Gapped degree phrases are improper movement constructions[1]

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Abstract: This paper argues for a deep similarity between two infinitival constructions, *tough*-constructions (TCs) and gapped degree phrases (GDPs). Specifically, both constructions contain an "improper movement" chain, where an $\bar{A}$ step is followed by an A step. I show that recent tests for A movement in TCs (Hartman 2009, 2012) also suggest the presence of A movement in GDPs. However, TCs and GDPs are not identical. I argue that GDPs are *null operator* structures, and propose that the null operator undergoes improper movement within the embedded clause of the GDP. TCs involve the movement of an overt DP. This movement is longer, beginning in the embedded clause and ending in matrix subject position. 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 explains the relationship between the two constructions.
Keywords: *improper movement, tough movement, gapped degree phrases, null operators*

1 Introduction

This paper is concerned with gapped degree phrases (GDPs) (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 (Chomsky 1977) that precedes an A movement step in the same movement chain. While similarities between

[1]Thanks to David Pesetsky, Sabine Iatridou, Danny Fox, Martin Hackl, Aron Hirsch, and the audiences at PLC18 and MIT's Synatx Square for helpful comments and discussion on this paper. All errors are my own.

TCs and GDPs have been noted in the literature since at least 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) (N&S), which proposes a semantics for gapped degree phrases. This paper shows that the LF proposed in N&S is sufficient to capture the syntactic behavior of GDPs, and shows syntactic motivations for a semantically necessary movement chain proposed by N&S.

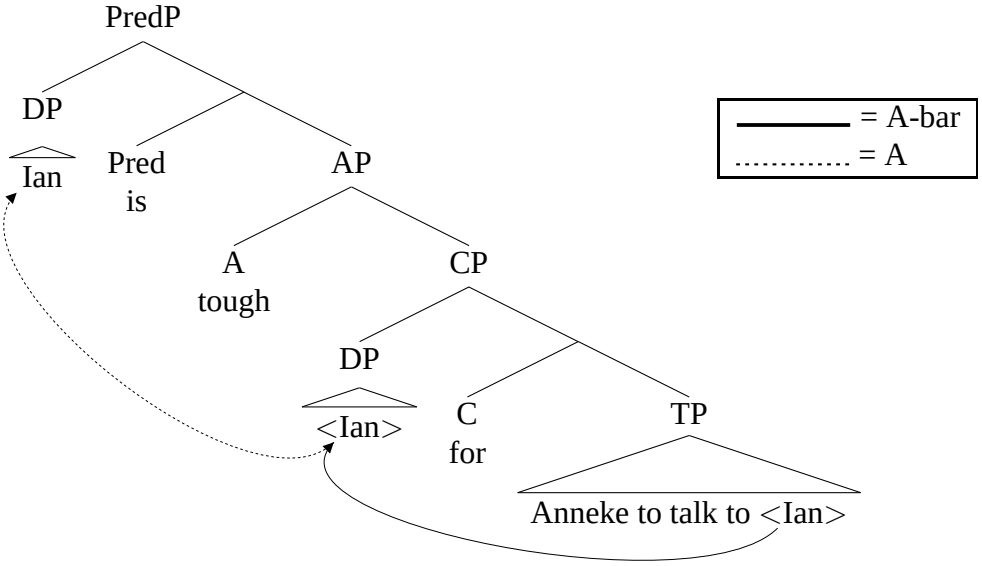
This paper is primarily concerned with two things: the relationship between the *movement chains* in GPDs and TCs and the distinction between *what* moves in each construction. This paper shows in Sections 3 & 4 that both TCs and GDPs contain an improper movement chain, i.e., that each construction involves a single movement chain where some element undergoes both $\bar{A}$ and A movement, crucially in that order [2]. A crucial distinction is the *location* of this improper movement chain. In TCs, the improper movement chain spans the entire clause. In GDPs, the improper movement chain is internal to the embedded clause[3]. Another distinction corncerns *what* kind of element moves in each construction. In Section 5, I argue that GDPs are *null operator* constructions, while TCs involve movement of an *overt DP*[4]. This proposal is schematized in (3) for TCs and (4) for GDPs.

[2]Though cf. Chomsky 1977, 1981, Fleisher 2013, and the references therein for an alternative analysis of TCs.

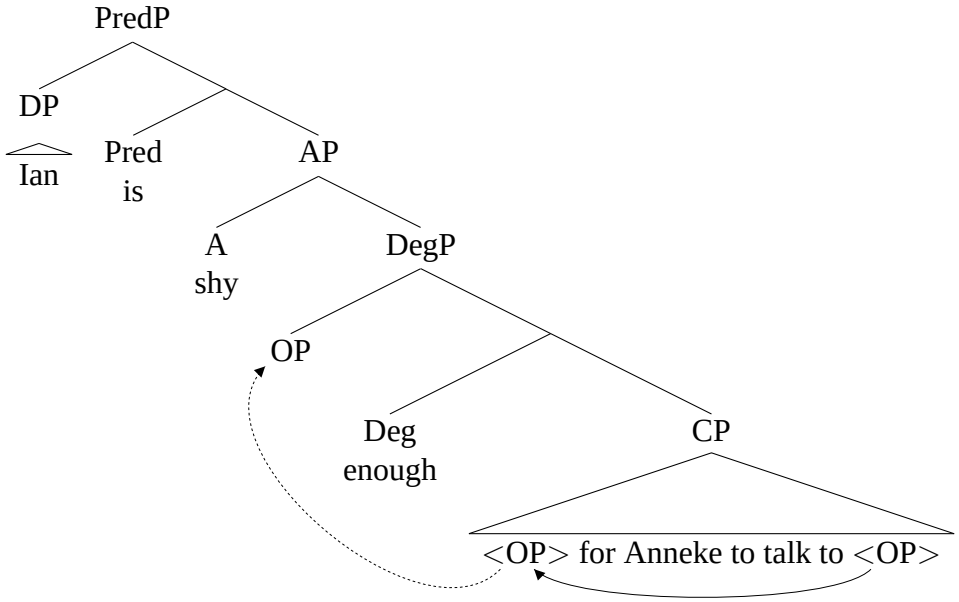
[3]I assume the embedded clause of GDPs include the DegP layer directly above CP.

[4]This analysis is possible to refashion in terms of Hicks (2009), where TCs involve the $\bar{A}$ movement of a complex null operator, a (coreferencial and overt) subcomponent of which is then A moved into the matrix clause.

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



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



Evidence for an $\bar{A}$ movement step in TCs and GDPs is given in Section 3, following observations from Lasnik & Fiengo (1974) and observations and analysis in Chomsky (1977). Section 4 argues for an A movement step in TCs following recent analysis in Hartman (2009, 2012), and shows that Hartman's diagnostics also suggest an A movement step in GDPS. In Sections 3 & 4, I show that the $\bar{A}$ movement step in both

TCs and GDPs must crucially precede the A movement step in both constructions. Section 5 presents additional data supporting the claim that TCs involve the (improper) movement of an overt DP, while GDPs involve the (improper) movement of a null operator.

2 Gapped degree phrases

GDPs obligatorily contain two parts, a degree word (such as *too* or *enough*) and an embedded CP licensed by the degree word[5].

(5) 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 an argument of the degree word comes from pairs like (6), taken from Lasnik & Fiengo (1974:536), where the CP, called the *standard*, cannot occur without the of the degree word, suggesting that the standard is licensed by the degree word (cf. N&S 2011 and Meier 2003).

(6) a. This mattress is {thin/thick}.
b. *This mattress is {thin/thick} to sleep on[6].
c. This mattress is {too thin/thick enough} to sleep on.

This paper adopts the constituent structure proposed in N&S, where the degree phrase is an argument of AP. N&S propose that GDPs have an LF corresponding to (7)[7].

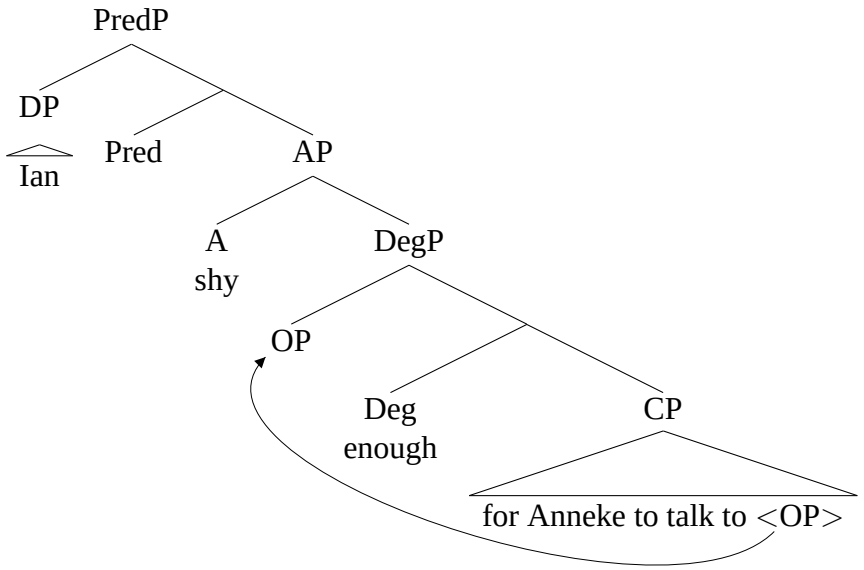
[5]Degree words can themselves appear without an overt CP as their complement., e.g., 'This mattress is thin enough.' A prediction of this analysis is that in such constructions a (perhaps contextually specified) CP is semantically present but not overt, analogous to comparative deletion, e.g., 'This mattress is thin enough TO QUALIFY AS THIN.'

[6]A 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.

[7]The structures in this paper give the correct word-order for *enough*-type degree constructions, where the degree word follows the adjective, but not *too*-type degree constructions, where the degree word precedes the adjective.

This does not pose a problem for my analysis. See Meier (2003) and N&S for arguments that *too* and *enough* constructions must have identical structures, regardless of English word-order. There is also evidence that additional processes, such as extraposition, are responsible for this word-order asymmetry in English. Because this paper focuses on processes internal to the DegP, the addition of processes like CP extraposition to the derivation for GDPs does not alter the predictions of this analysis.

(7) Ian is enough shy for Anneke to talk to.
Ian is [$_{AP}$ shy [$_{DegP}$ OP enough [$_{CP}$ for Anneke to talk to t_{op}]]]



The specifics of the null operator movement chain in (7) are left intentionally unspecified for the moment; the movement chain in (7) should be taken as an abbreviation, showing only its tail and its head. What's crucial is the final landing site of the null operator: the highest specifier of the Degree Phrase—the phrase introduced as the complement to the adjective.

This movement is semantically necessary, and allows the null operator to be semantically bound to 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. N&S show precisely how this binding takes place: Following Nissenbaum (2000), N&S assume that null operators are bound to their semantic antecedents via an extension of Predicate Modification, called COMPOSE. However COMPOSE can only take place on nodes of certain types–the null operator movement that occurs within DegP creates such a semantic type, and allows the DegP and the AP to be predicated on the same type-e individuals. For a full account of the specifics of COMPOSE, and additional details on how this structure is semantically calculated, see

N&S.

This paper assumes that semantically necessary movement steps are present in the syntax, as well as at LF. Section 4 gives shows that GDPs contain a syntactically motivated (in this case, ϕ-driven) movement step in the same location where N&S's semantically necessary movement step is proposed to take place. Based on tests developed by Hartman (2009, 2012) for *tough*-constructions, I suggest that spec-DegP is an A position, and that Deg^0 has a ϕ-probe which can trigger movement of the closest ϕ-feature-bearing DP. Crucially, I also show that movement of the null operator is blocked if another argument intervenes between the null operator and spec-DegP at a certain point in the derivation[8].

3 $\bar{\text{A}}$ movement in TCs and GDPs

3.1 $\bar{\text{A}}$ movement in TCs

Tough-constructions have been argued since Chomsky (1977) to contain an $\bar{\text{A}}$ step, beginning in the embedded object position and continuing to the embedded spec-CP, as (partially) schematized in (8)[9].

(8) __ is tough [$_{\text{CP}}$ Ian C [$_{\text{TP}}$ for Anneke to talk to <Ian>.]]

This proposal stems from the fact that *tough*-constructions act like $\bar{\text{A}}$ constructions. Within the embedded CP, *tough*-movement takes advantage of spec-CP and is not

[8]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 (*rather, kind of, awfully*), but this paper will be primarily concerned with degree phrases that contain an overt *too/enough*. Some degree words do not license GDPs (*very, so, entirely*). Developing a typology of which degree words can occur with GDPs, and explaining that typology in full, is an interesting problem left for future research.

[9]In the literature, there is debate about which kind of syntactic element undergoes that $\bar{\text{A}}$ movement: a null operator (Chomsky 1977) or the object DP itself (Pesetsky) 1987. In Section 5, this paper will argue that TCs involve movement of the embedded object DP. For consistency, this section will also illustrate TCs as containing an overt DP (and not a null operator) that undergoes movement. However, at this point, it is unclear if the two approached make distinct predictions.

ϕ-feature driven. This is shown in (9), where an embedded object can *tough*-move across the embedded subject before landing in the embedded spec-CP (satisfying the PIC). This suggests that, within the embedded CP, TCs are $\bar{A}$-movement constructions. While arguments cannot A-move over each other without violating minimality, $\bar{A}$ movement over another argument is indeed possible (Rizzi 1990).

(9) 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)

Tough-constructions also obey other locality conditions that characterize $\bar{A}$-movement. For example, gap sites in TCs can be separated from their fillers by a clause boundary (10a), but not an island boundary (10b).

(10) 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)

Tough-constructions also mirror other $\bar{A}$ movement constructions in a number of ways. Like other $\bar{A}$ movement constructions, TCs can license parasitic gaps (11)[10].

(11) That candidate was easy to hire t [without interviewing *pg*].

Tough-movement from the higher position of double object constructions (DOCs) is also prohibited (12a), a restriction that is also found in other $\bar{A}$ movement constructions (12b).

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

3.2 $\bar{A}$ movement in GDPs

GDPs behave identically to *tough*-constructions with respect to $\bar{A}$ movement tests[11]. Like TCs, (object) GDPs appear to have a movement step that is not ϕ-motivated and takes

[10] For an analysis of parasitic gaps that does not make reference to $\bar{A}$ movement, see Nissenbaum 2000.
[11] This was first noted in Lasnik & Fiengo (1974) and first analyzed in Chomsky (1977).

advantage of intermediate spec-CP positions. This is illustrated in (13), where the embedded object—in this case, a null operator—can move across the embedded subject without violating minimality.

(13) 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)

TCs and GDPs also share locality restrictions. The null operator cannot move out of an island boundary (14a), but the null operator in GDPs can be separated from its gap site by a clause boundary (14b).

(14) 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)

GDPs behave like $\bar{A}$ constructions with respect to other extraction tests. Like TCs, GDPs license parasitic gaps (15) and disallow extraction of the indirect object in DOCs (16).

(15) Ian is too shy for Anneke to talk to t [without getting to know *pg*]

(16) Ian is too dumb to give __ this book.

Additionally, TCs and GDPs share the following mysterious similarity, which seems to suggest the presence of $\bar{A}$ movement: As first noted by Chomsky (1977:104), TCs can show overt *wh*-movement *tough*-movement occurs inside an adnominal (17). GDPs have this property as well, as shown in (18), which also contains an overt *wh*-word.

(17) a. This is [a tough chair on *which* to sit]
b. This is [an easy violin *on which* to play sonatas]

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

In (17)-(18), the presence of an overt *wh*-word does suggest the presence of $\bar{A}$ movement. However, this paper does not add to the discussion of what conditions the presence of an

overt *wh*-word in TCs and GDPs.

3.3 Interim Summary

This section has argued, based on locality and extraction restrictions, that both TCs and GDPs contain at least one instance of $\bar{\text{A}}$ movement in their derivations. This $\bar{\text{A}}$ movement step targets the specifier of the embedded CP. For the remainder of this paper, I make the following assumptions about $\bar{\text{A}}$ movement: An $\bar{\text{A}}$ extracted argument may only cross a phase boundary if it first moves to the specifier of that phase. Both CP and vP function as phases. $\bar{\text{A}}$ movement is successive-cyclic, and $\bar{\text{A}}$ extracted arguments move through spec-vP on their way to spec-CP (Fox 1999, Rackowski and Richards 2005, van Urk and Richards, *to appear*). Given these assumptions, the $\bar{\text{A}}$ step of TCs and GDPs can be represented as (19) and (20), respectively. For this section, I have stipulated that TCs involve movement of an overt DP while GDPs involve movement of a null operator. Section 5 discusses further evidence for this distinction.

(19) *Tough* constructions
__ is tough [$_{\text{CP}}$ Ian C [$_{\text{TP}}$ for Anneke to [$_{v\text{P}}$ t$_I$ talk to t$_I$.]]]

(20) Gapped degree phrase
Ian is [$_{\text{AP}}$ shy [$_{\text{DegP}}$ too [$_{\text{CP}}$ OP C [$_{\text{TP}}$ for Anneke to [$_{v\text{P}}$ t$_{op}$ talk to t$_{op}$.]]]

4 A movement

This section shows that both TCs and GDPs contain an A movement step in their derivations. Crucially, this A movement step must occur after the $\bar{\text{A}}$ movement step discussed in Section 3. Evidence for an A movement step in TCs comes from Hartman (2009, 2012)[12], whose arguments are discussed in Section 4.1 and 4.2. Section 4.3 shows that Hartman's tests can be extended to GDPs, where they diagnose an A movement step,

[12]For an alternative account, see Bruening (2012).

as well. This evidence argues for an improper movement analysis of both TCs and GDPs. The improper movement structure for TCs is schematized in (21), repeated from (3), cf. (19), and the improper movement structure for GDPs is schematized in (22).

(21) Tough (improper) movement:
Ian is tough [$_{CP}$ t_I for Anneke to [$_{vP}$ t_I talk to t_I]

A Key:
——— = A-bar
..... = A

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

Note that the improper movement chains in (21)-(22), while similar, are not identical. The movement chain in the TC, (21), spans the entire clause, beginning in the embedded object position and moving to the canonical subject position in the matrix clause. In GDPs, (22), however, the movement chain is entirely internal to the embedded clause, originating in embedded object position and ending in spec-DegP.

4.1 Defective Intervention

Hartman's argues for an A movement step in TCs by showing that, when TCs optionally license an oblique experiencer argument above the embedded CP, TCs show sensitivity to defective intervention effects. This section briefly describes cross-linguistic examples of defective intervention, focusing on Romance, and gives a brief overview of how defective intervention effects manifest in English ECM constructions. This paper does not add to the long-standing discussion of why English *seem* and *appear* behave anomalously in this regard.

Cross-linguistically, the presence of an intervening experiencer argument is known to "block" A movement operations. This is illustrated in (23) with an example from French (Hartman 2009), where the experiencer argument can only grammatically appear in the expletive construction (23a), and not when raising has taken place (23b).

(23) a. Il semble (au garçon) qu'ell a du talent
EXPL seems (to.the boy) that-she has of-the talent
'It seems to the boy that she has talent.'

b. Elle semble (*au garçon) avoir du talent
she seems (to.the boy) to.have of-the talent
'She seems (*to the boy) to have talent.'

This effect is not specific to French, and has been shown in Italian (Rizzi 1986), Spanish (Torrego 1996) and Icelandic (Holmberg and Hróarsdóttir 2004). Hartman (2009, 2012) shows defective intervention in a number of English constructions, as well, including ECM constructions. Crucially, ECM predicates, like *tough* predicates, can optionally license an oblique experiencer argument above the embedded CP (24a) and involve A movement into the matrix clause (24b).

(24) a. The prosecutor proved [$_{PP}$ **to the jury**] [$_{CP}$ that the defendant was guilty]
b. The prosecutor proved the defendant [$_{TP}$ t to be guilty]

However, while (24) shows that ECM constructions can involve either an overt experiencer argument or movement into the matrix clause, (25) shows that these two effects cannot co-occur. When an oblique experiencer argument is present, the embedded subject cannot move into the matrix clause (25).

(25) *The prosecutor proved the defendant [$_{PP}$ **to the jury**] [$_{TP}$ t to be guilty]

In (25), the oblique experiencer blocks A movement. This contrast can be reduced to a minimality violation. Since an argument cannot A move over another argument, ECM constructions containing both an oblique experiencer and A movement of the embedded subject into the matrix clause are ungrammatical. However, when the oblique argument is not present in the derivation, A movement of the embedded subject can proceed grammatically (24b).

Hartman additionally shows that defective intervention effects can be obviated in

at least two ways. If the experiencer argument occurs in a non-intervention position, defective intervention violations do not occurs (26)[13]. Additionally, when the oblique argument is replaced by a PP adjunct that does not bear ϕ-features, movement over the adjunct is licensed (27). This suggests that it is the argument status of the oblique that underlies these contrasts, and not a restriction on some unrelated factor, such as linear order (though cf. Bruening 2012).

(26) [$_{PP}$ **To the jury**], the prosecutor proved the defendant [$_{TP}$ t to be guilty].

(27) Mary proved John [$_{PP}$ over the course of the trial] [$_{CP}$ t to be a liar]

4.2 Defective intervention in TCs

Hartman (2012) shows that *tough*-constructions are also sensitive to defective intervention effects. *Tough*-predicates can optionally license an oblique experiencer (28a). When the oblique experiencer is not present, *tough*-movement is grammatical (28b). As with ECM constructions, *tough*-moving an argument from the embedded CP over a PP experiencer argument results in ungrammaticality (28c).

(28) a. It is important ([PP to Mary]) [$_{CP}$ for John avoid cholesterol.]
b. Cholesterol is important [$_{CP}$ for John to avoid t]
c. *Cholesterol is important [$_{PP}$ for Mary] [$_{CP}$ for John to avoid t]

Moving the PP experiencer to a non-interventing position in the clause is enough to avoid the minimality violation and license *tough*-movement again (29).

(29) For Mary, cholesterol is important [$_{CP}$ for John to avoid t]

Changing the oblique argument to a ϕ-feature-less adjunct also licenses *tough*-movement again.

(30) Cholesterol was important [$_{PP}$ last year] [$_{CP}$ for John to avoid t]

[13]This paper remains agnostic about whether this is a movement or base-generation contrast.

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 (31).

(31) 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 (31) involve *tough*-movement, only the *for* PPs (the embedded subjects) are grammatical (32)-(33). This suggests that it is the oblique experiencer, not the embedded subject, that is absent from these constructions.

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

Additional evidence comes from partial control[14]. In (33a), the oblique experiencer partially controls the embedded PRO. However (33b) lacks a partial control reading (and is ungrammatical). This is easily explained if (33b) 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.

(33) 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 __]

4.2.1 GDPs and oblique evaluators

Degree phrases, like TCs and ECM predicates, can also optionally license an oblique argument. This argument is an oblique *evaluator*, which evaluates the likelihood of the CP standard occurring in the actual word, relative to the evaluator's own belief worlds[15]. In

[14]Thanks to David Pesetsky (p.c.) for bringing these examples to my attention.

[15]In this paper, I leave the relationship between evaluators of GDPs and *judges* of predicates of personal taste (Lasersohn 2005) intentionally vague. Particularly, I do not make a claim regarding whether or not judges and evaluators play an identical role in their sentences, or whether they are introduced (syntactically

(34), *Chris's advisor* evaluates the current humidity, relative to the possibility of an expensive experiment's success.

(34) a. CONTEXT: Chris needs his advisor's approval to run a very expensive experiment that will only succeed if preformed in dry weather.
b. It's too humid [$_{PP}$ **for his advisor**] [$_{CP}$ for Chris to run the experiment].

The distribution of evaluators, however, is limited. While evaluators can occur in gapless degree phrases, they cannot appear in gapped degree phrases. This is illustrated in (35)-(36).

(35) a. It is too awkward for [$_{PP}$ for Olivia] [$_{CP}$ for Anneke to talk to Ian].
b. *Ian is too awkward [$_{PP}$ for Olivia] [$_{CP}$ for Anneke to talk to __].

(36) a. This experiment is too simple for Chris [$_{CP}$ for Mary to use it as one of her exam questions].
b. *This experiment is too simple [$_{PP}$ for Bob] [$_{CP}$ for Chris to run __].

The judgement contrast in (36)-(35) reduces to a movement contrast. In (36a) and (35a), the degree phrase is gapless, which means that it does not contain an instance of null operator movement. However, (36b) and (35b) are GDPs, which do contain an instance of null operator movement. This contrast is parallel to the defective intervention facts seen for TCs and ECM verbs, where A movement is blocked when an oblique argument argument intervenes between the head and tail of the A movement chain.

Like other defective intervention effects, the contrast in (36)-(35) can also be obviated. As shown again in (37), null operator movement within the GDP can occur if there is no oblique evaluator introduced above the embedded CP (37a), but not if the evaluator is present (37b). However, when the evaluator occurs in a non-intervention position, movement within the embedded DegP can still occur (37c). Additionally, this is

or semantically) in the same way. I leave similarly open the relationship between TC experiencers and GDP evaluators.

not a linear word order restriction. When the intervening argument is replaced with an adjunct that does not bear ϕ-features, null operator movement can once again occur (37d).

(37) a. Ian is too shy [$_{CP}$ for Anneke to talk to _].
b. *Ian is too shy [$_{PP}$ for Olivia] [$_{CP}$ for Anneke to date _].
c. [$_{PP}$ For Olivia], Ian is too shy [$_{CP}$ for Anneke to date _].
d. Ian was too shy [$_{PP}$ last year] [$_{CP}$ for Anneke to talk to _].

4.2.2 Defective intervention and evaluators

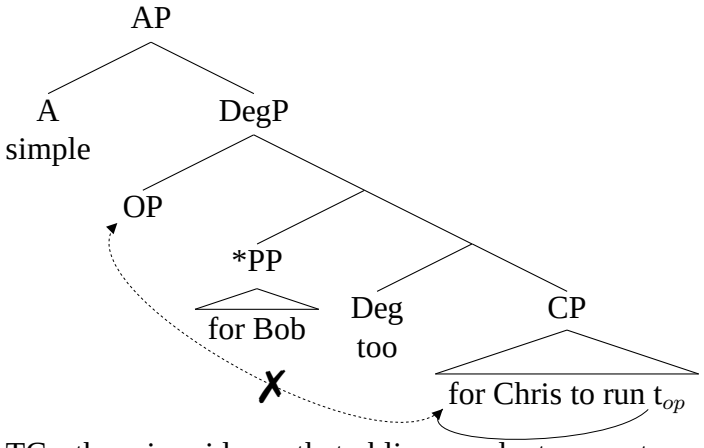
The contrasts in the previous section, when coupled with the $\bar{A}$ data in Section 3, tell us about the structure of GDPs. They shows us that, like TCs, GDPs have a movement chain that shows, at different points, the properties of both A and $\bar{A}$ movement. Within the embedded CP, this movement acts like $\bar{A}$ movement (the null operator can move "across" other arguments without causing a minimality violation). Above the embedded CP, however, this movement acts like A movement (the null operators cannot move "across" other arguments without causing a minimality violation).

These contrasts also show a parallel between the syntactic position of the TC experiencers and GDP evaluators. Like TC experiencers, GDP evaluators must be introduced outside the embedded CP, but below the final landing site of the moved element, in the case of GDPs, a null operator. Here, I will assume that the evaluator is introduced in a lower specifier of DegP, below the highest specifier (the landing site for the null operator)[16], as shown in the partial tree in (38). Positioning the evaluator

[16]In (37), the evaluator is simply introduced as a lower specifier of Deg. An alternative analysis could have the evaluator introduced as the specifier of a designated functional head, above the embedded CP, as in (i).

elsewhere within the tree would not properly predict the contrasts seen in this section[17].

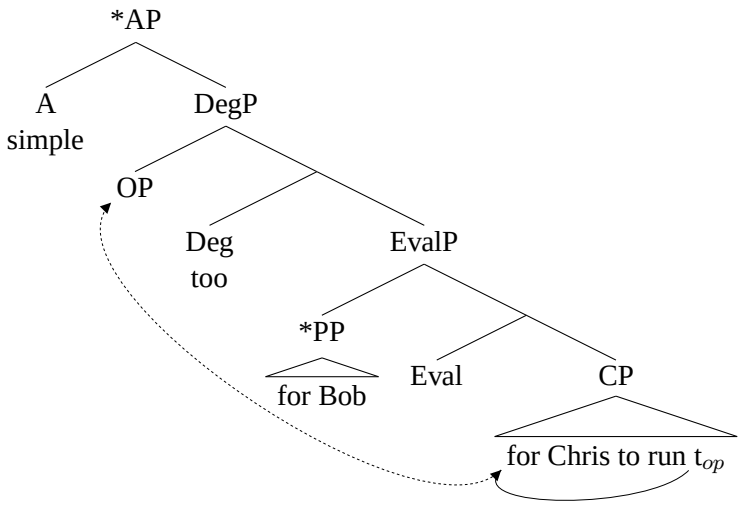
(38) *This experiment is **too simple for Bob for Chris to run**



Like with TCs, there is evidence that oblique evaluators are true arguments of the construction. While *for* is the only preposition that can case-assign an evaluator[18], the partial control facts from Section 4.2 are mirrored in GDPs (39).

(39) a. It's too cold [$_{for}$ Mary] [$_{CP}$ PRO to meet on the bridge]
b. The bridge is too cold [$_{CP}$ for Mary to meet on _]

(i)



[17]If the evaluator were introduced within the CP, (37b)-(36b) would be predicted to be grammatical–as the null operator would be able to $\bar{A}$ move across the evaluator as easily as it could move across the subject of the embedded CP. If the evaluator were introduced outside of the DegP, (37b)-(36b) would also be predicted to be grammatical, as the null operator would complete its movement chain before the evaluator were introduced.

[18]Recall that TC experiencers can be case-assigned by a variety of prepositions, perhaps lexically determined, by the *tough*-predicate.

The example in (39) shows that a partial control reading is only possible when there is no DegP internal movement, such as the gapless degree phrase in (39a). In (39a), the evaluator *for Mary* partially controls the embedded subject PRO. However, (39b), 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 not the oblique evaluator.

4.3 Interim summary

This paper has proposed that both TCs (following Hartman 2009, 2012) and GDPs are improper movement constructions[19]. Within the embedded CPs of both constructions, locality restrictions, a lack of minimality effects, and other extraction tests (Section 3)

[19]This paper has discussed a subset of all the possible GDP, and has focused on GDPs that contain an object gap. It has not discussed *subject* GDPs, as in (i). Note that, unlike GDPs, TCs cannot occur with a subject gap (ii)

(i). Anneke is too shy _ to date Ian. (ii) *Anneke is tough _ to talk to Ian.

If subject GDPs are analyzed as control constructions, the fact that TCs cannot license PRO in the embedded subject position presents another piece of evidence suggesting that TCs matrix subjects are, in fact, derived subjects (as a derived TC subject could not control an embedded PRO without violating binding theory). However, there exists some evidence that subject GDPs are indeed movement constructions. GDPs are, for example, "better" at licensing parasitic gaps that control constructions, as seen when the marginally grammatical (iia) is compared to the entirely ungrammatical (iib).

(ii) a. ?This student is too eager to take the bar exam [without someone talking to *pg* first]
b. *This student is eager to take the bar exam [without someone talking to *pg* first]

One route to resolution may lie in an anti-locality restriction proposed by Erlewine (2014), which restricts $\bar{A}$ movement from the specifier of an XP to the specifier of the XP that immediately dominates it (this constraint does not restrict short A movement). This anti-local movement restriction rules out, among other things, short subject movement from spec-TP to spec-CP, as illustrated in (iii).

(iii) *Anne is tough [$_{CP}$ t_A [$_{TP}$ t_A to [$_{vP}$ t_A visit Ian]]]

Assuming some notion of phase extension, this restriction would not rule-out subject movement in GDPs, however, if subjects of GDPs were allowed to move directly from spec-TP to spec-DegP. Because CP intervenes between TP and DegP, this would not be anti-local movement. While I leave the details of this proposal for future research, Erlewine's anti-locality may be able to explain the subject/non-subject asymmetry between TCs and GDPs. Brillman & Hirsch (2014) have argued for this explanation of this asymmetry, in their recent attempt to extend Erlewine's anti-locality restriction to English.

argue for an initial $\bar{A}$ movement step in both constructions. Defective intervention effects (this section) 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 (40), repeated from (21) and (22).

(40) a. *Tough*-constructions:
Ian is tough [$_{\text{CP}}$ t_I for Anneke to [$_{v\text{P}}$ t_I talk to t_I]

b. Gapped degree phrase movement:
Ian is [$_{\text{AP}}$ shy [$_{\text{DegP}}$ OP too [$_{\text{CP}}$ t_{op} C [$_{\text{TP}}$ for Anneke to [$_{v\text{P}}$ t_{op} talk to t_{op}.]]]

5 What moves in TCs and GDPs

This section discusses which element moves in TCs and GDPs, and proposes that they are distinct. Specifically, I propose that TCs involve the movement of an overt DP, while GDPs involve movement of a null operator. This section discusses two kinds of evidence for this distinctions: split antecedents and Θ-roles.

5.1 Split antecedents

TCs and GDPs do not behave identically with respect to split-antecedent matrix subjects. TCs cannot occur with a split-antecedent subject in the matrix clause (41), while GDPs can (42).

(41) TCs and split-antecedent matrix subjects
*Lars is easy and Chris is tough [$_{\text{CP}}$ to introduce _ to each other]

(42) GDPs and split-antecedent matrix subjects
Lars is friendly enough and Chris is compassionate enought [$_{\text{CP}}$ to introduce _ to each other]

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 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 (41) is ungrammatical. In GDPs, the null operator moves within the phasal DegP, and then links up to its split antecedent, base generated in the matrix clause, semantically—this binding operation does not require any movement of the split antecedent. N&S's analysis of how null operators are semantically bound to singular antecedents functions identically in the split-antecedent case. Thus, the ungrammaticality of the (41) is expected on an analysis where TCs involve the movement of an overt DP and the grammaticality of (42) is expected on an analysis where GDPs are null operator constructions.

5.2 Θ-roles

TCs and GDPs also differ in whether or not they can assign a Θ-role to their matrix subject[20]. While TCs crucially *do not* assign a Θ-role to their matrix subject, GDPs *do*. Thus, while (unmoved) TCs can occur with an expletive *it* in matrix subject position, GDPs cannot (43). 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.

(43) 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 complement without a gap. This is illustrated in (44a), which appears to fail precisely

[20]This is not a claim that TCs do not have any Θ-roles to discharge. In addition to the Θ-role that TCs assign their clausal complement, TCs can also assign a "experiencer" Θ-role as well. This Θ-role is often discharged in the matrix clause, most usually to the oblique experiencer, when it is present. The presence of this Θ-role may be sufficient to explain why reconstruction into the embedded clause is blocked in TCs, though this paper leave that problem for future research.

because no Θ-role is assigned to *Olivia*, the matrix subject. Gapless degree phrases, like (44b), can occur with a matrix subject and an embedded clause, further suggesting that GDPs do assign a Θ-role to their matrix subject.

(44) a. *Olivia is tough for Ian to talk to Anneke. (TC)
b. Olivia is too smart for the committee to reject her application. (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 clause.

6 Conclusions

This paper has shown that both TCs and GDPs are improper movement constructions, containing a $\bar{\text{A}}$ movement step internal to their embedded CPs (Section 3) and an A movement step thereafter (Section 4). These movement chains are schematized in (45), repeated from (40).

(45) a. *Tough*-constructions:
Ian is tough [$_{\text{CP}}$ t_I for Anneke to [$_{v\text{P}}$ t_I talk to t_I]

b. Gapped degree phrase movement:
Ian is [$_{\text{AP}}$ shy [$_{\text{DegP}}$ OP too [$_{\text{CP}}$ t_{op} C [$_{\text{TP}}$ for Anneke to [$_{v\text{P}}$ t_{op} talk to t_{op}.]]]

The movement chains of GDPs and TCs are very similar, though different elements undergo this movement in each construction, and the final landing sites also differ (Section 5). In *tough*-constructions, an overt DP undergoes movement from the embedded object position to the matrix subject position. In GDPs, a (silent) null operator undergoes

movement from the embedded object position to the edge of the Degree Phrase.

Crucially, this paper has assumed that improper movement chains *sometimes* are possible in the grammar, at least in the cases of TCs and GDPs. In that respect, this paper also argues that GDPs 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" have an improper movement construction, and Obata and Epstein (2011) claim that the Bantu language Kilega allows improper movement constructions in certain contexts.

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.

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