

Against intervention accounts of experiencer intervention in English *tough*-movement. Evidence from extraction of the *tough*-adjective*

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1 Introduction: Basics of English *tough*-movement

The alternation in (1) has been a challenge for linguistic theory for a long time:

- (1) a. It is tough to read this book.
- b. This book is tough to read.

One important approach to this alternation assumes that (1-b) is derived from the expletive construction in (1-a) via movement, cf. Brody (1993), Hartman (2011), Longenbaugh (2016) and much older literature. Concretely, the embedded object moves (potentially via stopovers) to the matrix subject position. Because of the frequent use of the adjective *tough* in this construction, the variant in (1-b) is called *tough*-movement (TM), and the surface subject is referred to as the *tough*-subject.

A direct movement analysis presents a number of immediate problems given current assumptions about movement: First, it is in conflict with the Activity Condition in that the subject seems to receive two cases. Second, it violates Improper Movement in that A'-movement is followed by A-movement. If the trace in the embedded clause qualifies as a variable, there should be a Condition C violation since it would be bound by the subject from an A-position. It is uncontroversial that A'-movement is involved in some way: (i) the relationship between the matrix subject position and the embedded object is, in principle, unbounded (although acceptability decreases rather quickly), cf. (2-a) (from Heycock 1994, 257). (ii) this relationship is subject to locality constraints, cf. (2-b) (from Browning 1987, 21, fn. 14). (iii) parasitic gaps are licensed, cf. (2-c) (from Řezáč 2006, 308):

- (2) a. These papers were easy for me to get someone to sign ____.
- b. ??John is fun for us to find out how to annoy ____.
- c. Cernunnos was probably not easy [to poke ____ [without offending pg]].

Third, direct movement is unlikely given the following movement paradox: A CP-*tough*-subject cannot occur as a direct object of the verb it is supposed to originate from in *tough*-movement, see Wilder (1991, 123):

- (3) a. [For him to be top of the class] is hard to believe ____.
- b. *I cannot believe for him to be top of the class.

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Fourth, reconstruction effects are limited, perhaps even absent. They are clearly impossible with scope, see the contrast in (4) (see also Salzmann 2017, 326ff.):

- (4) a. Nothing is hard for Melvin to lift. \neq
 b. It is hard for Melvin to lift nothing. Postal (1974, 356).

Because of these problems for the direct movement analysis, alternative proposals have been advanced. In Hicks (2009), there are two independent chains: there is a complex operator containing the *tough*-subject. This complex operator A'-moves from the embedded object position to Spec,CP in the complement clause. From there, the *tough*-subject subextracts and A-moves to the matrix subject position:

- (5) John₂ is easy [CP [DP D [NP Op ___₂]]]₁ to please ___₁].

While this derivation avoids the problem with the Activity Condition, it certainly incurs a violation of the freezing principle. Furthermore, it may also be in conflict with certain versions of Improper Movement (e.g., those based on the Williams Cycle, see Müller 2014, where movement to a specifier that is lower on the functional sequence than its launching site is ruled out).

Another alternative involves base-generation. More concretely, the *tough*-subject is base-generated in the matrix clause and is licensed via predication: operator movement in the complement CP turns the CP into a predicate, and the *tough*-subject then satisfies this predicate, cf. Chomsky (1977), Cinque (1990) Řezáč (2006), Keine & Poole (2017), Salzmann (2017):

- (6) [TP John is [AP easy [CP₁ Op to please ___₁]]]

While many facts thus tend to argue against movement of the *tough*-subject from the embedded clause, a movement analysis received new support by intervention data discovered in Hartman (2011), discussed in the next section.

2 Intervention in English *tough*-movement

In this section, I will introduce the intervention data and the different explanations that have been proposed for them in the literature.

2.1 Defective intervention and revival of the A-movement account

Hartman (2011) observed that the presence of experiencers leads to ungrammaticality in English *tough*-movement, but not in the expletive construction:

- (7) a. It is important (to Mary) to avoid cholesterol.
 b. Cholesterol₁ is important (*to Mary) to avoid ___₁.
 (8) a. It was very hard (on me) to give up sugar.
 b. Sugar₁ was very hard (*on me) to give up ___₁.

Hartman (2011) proposes that this is an instance of (defective) intervention: A-movement across the experiencer is blocked by Relativized Minimality, like in Romance languages, where raising across an experiencer leads to ungrammaticality.

(9) Cholesterol₁ is important (*to Mary) [___₁ PRO to avoid ___₁].

(10) a. It is impossible [for every student] to fail this test.
 Exp: every \succ impossible (\approx all pass)
 b. It is impossible [for every student to fail this test].
 embedded subject: impossible \succ every (\approx not all fail);
 c. This test is impossible [for every student to fail].
 impossible \succ every; *every \succ impossible

(11) a. To Mary, cholesterol₁ is important to avoid __₁.
b. Cholesterol₁ is important to avoid __₁ to Mary.

(12) John₁ seems to Mary ___₁ to be happy.

(13) a. It is always annoying (at meetings) to talk about the budget.
b. The budget₁ is always annoying (*at meetings) to talk about __₁.
c. John seemed (at the meeting) to be agitated.

¹Confusingly, Longenbaugh (2016) makes the opposite claim, viz., that only *for-to*-subjects intervene but not PP-experiencers, based on data with non-thematic associates of *for* (viz., *there* and *it*), scope data similar to (i) and ellipsis, with the PP surviving ellipsis under TM. See also ex. (17).

²For further arguments that *for*-PPs in *tough*-movement are not experiencers, see Keine & Poole (2017, 301–304).

ers seem to accept such examples, though):

- (14) ?Cholesterol₁ is to Mary important to avoid __₁.

Under a Relativized Minimality account, (14) should be just as degraded as (7-b) since there is A-movement across the experiencer. A final complication for the A-movement approach comes from the observation in Keine & Poole (2017, 312) that certain PPs – argument-PPs according to the authors – do not cause an intervention effect (my consultants uniformly rejected such examples, though):

- (15) a. It is damaging [to cars] to drive over these traffic cones.
b. [These traffic cones]₁ are damaging [to cars] to drive over __₁.

Taken together, these facts strongly suggest that the degradedness induced by the presence of experiencers in TM cannot be due to (defective) intervention in A-movement. Consequently, alternative explanations have been advanced, which are briefly summarized in the following subsections.

2.2 Alternative explanations

Different alternatives have been proposed to account for the degrading effect of experiencers that are completely unrelated to Relativized Minimality. The effect is either related to a different argument structure of *tough*-adjectives (Longenbaugh 2016), to basic ordering properties of the AP (Bruening 2014) or to a semantic type-mismatch (Keine & Poole 2017). They will be discussed in turn.³

2.2.1 Longenbaugh (2016)

The approach by Longenbaugh (2016) is based on slightly different empirical assumptions. While TM is blocked with *on*- and *to*-PPs (cf. (7-b), (8-b) above), it is not blocked with *of*-PPs:

- (16) a. It was foolish [of Don] to make that statement.
b. That statement was foolish [of Don] to make __.

In addition, *for*-PPs actually do not intervene according to him (only *for-to*-PPs do):

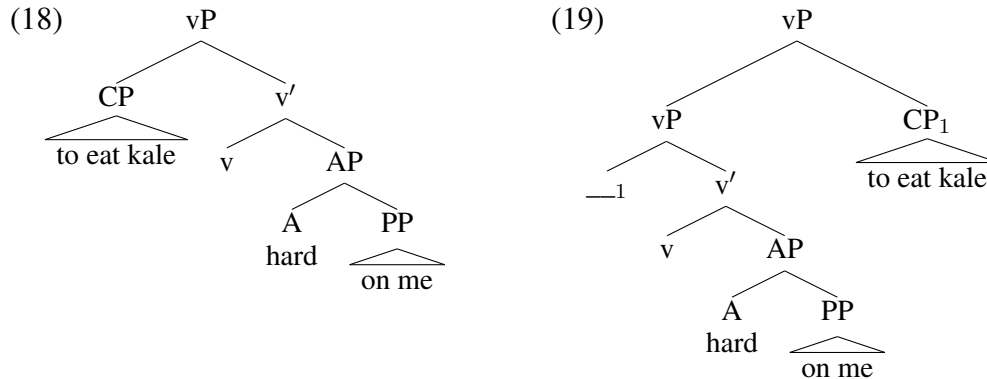
- (17) The bonfire was tough [for Sasha] to jump over __.

The empirical generalization he bases himself on is that TM is blocked with experiencer-PPs (those with the preposition *on* or *to*), but not with PPs that precipitate the event described in the non-finite clause as in (16). This is related to different structural positions of the CPs: With experiencer PPs as in (7-b), (8-b) the CP is a causer and therefore merged as an external argument, see (18).⁴ The surface order

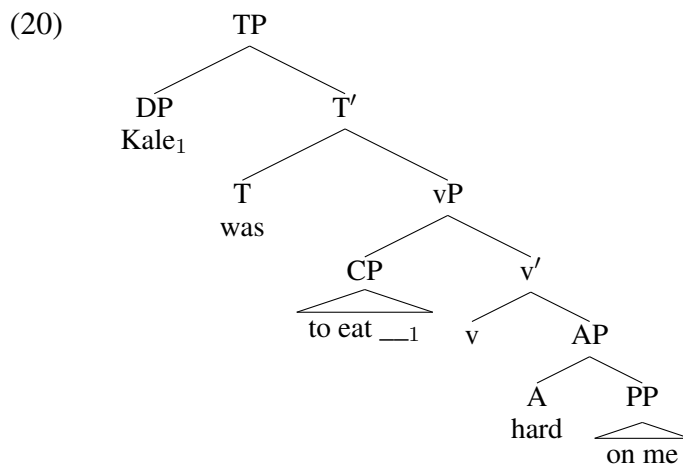
³Another possibility to account for the impossibility of experiencer-PPs to occur between adjective and CP would be the approach by Zwart (2012), who treats *easy to please* as a reanalyzed chunk from a previous derivation. However, given that the adjective will be shown below to be able to move without the CP, this solution cannot be generally correct.

⁴Evidence for this comes from Condition C: If such adjectives take a finite CP-complement, an R-expression inside that complement can be coreferential with a pronominal experiencer, suggesting that the CP is in a higher structural position than the PP.

in the expletive variant arises through extraposition of the CP, (19):



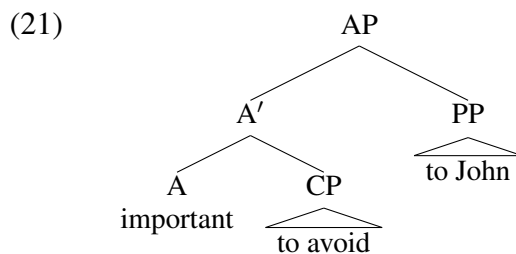
Under Longenbaugh's direct movement approach, TM is blocked here because this would require subextraction of the *tough*-subject from a specifier, which is ruled out by the Condition on Extraction Domains (Huang 1982) and would also fail because the matrix *v* cannot attract it (it does not c-command it):



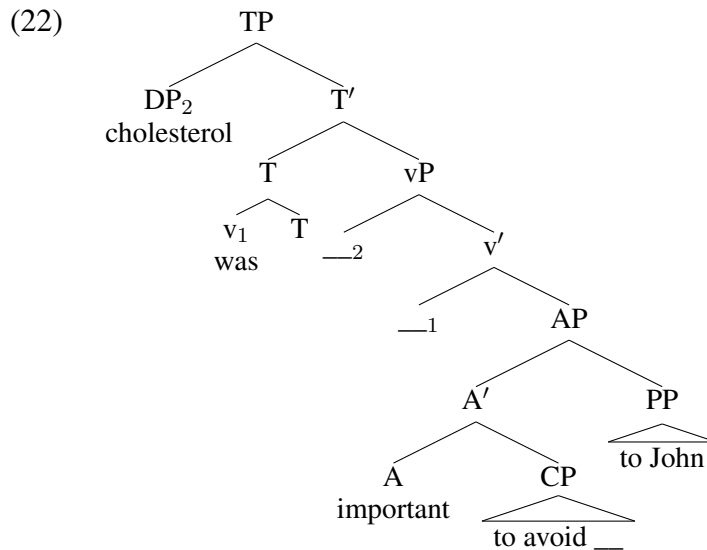
If the PP is not an experiencer as in (16), (17), it is merged above the CP, which is thus a complement and extraction is fine. If no PP is present, the CP is also merged as a complement, in which case extraction is obviously also unproblematic.

2.2.2 Bruening (2014): Just a matter of word order

Bruening (2014) seems to assume (he does not say so explicitly) that the base order is [A–CP]–PP as in (21) (or perhaps PP–[A–CP]):

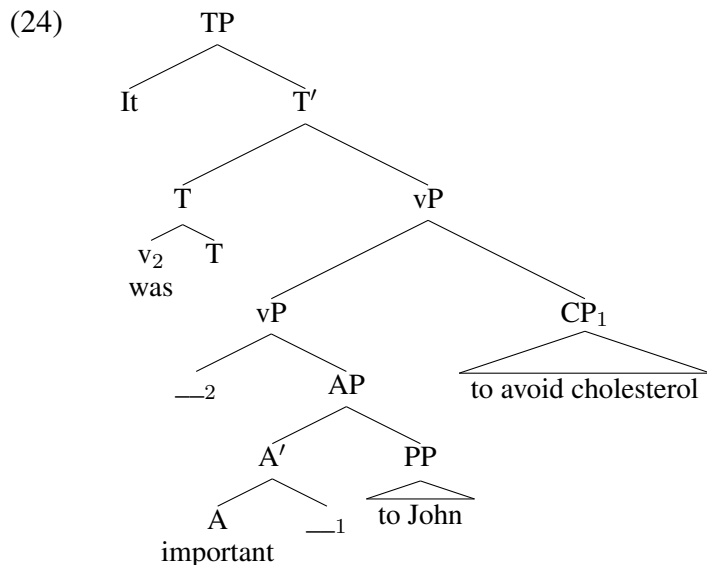


The order Adj-PP-CP would consequently require extraposition of the CP. Bruening proposes that extraposition of this kind of null operator construction is impossible (for reasons not investigated in detail, perhaps because C has to cliticize on the adjective). As a consequence, if extraposition of the CP is impossible, the PP can occur at the end of AP (if projected as a right-hand specifier) or at the beginning (if projected as a left-hand specifier) or in topicalized position. But crucially, it cannot occur between the adjective and the CP; the intervention configuration thus cannot be generated (he remains agnostic as to how the TM-subject is related to the gap inside the complement CP):



(23) (To John,) Cholesterol is (?to John) important (*to John) to avoid (to John).

In the expletive construction, on the other hand, there is no operator movement. Consequently, extraposition of the CP is possible and the presence of the experiencer has no degrading effect:



2.2.3 Keine & Poole (2017)

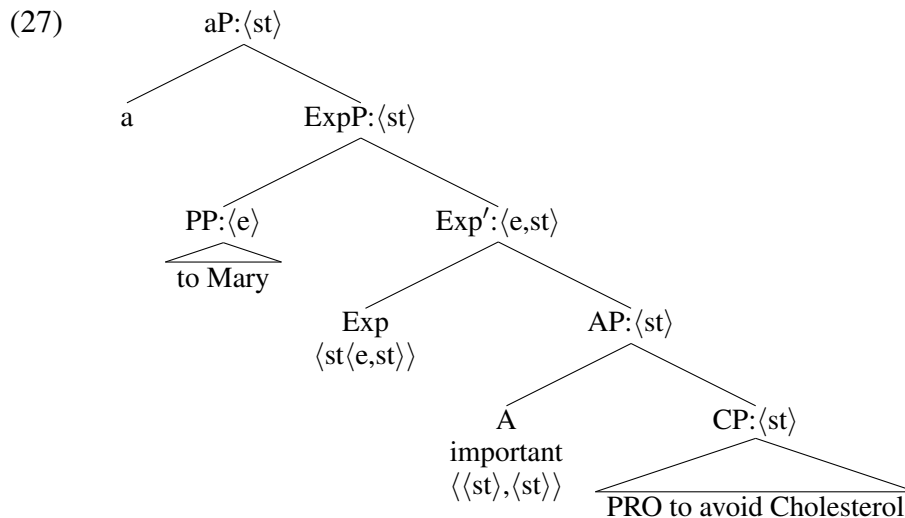
A crucial component of this analysis is that both the semantic type of the CPs and the adjectives differ in the expletive vs. the TM-variant:

- (25) a. expletive construction: CP = propositional $\langle st \rangle$; adjective = $\langle st, st \rangle$
 b. TM: CP = predicative/property $\langle e, st \rangle$; adjective = $\langle \langle e, st \rangle, \langle e, st \rangle \rangle$

The experiencer is assumed to be introduced by a designated functional head Exp, which combines with propositions (the experiencer is thus not an argument of the adjective):

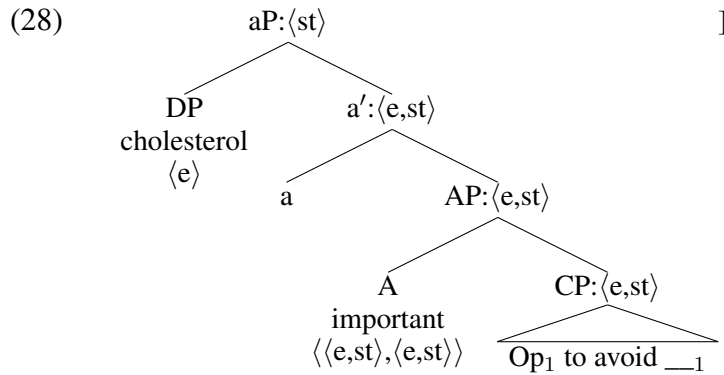
- (26) Exp = $\langle st, \langle e, st \rangle \rangle$; PP = $\langle e \rangle$

The expletive construction The structure and semantics of the expletive construction are illustrated in (27):



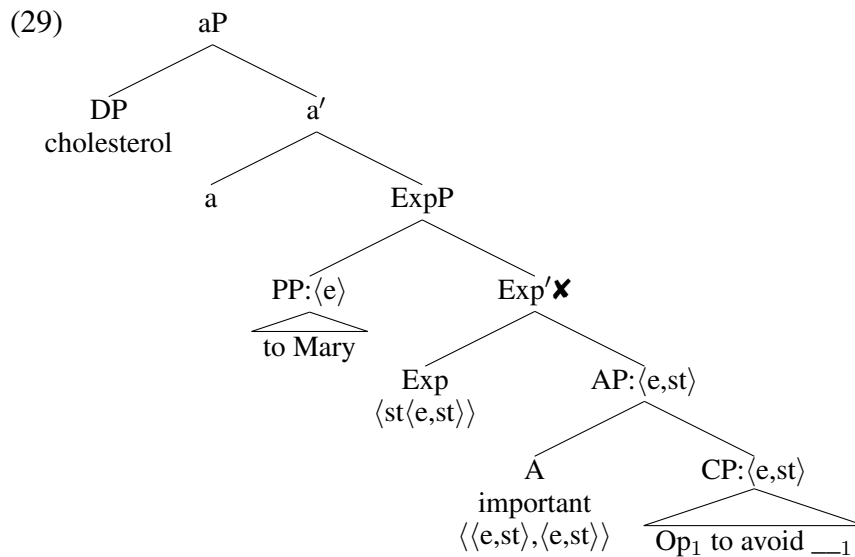
The derivation proceeds as follows: The adjective combines with a propositional CP and returns a proposition. Then, Exp is merged, which combines with a proposition and still requires an individual. This argument is satisfied by the PP, which is merged in ExpP's specifier. The PP is thus generated above the CP, arguably to ensure control. There is another functional head *a* to which the adjective moves to derive the correct word order (cf. little *v* in the verbal domain). Since the PP is introduced above the adjective, it scopes over it (recall (10-a)).

Tough-movement The derivation in *tough*-movement is crucially different. We first consider the derivation without experiencer in (28):

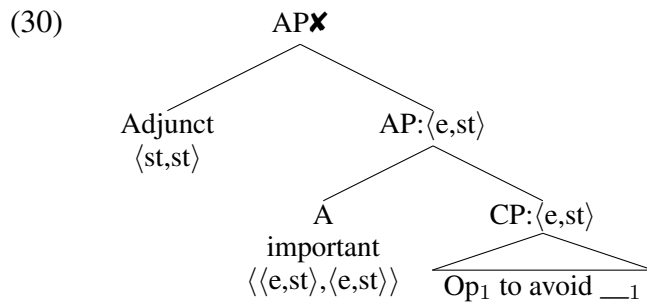


The complement CP is predicative because operator movement has turned it into a predicate. The adjective thus has to be a of a different type to combine with this CP (note that the CP is still treated as an argument here). The AP is a property, and the open slot is then satisfied by the *tough*-subject.

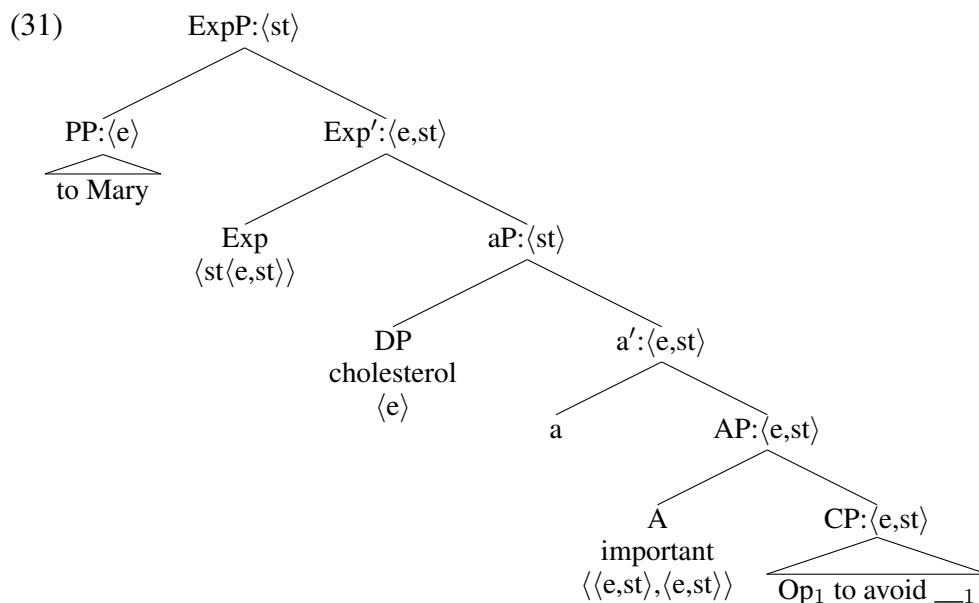
The degradedness that obtains in the presence of experiencers is then related to a type-mismatch. Such a derivation is illustrated in (29):



The crucial point is that ExpP cannot be introduced in the TM-construction if the AP is non-propositional because ExpP requires a proposition. Thus, the derivation crashes in the semantics at the point where ExpP is combined with AP because of a type-mismatch. With the type-mismatch assumption, the intervention by adjuncts, which are ⟨st,st⟩, can be captured as well: They combine with propositions and therefore cannot combine with the predicative AP:



Crucially, the derivation is felicitous if the experiencer/the adjunct is introduced above the TM-subject as it then can combine with a proposition (the PP could also be introduced above TP):



2.3 A challenge: AP-movement

A fact that has important consequences for this discussion (but which seems to have been neglected) is that extraction of the *tough*-adjective to the exclusion of the CP is possible (see Rezac 2006: 293, based on Heycock 1994, 257-258; see also Higgins 1973, 77):

(32) [How difficult] is Janice [to forget __]?

Given that the CP is normally treated as a complement (the *tough*-adjective are analyzed as unaccusative), this would involve remnant AP-movement (as in [*How likely __*]_I is John [*to win*]_I), with the CP first extraposing, followed by A'-movement of the AP.

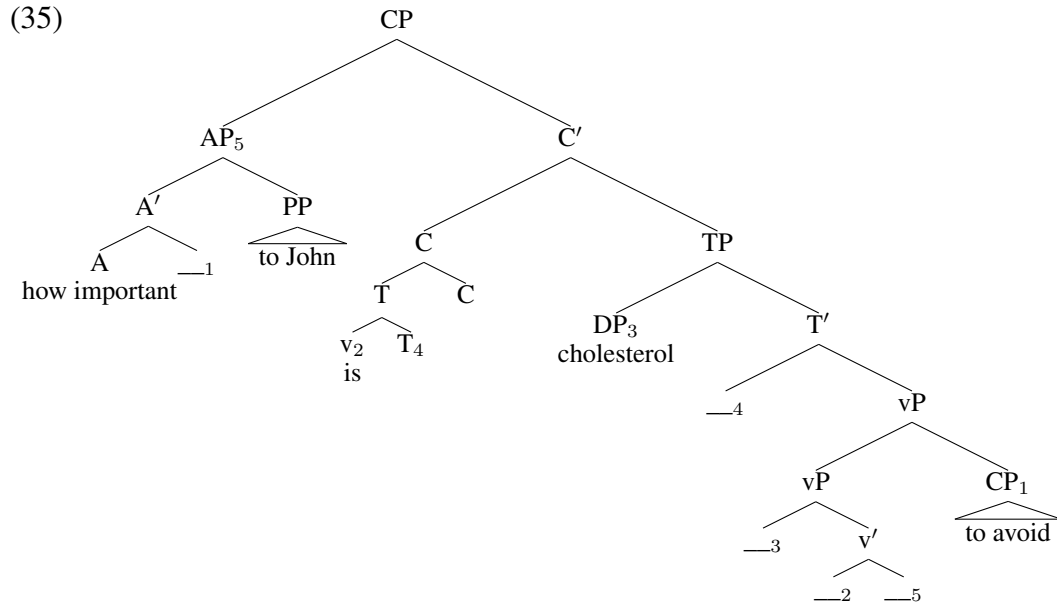
Interestingly, the adjective may pied-pipe the experiencer (Řezáč 2006, 293):

- (33) a. [How difficult for George] is Janice [to forget __]?
 b. [How important to John] is cholesterol [to avoid __]?

Again, this seems to require extraposition of the CP (followed by remnant AP-movement). The base-structure of such predicates would be as in (34) with the CP as a complement and the experiencer as a specifier, which could be to the left (Keine & Poole 2017, (34-a), or to the right (Řezáč 2006, Bruening 2014), (34-b):

- (34) a. $[_{AP} PP [_{A'} A CP]]$ b. $[_{AP} [_{A'} A CP] PP]$

The simplified derivation of examples like (33) would thus look as in (35):



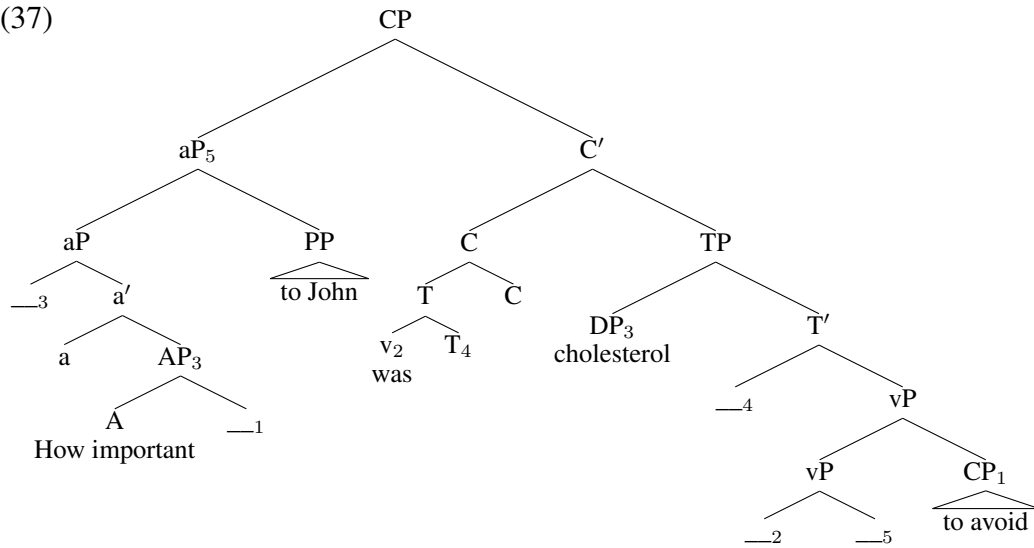
However, AP-extraction in as in (35) instantiates the intervention configuration; under the accounts of Hartman (2011) and Keine & Poole (2017), the examples in (32) and (33) should thus be just as degraded as (7-b) and (8-b), contrary to fact: Either, the TM-subject has A-moved across the experiencer, violating Relativized Minimality, or the experiencer is merged with the predicative adjective, leading to a type-mismatch. Under Bruening's assumptions, (32), (33) can simply not be generated since AP-movement to the exclusion of the CP is not possible without extraposition of the CP. Thus, while he can explain the ungrammaticality of the baseline examples (7-b), (8-b), the grammaticality of (32) and (33) remains unaccounted for.

At first sight, a way out suggests itself for Hartman (2011) and Keine & Poole (2017): Recall from above that experiencers do not intervene if they are introduced above the *tough*-subject:

- (36) To Mary, cholesterol is important to avoid ___.

The absence of intervention under AP-extraction as in (33) could then be related to the fact that in such examples, the PP is in fact introduced above the base-position of the subject, e.g., adjoined to aP, cf. (37):

(37)



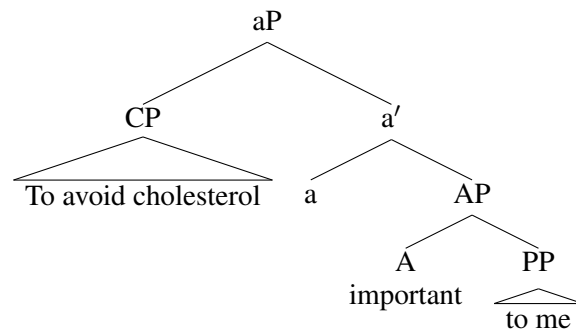
However, while this structure accounts for the grammaticality of (33), nothing rules out high attachment of the PP and extraposition taking place in the basic TM-construction in (7-b), (8-b), where AP is in-situ. Consequently, once extraposition is a possibility, such approaches wrongly predict (7-b), (8-b) to be just as grammatical as (33). It seems that one would have to stipulate that CP-extraposition is only possible under AP-movement, clearly an undesirable state of affairs.

As will be discussed below, the constituency that Longenbaugh (2016) adopts makes AP-fronting to the exclusion of the CP as in (32), (33) in principle possible. However, under Longenbaugh's assumption, TM should always be ungrammatical once a PP is present, irrespective of where the PP occurs since TM will necessarily involve sub-extraction of the TM-subject from a specifier. Hence, the three grammatical options in (23) as well as (33) remain unaccounted for.

3 Proposal: a different base structure

I would like to propose an alternative that rests on two assumptions, adopting insights from both Bruening (2014) and Longenbaugh (2016): First, the base structure of *tough*-adjectives is different from what is assumed in much of the literature: Instead of treating the adjectives as unaccusative predicates, I follow Longenbaugh (2016) in assigning them an unergative structure with the CP-subject merged as the external argument (projected in a separate *aP*) and the PP-experiencer as an internal argument:

(38)



The CP is thus a causer rather than a subject matter and thus is projected above the PP (Pesetsky 1995, Hartman 2012). The argument that the reverse hierarchy is needed to ensure control of the PRO within the CP by the experiencer (Řezáč 2006, 293) can be shown to be inconclusive given that *tough*-movement displays special control properties: intraposed subjects of *tough*-predicates require obligatory control and unlike other predicates block NOC, see Landau (2001, 136f.):

- (39) a. Mary_i thought that [PRO_{*i/j} to behave well] would be easy for Peter_j.
b. Mary_i thought that [for her_i to behave well] would be surprising for Peter_j.

This special control property of experiencers of *tough*-predicates can be linked to LF-raising, cf. Landau (2010). Thus, the surface position of the experiencer need not c-command PRO; its projection below the non-finite CP is thus not problematic.

Evidence for the different base structure comes, among other things, from properties of the *tough*-adjectives in languages like German or Dutch, see Bennis (2000, 2004), where they clearly pattern with unergatives.

The structure in (38) is the base for both the TM- and the non-TM version, which occurs with, (40-b), or without extraposition, (40-a):⁵

- (40) a. [To avoid cholesterol] is important to me.
b. It is important to me [to avoid cholesterol].

As for *tough*-movement, I will assume, as in Řezáč 2006, Keine & Poole 2017, that the TM-subject is base-generated in its surface position, licensed by predication.

As a consequence of the structure in (38), AP-movement pied-piping the experiencer is unproblematic as they form a constituent to the exclusion of the CP-subject. Crucially, the CP therefore does not have to undergo extraposition under these assumptions in the examples with AP-movement ((32),(33)):

- (41) [_{CP} [_{AP} How difficult for George]₁ is [_{TP} Janice [_{aP} [_{CP} to forget] a ____]]]?

⁵Evidence that the CP in the expletive version in (40-b) is extraposed comes from the observation that it cannot be fronted together with the adjective, see Higgins (1973, 73):

- (i) a. *How easy to please John is it.
b. How easy is it to please John?

Pied-piping of the PP is possible, though, cf., e.g., *How important to you is it to avoid cholesterol?*

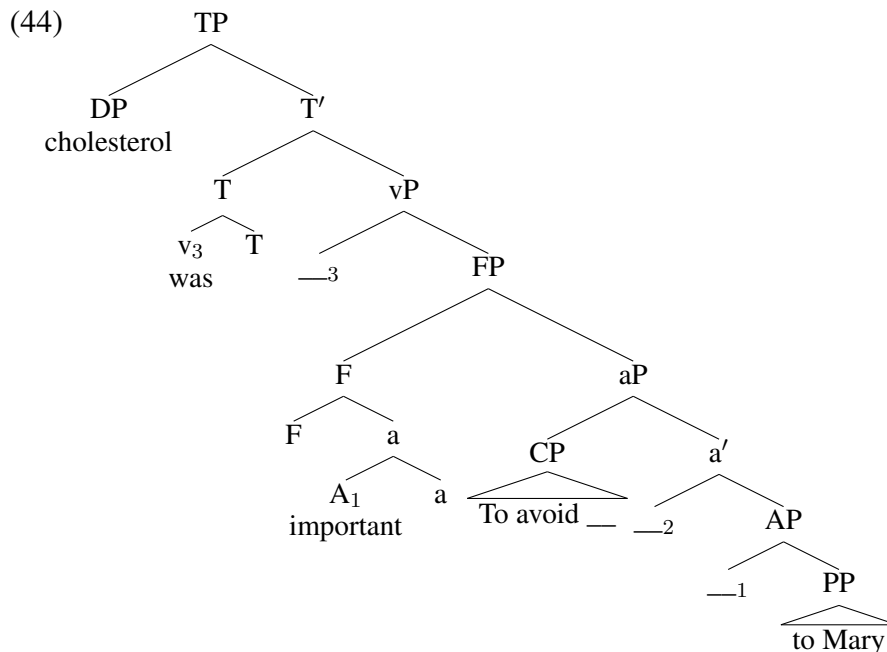
Crucially, the absence of extraposition fits in nicely with the observation that the CP is lower than adverbials like *yesterday* under AP-extraction, see Heycock (1994, 257):

(42) How difficult were the children (?*yesterday) to control (yesterday)?

While previous work had to stipulate that the CP adjoins very low (e.g., to AP, see Řezáč 2006, 293), this is not necessary under the revised structure, where it simply remains in-situ. The PP can optionally undergo extraposition, leading to remnant AP-movement and versions as in (43):

(43) [How important ___₁]₁ was Cholesterol [to avoid ___₂] to Mary₁?

Second, the ungrammaticality of the intervention configuration in (7-b), (8-b) follows under the assumption (cf. Bruening 2014) that certain null-operator CPs cannot undergo extraposition.⁶ In the absence of AP-movement, the A normally moves via *a* to F above the CP in TM (the SU is base-generated in Spec,FP or Spec,TP); thus, the only possibility is the order A-CP-PP:



Head-movement of A to F via *a* is blocked if AP undergoes movement itself as in (32),(33), cf. (41).⁷ FP-movement including the A then accounts for examples

⁶I remain agnostic as to why this does not hold for other null operator constructions like relative clauses and parasitic gaps.

⁷One may object that this approach, like those criticized above, also has to stipulate that AP-movement crucially affects the possibility of other movement operations in an arbitrary way, in this case, A-to-F-movement (rather than extraposition). To avoid this conclusion, one can assume that movement of A to F via *a* always takes place. However, if AP undergoes A'-movement, the adjective is spelled out within the moved AP and not adjoined to F. In V/VP-topicalization in other languages, such a configuration often leads to verb doubling or *do*-support to host morphology inserted into T. In the case at hand, this is not necessary since neither *a* nor F receive phonetic realization.

where the CP is pied-piped (in (45), the PP is optionally extraposed; see also Higgins 1973, 77 for similar data):

(45) [FP How important to avoid ___1]2 was cholesterol ___2 [PP to Mary]1?

4 Conclusion

I have argued that intervention effects in English *tough*-movement are only apparent. The degradedness caused by experiencer-PPs in TM have nothing to do with either syntactic or semantic intervention. Rather, the offending surface string A-PP-CP simply cannot be generated because (i) the PP is a complement of the adjective, (ii) the CP a specifier and (iii) the null operator CP cannot extrapose. With the proposed structure, all possible surface variants can be generated, including cases where the PP and the CP are pied-piped by AP-fronting.⁸ Previous accounts all fail to account for the grammaticality of TM under AP-fronting either because they assume that the CP is a complement of the adjective (Hartman 2011, Bruening 2014, Keine & Poole 2017) or because they take TM with CPs in specifier position to be generally impossible (Longenbaugh 2016).

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⁸To capture the adjunct data in (13), I am forced to assume that adjuncts can only adjoin to the right of aP. At this point I have no insights to offer for those cases where the experiencer PP precedes the *tough*-adjective (recall (14)). Given my structural assumptions, this would have to involve some kind of low topicalization of the PP to a left-adjoined position of FP/vP. Similarly, adjuncts that are acceptable to the left of the *tough*-adjective (see Bruening 2014, 710) must be left-adjoined to FP/vP as well and crucially not to aP. Finally, for cases where the presence of PPs does not lead to degradation as in (15-b), (16-b), I would have to assume that the adjectives' argument structure is different, with the CP being projected as a complement.

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