

Too tough to see: null operators and hidden movement chains¹

Abstract

This paper argues for a deep similarity between two infinitival constructions, *tough*-constructions (TCs) and gapped degree phrases (GDPs). Specifically, this paper claims that both constructions contain an “improper movement” chain, where an \bar{A} movement step is followed by an A movement step. An \bar{A} movement step for TCs and GDPs has been proposed in the literature since Chomsky (1977). I show that recent tests for an A movement step in TCs (Hartman 2009, 2012) also suggest the presence of an A movement step in GDPs, based on the ability of oblique arguments to function as “defective intervenors” to gapped-degree movement. However, GDPs and TCs are not identical: GDPs assign an extra Θ -role, and allow subject gaps (which TCs do not). To account for this, I propose (following Chomsky 1977, and more recently Nissenbaum & Schwarz 2011) that GDPs are *null operator* structures, where the null operator itself undergoes “tough” (e.g., improper) movement within the degree phrase. An independently motivated anti-locality constraint (Erlewine 2013) explains the subject gap asymmetry between TCs and GDPs. Thus GDPs can be understood as containing a *tough*-movement “core” inside their DegP. The presence of this movement “core” and the larger structure of the GDP are enough to explain relationship between the two constructions.

1 Introduction

This paper is concerned with gapped degree phrases (GDPs), an \bar{A} movement construction discussed in Chomsky (1977), given in (1), and their relationship to *tough*-constructions (TCs) (2).

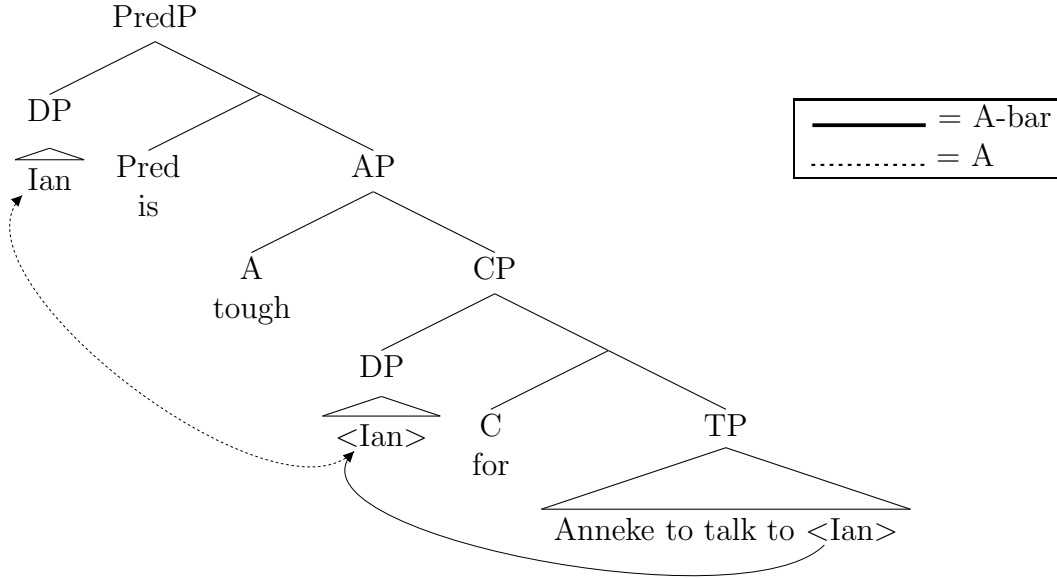
- (1) Ian is *too shy* for Anneke to talk to ____ (2) Ian is *tough* for Anneke to talk to ____

This paper serves two functions: First, it proposes that GDPs, like TCs, are “improper movement” constructions, meaning they contain an \bar{A} movement step that precedes an A movement step in the same chain. While similarities between TCs and GDPs have been noted in the literature since Lasnik and Fiengo (1974), an improper movement analysis has not previously been extended to GDPs. Second, this paper serves as a syntactic companion to Nissenbaum and Schwarz (2011) (henceforth N&S), which proposes a new semantics for gapped degree phrases. This paper shows that the LF proposed in N&S is sufficient to capture the syntactic behavior of GDPs. Particularly, it shows that there are syntactic motivations for a semantically necessary movement chain proposed by N&S for GDPs.

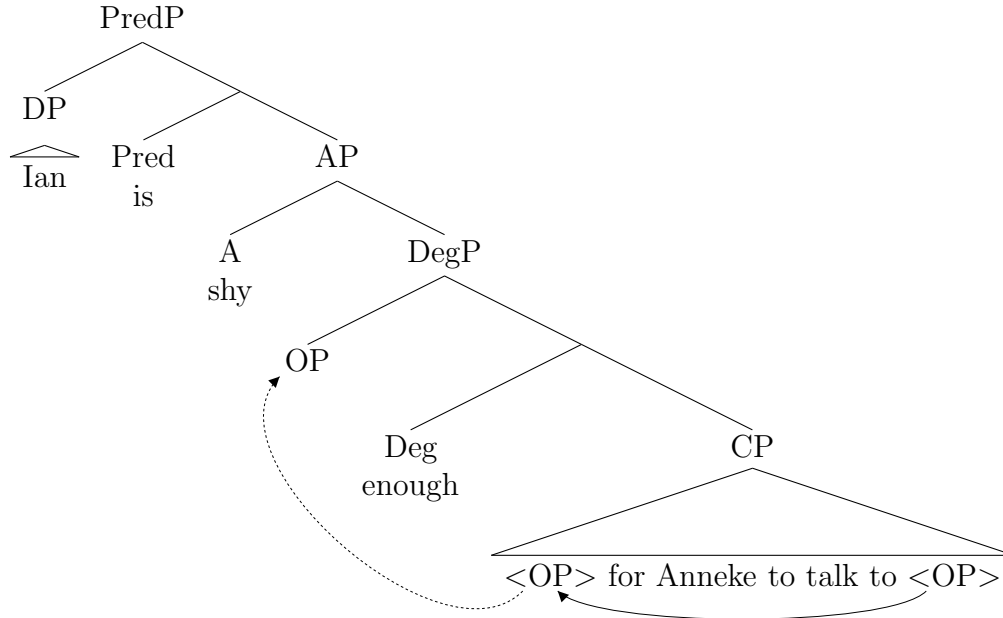
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This majority of this paper is concerned with the relationship between the *movement chains* in GDPs and TCs. This paper shows, based on tests in Sections 3 & 4, that both TCs and GDPs are constructions that contain an improper movement chain (though cf. Chomsky 1977, 1981, Fleisher 2013, and the references therein for an alternative analysis of TCs). This movement chain is schematized in (3) for TCs and (4) for GDPs.

- (3) Ian is tough for Anneke to talk to.



- (4) Ian is shy enough for Anneke to talk to.



In addition to providing evidence for the *location* of the movement chains in (3)-(4), this paper will show that each chain contains both an \bar{A} and an A step, in that order. Section 3

outlines arguments for including an \bar{A} movement step in both TCs and GDPs. Recent evidence supporting the presence of an A movement step in TCs comes from Hartman (2009, 2012). Hartman (2012) shows that the oblique experiencer argument optionally licensed by a *tough*-predicate serves as a “defective intervener” to *tough*-movement; i.e., oblique experiencers block the A movement step of the TC derivation from occurring (cf. Section 4). This follows from a theory of A movement as ϕ -feature motivated movement. This theory of movement is illustrated in (5). In (5a), T triggers movement of the closest DP, in this case *Ian*, which has previously been \bar{A} moved to Spec,CP. The example in (5b) is ungrammatical precisely because *Ian* is not the closest DP. Because the oblique experiencer is present in (5b), only movement of the oblique experiencer itself can be triggered by T²; movement of *Ian* cannot be triggered. In other words: *Ian* cannot move across the oblique argument *for Olivia* without causing a minimality violation (Rizzi 1990). Example (5c) shows that the contrast in (5a)-(5b) does indeed reduce to movement restrictions. When no movement occurs, an oblique experiencer can grammatically co-occur with a *tough* adjective. The ϕ -driven movement pattern illustrated in (5) is often assumed to be a symptom of A movement because canonical A movement operations (e.g., EPP- and case-driven movements) are sensitive to ϕ -feature relations, however Section 6 will question that assumption.

- (5) a. Ian is tough [_{CP} t_I for Anneke to talk to t_I]
 b. *Ian is tough [_{PP} for Olivia] [_{CP} t_I for Anneke to talk to t_I]
 c. It is tough [_{PP} for Olivia] [_{CP} for Anneke to talk to Ian]
-

In Section 2.4, I show that GDPs can also optionally license an oblique argument, called an *evaluator*. These evaluators are crucially introduced internal to the DegP in GDPs. In Section 4, I show that these DegP internal evaluators serve as “defective intervenors” to GDP movement. The presence of Hartman-style defective intervention effects in GDPs suggests that, like TCs, they contain both an A and an \bar{A} step. When the evaluator is absent, both the \bar{A} and the A movement steps of the GDP derivation can proceed uninhibited (6a), cf. (4). However, when the evaluator is present, the A-movement step of the GDP is blocked, (6b), cf. (5) parallel to TCs.

- (6) a. Ian is too shy [_{CP} for Anneke to talk to _]
 b. *Ian is too shy [_{PP} for Olivia] [_{CP} for Anneke to talk to _]
 c. For Olivia, Ian is too shy [_{CP} for Anneke to talk to _].

²Such movement would result in the oblique experiencer being assigned nominative case, a case theory violation since the oblique experiencer is already case-marked by its preposition.

This paper also discusses the differences between TCs and GDPs. One difference between the two constructions involves Θ -role assignment. While TCs crucially *do not* assign a Θ -role to their matrix subject, GDPs crucially *do*. Thus, while (unmoved) TCs can occur with an expletive *it* in matrix subject position, (unmoved) GDPs cannot (7). That the matrix subject position of TCs is not a Θ -position was one of the original arguments used for assuming an A movement step in TC movement chains.

- (7) a. It's tough for Ian to talk to Anneke. (TC)
 b. *It's too shy for Ian to talk to Anneke. (GDP)

Additionally, TCs cannot contain a non-expletive subject if they contain a *for* phrase without a gap. This is illustrated in (8a), which appears to fail precisely because no Θ -role is assigned to *Olivia*, the matrix subject. Gapless degree phrases, like (8b), can occur with a matrix subject and an embedded clause, further suggesting that GDPs do assign a Θ -role to their matrix subject.

- (8) a. *Olivia is tough for Ian to talk to Anneke. (TC)
 b. Olivia is too smart for her papers to be rejected. (GDP)

This Θ -role asymmetry can be accounted for by claiming that GDPs, but *not* TCs, are *null operator* constructions. In TCs an overt DP undergoes movement, and is assigned a Θ -role only in its base position. In GDPs, it is not the matrix subject itself, but rather a *null operator* that moves. This null operator movement is entirely internal to the embedded clause; the null operator never moves into the matrix clause. After this movement chain is completed, the null operator is semantically linked to its antecedent in the matrix clause³.

A null operator movement account of GDPs requires a particular constituent structure, given in (9) (cf. N&S 2011). This constituent structure corresponds to the word-order of *enough*-type degree phrases, but not the word-order of *too*-type degree phrases⁴. The structure for (9) leads to the following (very informal) semantics: “Ian is shy to a degree, *d*. This degree is greater than or equal to the degree of shyness that prohibits Anneke from talking to Ian.”

³Another way to think of this is in terms of *semantic types*. *Tough*-constructions involve an adjective that relates situation (truth conditions) to degrees (e.g., of toughness, ease, difficulty); these adjectives are of type $\langle st \langle d, st \rangle \rangle$. Gapped degree phrases involve an adjective that relates an individual to degrees (e.g., of shyness, happiness, intelligence); these adjectives are of type $\langle e \langle d, st \rangle \rangle$.

⁴Note that this structure is minimally different than that proposed in N&S 2011, where the DegP is a *leftward* complement to the AP (in my example, the DegP is a *rightward* complement of the AP). This change is made largely for clarity, as it better reflects English word-order and does not (to the best of my knowledge) make any predictions that diverge from the original structure proposed in N&S 2011

- (9) Ian is [_{AP} shy [_{DegP} OP too [_{CP} t_{op} for Anneke to talk to t_{op}]]]
-

When the structures and movement chains of GDPs and TCs are compared, the following relationship emerges: GDPs are structurally “larger” than TCs. While TCs and GDPs both contain movement chains of the same *length*, the movement chain in TCs spans the entire sentence—an element Merged in the embedded clause moves to matrix subject position. GDPs involve a movement chain that does not reach the matrix clause—GDP movement is entirely internal to the DegP. Thus the DegP internal to the GDP can be thought of as containing an instance of *tough*-movement (with Deg essentially playing the syntactic role of the *tough* predicate). Taking this comparison seriously immediately makes predictions about the properties of Deg and its specifier. Deg must have a ϕ -probe, like T. Spec-DegP will have the properties of an A position, as least as far as ϕ -feature driven movement is concerned. In Sections 4 & 5, I show that these predictions are borne out.

The remainder of this paper argues that these two structural differences—the presence of an additional syntactic layer and a Θ -role in GDPs—is sufficient to explain the syntactic similarities and differences between the two constructions. The improper movement chain within the degree phrase in GDPs is sufficient to explain why the two constructions show hallmarks of both A and \bar{A} movement. The null operator analysis of GDPs explains why GDPs have a Θ -role that TCs lack. Finally, analyzing GDPs as structurally larger than TCs—when coupled with an independently proposed anti-locality restriction (Erlewine 2013, cf. Abels 2003, Bošković 2005)—will be shown to explain the final difference between TCs and GDPs: that while subjects of the embedded CP cannot undergo *tough*-movement, null-operator subjects of GDPs can be extracted (10).

- (10) a. *Anneke is tough $_\$ to talk to Ian⁵. (TC)
 b. Anneke is too smart $_\$ to talk to Ian. (GDP)

The paper is organized as follows. Section 2 discusses GDPs in greater detail, paying particular attention the constituent structure that corresponds to the LF proposed in N&S and the Merge location of the evaluator. Section 3 briefly reviews \bar{A} movement tests for TCs and (object) GDPs. Section 4 gives evidence for a A movement step in both TCs and (object) GDPs. Section 5 discusses subject GDPs specifically. Section 5 also discusses the subject extraction asymmetry between TCs and GDPs, and suggests that a previously proposed theory of anti-locality can account for this difference. Section 6 reviews the analysis, and

⁵This sentence is grammatical on a reading where *Anneke* herself receives a Θ -role from *tough*; however, that reading is not an example of *tough*-movement. The sentence is additionally marginally grammatical on a “coercion” reading, with a semantics of approximately “talking to Ian was a tough thing for Anneke to do.” This is also not *tough*-movement. See Stowell (1991) for an analysis of these constructions.

discusses its consequences, particularly for theories of improper movement and anti-locality.

2 Gapped degree phrases

2.1 The pieces

Gapped degree phrases, like (11), contain two parts, a degree word (such as *too* or *enough*) and the embedded CP licensed by the degree word⁶.

- (11) a. Ian is too shy for Anneke to talk to __.
b. Anneke is too smart __ to talk to Ian.

Evidence that the embedded CP is truly an argument of the degree word comes from pairs like (12), taken from Lasnik & Fiengo (1974:536) where the CP cannot occur without the presence of the degree word. In accordance with the gradable adjectives literature, I call this embedded CP the *standard*.

- (12) a. This mattress is {thin/thick}.
b. *This mattress is {thin/thick} to sleep on⁷.
c. This mattress is {too thin/thick enough} to sleep on.

In addition, GDPs can also optionally license an *evaluator*. The *evaluator* evaluates the *standard*, relative to their belief worlds. In (13), *Lars* evaluates the thickness of the mattress, relative the baby's sleeping on it.

- (13) For Lars, this mattress is {too thin/thick enough} for the baby to sleep on.

The remainder of this section is devoted to discussion these parts of the (gapped) degree phrase (the degree word, the standard and evaluators), independently and in concert. Section 2.2 discusses the constituent structure of GDPs, assuming the LF proposed in N&S. It also describes the DegP-internal null operator movement chain proposed in N&S for GDPs. Section 2.3 very briefly reviews the properties of the degree words themselves (cf. Meier 2003 for a more thorough discussion). Section 2.4 discusses evaluators. Particularly, it gives word-order and movement arguments for introducing the evaluator internal to the DegP.

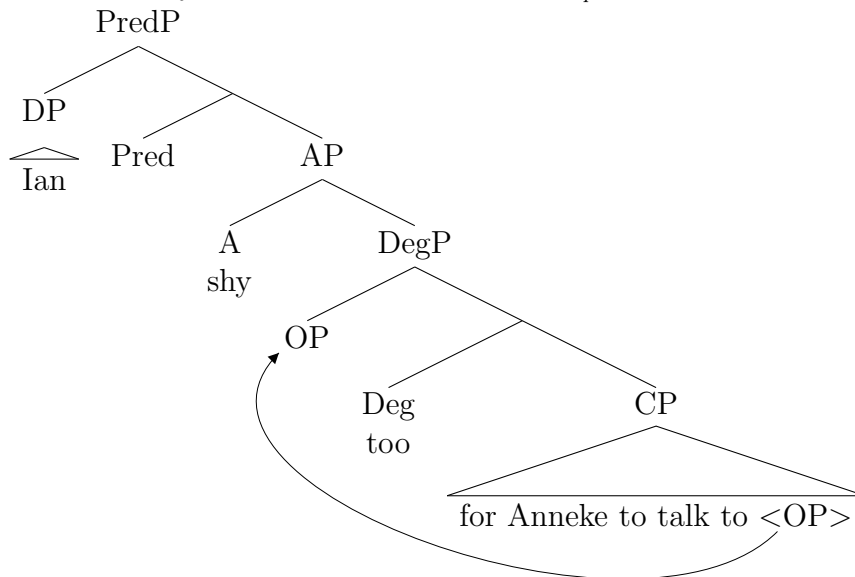
⁶Degree words can themselves appear without an overt CP as their complement., i.e., 'This mattress is too thin.' A prediction of this analysis is that, in such constructions a (perhaps contextually specified) CP is semantically present but not overt, analogous to comparative deletion.

⁷A small class of adjectives are grammatical in this constructions, as in '*These flowers are pretty to look at*'. This paper will not discuss these constructions.

2.2 The structure

Section 1 introduced a syntactic structure for GDPs, corresponding to the LF proposed for GDPs in N&S (9) (cf. (4)). This structure is given again in (14).

(14) Ian is too shy OP for Anneke to talk to t_{op} .



The specifics of the null operator movement chain in (14) are left intentionally unspecified for the moment; the movement chain in (14) should be taken as an abbreviation, showing only its tail (where the null operator is first Merged) and its head (the null operator’s final landing site). For the purposes of this paper, the most crucial part of this structure is the final landing site of the null operator. As proposed in N&S, the null operator obligatorily moves to the highest specifier of the Degree Phrase—the phrase introduced as the complement to the adjective itself.

This movement is semantically necessary. Without this movement, the null operator cannot be linked up with its antecedent in the matrix clause, in this case *Ian*. Put another way: without this movement, there is no way to account for the obligatory identity between the operator and its matrix antecedent. This semantic binding happens via an extension of Predicate Modification, which N&S call COMPOSE. This semantic operation is utilized elsewhere in the grammar. Following Nissenbaum (2000), N&S argue that, among other things, COMPOSE is the operation used to bind the gap sites in parasitic gaps, another null operator construction. For a full account of how this structure is semantically calculated, see N&S (2011). However, it is not immediately clear that this analysis captures English word-order facts. While this structure predicts the correct word order for *enough*-type degree phrases, where the degree word follows the adjective (e.g., ‘Ian is **shy** *enough*...’), it predicts the wrong word order for *too*-type degree constructions, where the degree word precedes the

adjective (e.g., ‘Ian is *too shy*...’).

Both *too* and *enough* type degree words can be understood as having the structure as in (14). Because the structure in (14) is the structure required by the semantics, *too*-type degree words must contain an additional syntactic movement step, where the degree word itself moves to some position in the AP (or higher). In (17), I indicate an example of how this might happen, by head-moving *too* into the adjective *shy*. The purpose of this discussion is to show that the word-order differences between *too* and *enough* are not problematic for this analysis, and can be outsourced to other components of the grammar, without negatively affecting the analysis herein. This dovetails with other analyses of the two constructions—Meier (2003) and N&S 2011 both assume an identical structure for *too* and *enough* structures, despite the difference in (English) word order⁸. Movement along the lines of that suggested in (17) is supported by constituency tests, which suggest that *too* and *enough* do in fact have distinct constituent structures. Specifically, *enough* can be easily separated from its adjective, while *too* cannot be, suggesting that *too* and the adjective form a constituent, while *enough* and its adjective do not.

- (15) a. Enough (for us) to see it again, that’s how good the movie was!
 b. *Too (for us) to see it again, that’s how boring the movie was!

Under a theory where *too* obligatorily moves out of the DegP, the ungrammaticality of (15b) is easy to explain. In (15a), *enough* does not have to move, so (15a) is grammatical. In (15b), *too* has not been able to move out of the DegP, crashing the sentence. Note that a larger constituent, containing *too* in its target movement position, can be left-dislocated (16).

⁸Other analyses give slightly different structures. Some theories propose a basic word-order for all comparatives/degree structures, and then assume an obligatory instance of extraposition, as in (i)-(ii).

- (i) **Basic word order:** John is [DegP very] shy
 John is [DegP enough to talk to Anneke] shy
- (ii) **Obligatory extraposition:** John is t_{DegP} shy [enough to talk to Anneke]

Note that, even assuming obligatory extraposition, *too* must undergo some kind of movement to (or above) the AP.

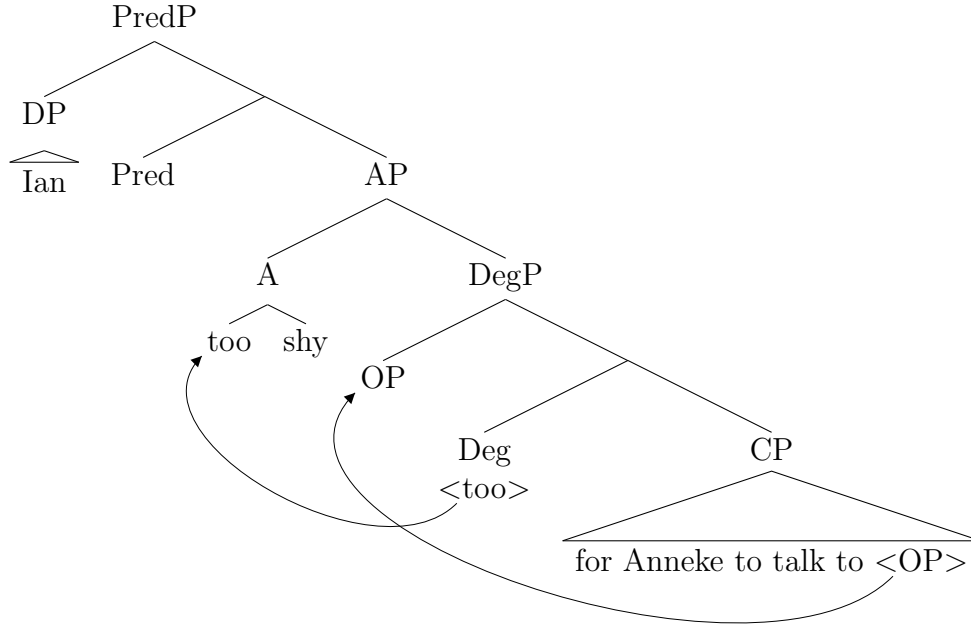
- (iii) John is t_{DegP} [AP too shy] [DegP t_{too} to talk to Anneke]

This paper does not assume an obligatory extraposition approach—but neither does it reject one. Because this paper focuses on a movement chain entirely internal to the DegP, obligatory extraposition approaches make the same predictions as structures like (9)/(4). It should also be noted that N&S give their examples with a head-final AP, as in (i) (though they do not discuss obligatory extraposition). Because compositional semantics is not effected by directionality, using a head-initial AP (as in (9)/(4)) does not significantly diverge from their analysis.

(16) Too boring (for us) to see again, that how (boring) the movie was.

Thus, the structure of *too*-type degree phrases can be understood as in (17):

(17) Ian is too shy OP for Anneke to talk to t_{op} .



For the remainder of this paper, I will use the structure given in (14), not (17) for clarity. This is consistent with N&S and Meier (2003), who claim that both *too* and *enough* should have the same semantic constituent structure. Following the data in (15)-(16), I assume that the constituent structure proposed in this section is not incompatible with English word order.

2.3 Too & enough & thresholds

This section very briefly reviews the semantic properties of the degree words *too* and *enough* (for more information, see Meier 2003), and introduces the notion of a *threshold*.

Too and *enough* are both modal operators that can express deontic and epistemic modalities. This is given in (18). *Too* and *enough* can also act as a kind of counterfactual, as in (19).

(18) You're too tall to ride the roller-coaster.

- a. Deontic: because the theme-park rules say that it's so.
- b. Circumstantial: because you don't fit in the seats.

(19) a. This paper is *too short* to publish, but we'll do it anyway.

- b. This paper isn't *long enough* to publish, but we'll do it, anyway.

These are properties of the degree words themselves, not the constructions they occur in. Meier (2003) claims that the facts in (18)-(19) follow from the fact that *too* and *enough* both take a covert modal as their complement. This is schematized in (20)⁹.

- (20) Bertha is too young to drive.
 Bertha is [young [[too CAN] to drive a car]]

The counterfactual reading of *too* and *enough* stem from the fact that the sentence (and the covert modal) can either be evaluated against the possible world, or some idealized world. In this paper, mainly to simplify the discussion, I treat *too* itself as a modal operator, instead of a comparative element that embeds a covert modal operator. Purists may think of the modal *too* I describe as the complex operator *too CAN*. For the purposes of this paper, *too* and *enough* are important because they convey degrees of sufficiency and excess¹⁰, relative to a threshold, as in (21).

- (21) Anneke is too short to play in the WNBA.

In (21), *Anneke*'s degree of height does not meet the threshold established for playing in the WNBA. A parallel example is given in (22) with *enough*. In (22), *Anneke*'s degree of height is at or above the threshold established for playing in the WNBA.

- (22) Anneke is tall enough to play in the WNBA.

Some thresholds are (somewhat) debatable: the height threshold for playing in the WNBA is related to one's ability to jump and maneuver a basketball above the heads of others, but it not listed in the organization's official rules. Other thresholds are not debatable: The temperature threshold for when rain turns to snow is established by physics. However, some thresholds are subjectively and individually determined. The wealth threshold that determines whether a person is rich or not may be set subjectively. The same can be said for the cost threshold that determines whether an item is expensive or cheap. Sentences with a subjective threshold are *judgement calls*. It's important to note that *too* and *enough* constructions are not the only constructions that can express judgement calls (i.e., subjective thresholds), though those will be the primary focus of this paper.

⁹This analysis is similar to other, more recent analyses that have proposed the presence of covert modals in bi-clausal structures, such as Harves and Kayne (2012) for *have* and Kayne (2009) for *be* (i).

i. a. Bertha has NEED to buy a car.

b. Bertha is SUPPOSED to arrive at 7.

¹⁰Whether *too/enough* determine sufficiency/excess or deficiency/lack depends on whether the degree word occurs with positive or negative polar adjectives (e.g., *tall* and *old* are positive while *short* and *young* are negative). For more information, see Meier (2003).

2.4 Evaluators

Evaluators evaluate. Specifically, they evaluate whether or not a threshold is met, relative to their belief worlds.

- (23) For Olivia, Ian is too shy for Anneke to talk to.

When evaluators are present, we only have information about how the evaluators understands the threshold. In (23), *Ian* may indeed have talked to *Anneke*; *Olivia* may just misunderstand the degree of shyness that prohibits this from happening. Importantly, evaluators can only occur with judgement calls. When an evaluator is combined with a sentence that does not involve a judgement call, the result is distinctly odd. Compare (24a) to (24b).

- (24) a. #For Olivia, 0°F is too warm for rain to turn to snow.
b. For Olivia, 105°F is too warm for anyone to go outside.

As noted briefly in Section 2.3, *too* and *enough* constructions are not the only judgement call constructions. Adjectives and other degree constructions can also be judgement calls, as in (25).

- (25) a. For me, teal is blue, but for Chris it's more of a green.
b. For a graduate student, he's a very rich man but for Bill Gates he's a pauper.
c. For Anthony, big cities are the least fun to visit.

The judgement calls in (25) can all occur with evaluators because they do not refer to objectively set thresholds. Whether teal is blue or green is a matter of debate. There is no universally accepted threshold for richness or non-subjective list of best places to visit. Comparatives, however, do not (easily) occur as judgement calls—they include an overtly established threshold. As predicted, comparatives like (26) cannot co-occur with evaluators.

- (26) #For Olivia, Javi is taller than Anneke.

The remainder of this section looks at *where*, in a judgement call, the evaluator is introduced. While evaluators may be able to be introduced in multiple locations, I propose that, when evaluators co-occur with *too* and *enough* degree phrases, one of the locations where evaluators can be introduced is internal to the DegP¹¹. Support for this claim comes from word-order facts in sentences like (27)-(29), where the evaluator linearly follows both the degree word

¹¹The fact that evaluators can occur with sentences that do not contain a degree word like *too* or *enough* shows that evaluators do not obligatorily need to be introduced internal to a DegP. In these cases, I propose that evaluators are introduced at or above the CP, in the left periphery of the sentence. In Section 4, I show that evaluators of judgement calls that contain a DegP can either occur at the left-edge of the sentential CP or internal to the DegP.

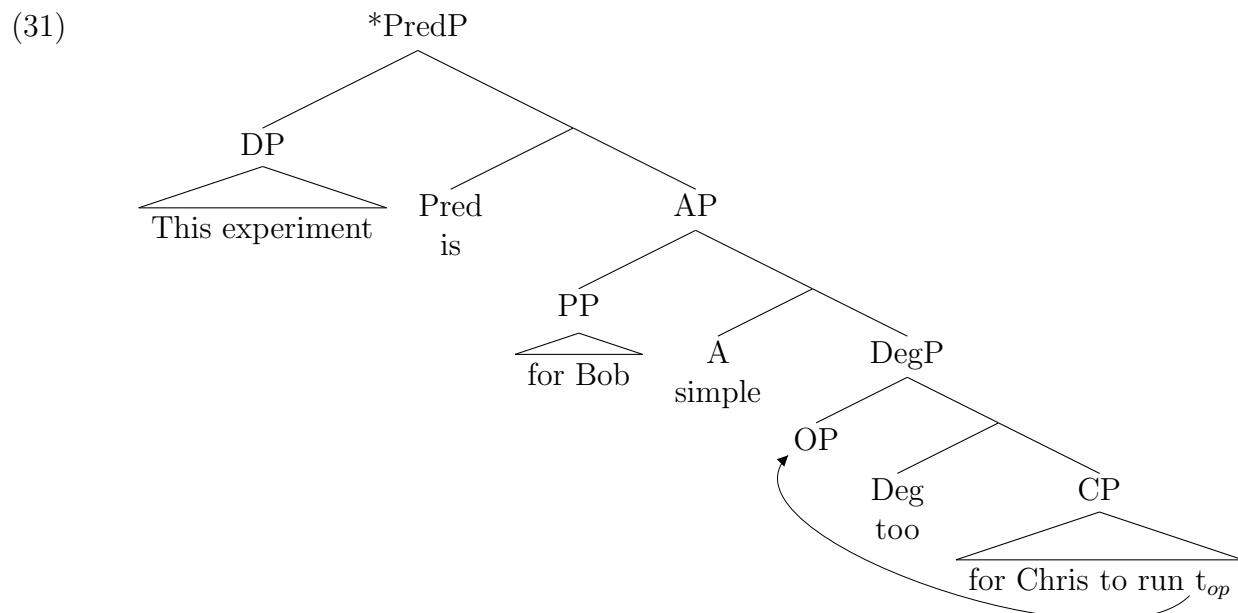
and the adjective.

- (27) CONTEXT: Chris needs to run an experiment that will only be successful if performed in warm weather. He cannot run it without his advising committee's approval.
It's too cold [PP for his advising committee] [CP for Chris to run the experiment]
- (28) CONTEXT: Marie and Paul had a messy breakup last year
It's too awkward [PP for Marie] [CP for Paul to be at the party]
- (29) CONTEXT: The superintendent of a school district is a very conservative man, prone to avoiding controversy. He determines which books the entire district is (not) allowed to assign.
The Handmaid's Tale is too controversial [PP for the superintendent] [CP for any high school to assign it next semester]

Additional evidence for introducing evaluators internal to the DegP comes from movement facts. While evaluators can occur sentence-internally in *gapless* degree phrases, they cannot occur sentence-internally in *gapped* degree phrases (30), cf. (27).

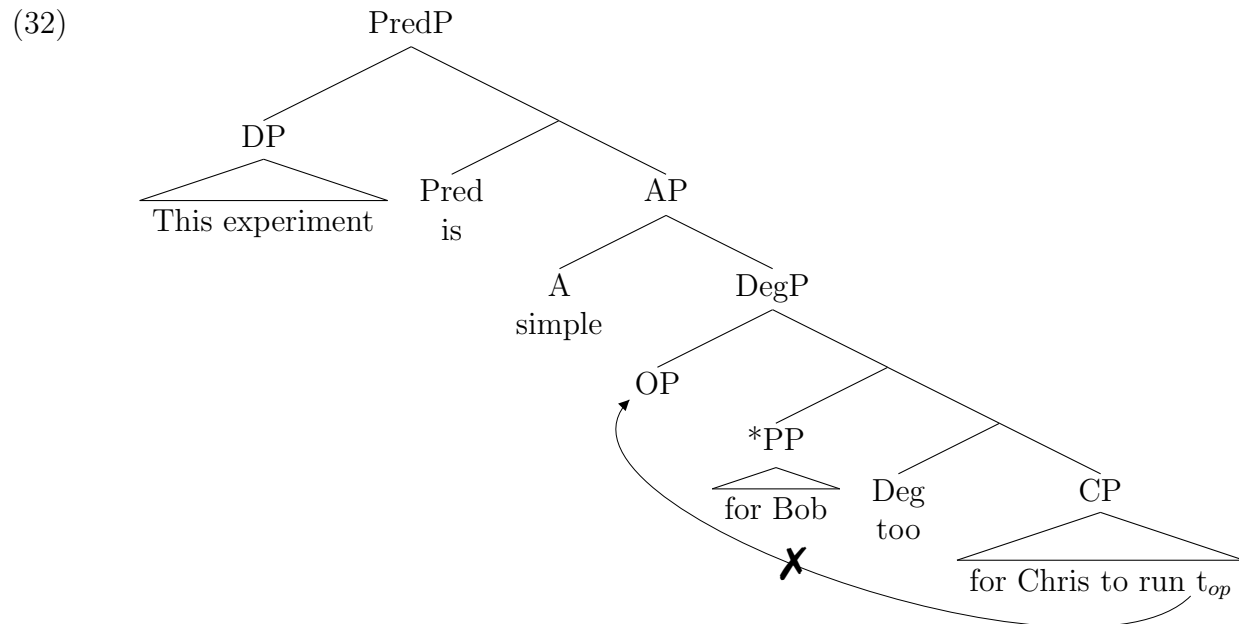
- (30) *This experiment is too simple [PP for his committee] [CP for Chris to run _].

The contrast between (30) and (27) is mysterious if sentence-medial evaluators are introduced outside the DegP—say, as part of the AP. Abstracting away from word-order, a structure where the evaluator is introduced above DegP would look like (31).



In (31), there is no reason why the movement chain would be prevented from taking place, and in fact no reason why the sentence would be ungrammatical. However, if the evaluator is introduced DegP internally, we predict the ungrammaticality of (30). Recall that the

introduction proposed that spec-DegP was a position with A properties (specifically because Deg has a ϕ -probe). This predicts that movement of the null operator to spec-DegP is ϕ -driven. When the evaluator is introduced internal to the DegP, as in (32), it functions as a defective intervener to the necessary null operator movement¹². The tree in (32) assumes that Deg has multiple specifiers, one in which an argument (the evaluator) can be introduced and another which can function as a landing site for movement.



Given the word-order facts and movement contrasts discussed in this section, the remainder of this paper will assume that evaluators, when they co-occur with *too/enough* constructions, can be base generated internal to the DegP.

2.5 A note on the examples

So far, this paper has discussed only two degree words that can be used in the formation of GDPs—*too* and *enough*. Primarily for clarity, this paper will predominantly give examples with *too* alone. Unless stated otherwise, the judgements are parallel across the two words. With the exception of the word order and constituency differences noted in Section 2.2, GDPs formed with either degree word appear more or less identical.

Other degree words may very well license GDPs (33), but this paper will be primarily concerned with degree phrases that contain an overt *too/enough*. Some degree words do not license GDPs (34). Developing a typology of which degree words can occur with GDPs, and

¹²In (32), Deg is represented as having multiple specifiers—one hosting the evaluator and the other hosting the null operator.

explaining that typology in full, is an interesting problem left for future research.

- (33) a. Ian is rather ugly for Anneke to talk to __.
 b. Ian is kind of shy for Anneke to talk to __.
 c. Ian is awfully shy for Anneke to talk to __
- (34) a. *Ian is very shy for Anneke to talk to __.
 b. *Ian is so shy for Anneke to talk to __.
 c. *Ian is entirely shy for her to talk to __.

3 \bar{A} movement

Tough-constructions have been argued since Chomsky (1977) to contain an \bar{A} step, beginning in the embedded object position and ending in the embedded spec-CP. However, since Chomsky (1977), there has been debate about *which kind* of syntactic element undergoes that \bar{A} movement. In Chomsky (1977), it was a null operator. However, more recent improper movement analyses of *tough*-constructions propose that it is the object DP itself that undergoes this \bar{A} movement step. This paper will also assume it is the embedded object DP—and not a null operator—that undergoes \bar{A} movement in TCs, as (partially) schematized in (35).

- (35) — is tough [_{CP} Ian C [_{TP} for Anneke to talk to <Ian>].]
- 

Support for proposing an \bar{A} movement step in *tough*-constructions comes from the fact that *tough*-movement display many properties of \bar{A} movement constructions. *Tough*-constructions can license parasitic gaps (36), traditionally thought to be licensed by \bar{A} movement (Engdahl 1983).

- (36) a. That candidate was easy to hire *t* [without interviewing *pg*]. (tough PG)
 b. Which candidate did you hire *t* [without interviewing *pg*]? (wh PG)

There is also evidence from island effects (Chomsky 1977). In TCs, the gap site can be separated from its filler by a clause boundary (37a). However, the gap site cannot be separated from its filler by an island boundary (37b).

- (37) a. Ian is tough [_{CP} for Anneke to say [_{CP} that she has talked to __]] (clause)
 b. *Ian is tough [_{CP} for Anneke to talk about [_{DP} the book written by __]] (island)

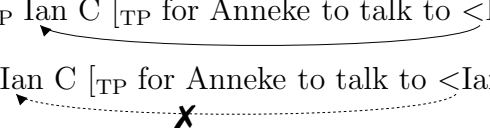
Additionally, *tough*-movement from the higher position of double object constructions (DOCs) is prohibited (38a). This restriction is found in other \bar{A} movement constructions, like *wh*-movement, as well (38b).

- (38) a. *Ian was tough to give *t* this book. (DOC *tough*-extraction)
 b. *Who did you give *t* this book? (DOC *wh* movement)

Chomsky (1977:104) states that an \bar{A} step in *tough*-constructions is a particularly “natural” argument, as *tough*-constructions have “analogous forms in which [a] *wh*-phrase may directly appear” (39).

- (39) a. a tough chair on *which* to sit
 b. an easy violin *on which* to play sonatas

Final support for this \bar{A} step is theory internal: *tough*-extraction can occur over the subject of the embedded CP without causing a relativized minimality violation. Because the embedded object must move over another argument—the embedded subject (either overt or PRO)—relativized minimality requires that this step *must* be \bar{A} movement. A movement would result in a RM violation, with the embedded subject functioning as a defective intervener.

- (40) a. ✓__ is tough [_{CP} Ian C [_{TP} for Anneke to talk to <Ian> .]] (\bar{A})
 b. *__ is tough [_{CP} Ian C [_{TP} for Anneke to talk to <Ian> .]] (A)
- 

Object GDPs behave identically to *tough*-constructions with respect to \bar{A} movement tests. GDPs license parasitic gaps (41) and disallow extraction of the indirect object in DOCs (42).

- (41) Ian is too shy for Anneke to talk to *t* [without getting to know *pg*]
 (42) Ian is too dumb to give __ this book. (DOC extraction)

Additionally, the null operator cannot move across an island boundary (43a), but the null operator can be separated from its gap site by a clause boundary (43b).

- (43) a. *Ian is too reclusive [_{CP} for Anneke to talk about [_{DP} the book written by __]]. (island)
 b. Ian is too reclusive [_{CP} for Anneke to say [_{CP} that she has talked to __]]. (clause)

Gapped degree phrases also have a corresponding overt *wh*-construction (45)¹³.

- (44) a. She thinks 35 miles/week is *too small a base on which* to run a marathon.
 b. I don't believe this is *a big enough hook on which* to hang a coat.

¹³I only nominally have these constructions in my grammar; these examples are results from the first page of Google searches for “too * a * on which to” and “a * enough * on which to,” which yielded 274,000,000 and 255,000,000 search results, respectively. Other native English speakers who have this construction in their grammars agree with these judgements.

Finally, GDPs also allow movement of the extracted object past the subject of the embedded CP. As briefly discussed in Section 1, this fact suggests that the movement step from the embedded object position to embedded spec-CP is not ϕ -driven movement. Generally, \bar{A} movement is *not* thought to be ϕ -driven. Because the ϕ -features of the embedded subject do not block movement of the embedded object, we expect that the object \bar{A} moves at least as high as the embedded CP (45). Recall that this is *null operator movement*, which occurs internal to the DegP.

- (45) a. ✓... [AP shy [DegP too [CP OP C [TP for Anneke to talk to t_{op} .]]] (\bar{A})
 b. *... [AP shy [DegP too [CP OP C [TP for Anneke to talk to $<t_{op}$.]]] (A)
-

For the remainder of this paper, I make the following assumptions about \bar{A} movement: An \bar{A} extracted argument may only cross a phase boundary if it first moves to the specifier of that phase. Both CP and v P function as phases. \bar{A} movement is successive-cyclic, and \bar{A} extracted arguments move through spec- v P on their way to spec-CP (Fox 1999, Rackowski and Richards 2005, van Urk and Richards 2013). Given these assumptions, the \bar{A} step of TCs and GDPs can be represented as follows (with traces used in place of copies, for space):

- (46) *Tough* constructions
 – is tough [CP Ian C [TP for Anneke to [v P t_I talk to t_I .]]]
- (47) Gapped degree phrase
 Ian is [AP shy [DegP too [CP OP C [TP for Anneke to [v P t_{op} talk to t_{op} .]]]]
-

Split-antecedent tests support distinguishing the \bar{A} movement chains of TCs and GDPs as in (46)-(47), at least in terms of *what* kind of element undergoes \bar{A} movement in each construction. The example in (48) show that GDPs can occur with split antecedents (48a) while TCs cannot (48b).

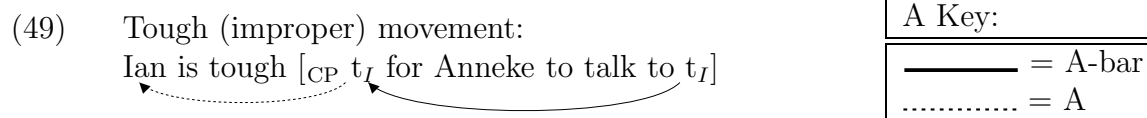
- (48) a. Lars is friendly enough and Chris is compassionate enough (for me) to introduce
 __ to each other. (GDP)
 b. *Lars is easy and Chris is tough (for me) to introduce __ to each other. (TC)

This follows naturally from the analysis proposed here, where a null operator undergoes \bar{A} movement in GDPs and an overt DP undergoes \bar{A} movement in TCs. In gapped degree phrases, the null operator moves within the phasal DegP, and then links up to its split antecedent, base generated in the matrix clause. In TCs, the split antecedent would need to be moved from the embedded clause to the matrix clause. This kind of movement is predicted to cause a binding theory violation. This account explains why (48b) is ungrammatical,

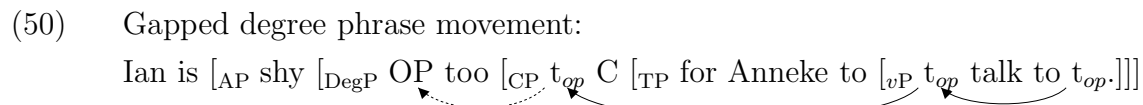
unlike (48a). Thus, the ungrammaticality of the *tough*-construction (48b) is expected on an analysis where *tough*-constructions contain a single movement chain, from the embedded object position to the matrix subject position.

4 A movement

This section adopts and defends an improper movement analysis of *tough*-constructions and gapped degree phrases. To do this, this section shows that the derivations of both TCs and GDPs contain an A movement step, which crucially must occur after the \bar{A} movement step discussed in Section 3. The improper *tough*-movement structure is schematized in (49), repeated from (3), cf. (46). Evidence for this movement chain in *tough*-constructions comes from Hartman (2009, 2012), which shows that (a) English is language sensitive to certain types of RM effects, where an intervening argument can block A movement and (b) these RM effects are seen in *tough*-constructions, where the presence of an argument above the CP can indeed block *tough*-movement. Arguments for an improper movement chain in gapped degree phrases come from applying Hartman's tests to these constructions, which produce results that mirror the *tough*-construction data¹⁴.



The gapped degree phrase improper movement chain is illustrated in (50) cf. (47). Unlike *tough*-constructions, however, this movement chain does not extend into the matrix clause. In gapped degree phrases, the entire improper movement phrase is internal to the DegP that contain the null operator.



4.1 English is a defective intervention language

Hartman (2009, 2012) supports an improper movement analysis of *tough*-constructions by showing that *tough*-constructions are sensitive to defective intervention effects when an oblique experiencer is present. Oblique experiencers are oblique arguments optionally licensed by some predicates, including *tough* adjectives and ECM verbs, as illustrated in (51).

¹⁴For analyses of *tough*-constructions that do not assume an A movement step, see Chomsky (1977, 1981), Fleisher (2013) and the references therein.

(51) Oblique experiencers

- a. It was hard [_{PP} on Mary] [_{CP} for her boyfriend to give up sugar] (TC)
- b. The prosecutor proved [_{PP} to the jury] [_{CP} that the defendant was guilty] (ECM)
- c. It was proven [_{PP} to the jury] [_{CP} that the defendant was guilty]

The argument status of these experiencers is shown by *wh*-extraction tests. Because the DP can be grammatically *wh*-extracted from the experiencer PP, we predict these oblique PPs to be arguments, not adjuncts.

- (52) a. Who was it hard [_{PP} on *t_{wh}*] [_{CP} for Mary to give up sugar]?
- b. Who did the prosecutor prove [_{PP} to *t_{wh}*] [_{CP} that the defendant was guilty]?
- c. Who was it proven [_{PP} to *t_{wh}*] [_{CP} that the defendant was guilty]?

In both active and passive ECM constructions, oblique experiencer block A movement, (53)-(54). This contrast can be reduced to a RM violation. Since an argument cannot A move over another argument¹⁵, ECM constructions containing both an oblique experiencer an argument that must A move across the experiencer are predicted to be ungrammatical. This prediction is borne out in (53a) & (54a), where A movement across an experiencer is ungrammatical. When the oblique experiencer is not present, A movement of a lower argument is predicted to be licit. This prediction is borne out in (53b) & (54b).

(53) Active ECM verb

- a. *The prosecutor proved the defendant [_{PP} **to the jury**] [_{TP} t to be guilty]
- b. The prosecutor proved the defendant [_{TP} t to be guilty]

(54) Passive ECM verb

- a. *The defendant was proven [_{PP} **to the jury**] [_{TP} t to be guilty]
- b. The defendant was proven [_{TP} t to be guilty]

Hartman shows that these defective intervention effects can be obviated by moving the experiencer to a non-intervention position elsewhere in the clause (55).

- (55) a. [_{PP} **To the jury**], the prosecutor proved the defendant [_{TP} t to be guilty].
- b. [_{PP} **To the jury**], the defendant was proven [_{TP} t to be guilty]

¹⁵There are two exceptions to this rule, perhaps English specific. The English verbs *seems* and *appears* license A movement (raising) across an intervening experiencer (i). These verbs are anomalous in this regard; to the best of my knowledge, there is no account about why they do not show the same defective intervention effects found in other constructions, like ECM verbs.

- (i) a. ✓Lars seems **to me** [t to have stolen the coffee] b. Lars appeared **to me** [t to have stolen the coffee]

4.2 Defective intervention and improper movement

Crucially, Hartman shows that *tough*-constructions are also sensitive to RM effects. As seen in (51), *tough*-predicates can optionally license an oblique PP experiencer. When the oblique experiencer is not present, *tough*-movement is grammatical (56b). As with ECM active and passive constructions, *tough*-moving an argument from the embedded CP over a PP experiencer argument results in ungrammaticality (56c).

- (56) a. It is enjoyable ([PP to me]) [CP for John to eat strawberries.]
 b. Strawberries are enjoyable [CP for John to eat *t*]
 c. *Strawberries are enjoyable [PP to me] [CP for John to eat *t*]

Similarly, moving the PP experiencer to a non-intervention position in the clause is enough to avoid the relativized minimality violation and license *tough*-movement again (57), from Chomsky (1977).

- (57) a. It is easy [PP for the rich] [CP for the poor to do the work]
 b. *The work is easy [PP for the rich] [CP for the poor to do $_\$].
 c. The work is easy [CP for the poor to do $_\$].
 d. [PP For the rich], the work is easy [CP for the poor to do $_\$].

These facts suggest that the final step in the *tough*-movement chain is an A movement step. However, this analysis hinges on the assumption this argument is the subject of the embedded CP, *not* an experiencer licensed by the *tough*-predicate. Hartman (2009, 2012) has several arguments for this. The strongest comes from *tough* predicates that license oblique experiencer with a preposition other than *for*, as in (58).

- (58) a. It was hard [PP **on** Mary] [CP for her boyfriend to give up sugar]
 b. It is enjoyable [PP **to** John] [CP for his granddaughter to eat strawberries]

When the examples in (58) involve *tough*-movement, only the *for* PPs (the embedded subjects) are grammatical (59)-(60). This suggests that it is the oblique experiencer, not the embedded subject, that is absent from these constructions.

- (59) a. Sugar was hard for Mary to give up.
 b. *Sugar was hard on Mary to give up.
 (60) a. Strawberries are enjoyable for John to eat.
 b. *Strawberries are enjoyable to John to eat.

Additional evidence comes from partial control¹⁶. In (61a), the oblique experiencer partially controls the embedded PRO. However (61b) lacks a partial control reading (and is ungrammatical). This is easily explained if (61b) lacks an oblique experiencer and a PRO to partially control. Thus, partial control facts suggest that *tough*-constructions lack an oblique experiencer and contain an overt (non-PRO) embedded subject.

- (61) a. It's tough [_{PP} for Mary] [_{CP} PRO to meet on the bridge]
 b. *The bridge is tough [_{CP} for Mary to meet on _]

Gapped degree phrases have a parallel distribution with regard to defective intervention tests. Recall that gapped degree phrases can optionally license an oblique evaluator, introduced above the degree word in the DegP (cf. Section 2.2-2.3). Example (62) shows that, while this evaluator is allowed when there is no overt movement, the evaluator cannot co-occur with null operator movement internal to the DegP.

- (62) a. It is too cold [_{PP} for Bob] [_{CP} for Chris to run this experiment]
 b. *This experiment is too simple [_{PP} for Bob] [_{CP} for Chris to run _].

This is a crucial contrast with gapless degree phrases, which do not contain an instance of null operator movement.

- (63) This experiment is too simple for Chris [for Mary to use it as one of her exam questions].

This contrast is not predicted if the null operator undergoes \bar{A} movement alone. If that were the case, the null operator would be able to cross over the evaluator, as it can cross over the subject of the embedded CP. However, this contrast is predicted if the null operator undergoes a final A movement step, parallel to the final movement step in *tough*-constructions. If there is no final A movement step, it is difficult to explain the grammaticality of (63b).

The gapped degree phrase parallels the *tough*-construction data in two key ways. First, when the oblique evaluator is not present, null operator movement can occur, as in (64). Second, when the oblique experiencer is moved to a non-intervention position, null operator movement is licensed again (65).

- (64) The experiment is too simple [_{CP} for Chris to run _].
 (65) [_{PP} For his advisor], this experiment is too simple [_{CP} for Chris to run _].

As with the *tough*-construction data, this analysis hinges on *for Chris* in (64) being an embedded subject, not an oblique evaluator. Again, evidence for this comes from partial

¹⁶Thanks to David Pesetsky (p.c.) for bringing these examples to my attention.

control. A partial control reading is only possible when there is no DegP internal movement, such as the gapless degree phrase in (66a). In (66a), the evaluator *for Mary* partially controls the embedded subject PRO. However, (66b), which involves null operator movement, does not have a partial control reading (and is so ungrammatical). This is only explained if *for Mary* is the embedded subject, and there is no evaluator licensed.

- (66) a. It's too cold [_{PP} *for Mary*] [_{CP} PRO to meet on the bridge]
 b. *The bridge is too cold [_{CP} *for Mary* to meet on —]

This supports an improper movement analysis of gapped degree phrases, where the final movement step, from spec-CP to spec-DegP, is an A movement step. This is schematized in (67), repeated from (50).

- (67) Gapped degree phrase movement:
 Ian is [_{AP} shy [_{DegP} OP too [_{CP} t_{qp} C [_{TP} *for Anneke* to [_{vP} t_{qp} talk to t_{op}]]]]
-

4.3 Interim summary

Thus far, this paper has proposed that both *tough*-constructions (following Hartman) and gapped degree phrases are improper movement constructions. Parasitic gaps, islands and double object construction extraction data (among other tests, Section 4.1) argue for an initial \bar{A} movement step in both constructions. Defective intervention effects (Section 4.2) argue for a subsequent A movement step in both constructions. Crucially, this A movement step must *follow* the \bar{A} movement step, otherwise we predict defective intervention effects whenever an embedded subject (either PRO or overt) is present in either a *tough*-construction or a gapped degree phrase. The improper movement chains in both constructions are given in (68), repeated from (49) and (50).

- (68) a. *Tough*-constructions:
 Ian is tough [_{CP} t_I *for Anneke* to [_{vP} t_I talk to t_I]]
 b. Gapped degree phrase movement:
 Ian is [_{AP} shy [_{DegP} OP too [_{CP} t_{qp} C [_{TP} *for Anneke* to [_{vP} t_{qp} talk to t_{op}]]]]
-

Notably, this paper has thus far only examined the structure of *object* gapped degree phrases. The remainder of this paper will examine the structure of *subject* gapped degree phrases, as in (69).

- (69) Anneke is too smart — to talk to Ian.

5 Subject gapped degree phrases

Thus far, this paper has reviewed the similarities between *tough*-constructions and object gapped degree phrases. This is because *tough*-constructions are exclusively object gap constructions; *tough*-movement cannot take place from the subject position of the embedded clause (70).

- (70) a. Ian is tough for Anneke to talk to t_I .
 b. *Anneke is tough t_A to talk to Ian.

However, gapped degree phrases can occur with either an object or a subject gap (71).

- (71) a. Ian is too shy for Anneke to talk to t_I .
 b. ✓Anneke is too smart t_A to talk to Ian.

This section will explore two questions related to this contrast. First, it will look at restricted subject movement in *tough*-constructions, and argue that this restriction is naturally predicted by adopting a theory of anti-locality, independently proposed by Erlewine (2013). Second, it will look at why a subject gap is possible in gapped degree phrases; this possibility is indeed also predicted under Erlewine’s anti-locality proposal. Following this discussion it will discuss the (subject) movement chain found in subject gapped degree phrases. Using evidence from Hartman’s tests, it will argue that this movement chain contains a single link, and that this single movement step is ϕ -driven movement. Whether this movement step is an example of A or \bar{A} movement is left ambiguous.

5.1 Tough-restrictions & anti-locality

At first glance, the subject movement restriction on *tough*-constructions is mysterious. The movement chain for subject *tough*-extraction would look like (72), minimally different from the object *tough*-extraction movement chain, (73), repeated from (49).

- (72) Subject *tough*-movement
 ✗Anneke is tough [_{CP} t_A [_{TP} t_A to talk to Ian]]
-

- (73) Object *tough*-movement:
 ✓Ian is tough [_{CP} t_I for [_{TP} Anneke to [_{vP} t_I talk to t_I]]]
-

The (hypothetical) movement chain in (72) would obligatorily include at least two links: one short \bar{A} movement step from the embedded spec-TP to embedded spec-CP, and another A

movement step from the embedded spec-CP to matrix subject position¹⁷. This restriction is no less mysterious under an analysis where *tough*-subjects are base generated in the matrix clause, which would predict the structure in (74). There, the null operator would obligatorily move to the edge of the CP in order to be semantically bound by its matrix antecedent¹⁸.

(74) *Ian is tough [_{CP} OP [_{TP} *t_{op}* to talk to Anneke]]

Importantly, the structures in (72) and (74) both involve a very short \bar{A} movement step, from the embedded spec-TP to the embedded spec-CP, across no intervening material. It is this short \bar{A} movement step that I propose is not allowed.

This kind of restriction on short \bar{A} movement is an *anti-locality* restriction. Much as there are syntactic *locality* constraints that rule out movement that is *too long* (cf., the Head Movement Constraint, Travis 1984; Shortest Move, Chomsky 1993; the Minimal Link Condition, Chomsky 1995; Relativized Minimality, Rizzi 1990), a growing body of work (cf. Abels 2003, Bošković 2005) proposes that there are also *anti-locality* constraints that rule out movements that are *too short*. In particular, Erlewine (2013) proposes, based on Agent Focus effects in Kaqchikel (Mayan), the following anti-locality constraint (75), which limits short \bar{A} movement, as schematized in (76).

(75) \bar{A} movement of a phrase from the specifier of XP must *cross* a maximal projection other than XP. Movement from position α to position β *crosses* γ if and only if γ dominates α but does not dominate β .

(76) * [_{XP} a X [_{YP} *t_a* Y ...]] ✓ [_{XP} a X ... *intervening material* ... [_{YP} *t_a* Y ...]]

This restriction is straightforwardly enough to rule out subject movement in *tough*-constructions. The structures in both (72) and (74) would involve precisely the movement step ruled out by (75). Under the anti-locality theory in (75), the *tough*-movement subject restriction is not mysterious at all. The movement in (72) violates the constraint in (75) and so is ruled out.

Erlewine (2013) proposes that (75) can be obviated in Kaqchikel. While subject movement in Kaqchikel cannot occur from spec-TP to spec-CP without crossing some intervening XP, subject movement can still occur. One way to obviate (75) and license subject movement to allow the subject to move to spec-CP from below spec-TP (e.g., from spec-*v*P), as illustrated in (77). While this option is available in Kaqchikel, it is not available in

¹⁷Assuming VPISH, an additional movement step from embedded spec-*v*P to embedded spec-TP would also have to occur.

¹⁸In (55), I have represented the subject of the embedded clause as a null operator, not a PRO, as PRO resists \bar{A} extraction from subject position. For further discussion of this restriction, see Section 5.3

English; having the subject “skip” spec-TP would violate the EPP.

$$(77) \quad *[_{CP} \text{ Subject } [_{TP} \text{ -- } T [_{vP} t_{Subj} v VP]]] \quad (\text{in English})$$

5.2 Subject gapped degree phrases

Section 5.1 argued that an anti-locality restriction on short \bar{A} movement was enough to explain why subjects cannot undergo *tough*-movement; it predicts that the movement chain in subject *tough*-movement, but crucially not object *tough* movement, would be too short, and violate anti-locality. This section shows that the anti-locality constraint in (75) predicts that both subject and object gaps will be possible in gapped degree phrases.

At first glance, the structure of subject gapped degree phrases is not immediately straightforward. The word-order could correspond to two possible structures, a null operator (78) and a PRO structure (79). The null operator structure is parallel to the object gapped degree phrase structure proposed throughout this paper, cf. (50). The PRO structure would be parallel to adjectival control constructions (79b)

$$(78) \quad \text{Anneke is too smart } [_{DegP} OP t_{too} [_{CP} t_{op} C [_{TP} t_{op} \text{ to talk to Ian}]]] \quad (\text{null OP})$$

$$(79) \quad \begin{array}{ll} \text{a. Anneke}_i \text{ is too smart } [_{DegP} t_{too} [_{CP} [_{TP} PRO_i \text{ to talk to Ian}]]] & (\text{control}) \\ \text{b. Anneke}_i \text{ is eager } [_{CP} [_{TP} PRO_i \text{ to talk to Ian}]] & (\text{adjectival control}) \end{array}$$

A control analysis of gapped degree phrases trivially respects anti-locality constraints, as it does not involve movement, assuming a non-movement theory of control. The null operator structure, (78), however, is a problem for an anti-locality theory, as it involves a short-movement step from spec-TP to spec-CP that does not cross any intervening material. In order for subject gapped degree phrases to obey anti-locality, they would need to involve a longer movement step, directly to spec-DegP, as illustrated in (80)

$$(80) \quad \text{Anneke is too smart } [_{DegP} OP t_{too} [_{CP} C [_{TP} t_{op} \text{ to talk to Ian}]]] \quad (\text{null OP})$$

Distinguishing a movement and control account for a construction that involves very local movement is a difficult task. However, in this case, I believe the evidence favors a movement theory of subject gapped degree phrases over a control analysis. The first argument for this comes from the interaction of subject gapped degree phrases and oblique evaluators. A control analysis predicts that subject gapped degree phrases could co-occur with *in situ* oblique evaluators. Because PRO does not move, the oblique evaluators would trivially not serve as defective interveners to movement, and the sentence is predicted to be grammatical. A movement analysis, however, predicts that a subject gapped degree phrase could not co-

occur with an *in situ* oblique experiencer without causing a RM violation. Example (81) shows that a subject gapped degree phrase and an oblique evaluator *cannot* co-occur, which the movement approach predicts.

- (81) *Anneke is too smart for Olivia to talk to Ian.
- a. ...smart [_{DegP} OP [_{PP} for Olivia] *t_{too}* ... *t_{op}* to talk to Ian] (✗predicted)
- b. ...smart [_{DegP} [_{PP} for Olivia] *t_{too}* ... [_{TP} PRO to date Ian]] (✓predicted)

This data doesn't just suggest that subject gapped degree phrases are movement constructions. It suggests that they feature a very specific type of movement: ϕ -feature driven movement of the null operator to spec-DegP.

Additional evidence for a movement step in subject gapped degree phrases comes from parasitic gaps. Like their object gap counterparts, subject gapped degree phrases can also license parasitic gaps (82). While subject gapped degree phrase licensed parasitic gaps are somewhat degraded, they are better than parasitic gaps licensed by either no overt movement (83a) or a raising predicate (83b). This favors a movement analysis of subject gapped degree phrases over a control analysis¹⁹.

- (82) a. ?This student is too young *t* to take the bar exam [without someone talking to *pg* first]
 b. *This student is eager PRO to take the bar exam [without someone talking to *pg* first].
- (83) a. *This student took the bar exam [without someone talking to *pg* first].
 b. *This student is likely *t* to take the bar exam [without someone talking to *pg* first].

This tells us slightly more about the *single* movement step in subject gapped degree phrases. Though this step is a ϕ -driven movement step, it can also license a parasitic gap. Not all ϕ -driven movements have this property; example (83) shows that raising and EPP-driven subject movement, both movements that are assumed to be driven by ϕ -features, cannot license parasitic gaps.

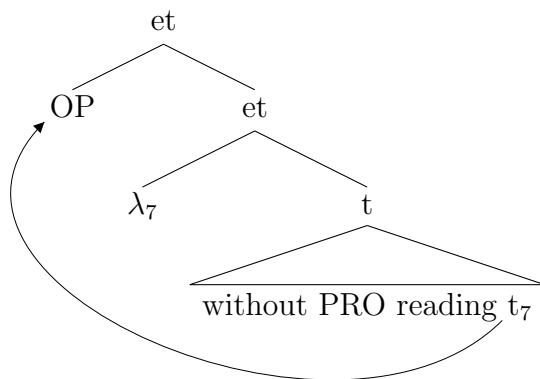
It is not clear whether the movement suggested by (82) is A or \bar{A} movement. While Engdahl (1983) proposes that parasitic gaps are “parasitic” on \bar{A} movement, this is not undisputed. Nissenbaum (2000) proposes that parasitic gaps are not licensed by any syntactic operation at all, but rather by Predicate Abstraction (PA), a semantic operation.

According to Nissenbaum, the conflation of parasitic gaps and \bar{A} movement reduces to the fact that PA co-occurs with all instances of \bar{A} movement; in fact, PA co-occurs

¹⁹Again, assuming a theory where PRO does not move. For further discussion see Section 5.3

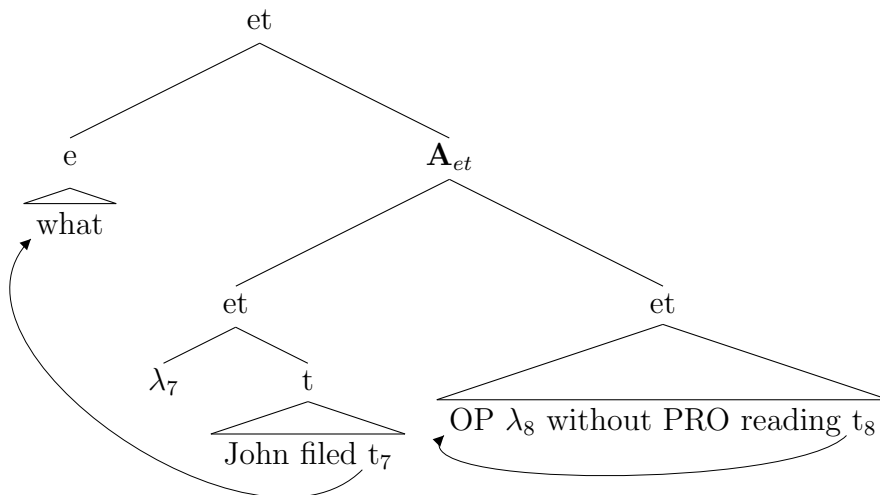
with all instances of syntactic movement, and creates a type $\langle e, t \rangle$ node in the LF. Under Nissenbaum’s theory, parasitic gaps are “parasitic” on a this $\langle e, t \rangle$ node that PA creates. Thus parasitic gaps can be licensed in any environment where PA occurs. This is because, under Nissenbaum’s analysis, the clause that contains the parasitic gap are themselves null operator structures of type $\langle e, t \rangle$, with the structure in (84). The null operator movement in parasitic gap clauses is analogous to the null operator movement found in gapped degree phrases²⁰.

(84) What did John file **without reading** __?



The null operator movement in the parasitic gap clause creates a structure of type $\langle e, t \rangle$, which can adjoin to the matrix clause if and only if the matrix clause also contains a PA (i.e., movement) site of type $\langle e, t \rangle$. This is illustrated in (85).

(85) What did John file without reading __?

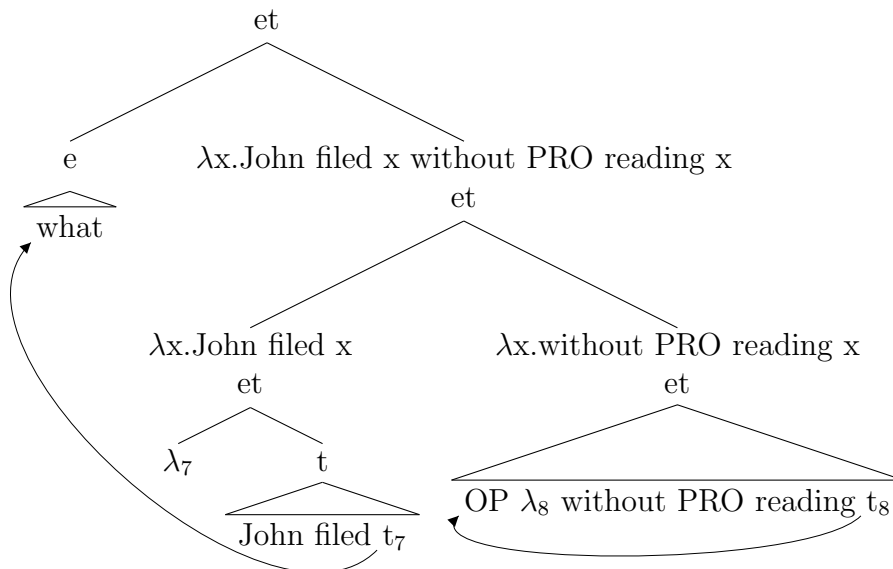


At node **A** (of type $\langle e, t \rangle$) in (85), Predicate Modification conjoins the two type $\langle e, t \rangle$ nodes together. A crucial result of applying PM here is that the two gap sites—the null operator trace in the adjunct clause and the *wh*-trace in the matrix clause—are now obli-

²⁰For an detailed analysis of the similarities found in gapped degree null operator structures and the null operator structures found in parasitic gap clauses, see Nissenbaum & Schwarz 2011.

gatorily predicated on the same argument variable. This explains the obligatory identity between the gap sites. The LF from (85) is repeated in (86), accompanied by its semantic computation²¹.

(86) What did John file without reading __?



The result of Nissenbaum's proposal is to divorce the licensing of parasitic gaps from a prior instance of \bar{A} movement. This has the benefit of explaining why some A movement operations, such as Heavy NP Shift, can license parasitic gaps (87).

(87) John filed t [without reading pg] a recent article about the impact of global warming.

Nissenbaum's proposal also solves the mystery of *why* parasitic gaps and \bar{A} movement would be closely related. Though widely accepted and generally true, the claim that (only) \bar{A} movement can license parasitic gaps is itself an unexplained stipulation. Nissenbaum's proposal claims that any instance of movement that involves a lambda abstraction site can host a parasitic gap, and so rids the theory of this stipulation²².

However, under a Nissenbaum theory of parasitic gaps, the data in (82) is less informative than it would be, under Engdahl's theory of parasitic gaps. Under Engdahl, (82) would show that subject gapped degree phrases contained an \bar{A} movement site. Under Nissenbaum, (82) simply supports the proposal that subject gapped degree phrases are movement constructions.

²¹This discussion, while accurate, is very much an oversimplification of Nissenbaum's proposal. See Nissenbaum (2000) for full details of this account. See Nissenbaum (2000), also, for answers to the questions that this discussion raises, such as why parasitic gaps cannot be licensed by EPP-driven movement or QR, or why a parasitic gap cannot adjoin to a VP of type $\langle e, t \rangle$.

²²Though Nissenbaum himself does need some stipulations to explain why certain contexts *do not* license parasitic gaps. See Nissenbaum (2000) for details.

We can learn more about the movement chain in subject gapped degree phrases by looking at other (un)grammatical subject gapped degree phrase licensed parasitic gaps. Even under a movement analysis of subject gapped degree phrases, the data in (82) is surprising, because subject movement does not normally license parasitic gaps (88).

- (88) *Who *t* hired that candidate without my talking to *pg* first?

The relationship between subject gapped degree phrases and parasitic gaps is more complicated than (82) makes it appear. While subject gapped degree phrases can license *some* kinds of parasitic gaps, they cannot license *all* kinds of parasitic gaps. Specifically, while subject gapped degree phrases *can* license parasitic gaps out of tenseless adjuncts, they cannot license parasitic gaps out of tensed adjuncts. This is shown in (89), where (89a) is an ungrammatical tensed adjunct parasitic gap, and (89b) is a grammatical infinitival adjunct containing a parasitic gap.

- (89) a. *This student is too *t* inexperienced to take the bar exam [before we talk to *pg*].
 b. ?This student is too *t* inexperienced to take the bar exam [without us talking to *pg*].

Object gapped degree phrases do not have this restriction, as in (90), where both the tensed and infinitival adjuncts containing parasitic gaps are grammatical.

- (90) a. This candidate is too inexperienced to hire *t* [before we interview *pg*]
 b. This candidate is too inexperienced to hire *t* [without us interviewing *pg* first]

This suggests that subject and object gapped degree phrases do not have identical movement chains. Particularly, the contrast in (89)-(90) shows that object gapped degree phrases have at least one additional site where parasitic gaps can adjoin, compared with subject gapped degree phrases. It also suggests that object gapped degree phrases have one site where either tensed or infinitival parasitic-gap containing adjuncts can adjoin, while subject gapped degree phrases lack this position. This can be explained by proposing that, in object gapped degree phrases, parasitic gaps can adjoin to either spec-*v*P (where the object null operator must successive-cyclically \bar{A} move before continuing higher. In subject gapped degree phrases, this adjunction position is not available. In both subject and object gapped degree phrases, however, parasitic gaps can adjoin at the DegP level.

The data in this section suggest that subject gapped degree phrases have a movement chain as in (91), where the subject, a null operator, moves directly from the embedded spec-TP to the spec-DegP. This movement respects the anti-locality constraint in (75). Because of a lack of available tests, I remain agnostic about whether this movement step is A or \bar{A}

movement, and instead simply label it as “ ϕ -driven,” as shown by Hartman’s tests in (81).

- (91) Chris is kind [_{DegP} OP enough [_{CP} \emptyset [_{TP} t_{op} to talk to Lars]]] ----- = ϕ -driven

Under traditional phase-based theories of movement, arguments cannot usually “skip” successive cyclic movement through spec-CP. However, Rackowski & Richards (2005) claim that this is a generalization that can be broken, not an inviolable rule. Specifically, they claim that clausal embedding verbs can Agree with their embedded CP, and that this agreement operation de-phases the embedded CP and opens it up for extraction. This approach helps explain why complement CPs are not islands for movement, while adjunct and subject CPs are; adjunct and subject CPs are not in a syntactic configuration where some higher element can Agree with them.

Here, I propose that the Degree head, present in gapped degree phrases but crucially not in *tough*-constructions, is an element that can Agree with an embedded CP, de-phasing the CP and opening it up for extraction²³. Thus the movement chain in (91) is possible only if the degree word has entered into an agreement relationship with the embedded CP.

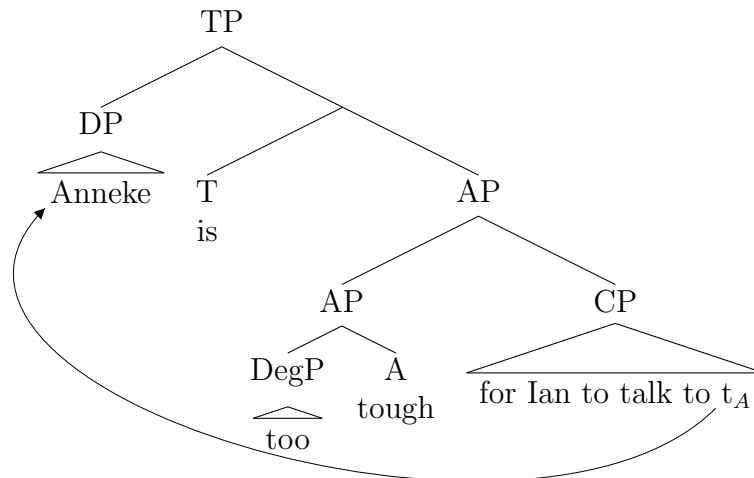
This predicts that it is not just the presence of the degree word, but the degree word’s syntactic relationship with the embedded clause, that licenses subject extraction. This prediction is borne out. The sentence in (92) is ambiguous between a *tough*-construction and a gapped degree phrase reading. In the *tough* reading (92a), the situation denoted by the standard is evaluated as *tough*; in the gapped degree phrase reading (92b), the matrix subject *Ian* is assigned a Θ -role.

- (92) Anneke is too tough for Ian to talk to ____.
- a. Anneke is [_{AP} [_{AP} [_{DegP} too] tough] [_{CP} for Ian to talk to ____] (TC reading)
 - b. Anneke is [_{AP} [_{DegP} OP too [_{CP} for Ian to talk to t_{op}]] tough] (GDP reading)

The structure of (92b) is given again, as a tree, in (93).

²³For the purposes of this paper, the technical mechanism used to de-phase CP is not important. Another method would be to represent DegP instead as a little cP that takes a non-phasal CP as its complement.

(93)



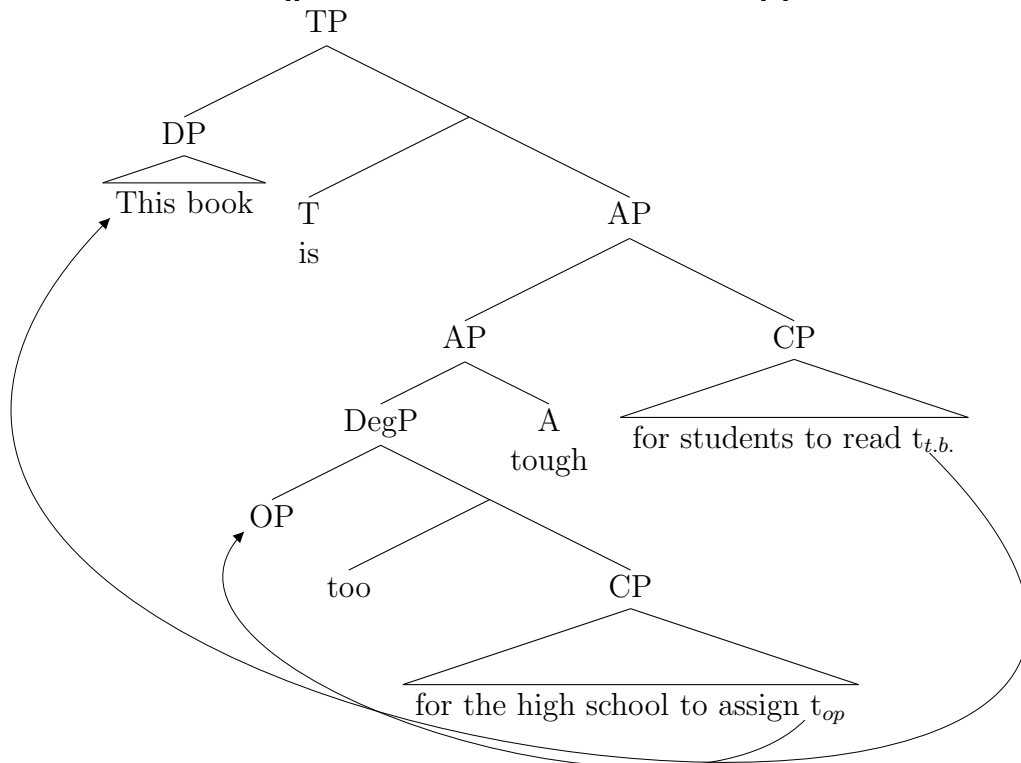
This predicts that (92b), the *tough*-reading of (92), will not allow for subject extraction; while there is still a degree word, it is not in syntactic position where it can Agree with the embedded CP. If the subject were to *tough*-move out of the structure in (92b), there would still be an anti-locality violation. This prediction is borne out in (94a), where a *tough* reading is not available. Similarly, we predict that subject gaps are possible in the sentence receives a GDP interpretation. This prediction is borne out in (94b).

(94) Anneke is too tough _ to talk to Ian.

- a. *Anneke is [AP [AP [DegP too] tough] [CP t_A to talk to Ian]] (TC reading)
- b. Anneke is [AP [DegP OP too [CP t_{op} to talk to Ian]] tough] (GDP reading)

It stands to question what evidence we have for claiming the *tough* reading of (92) has the structure given in (94a), where *too* modifies the *tough*-predicate itself, and not the CP. Evidence for this structure comes from the fact that sentences with the structure of (93) can optionally contain a second embedded CP. This embedded CP is licensed by the degree word, not the *tough* adjective (95).

- (95) This book is too tough for students to read for the high school to assign.
 This book is [[too for the high school to assign _] [tough for students to read _]]



Evidence for distributing the CPs as in (95)—with “*for students to read*” as the CP licensed by the *tough* predicate and “*for the high school to assign*” as the CP licensed by *too*—comes from subject extraction data. As predicted, subject extraction cannot take place from the CP licensed by the *tough* predicate (96). Subject extraction, however, *can* take place from the CP licensed by *too* (97).

- (96) *This book is [too [easy _ to please the administration] to assign _ to HS students]
 (97) This book is [too [easy for students to read _] _ to please the administration]

5.3 Null operator or PRO

This paper proposes, following Chomsky (1977) and N&S, that object GDPs contain a null operator that undergoes movement. Section 5.2 shows that subject GDPs, too, contain a covert element that undergoes movement, and calls that element a null operator, parallel to the object GDP case. However, an alternative analysis could call that null element PRO, and label the movement chain as in (98).

- (98) Ian is [_{AP} too shy [_{DegP} PRO _{t_{too}} [_{CP} [_{TP} _{t_{PRO}} to talk to Anneke]]]]

This decision to call this element a null operator (instead of PRO) has largely been motivated by theory internal concerns. It makes this paper’s main proposal internally consistent, by claiming that subject and object GDPs are structures that contain the same covert element. It also obeys theory internal restrictions on the distribution of PRO and null operators. It avoids putting PRO in an object position in object gapped degree phrases. In subject gapped degree phrases, it avoids requiring \bar{A} extracting PRO from a subject position, which is claimed to be ruled out for case reasons in Chomsky (1981).

However, the covert element found in subject GDPs behaves like PRO. We saw in (62), repeated in (99), that GDPs can occur in partial control constructions, suggesting a PRO(-like) element in the numeration. We also see subject gapped degree phrases occurring with control adjectives (100), again suggesting the presence of PRO.

(99) The chair is too busy to PRO meet at six.

(100) Ian is too eager $__$ to date Anneke
cf. Ian is eager PRO to date Anneke.

Subject GDPs formed with control adjectives have the same properties as subject GDPs formed with adjectives that do not license control constructions (or take clausal complements) on their own. This is shown in (102) with a gapped degree phrase and the adjective *eager*. *For Olivia* cannot be interpreted as an evaluator if it remains *in situ*, as predicted by Hartman’s movement tests (cf. Section 4).

(101) a. (For Olivia), Ian is too eager $__$ to date Anneke.
b. *Ian is too eager for Olivia to date Anneke²⁴.

However, there is also a contrast between canonical control constructions that license parasitic gaps, and subject gapped degree phrases that license parasitic gaps (103). So while the covert element in subject gapped degree phrases behaves like PRO, it also undergoes movement; particularly the kind of movement that is associated with null operators²⁵.

(102) a. ?This student is too *t* eager to take the bar exam [without us talking to *pg*].
b. *This student is *t* eager to take the bar exam [without us talking to *pg*].

It’s worth asking if this theory-internal choice—to label the covert element in subject GDPs as a null operator instead of PRO—has any empirical consequences. To the best of my

²⁴Where “*for Olivia*” is an evaluator.

²⁵Note, this is not the same movement advocated for in theories of control-as-movement (Hornstein 1999). In this theory, it is a covert operator PRO that moves, not an overt DP. Additionally, this PRO does not move into a Θ -position, as claimed in Hornstein (1999, and his followers); this PRO simply undergoes ϕ -driven movement to spec-DegP, before being semantically bound to the matrix subject, parallel to the analysis claimed for a null operator.

knowledge, it does not. This follows from the deep similarities between PRO and null operators in the literature. Semantically, they have been claimed to have similar properties. Null operators are semantically vacuous elements that can undergo movement, thereby creating a type $\langle e, t \rangle$ node in the LF where they can be obligatorily linked to an antecedent (cf Section 5.2). In Heim and Kratzer (1998), following May (1977), show that PRO can also been understood as a semantically vacuous element that can undergo movement to create a type $\langle e, t \rangle$ node in the LF. While the exact motivations for these movements are distinct²⁶, their end result is identical. In other words: there are no empirical reasons to label this covert operation as *either* a null operator or PRO, particularly since it shares the properties of both. This raises larger questions about the relationship between PRO and null operators more generally.

The biggest challenge to adopting the structure in (98) is a restriction on \bar{A} extracting PRO from a subject position, as illustrated in examples like (103).

- (103) *who does it seem [t to see Mary] (Chomsky 1981:175 exx 18)

This example shows PRO moving from the embedded spec-TP to the matrix spec-CP. While Chomsky (1981, 1982) rules this movement out for Case theory reasons, this movement also violates the anti-locality constraint in (75). In fact, many other banned instances of \bar{A} moving PRO from a subject position also violate (75).

- (104) a. *the man [\bar{s} that [s you tried [\bar{s} [s t to win]]]]
 b. *the man [\bar{s} that [s I wonder [\bar{s} what [s t to see]]]] (Chomsky 1981:176 exx 19)

Taking the restriction in (75) seriously allows us to re-examine Chomsky's restriction on \bar{A} moving PRO in a new light. Recent evidence from Hebrew, Russian, Icelandic and Ancient Greek (Landau 2000, 2006) shows that, at least in these languages, PRO bears standard case. This weakens Case theoretic restrictions on the movement of PRO, since PRO can be assigned case in spec-TP, like any other nominal. However, an anti-locality explanation of the ungrammaticality of (103)-(104) needs no PRO-specific theory of Case. Under a theory of anti-locality as proposed in (75), it's possible to reduce this restriction on \bar{A} moving a subject PRO to an anti-locality violation.

²⁶Assuming a Nissenbaum theory, null operators move to create a node that can adjoin to the matrix clause, ensuring an obligatory link between the null operator and its antecedent. In Heim & Kratzer (1998:227), PRO moves to create a type $\langle e, t \rangle$ node that can serve as a landing site for QR.

6 Conclusions

This paper has argued that both *tough*-constructions and gapped degree phrases are improper movement constructions. The movement chains of object gapped degree phrase and *tough*-constructions are very similar, though different elements undergo this movement in each construction, and the final landing sites also differ. In *tough*-constructions, an overt DP undergoes movement from the embedded object position to the matrix subject position. In object gapped degree phrases, a (silent) null operator undergoes movement from the embedded object position to the edge of the Degree Phrase.

In *tough*-constructions, the first step of this movement chain has properties associated with \bar{A} movement: it can license parasitic gaps (though cf. Section 5), displays \bar{A} island effects, does not allow extraction from the higher double object position, and is not ϕ -driven (cf. Section 3). The second step of this movement chain has A movement properties: it is ϕ -driven, satisfies the EPP, and ends in a Case position. In object gapped degree phrases, these facts are mirrored. The first step of the movement chain has \bar{A} properties: it licenses parasitic gaps, disallows indirect object extractions, and is not ϕ -driven. The second movement step is ϕ -driven, giving at least one A movement property. The movement chains of *tough*-constructions and object gapped degree phrases are repeated in (105) from (68).

- (105) a. *Tough*-constructions:
 Ian is tough [_{CP} t_I for Anneke to [_{vP} t_I talk to t_I]]
- b. Gapped degree phrase object movement:
 Ian is [_{AP} shy [_{DegP} OP too [_{CP} t_{op} C [_{TP} for Anneke to [_{vP} t_{op} talk to t_{op}.]]]]

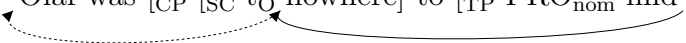
Importantly, this paper argues that subject gapped degree phrases are also movement constructions. Subject gapped degree phrases do not have a *tough*-movement correlate, because subject extraction out of *tough*-constructions is ruled out by anti-locality constraints limiting short \bar{A} movement. Subject extraction is ruled *in* for gapped degree phrases by the relationship that the degree word enters with the embedded CP. The exact nature of the movement chain in subject gapped degree phrases is unclear; tests only show that this movement is ϕ -driven. A structure for subject gapped degree phrases is given in (106), repeated from (91)

- (106) Chris is kind [_{DegP} OP enough [_{CP} \emptyset [_{TP} t_{op} to talk to Lars]]] = ϕ -driven

6.1 Improper movement

Crucially, this paper has assumed that improper movement chains *sometimes* are possible in the grammar, at least in the cases of *tough*-constructions and gapped degree phrases. In that respect, this paper also argues that gapped degree phrases should be added to the list of possible improper movement constructions. *Tough*-constructions are not the only construction argued to contain an improper movement chain. Wood (2013) proposes that Icelandic “Fate Accusatives” (107) have the structure in (108), which contains an improper movement chain.

- (107) Ólaf var hvergi að finna __
 Ólafur.ACC was nowhere to find __
 ‘Ólafur was nowhere to be found.’

- (108) Olaf was [CP [SC t_O nowhere] to [TP PRO_{nom} find t_{SC}]]
- 

This suggests that the question is not *if* improper movement is allowed, but *when* improper movement is allowed. In this respect, this paper works towards an emerging body of work that does not seek to rule out improper chains by default, but rather asks when and how improper movement chains are (not) licensed.

6.2 Anti-locality

This paper also promotes a theory of anti-locality that limits short \bar{A} movement from spec-TP to spec-CP. While this anti-locality restriction makes the correct prediction for *tough*-constructions and gapped degree phrases, there are many English constructions (e.g., subject *wh* movement) that have been argued to include short \bar{A} movement from spec-TP to spec-CP. However, English is also a language characterized by many subject/non-subject asymmetries (e.g., subject *wh*-questions lack auxiliary inversion and *do*-support, compared to non-subject *wh*-questions). Taking the anti-locality constraint in (75) to its logical conclusion (for English) predicts that there will be no short \bar{A} movement from spec-TP to spec-CP in the language. It also gives a possible (non Case theoretic) motivation for the ban on \bar{A} -moving PRO from subject position. This paper raises the question of whether or not the constraint in (75) is sufficient to explain this suite of subject/non-subject asymmetries in English.

This work, and others that assume such a short-movement restriction, raises the deeper question of *why* this anti-locality constraint might exist in the first place. It also raises the question of whether or not *all* short movements should be restricted in the grammar, or if this restriction applies only to short subject movement from spec-TP to spec-CP. While this

paper does not answer these questions, I suggest that a short subject-movement restriction may be theoretically motivated. Recent theories of feature inheritance (Chomsky 2007) claim that TP inherits its features from CP. Motivating the restriction in (75) may involve this relationship, if moving from the complement of TP to spec-CP can be understood as analogous to movement within the same maximal projection. This is precisely the type of anti-local movement ruled out in Abels (2005). Such an approach would suggest that Erlewine’s short subject-movement restriction is not so much a new kind of anti-locality restriction, but rather an extension of an anti-locality restriction that has been independently motivated and proposed.

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