predication relation proposed by Browning (1987), and examine some properties of *tough* constructions. Section 3 is concerned with *too-to*, and *enough to* constructions. Summarizing the basic nature of these constructions, we will illustrate whether predication relation works in the constructions. Section 4 is the conclusion of this thesis.

2. *Tough* Constructions

2.1. *Licensing Condition on Null Operator of Tough Constructions*

The idiosyncrasy of *tough* constructions is that they obligatorily require the object gap in

an infinitival clause, which corresponds to the element occurring in the matrix subject. The sentence of (1a) exemplifies an instance of the constructions.

- (1) a. This book is easy (for us) [to read].
 b. It is easy (for us) [to read this book].

Postal (1971) states that (1a) be derived from the underlying structure (1b): *this book* embedded in the infinitival clause raises to the subject position of the matrix clause.

Chomsky (1981) proposes that *tough* constructions involve a null operator (OP) movement within the infinitival clause. Assuming his analysis, the structure of (1a) corresponds to that of (2).

- (2) This book is easy (for us) [_{CP} OP_i PRO to read t_i].

In (2), the null operator (OP) moves to the initial position of the infinitival clause, which is A'-position. Hence, this movement of the operator is regarded as an instance of A'-movement.

If the null operator in *tough* constructions is the same as the one contained in purpose clause constructions, we predict that the constructions should show tensed-S condition. Consider the examples (3) and (4).

- (3) a. This lesson is impossible for you [to expect [the class to finish t by Monday]].
 b.?* This lesson is impossible for you [to expect [that the class will finish t by Monday]].
- (4) a. John should be easy for us [to persuade Mary [to vouch for t]].
 b.* That book is impossible to believe [that Tom stole t].

The (b) examples of (3) ~ (4) violate tensed-S condition since the gaps of the operators occur within tensed clauses; on the other hand, the (a) sentences of (3) ~ (4) does not yield the

violation because the empty categories sit within infinitival clauses. This means that *tough* constructions contain the same characteristic as purpose clauses (OPCs), which involves the second type of null operator (*Top*)

Recall that, in purpose clause constructions, we will postulate the following conditions.

- (5) a. The value of the ϕ -set of the null operator must be determined by its antecedent via predication at the VP level; otherwise the derivation crashes by virtue of the violation of legibility conditions.
 b. Purpose clauses (OPCs) are analyzed as involving the second type of null operator (*Top*), which is triggered by an EPP feature.

The condition (5a) states that the null operator is licensed via predication, which is cited in (6).

(6) Predication

If NP and X are co-indexed, NP must c-command X or a variable bound to X in the same minimal domain.¹ (cf. Williams (1980))

Notice that, extending the analysis of Williams (1980), Browning (1987) claims that a subject-predication relation is licensed if NP and X fulfill both a configurational condition (6), and a relational specification (7).

- (7) A subject-predicate relation holds if
 a. the NP discharges the external θ -role of the X or
 b. the NP specifies the ϕ -set of a null operator in the specifier of the X.
 (cf. Browning (1987))

This condition states that a predication relation holds without a θ -assignment relation between two elements if they meet the conditions of (6) and (7b).

Condition (5b) stems from Authier (1989); he suggests that there exists the second type of empty operator that does not alternate with overt wh-phrases. This means that two types of empty operators exist in English. According

to his analysis, the first type of null operator (*OP*) occurs in the [Spec, CP] position, whereas the second type of null operator, which we will call *Top* operator (*Top*), sits in the TP position.

Given his analysis, null operators of *tough* constructions belong to the second type of null operator; they move to [Spec, TP] position. We will assume that the EPP feature of *T* attracts the null operator (*Top*); in other words, the movement of *Top* operator is triggered by an EPP feature.

In the remainder of this subsection, we will see how the null operator of *tough* constructions is associated with its antecedent via predication. Consider again the example of (1a), repeated here as in (8).

- (8) This book is easy (for us) [to read].
(= (1a))

Consider the derivation of (8), whose configuration is illustrated in (9).

- (9) This book is [_{AP} easy (for us) [_{CP} TOP_i [_{TP} t_i PRO to read t_i]]].

In (9), *Top* raises to the [Spec, TP] position as an intermediate step of the movement, then further moves to the [Spec, CP] position. In this situation, the infinitival clause (CP) and its local binder in (9) should fulfill the requirement of Predication.

Recall that we must satisfy the following conditions for the null operator (*Top*) to associate with its antecedent.

- (10) Predication
If NP and X are co-indexed, NP must c-command X or a variable bound to X in the same minimal domain. (cf. Williams (1980))
- (11) A subject-predicate relation holds if
a. the NP discharges the external θ -role of the X or
b. the NP specifies the ϕ -set of a null operator in the specifier of the X.
(cf. Browning (1987))

If predication relation did not hold between the operator and its antecedent, the antecedent would fail to determine the value of ϕ -sets of the operator, so that the derivation would violate legibility conditions.

In (9), *this book* c-commands the infinitival clause (CP) in the same minimal domain of AP. In addition, *Top* occupies the position where the antecedent specifies the ϕ -set of the operator. Hence, the ϕ -set of the operator (*Top*) is determined by its antecedent, so that the derivation precludes the violation of legibility conditions.

2.2. Tensed-S Condition in Tough Constructions

Tough constructions show tensed-S conditions. Consider again the examples (3) ~ (4), repeated here as in (12) and (13).

- (12) a. This lesson is impossible for you [to expect [the class to finish t by Monday]].
b.?* This lesson is impossible for you [to expect [that the class will finish t by Monday]].
- (13) a. John should be easy for us [to persuade Mary [to vouch for t]].
b.* That book is impossible to believe [that Tom stole t].

The (b) examples of (12) ~ (13) violate tensed-S condition since the gaps of the operators occur within tensed clauses; on the other hand, the (a) sentences of (12) ~ (13) does not yield the violation because the empty categories sit within infinitival clauses.

The grammatical contrast between these sentences can be subsumed under our analysis. Recall the assumption discussed in the previous subsection that an infinitival clause CP is not a phase. With the postulation in mind, we will see the configurations (14) and (15), which correspond to those of the instances (12a) and (12b).

- (14) This lesson_i is impossible for you [_{CP} Top_i [_{TP} t_{Top1} to [_{XP} t_{Top2} expect [the

class t_{Top3} to finish t_{Top4} by Monday]]]].
 (= (12a))

(15)?* This lesson_i is impossible for you
 [_{CP} Top_i [_{TP} t_{Top1} to [_{VP} t_{Top2} expect [_{CP} t_{Top3}
 that [_{TP} t_{Top4} the class will finish t_{Top5} by
 Monday]]]]]]. (= (12b))

The grammatical contrast between (12a) and (12b) is attributed to the difference of the chains which each derivation forms. In (15), the intermediate step of *Top* from base-generate position (t_5) to the [Spec, TP] position (t_i) is driven by EPP feature on the head of TP. The next movement of the operator, raising from t_4 to t_3 , is triggered by the P-feature. The next step of the operator is the raising to the [Spec, \bar{v} P] position (t_2), and then attaches to the higher TP position (t_1). Here, by assumption, the final landing site of *Top* is an A-position. Hence, if the specifier of CP is necessarily an A'-position, as seems plausible, a series of derivation creates an improper chain of the form A-A'-A'-A.³ Thus, the derivation of (15) is excluded.

On the other hand, in (14), *Top* operator need not move through [Spec, CP] position on the way to the higher [Spec, \bar{v} P] position as an intermediate step since the infinitival clause CP is not a phase, so that the operator directly raises from TP to the higher \bar{v} P position. If so, the derivation (14) creates a chain of the form A-A-A. Hence, the derivation of (12a) converges.⁴

3. *Too-to* and *Enough to* Constructions

We will turn our attention to the so-called *too-to* and *enough to* constructions, whose instances are represented in (16) and (17).

- (16) The men are too stubborn to talk to.
 (17) The football is soft enough to kick.

It has been commonly assumed that they contain a null operator movement within the embedded clause, as is instantiated in (18) and (19).

- (18) The men are too stubborn [_{CP} OP_i PRO to talk to t_i].
 (19) The football is soft enough [_{CP} OP_i PRO to kick t_i].

In both structures, the null operator (OP) raises to the embedded [Spec, CP] position. We can think of this movement as A'-movement because it is analogous to *wh*-movement. In what follows, when we examine the sentences in order to see the idiosyncrasies of these constructions, we will restrict attention only to those of *too-to* constructions.

First, *too* can appear with both adjectives and certain quantifiers.

- (20) a. John is too angry to talk to.
 b. John likes eating too much to diet.

too can be realized preminally only when it modifies a quantifier.

- (21) a.* John is a too angry man to talk to.
 b.* John is a too angry man to try to reason with him.
 c.* John is a too angry to talk to man.
 (22) a. Too many people to dance with them all came to the party.
 b.?? Too many people to dance with came to the party.
 c. I brought home too many books to read them all in one night.
 d.?? I brought home too many books to read in one night.

(Browning (1987))

Note that, as in (22b) and (22d) shows, the presence of a null operator degrades the acceptability of the sentence when *too* occurs with a quantifier.

The second property of the construction is concerned with the inability of a null operator to appear in an infinitival clause when *too* modifies an adverb and a quantifier.

- (23) Mary is too fast [_{OP}_i for me to keep up with t_i].
 (24) a.?? John likes Bill too much [_{OP}_i to fire

- t_i].
- b.?? John works too little [OP_i to promote t_i].
- c.?? Mary intimidates John too much [OP_i for him to hire t_i].
- (25) a.?? John arrived too recently [OP_i for me to have met t_i].
- b.?? Mary sees John too infrequently [OP_i to recognize t_i].
- c.?? John types too poorly [OP_i to hire t_i].
- d.?? Mary left the party too early [OP_i for me to talk to t_i].

The illegitimacy of (24) and (25) is attributed to the fact that the adverb containing the null operator is not predicated of the NP with which the null operator is co-indexed. If the reasoning is correct, as Browning (1987) observes, these examples seem to indicate that null operators are associated only with the subject of the predicate.

Now we will demonstrate that predication relation is operative when a null operator in *too-to* and *enough to* constructions is licensed by its local binder. We will assume that the infinitival clause in these constructions also involves the second type of null operator in the sense of Autier (1989). Assuming the configurations of *too-to* and *enough to* constructions proposed by Browning (1987), (27) illustrates the structure of the example (26).

- (26) The men are too stubborn to talk to.
- (27) The men_i are [_{DegP} t_i too stubborn [_{CP} Top [_{TP} PRO to claim t_{Top}]]]. (= (26))

In (27), *Top* raises to the [Spec, CP] position. This movement is triggered by the P-feature on the head of CP. In this situation, (27) fulfills the requirement of (10): *the men* c-commands the infinitival clause in the same minimal domain of DegP. Furthermore, *Top* sits in the position where its local binder determines the ϕ -set of the operator. Hence, the ϕ -set of the operator (*Top*) is specified by its antecedent, so that the derivation attenuates the violation of legibility conditions.

In the case of the licensing of the operator in *enough to* constructions, the same account as the one in *too-to* constructions can be given. Consider the sentence (28).

- (28) The football is soft enough [_{CP} Top_i PRO to kick t_i].

In this configuration, (28) satisfies the predication relation (10): *the football* c-commands the infinitival clause in the same minimal domain of AP, and the null operator (*Top*) is in a position where its value of the ϕ -set is specified from its local binder through predication relation. This relation between the operator and its antecedent fulfills the condition of (11b). Accordingly, the null operator in *enough to* constructions has its ϕ -set specified from its local binder, precluding the violation of legibility conditions.

Too-to and *enough to* constructions also show Tensed-S condition. Consider the following instances:

- (29) a.* This rock is too heavy [for us to try to claim [that we picked up e]].
- b. This rock is too heavy [for us to try to order her to pick up e].
- (30) ?* John is incompetent enough [for Bill to think [that we fired e for a good reason]].

The examples of (29a) and (30) violate tensed-S condition since the gaps of the operators sit within tensed clauses; whereas (29b) does not induce the violation since the empty category occurs in the infinitival clause.

The grammatical contrast between these sentences can be accounted for under our analysis, given that an infinitival clause CP is not a phase. We will examine the configurations (31) and (32).⁵

- (31) *This rock_i is too heavy [_{CP} Top_i for us to try [_{CP} [_{TP} t_{Top1} PRO to claim [_{CP} t_{Top2} that [_{TP} t_{Top3} we picked up t_{Top4}]]]]]. (= (29a))
- (32) This rock_i is too heavy [_{CP} Top_i for us to

try [_{CP} [_{TP} t_{Top1} PRO to order her [_{CP} [_{TP} t_{Top2} to pick up t_{Top3}]]]]]. (= (29b))

The contrast between (29a) and (29b) stems from the difference of the chains which each derivation forms. In (31), the intermediate step of *Top* from base-generated position (t₁) to the [Spec, TP] position (t₃) is driven by the EPP feature on the head of TP. The next movement of the operator, raising to CP, is triggered by a P-feature. The next step of the operator is the raising to the higher [Spec, TP] position (t₁). Hence, a series of derivation creates an improper chain of the form A-A'-A, violating the legibility conditions.

On the contrary, in (32), *Top* operator need not move through [Spec, CP] position on the way to the higher TP position as an intermediate step since the infinitival clause CP is not a phase, so that the operator directly raises from embedded TP to the higher TP position. This indicates that the derivation creates a chain of the form A-A-A. Hence, the derivation of (29b) converges.

4. Conclusion

In this paper, we have attempted to show that the licensing mechanism of a null operator discussed in Sugawara (2003) can extend to the three constructions; *tough* constructions, *too-to* constructions, and *enough to* constructions. In so doing, we crucially adopted the predication developed by Williams (1980) and the framework of Chomsky (2000, 2001).

In section 2, we have dealt with the licensing mechanism of null operator in *tough* constructions via predication relation proposed by Browning (1987). Section 3 has been concerned with *too-to*, and *enough to* constructions. Summarizing the basic nature of these constructions, we have shown whether predication relation works in the constructions.

Furthermore, it was also shown that tensed-S condition can be accounted for if these constructions are analyzed as involving the second type of null operator (*Top*), coupled with

two assumptions; (i) an infinitival clause CP is not a phase, and (ii) the movement of *Top* operator to [Spec, \bar{v} P] position is driven by an EPP feature and a P-feature. We have argued that the derivation forced to move to the [Spec, CP] position causes an improper movement.

Notes

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¹ The definition of the minimal domain is characterized as follows :

(i) Minimal domain

The minimal domain of a head H is the set of terms immediately contained in projections of H.

As for the definition of immediate containment, see Chomsky (2000).

² In Chomsky (2001), an adjunct clause is thought of as a weak phase, which is irrelevant to our analysis.

³ We will assume that, in the case of the movement of *Top* to the [Spec, \bar{v} P] position, it is optionally selected whether the movement is A-movement or A'-movement.

⁴ As another property of *tough* constructions, we observe the following case :

(i) a. * The work_i is pleasant for the rich [for poor immigrants to do t_i]

b. The work_i is pleasant for the rich [PRO to do t_i]

(ii) a. * Latin_i is a waste of time for us [for them to teach us t_i]

b. Latin_i is a waste of time for them [PRO to teach us t_i]

(Chomsky (1973))

When a lexical subject appears in an infinitival clause, the sentence gives rise to the violation of specified subject condition (SSC).

(iii) No rule can involve X, Y in the structure ... X ... [α ... Z ... WYV ...] ...

where Z is the specified subject of WYV

(Chomsky (1973))

The grammatical contrast seems to be associated with other factors than the ones we are discussing.

⁵For the ease of argument, we will omit the traces irrelevant to the discussion.

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