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On smuggling, the freezing ban, labels, and *tough*-constructions[*]

Željko Bošković
University of Connecticut

Abstract: Smuggling refers to a situation where movement of α would induce a violation that is voided by movement of a larger constituent β that contains α, which is followed by movement of α. Smuggling thus involves movement out of a moved element, which is traditionally assumed not to be possible (the constraint is referred to as the freezing ban). The paper shows that there is no general freezing ban. Extraction out of moved elements is generally allowed. The cases where such extraction appears not to be allowed involve independent problems concerning labeling. The paper re-examines from this perspective (which allows but restricts the possibilities for smuggling) the smuggling derivations proposed in Collins (2005a,b), focusing on the passive construction, and the smuggling analysis of *tough*-constructions proposed in Hicks (2009). A modified version of the latter is argued to be superior to the traditional null Op analysis of *tough*-constructions. Several conclusions regarding the structure of infinitives are also drawn; thus, the discussion of *tough*-construction coordinations provides evidence against analyses which place infinitival *to* low in the structure. The discussion in the paper also shows that there is a strong relationship between movement and labeling: unlabeled elements cannot undergo movement, unlabeled elements do not function as interveners, and movement cannot target unlabeled elements.

1. Introduction

Smuggling is typically used to refer to a situation where movement of XP would create a violation that is voided by movement of a larger constituent ZP that contains XP, which is then followed by movement of XP out of ZP (see Collins 2005a,b). The violation that is typically voided this way concerns intervention effects, i.e. relativized minimality (Rizzi 1990). This paper will address two issues concerning smuggling. As the above description of the smuggling situation indicates, smuggling involves movement out of a moved element, which is traditionally assumed to be disallowed. (The ban on movement out of moved elements is often referred to as the freezing ban.) The main goal of this paper is to discuss the problem that the freezing ban raises for smuggling. The discussion in this respect will lead to a reformulation and modification of both the traditional freezing ban (see also Bošković 2018) and several smuggling derivations of particular phenomena proposed in the literature (e.g. those proposed in Collins 2005a,b).

The paper will also discuss a particular case of smuggling where the violation smuggling voids is not a relativized minimality violation, but a violation of a different requirement, which means that relativized minimality is not the only constraint whose effect can be overcome through smuggling. The logic behind the case in question is, however, the same as in the basic cases of smuggling. The situation where movement of XP to the position of t'_i in (1) would induce a violation is voided by moving instead a larger consitutent, ZP, which is then followed by movement of XP out of ZP, as in (2). (The final position of XP is the same in (1) and (2).)

(1) $XP_i \ t'_i \ [_{ZP} \ldots t_i \ \ldots]$
(2) $XP_i \ [_{ZP} \ldots t_i \ \ldots]_j \ t_j$

Section two of the paper will discuss smuggling in relation to the freezing ban, which will include giving a more detailed background regarding both smuggling and the freezing ban. It will be argued that there is in fact no such thing as a general freezing ban—movement out of moved elements is generally possible. The cases where it appears not to be possible involve

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independent issues regarding labeling. Labeling, as discussed in Chomsky (2013), will play a prominent role in the discussion. In this respect, we will see that there is a strong relationship between movement and labeling; for one thing, unlabeled elements cannot undergo movement, a state of affairs which will be deduced below.

In section three, I will discuss in more detail a case of smuggling where what smuggling voids is not a violation of relativized minimality, but a violation of a different requirement. The case in question involves the *tough*-construction, and the account of that construction proposed in Hicks (2009). The account will be compared to the null Op account of *tough*-constructions, and consequences of the smuggling account for several aspects of *tough*-constructions, and the structure of infinitives more generally, will also be discussed.

2. Smuggling and the Freezing Ban

2.1. On the Scope of the Freezing Ban

Smuggling is a descriptive term used in Collins (2005a,b) for an interaction of movement operations where in a situation where movement of XP would be unable to cross YP due to an intervention effect (i.e. a relativized-minimality (RM) violation; note that I will use the two terms interchangeably), a larger constituent ZP dominating XP undergoes movement across YP, which is then followed by movement of XP out of ZP. In effect, then, movement of ZP smuggles XP across YP with respect to RM: XP is moved across YP without itself crossing YP, which voids a potential intervention effect. This situation is shown abstractly in (3). As a result of the smuggling movement of ZP, we end up with the configuration in (4) (using deleted copies instead of traces), where no RM violation arises although YP c-commands ~~XP~~, the underlying assumption here being that RM applies derivationally, not representationally: there is no RM violation because movement of XP itself did not cross YP.

(3) XP_i $[_{ZP}$ ... t_i ...$]_j$ YP t_j
(4) XP_i .....YP .... ~~XP~~

Collins (2005a,b) applies this kind of movement interaction to void potential RM effects in passive and *seem*+experiencer raising constructions, the relevant concern being the ability of the object that undergoes movement to SpecIP to cross the external argument/*by*-phrase in the passive construction and the ability of the element undergoing raising to cross the experiencer in the *seem*+experiencer construction. The constructions are illustrated below, with the potential intervenor given in bold.

(5) John was arrested ***by Mary***.
(6) John seems ***to Mary*** to know French.

Collins derives these constructions as shown below (the details of the derivation in (8), which is rather complex, are not important: what is important is that movement of VP, which dominates *John*, smuggles *John* across the experiencer).

(7) $[_{IP}$ $John_i$ was $[_{VoiceP}$ $[_{PartP}$ t_i arrested $t_i]_j$ $[_{Voice'}$ by $[_{vP}$ Mary $[_{v'}$ v $t_j]]]]]$
(8) $[_{IP}$ $John_i$ $[_{vP}$ $[_{VP}$ t_i seems $t_k]_j$ $[_{v'}$ v $[_{ApplP}$ to Mary $[_{XP}$ $[[_{IP}$ t_i to t_i know French$]_k$ $[_{X'}$ X $t_j]]]]]]]$

Focusing on (7), Collins argues that (7) is derived as follows: PartP moves to SpecVoiceP, crossing *Mary*, after which *John* moves out of the moved PartP. (Collins assumes that *John* first moves to SpecPartP). Crucially, *John* itself never moves across *Mary*, which voids the potential

RM effect. The effect is voided in a similar way in (8), where, due to the movement of VP, movement of *John* never crosses *Mary*.

A serious issue for these smuggling derivations, noted by Collins himself, is raised by the traditional ban on movement out of moved elements (henceforth the freezing ban), evidence for which has been given in numerous works, e.g. Ross (1967, 1974), Postal (1972), Huybregts (1976), Culicover and Wexler (1977), Wexler and Culicover (1980), Freidin (1992), Diesing (1992), Collins (1994), Ormazabal, Uriagereka, and Uribe-Echevarria (1994), Takahashi (1994), Müller (1998, 2010), Lasnik (1999), Stepanov (2001), Rizzi (2006), Boeckx (2008), Gallego (2009), Lohndal (2011), Uriagereka (2012), Bošković (2018) (see Corver 2017 for a review of the relevant literature and arguments).

(9) Movement is not possible out of moved elements.

The smuggling derivations in (7) and (8) both involve movement out of a moved element, in violation of the traditional freezing ban in (9). In fact, the issue arises quite generally with smuggling, as can be seen in the abstract smuggling derivation in (3), which also involves movement out of a moved element. The problem is quite serious, given the battery of arguments given in the relevant literature for the freezing ban.

In fact, the ban has been argued to hold for all kinds of movement. Thus, the traditional Subject Condition, which bans movement out of subjects in SpecIP (10), is one case of (9): given the VP Internal Subject Hypothesis extraction out of a subject in SpecIP involves extraction out of a moved element.

(10) ?*I wonder [$_{CP}$ who$_i$ [$_{DP}$ friends of t_i]$_j$ [$_{vP}$ t_j hired Mary]].

Movement is also disallowed from A-moved objects. Thus, given that objects that precede particles undergo A-movement (see Johnson 1991, Lasnik 1999, 2001, Gallego and Uriagereka 2007, among others), the contrast in (11) also illustrates (9).

(11) a. ?*Who$_j$ did you call [friends of t_j]$_i$ up t_i?
b. Who$_i$ did you call up friends of t_i?

Movement is also disallowed from *a*-marked objects in Spanish, which Torrego (1998) shows undergo object shift (*a* is a differential-object marker).

(12) ?*[De quién]$_j$ has visitado [$_{DP}$ a muchos amigos t_j]$_i$ [$_{VP}$ … t_i]?
of whom have-2SG visited many friends
'Who have you visited many friends of?' (Gallego and Uriagereka 2006)

The freezing effect is not confined to extraction out of elements in A-positions (as in the cases discussed above). Extraction out of elements located in SpecCP and out of topics is also disallowed (see Cinque 1990, Corver 2017, Grewendorf 1989, Lasnik and Saito 1992, Müller 1998, 2010, and Takahashi 1994, among many others).[1]

[1]Note that we are dealing here with argument extraction, which means subjacency-strength violations. Takahashi (1994) shows that, as expected, extraction of an adjunct out of a phrase moved to SpecCP leads to a stronger, ECP-strength violation (it is unclear how to capture this argument/adjunct difference in the current framework, though see Chomsky and Lasnik 1993).

Torrego (1985) (see also Chomsky 1986) claims that extraction out of SpecCP is possible in Spanish based on cases like (i). However, Gallego (2007) shows that (i) involves a prothetic object, the

(13) a. *Whose books$_i$ do you think that [reviews of t_i]$_j$ John never reads t_j?
b. ??/*Whose book$_i$ do you wonder [$_{CP}$ [how many reviews of t_i]$_j$ John read t_j]?
(Corver 2017)

The impossibility of preposition stranding in moved positions is another illustration of (9).

(14) *Which table$_i$ did you think that [on t_i]$_j$ John put the book t_j?

The freezing ban also holds for traditional rightward movement (see e.g. Ross 1967, Wexler and Culicover 1980, Johnson 1986, Lasnik and Saito 1992), as illustrated by (15).

(15) a. ?*What$_i$ did you give t_j to John [a movie about t_i]$_j$?
b. ?*What$_i$ did you see t_j yesterday [a movie about t_i]$_j$?

While there have been occasional claims that there are counterexamples to (9), see e.g. Abels (2007), Gallego and Uriagereka (2006), and Neeleman and de Koot (2010), the arguments for (9) offered in the literature are simply too numerous to dismiss the freezing ban as a whole, which raises a potentially rather serious issue for smuggling in general.

Bošković (2018), however, observes a new class of exceptions to the freezing ban, and based on these exceptions argues that the traditional freezing ban is fundamentally misguided, i.e. that there is nothing wrong in principle with movement out of moved elements. More precisely, Bošković (2018) provides a number of counterexamples to (9) which all have something in common: the element that is allowed to move out of a moved element is either base-generated at the edge of the moved element or it obligatorily moves there. In other words, Bošković (2018) shows that the traditional freezing ban holds only for successive-cyclic movement out of moved elements: elements that are base-generated at the edge of the moved element, or which move there independently of successive-cyclic movement, can extract.

To illustrate this with some of the examples given in Bošković (2018), the former case is illustrated by Serbo-Croatian (SC) possessors. SC possessors have been argued to be base-generated at the edge of the traditional NP (TNP) based on the fact that they can undergo extraction and bind out of their TNP, as shown by (16), which involves a Condition B violation, and (17) (see Bošković 2012, 2014, Despić 2011, 2013, among others; the binding facts were noted in the latter. Notice that these possessors undergo agreement in Φ-features and case).[2]

(16) [Kusturicin$_j$ najnoviji film] ga$_{i/*j}$ je zaista razočarao.

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extracted element being the matrix verb object, as in the structure in (ii), which means that it is not extracted from the embedded clause. When the prothetic object possibility is blocked by a reconstruction effect, as in (iii), such examples become unacceptable (examples like (i) are quite generally unacceptable with verbs that do not allow a prothetic object).

(i) Este es la autor del que no sabemos qué libros leer.
this is the author by whom not (we) know what books read
(ii) Este es la autor [del que]$_i$ no sabemos t_i [$_{CP}$ [qué libros]$_j$ leer t_j]
(iii) *[$_{CP}$ [De qué hijo suyo$_j$]$_i$ C sabes [$_{CP}$ [qué novelas t_i] C ha leído todo padre$_j$]]?
of what son his know-2SG what novels have-3SG read every father
'which son of his do you know which novels by has every father read?'

[2] The categorial status of the projection where the possessor is located is not important here. TNP is a neutral term which stands for whatever the highest projection in the nominal domain is here (the works cited argue that the TNP in this case is actually NP, SC, a language without articles, lacking DP).

Kusturica's.NOM.MASC.SG latest movie.NOM.MASC.SG him is really disappointed
'Kusturica's latest movie really disappointed him.' (Despić 2011, 2013)

(17) Jovanovu$_i$ je on vidio [t_i sliku].
John's.ACC.FEM.SG is he seen picture.ACC.FEM.SG
'He saw John's picture.'

Importantly, these possessors can be extracted out of moved elements. In (18a), possessor-extraction takes place out of a fronted object, and in (18b) out of a subject of a passive construction which precedes the verb. In (18c), the possessor is extracted out of an active subject which precedes a sentential adverb, indicating movement to SpecIP prior to possessor extraction. All these cases then involve movement out of a moved element. (For ease of exposition, I only indicate case agreement below.)

(18) a. Jovanovu$_i$ je on [$_{TNP}$ t_i sliku]$_j$ vidio t_j.
John's.ACC is he picture.ACC seen
'He saw John's picture.'
b. Jovanova$_i$ je [$_{TNP}$ t_i slika]$_j$ ukradena t_j.
John's.NOM is picture.NOM stolen
'John's picture was stolen.'
c. Jovanov$_i$ je [$_{TNP}$ t_i prijatelj]$_j$ vjerovatno t_j otpustio Mariju.
John's.NOM is friend.NOM probably fired Maria.ACC
'John's friend probably fired Maria.'

Dutch *r*-pronouns provide a case where an element that obligatorily undergoes movement to the edge of a moved element is able to extract out of the moved element. *R*-pronouns in Dutch are exceptional regarding word order within PP: they must precede the preposition although Dutch adpositions are otherwise always prepositional.

(19) a. daar op/von b. *op daar/*von daar
there on/of

(20) a. op/von deze tafel b. *deze tafel op/von
on/of this table

This is standardly analyzed as involving movement of the *r*-pronoun to SpecPP (or a higher position in the extended projection of the preposition). Notice that the movement is obligatory, hence the unacceptability of (19b), and that the *r*-pronoun can stay in SpecPP when the PP undergoes movement, as in (21). All this indicates that movement of *r*-pronouns to SpecPP is an obligatory movement that is independent of successive-cyclicity.

(21) a. [$_{PP}$ Daar op]$_i$ heb ik boeken t_i gelegd.
there on have I books put
b. Ik heb boeken [$_{PP}$ daar op] gelegd.

R-pronouns can also move out of the PP, stranding the P. Crucially, they can move out of moved PPs, as shown by (22).

(22) a. waar$_i$ had jij dan [t_i mee t_i]$_j$ gedacht dat je de vis t_j zou moeten snijden?
where had you then with thought that you the fish would must cut
'What did you think you should cut the fish with?'

b. cf. ?ik had met een scheermes gedacht dat je de vis zou moeten snijden.
I had with a razor thought that you the fish would must cut
(Barbiers 2002)

The acceptability of (22a) is rather dramatic and in stark contrast with English (14): in contrast to English, P-stranding in a moved position is possible in Dutch when the P-stranding movement is *r*-pronoun movement. The crucial difference here is that before extraction out of the PP, the *r*-pronoun undergoes obligatory movement to SpecPP which is independent of successive-cyclicity.

Bošković (2018) gives a number of other cases where movement out of a moved element is possible, all of which show the same pattern as (18) and (22a): the element which is allowed to exceptionally move out of a moved element is either base-generated at the edge of the moved element or it obligatorily moves there. Furthermore, this is not the case in any of the ill-formed examples of movement out of a moved element discussed above: none of these examples involve base-generation or obligatory movement (which is independent of successive-cyclicity) to the edge of the moved element. In fact, under Bošković's (2014) approach to phases, where the extended projection of every lexical category is a phase, in all the unacceptable examples the moved element is a phase, which means that these examples do involve movement via the edge of the moved element but these are instances of pure successive-cyclic movement (the moved element cannot stay in the position in question), forced by the Phase-Impenetrability Condition (PIC), which requires movement out of a phase to proceed via the edge of the phase. This is shown in (23) for (10), where the wh-phrase moves to the edge of the fronted DP as a result of successive-cyclic movement. DP being a phase, the PIC forces movement out of the DP in (23) to proceed via SpecDP. This is in contrast to (18), where the extracted element is base-generated at the phasal edge, and (22a), where it obligatorily moves there (i.e. it moves there independently of successive-cyclic movement).

(23) ?*I wonder [$_{CP}$ who$_i$ [$_{DP}$ t$_i$ friends of t$_i$]$_j$ [$_{vP}$ t$_j$ hired Mary]].

Based on such cases, Bošković (2018) restricts the freezing ban to successive-cyclic movement: the freezing ban holds only for successive-cyclic movement out of moved elements.

This has an interesting consequence. In a series of works I have argued that successive-cyclic movement does not involve feature checking (Bošković 1997a, 2002a, 2007, 2008). This is in fact also the cornerstone of the approach to successive-cyclic movement in Chomsky's (2013) labeling system, where, in the spirit of Collins (2002), labeling is not forced as part of Merge hence unlabeled objects are allowed during the derivation. Chomsky proposes a labeling algorithm where when a head and a phrase merge, the head projects (providing the label for the resulting object). When two phrases merge, there are two ways to implement labeling: through feature-sharing or traces, where traces are essentially ignored for the purpose of labeling. (24) illustrates the former case: when *which book* merges with interrogative CP (the relevant element is a CP at that point of the derivation), both the wh-phrase and the CP have the Q-feature; what determines the label of the resulting object is then the Q-feature. (This is reminiscent of Spec-Head agreement.)

(24) I wonder [$_{CP}$ which book$_i$ [$_{C'}$ C [John bought t$_i$]]].

As for the case of merger of two phrases which does not involve feature-sharing, Chomsky (2013) assumes that successive-cyclic movement does not involve feature-sharing (which follows Bošković 1997a, 2002a, 2007, 2008). There is then no feature-sharing between *that* and

the wh-phrase which passes through its edge in (25a). As a result, the embedded clause cannot be labeled when *what* moves to its edge (as indicated by ? in (25b)). When v is merged into the structure, *what* undergoes movement. The element merged with *that*-CP being a trace, it is ignored for labeling, hence ? is labeled as CP after movement of *what*. Importantly, the account is extended to all successive-cyclic movement: there is no feature-sharing in intermediate positions (i.e. with true successive-cyclic movement), which creates a labeling problem that in turn forces movement.

(25) a. What$_i$ do you think [$_{CP}$ t'$_i$ [$_{C'}$ that [he bought t$_i$]]]?
b. v [$_{VP}$ think [$_?$ what [$_{CP}$ that [he bought t$_i$]]]

Now, recall that the freezing ban holds only for successive-cyclic movement out of a moved element. As discussed above, successive-cyclic movement does not involve agreement/labeling. A phrase that is targetted by successive-cyclic movement then has a non-agreeing Specifier, which in the labeling framework means that it is unlabeled. Capitalizing on this, Bošković (2018) in fact argues that there is nothing wrong with movement out of moved elements, as shown by examples like (18) and (22a), replacing the freezing ban with the generalization in (26), which can be restated as in (27) in the labeling framework (see the discussion below).

(26) Phases with non-agreeing Specifiers cannot undergo movement.
(27) Unlabeled elements cannot undergo movement.

Under this approach, which rather radically departs from the traditional freezing ban approach, there is nothing wrong in principle with movement out of moved elements–even in unacceptable cases of movement out of a moved element the problem with moving YP from moved XP does not arise when YP moves out of moved XP ((26)-(27) do not in fact ban such movement). Rather, the problem arises with the movement of XP–XP itself cannot move here. In other words, moving XP does not freeze the internal structure of XP for movement–movement of YP to the edge of XP prevents movement of XP.

To see this (i.e. to see how (26)-(27) work), consider (28), involving movement of YP from moved XP.

(28) YP$_i$ [$_{XP}$...t$_i$...]$_j$...t$_j$

To derive (28), given the cycle YP must first move to the edge of XP (if XP is a phase, see the discussion below). If this movement is successive-cyclic movement, it will result in creation of a non-agreeing Specifier (cf. (26)), which will in turn delabel XP (cf. (27)). In other words, it will create a configuration that is disallowed by (26)-(27) (Bošković 2018 actually provides a deduction of (26)-(27) from an independent principle, which will be discussed below; for the time being I simply refer to the generalizations in (26)-(27), putting their deduction aside). This is then the reason why the freezing effect is restricted to successive-cyclic movement out of a moved element: movement out of a moved element, XP, is in principle allowed (as shown by (18) and (22a)), but successive-cyclic movement to the edge of XP freezes XP itself for the possibility of movement (given (26)-(27)); any later movement out of XP is then trivially disallowed. In other words, the traditional freezing ban was misguided: there is no problem with movement "from" (movement of YP from XP in (28)), but with movement "of" (movement of XP in (28)).

Strong independent evidence for this approach is provided by the fact that it extends to an otherwise rather puzzling case which does not involve movement out of a moved element at all but is nevertheless covered by the generalizations in (26)-(27). The case in question concerns the

immobility of V-2 clauses in German. As noted in Webelhuth (1992), Reis (1997), Wurmbrand (2014), Holmberg (2015), V-2 clauses in German cannot undergo movement. This is illustrated in (29), where a V-2 clause moves to SpecIP in (29a) and to SpecCP in (29b). These examples are unacceptable, in contrast to (29c), where the V-2 clause stays in situ.

(29) a. *weil [$_{CP}$ den Peter mag niemand] allgemein bekannt ist.
since the.ACC Peter likes nobody.NOM commonly known is
'since nobody likes Peter is commonly known'
b. *[Er$_i$ sei unheimlich beliebt], möchte jeder$_i$ gern glauben.
he is.SUBJ immensely popular would.like everyone like believe
'Everyone would like to believe he is immensely popular.'
c. Sie sagte den Peter mag niemand.
she said the.ACC Peter likes nobody.NOM
'She said nobody likes Peter.' (Wurmbrand 2014)

V-2 clauses are notorious for their promiscuity when it comes to what fills their Spec position, anything can in fact fill it. This has led to proposals that such clauses do not involve agreement at all; more precisely, they involve EPP without Agree (see Haegeman 1996, Jouitteau 2008, Roberts 2004, and Roberts and Roussou 2002, Bošković in press d, among others). In other words, what we have here is a clause with a non-agreeing Spec (just like with clauses that "host" successive-cyclic movement). Furthermore, since feature-sharing involves agreement, the most natural interpretation of this is that V-2 clauses do not involve feature-sharing, which then means that they are not labeled (see also Blümel 2017).[3] The immobility of V-2 clauses then immediately falls out from (26)-(27): it is just another case of movement of a phase with a non-agreeing Spec, i.e. of an unlabeled object.

The generalizations in (26)-(27) thus enable us to unify the traditional freezing ban and the immobility of V-2 clauses in German, while also capturing all the exceptions to the traditional freezing ban discussed above. Regarding these exceptions (see Bošković 2018 for additional cases), we have seen above that the freezing ban does not hold for elements that are base-generated at the edge of the moving element XP, or elements that obligatorily move to the edge of XP. In these cases XP does not have a non-agreeing Spec; in other words, the element at the edge of XP does not delabel XP, so that there is no violation of (26)-(27) (recall that movement out of moved XP itself is never an issue, the issue is whether XP can move in the first place).

2.2. Back to Smuggling

Consider what this approach to the freezing ban, which eliminates the freezing ban itself and replaces it with the generalizations in (26)-(27), entails for smuggling. The smuggling configuration in (3) will now be allowed if XP is base-generated at the edge of ZP, as in the case of the possessor in SC (18), or if it moves to the edge of XP independently of successive-cyclic movement, as in the case of the Dutch *r*-pronoun in (22a).

Consider then from this perspective the smuggling derivation of the passive in (7), where *John* moves out of moved PartP.[4] *John* is obviously not base-generated at the edge of PartP. Collins assumes that *John* moves to SpecPartP. If this is obligatory movement, not simply a

[3]This implies that some unlabeled objects can still be interpreted at the interface. This can in fact be taken to be what is special about V-2 clauses (but see Bošković in press c for an alternative account which also unifies the immobility of V-2 clauses and the freezing ban but where V-2 clauses are labeled).

[4] Recall that Collins (2005a) also proposes a smuggling account of the *seem*+experiencer raising construction in English. The derivation of the construction in question that he proposes can be modified so that the above discussion of (30) applies to it as well.

reflex of successive-cyclicity (i.e. if PartP requires a Spec) the derivation will conform to the reformulated freezing ban (more precisely, the replacement of the freezing ban) in (26)-(27) since PartP would not have a non-agreeing Spec (in other words, movement of *John* to the edge of PartP would not delabel it).

There is actually another way for (7) to conform with (26)-(27), which is if *John* does not move to SpecPartP at all (Collins actually does not really argue for this movement). Suppose then that this movement does not in fact take place (I return to this issue below). (5) would then have the structure in (30) rather than (7).

(30) John_i was $[_{\text{VoiceP}}\ [_{\text{PartP}}$ arrested $t_i]_j\ [_{\text{Voice'}}$ by $[_{\text{vP}}$ Mary $[_{\text{v'}}$ v $t_j]]]]]$.

Although it involves movement out of a moved element the smuggling derivation in (30) is actually not blocked by (26)-(27) (PartP does not have a Spec in the first place, which makes (26)-(27) irrelevant).

This is then another way for smuggling, and more generally movement out of a moved element, to be allowed. Putting it all together we then have (31).

(31) Movement of YP out of moved XP is allowed iff:
a. YP is base-generated at the edge of XP.
b. YP must move to the edge of XP independently of successive-cyclic movement.
c. YP does not move to the edge of XP.

Any smuggling operation, or movement out of a moved element more generally, which obeys (31) will then be allowed (more appropriately, obeying (31) ensures that there is no violation of (26)-(27); other issues can, of course, arise).

Now, as noted above, Bošković (2018) does not leave (26)-(27) at the level of a principle but provides a deduction of these generalizations, which turns them into theorems. While the deduction of the generalizations given in Bošković (2018) still allows movement out of a moved element under conditions in (31a) and (31b) it actually disallows it under condition (31c). In particular, Bošković (2018) argues that the inability of phases with non-agreeing Specs, or unlabeled elements, to undergo movement follows from Chomsky's (2000, 2001) claim that only phases can move, given that unlabeled elements are not phases, as argued in Bošković (2016b). This is the reason why the freezing ban holds only for successive-cyclic movement.

Chomsky (2000, 2001) establishes a number of criteria that differentiate phases from non-phases. One of them is that only phases can undergo movement, as stated in (32) (see also Rackowski and Richards 2005, Cheng 2012, Matushansky 2005, Harwood 2013, Legate 2014, Bošković 2015, among others).

(32) Only phases can undergo movement.

Consider from this perspective in a little bit more detail the abstract configuration in (28), repeated in (33a), which involves movement of YP out of moved XP. Before any movement shown in (33a) takes place, (33a) has the structure in (33b), where XP dominates YP.

(33) a. $\text{YP}_i\ [_{\text{XP}}\ \ldots\ t_i\ \ldots]_j\ \ldots\ t_j$
b. $[_{\text{XP}}\ \ldots\ \text{YP}\ \ldots]$

If only phases can move, XP must be a phase to be able to move in (33a). As a result, given the PIC, any movement out of XP will have to proceed successive-cyclically via the edge of XP.

This means that for YP to be able to move out of XP in (33b), YP will first have to move to the edge of XP. Moreover, given the cycle, movement of YP to the edge of XP has to precede the movement of XP.

Consider then the situation where movement of YP to the edge of XP is an instance of successive-cyclic movement. As discussed above, with successive-cyclic movement, the merger of YP and XP results in an unlabeled element. For Chomsky (2000, 2001), phases are CPs, vPs, and DPs.[5] But the object created by the merger of YP and XP is none of these; it actually does not have a label at all, hence it does not count as a phase (as discussed in Bošković 2016b, 2018, phases require label-determination, hence unlabeled objects cannot be phases). Given (32), the element formed by the merger of XP and YP is not allowed to move.

This then deduces (26)-(27), restricting the freezing ban effect to successive-cyclic movement. The reason why the effect arises with successive-cyclic movement is that successive-cyclic movement does not result in labeling (due to the lack of feature-sharing), "delabeling" the element whose edge it targets (XP).[6] Since labels are a prerequisite for phases, it then also devoids XP of phasehood, freezing it for movement. Since the cycle forces movement to the edge of XP to occur before movement of XP, this makes XP immobile, which deduces the generalizations in (26)-(27) (i.e. the empirical effects of (9), where they hold). As discussed above, the standard cases that are given to illustrate (9) all involve successive-cyclic movement of YP via the Spec of XP (where XP later moves itself). As a result, they also involve movement of YP (i.e. the Spec itself) out of XP since it is the very nature of successive-cyclic movement that a phrase that is undergoing successive-cyclic movement cannot stay in an intermediate Spec for independent reasons. This is the reason why they involve movement out of a moved element (the reason is thus essentially accidental, due to the nature of successive-cyclic movement). This has, however, led to the 'illusion' that this later movement is responsible for the ungrammaticality of the relevant constructions, masking the real reason for their ill-formedness.

Recall also that the generalizations in (26)-(27) cover a case which does not involve movement out of a moved element, namely the immobility of V-2 clauses in German. As discussed above, the non-pickiness of V-2 clauses regarding what fills their Spec position has led to proposals that such clauses do not involve agreement at all, i.e. they involve EPP without Agree, as in e.g. Roberts (2004). Since feature-sharing involves agreement, this means that they are not labeled. What is important here is that under accounts like Roberts (2004), movement to SpecCP of V-2 clauses is treated like successive-cyclic movement in Chomsky (2013) in that neither involves an agreement relation. In Bošković's (2018) account of the freezing ban, phrases with non-agreeing Specs cannot undergo movement, since a non-agreeing Spec delabels the relevant phrase, rendering it immobile. It is then quite natural from this perspective that, just like phases that "host" successive-cyclic movement, V-2 clauses cannot undergo movement.

The analysis presented in Bošković (2018), summarized above, thus deduces the generalizations in (26)-(27), which unify the traditional freezing ban and the immobility of V-2 clauses in Germanic (a unification which capitalizes on V-2 movement to SpecCP being formally the same as successive-cyclic movement in the relevant respect), in a way which also captures a number of exceptions to the traditional freezing ban.

Regarding those exceptions, consider e.g. (18a). Here, the possessor undergoes feature-sharing with its sister, which results in labeling, before the direct object undergoes movement. The direct object in (18a) is then labeled at the point when it undergoes movement (which is followed by possessor extraction). The example (and the same holds for (18b-c)) then does not

[5]I am ignoring other proposals regarding what counts as a phase; (32) actually most naturally fits with Bošković's (2014) phase system.

[6]More precisely, the movement does not delabel XP itself. It creates a new structural layer on top of XP—it is this new structural layer that lacks a label (I ignore this new structural layer for ease of exposition).

involve movement of an unlabeled element. Regarding the timing of labeling here, it is consistent both with the position taken in e.g. Bošković (2015) and Rizzi (2016) that labeling can take place as soon as possible and Chomsky's (2013) position that labeling takes place at the phasal level, after the phase is completed, given that the projection where the possessor is located, which is the highest projection in the nominal domain, is a phase (see Bošković 2014).

Putting aside the V-2 case, as discussed above, the cases of movement out of a moved element which are blocked by (26)-(27) involve successive-cyclic movement through the edge of the moved element, where successive-cyclic movement causes a problem by delabeling the element it targets due to the lack of agreement. This is in fact the reason why the effect in question is generally confined to phases: given the PIC, only phases must be targeted by successive-cyclic movement.

Now, while the generalizations in (26)-(27) allow movement out of a moved element under all the conditions in (31) (since none of them involves successive-cyclic movement), the deduction of (26)-(27) in Bošković (2018) allows it under conditions (31a) and (31b) but not (31c). The reason for this is that the deduction relies on Chomsky's proposal that only phases can undergo movement. As a result, since XP in (31) needs to move, XP then must be a phase. Consequently, movement out of XP must proceed via the edge of XP, given the PIC, which blocks the scenario in (31c): YP cannot move out of XP without moving to the edge of XP.[7]

Returning to the derivation of the passive in (30), Collins (2005b) suggests that VoiceP, not PartP, is the phase here. As discussed above, what creates a problem for the generalizations in (26)-(27) is successive-cyclic movement, which delabels its target due to the lack of agreement. This problem, however, inevitably arises only with phases, since only phases must be targeted by successive-cyclic movement (due to the PIC). The problem in question does not arise with Collins's derivation involving movement out of moved PartP since PartP is not a phase. Since (26)-(27) do not in fact ban movement out of a moved element, the derivation in question is then not blocked by (26)-(27). The derivation, however, does raise an issue for (32): if only phases can undergo movement, the derivation in question is ruled out independently. (PartP cannot move since it is not a phase.)

The upshot of the discussion here is that the derivation in (30) conforms to the reformulation of the traditional freezing ban in (26)-(27) but it does not conform to the deduction of (26)-(27) proposed in Bošković (2018) the reason being that the deduction relies on (32). The derivation in (30) is in fact exactly the case of (31c), which, as discussed above, is allowed by (26)-(27), but not by Bošković's (2018) deduction of (26)-(27). Recall, however, that Collins actually adopts the structure in (7), where *John* moves through SpecPartP. The only way to have Collins's smuggling derivation of passives conform with Bošković's (2018) deduction of (26)-(27) (i.e. the freezing ban) would in fact be to have *John* move to SpecPartP, with two additional changes: PartP needs to be a phase here (otherwise it could not move), and movement of *John* to SpecPart has to be independent of successive-cyclicity (in Chomsky's 2000 terms, Part should have an EPP property itself, it should not be given the EPP property only in cases where this is necessary to make successive-cyclic movement possible. Note that this would actually also be required under (26)-(27); (26)-(27) do allow the case in (31c) but if XP in (31) has a Spec it has to be an agreeing Spec, not just a Spec created as a reflex of successive-cyclicity). This would

[7] There is actually a small opening here. Uriagereka's (1999) original multiple spell-out proposal allowed not only the Spec of phase XP, but also its complement to be accessible from the outside: only what is dominated by the complement is not accessible from the outside under Uriagereka (1999). Bošković (2015) argues for a return to this conception of the PIC, a result of which is that movement of a phasal complement need not proceed via the phasal edge. Under this conception of the PIC the scenario in (31c) would still be allowed if YP is the complement of X.

then turn (7) into a case of (31b), which is allowed not only by the generalizations in (26)-(27) but also under Bošković's (2018) deduction of these generalizations.

In this respect, the word order in (34) is worth noting. Lasnik (1995) in fact suggests that the movement of the indefinite in (34a) is driven by an EPP feature, which could be taken to be the EPP feature discussed above (though several non-trivial issues arise here).[8]

(34) a. There was a book$_i$ put t_i on the table.
b. cf. *There was put a book on the table.

The gist of the above discussion is that if (32) holds, derivations where a non-phase moves, like the one given in (30) (under Collins's assumption that PartP is not a phase), will be blocked. The generalizations in (26)-(27) are, however, independent of the issue of whether (32) holds—there is nothing in these generalization that depends on only phases being able to undergo movement. They take effect with successive-cyclic movement because successive-cyclic movement delabels the element it targets due to the lack of agreement.[9] Their effect ends up being confined to phases as a by-product of the PIC since only phases must be targeted by successive-cyclic movement under the PIC. However, if non-phases can in principle move, their movement would not be subject to the traditional freezing ban under its reformulation in (26)-(27), since the PIC would not force movement to proceed through their edge (this would be the case of (31c)).

What all this means is that to allow the derivation in (30) itself (as it is), a new deduction of (26)-(27) is needed that would not rely on (32), i.e. (26)-(27) need to be deduced without banning movement of non-phases, the underlying assumption here being that it would be undesirable to keep (26)-(27) at the level of a principle.

Bošković (2018) briefly notes in passing that (27) may be deducible independently of (32) on the view on which movement is driven by an uninterpretable/unvalued feature of the moving element, as in Bošković (2007, 2011a), because an unlabeled element could not have such a feature under the assumption that labeling is necessary for projecting any features, a suggestion that I would like to elaborate on here.[10]

Note first that Bošković's (2007, 2011a) proposal that movement is driven by an uninterpretable/unvalued feature (uK) of the moving element fits the labeling framework quite naturally. The natural expectation in the labeling framework is that all (or at least most) movement is labeling driven: it takes place to resolve labeling problems. This is in fact exactly what happens when a merger of two phrases that does not involve feature-sharing occurs: the merger creates a labeling problem, with movement taking place to resolve it. What happens here is that the problem, more precisely, the reason for movement, is present in the pre-movement structure (which I will refer to it as the base position of movement for ease of exposition). In other words, the base position of movement drives the movement in the sense that something would go wrong in the base position of movement if movement does not take place—there is nothing in the higher structure that motivates it. This is in fact exactly the central characteristic

[8] In some languages, like French, participle agreement is triggered, which could be taken to indicate a Spec-Head agreement relation (independent of successive-cyclic movement, which does not involve agreement/feature-sharing, as discussed above) in PartP (see in fact Collins 2005b).

[9] As for V-2 movement to SpecCP in German, which, as discussed above, is formally the same as successive-cyclic movement in the relevant respect, such cases are not in principle confined to phases unless we assume that only phases can have the EPP property (see here Chomsky 2008).

[10] Bošković (2018) also notes that the same may hold on the view where movement is motivated by the EPP feature, as in Chomsky (2000, 2001), if we assume that the satisfaction of the EPP feature is tied to e.g. categorial features in that the moving element would need to have a categorial feature to satisfy the EPP feature (the underlying assumption again being that labeling is necessary for projecting any features).

of Bošković's (2007) approach to movement, which is implemented through the presence of a uK feature on the moving element, which forces movement (without the movement, a crash would occur; in other words, both the labeling approach of Chomsky 2013 and Bošković 2007 involve base- rather than target-driven movement).[11] It then seems natural to adopt Bošković's uK assumption here: X moves only if X has a uK.

To spell out the suggestion noted above regarding how to deduce (27) independently of (32) (under the assumption, discussed above, that X moves only if X has a uK), consider a case where X and Y merge, and the resulting object ? needs to undergo movement, which means that it has to have a uK. For the movement to be possible, either X or Y must have a uK feature and pass this feature to ? by labeling it. In other words, if X has the uK feature, then X must project and label ?. What this boils down to is that labeling is necessary for ? to have a uK and be able to move, which means that unlabeled elements cannot move. Bošković's (2007) assumption that movement is driven by a uK feature of the moving element (this is in fact the cornerstone of that system, which dispenses with the EPP and in fact all target-driven movement[12]) thus enables us

[11]As noted in Bošković (2016b) and Messick (in press), even the traditional EPP effect provides evidence for this approach. By now there is quite a bit of evidence from a number of languages that local subject wh-movement from SpecIP to SpecCP is banned. Consider e.g. the West Ulster English (WUE) data in (i-ii).

(i) Who$_i$ was arrested all t_i in Duke Street?

(ii) *They$_i$ were arrested all t_i last night. (McCloskey 2000)

Although, in contrast to standard English, WUE allows Q-float under wh-movement, like standard English it disallows (ii). (ii) shows a subject in SpecIP cannot float a quantifier in the postverbal position in passives. *Who* in (i) then cannot move to SpecIP before moving to SpecCP since *all* would then be floated under movement to SpecIP, which (ii) shows is disallowed. McCloskey (2000) in fact concludes based on these data that *who* moves directly to SpecCP, without moving to SpecIP, which can be interpreted as an argument against the traditional assumption that the EPP is a requirement on the target head, I. On the other hand, this is easily captured in both Chomsky's (2013) and Bošković's (2007) system (as Messick in press notes for the former). In both Chomsky (2013) and Bošković (2007) the traditional EPP effect has nothing to do with I: the subject moves because a problem would arise in the base position of the subject if it does not undergo movement. The movement is thus not driven by a property of I, in fact it is not required by I. Rather, it is something about the base position of the subject that forces its movement. Since neither system requires the subject to move to SpecIP, in both Bošković (2007) and Chomsky (2013) the relevant inadequacy can be satisfied if the wh-phrase in (i) moves to SpecCP (Bošković 2008 actually argues for this derivation of (i) within the former system).

The similarity between the two systems goes beyond the EPP effect. Consider e.g. successive cyclic movement. The crucial property of Bošković's account of successive-cyclic movement is that there is no feature-checking/agreement in the intermediate positions of successive-cyclic movement and that for each step of successive-cyclic movement, it is something about the base position of movement that drives it (recall that the base position here refers to the tail of any movement step): something would go wrong in the base position of the movement if it does not take place (i.e., there is nothing in the higher structure that motivates it in this sense). To take a concrete case, under Bošković's (2007) analysis there is no feature-checking/agreement between the wh-phrase and the complementizer *that* in (25). Moreover, if the wh-phrase does not move away from the embedded SpecCP, a problem will arise in exactly this part of the structure. While this is very different from e.g. Chomsky (1995), these are precisely the crucial ingredients of Chomsky's (2013) approach to successive-cyclic wh-movement.

[12] See also Bošković (2011c) for a number of cases where movement is quite clearly not target driven. One such case is QR, which is standardly assumed to involve IP adjunction (as one case). QR must be driven by the moving element since there is nothing about its target head I (or IP) that would require adjunction of a quantifier. Under the QR analysis quantifiers are assumed to be uninterpretable in situ, which can be tied to the presence of a uK feature which makes them uninterpretable in situ, requiring

to deduce (27) independently of (32), which means in a way that does not require only phases to be able to undergo movement (see also fn 10). This analysis then allows the smuggling derivation in (30) and more generally the case in (31c) while still deducing (27), which then need not have the status of a principle.

Before closing this section, it is worth noting another case where the projection of features under labeling plays a crucial role. Bošković (in press a) argues that unlabeled elements are not only unable to undergo movement, they also do not function as interveners.

(35) Unlabeled elements do not count as interveners.

If unlabeled elements cannot undergo movement it is not surprising that they do not function as interveners, since they are not candidates for movement themselves.[13]

(35) is actually rather natural theoretically even independently of this consideration. The notion of intervention is relative in that it depends on the nature of the intervener. In Rizzi's (1990) original proposal, this involved the A/A' distinction; current work generally appeals to featural properties of the interveners (see e.g. Rizzi 2004, Starke 2001). Labeling again plays a crucial role, in fact in a similar way it plays a role in the (im)mobility of (un)labeled elements.

Consider the situation where X and Y merge, and the resulting object ? functions as an intervener. To obtain an intervention effect, either X or Y must have the relevant feature that is involved in the intervention effect and pass this feature to ? by labeling it (so that the resulting object can function as an intervener). So, if X has the relevant feature, then X must project and label ?. The upshot of this is that labeling is necessary for ? to function as an intervener, which means that unlabeled elements cannot function as interveners. In other words, since intervention is feature-sensitive, the intervener must have the relevant feature. This is trivially not possible with unlabeled elements since due to the lack of projection in general the relevant feature is not projected either. The point here is that unlabeled elements cannot undergo movement and do not function as interveners for essentially the same reason.

It is worth noting here that Bošković (2016b) argues that movement cannot target unlabeled elements either (see also Yoo 2015).[14] We are then left with a unified picture where

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movement. To put it simply, QR makes sense only if an inadequacy of the quantifier, i.e. the moving element, rather than the target (the I head) drives it.

[13]Not being able to undergo movement, the only way they could work as interveners is if the notion of defective intervention, where X can block movement of Y although X itself cannot undergo the relevant movement operation (see Chomsky 1995), is adopted, which a number of authors have argued against (see e.g. Ura 1999, Vukić 2003, Bruening 2014).

[14]This is e.g. what is behind Richards's (2001) tucking in effect, illustrated by the Bulgarian multiple wh-fronting examples in (i). Here, the nominative wh-phrase moves first to SpecCP, given Superiority, with the second wh-phrase moving to the SpecCP that is lower than the SpecCP created by movement of *koj*.

(i) a. Koj$_i$ kogo$_j$ t$_i$ e udaril t$_j$? b. cf. *Kogo koj e udaril?
who whom has hit
'Who hit whom?'

Chomsky (2013) assumes that all labeling takes place at the phasal level, after the phase is completed. Bošković (2016b), on the other hand, argues that the labeling of the head-phrase merger case takes place immediately, for several reasons. One is subcategorization, the underlying assumption being that satisfying subcategorization, which is a syntactic requirement (hence needs to be satisfied during the syntactic computation when the relevant object is created), requires that the element with the requirement to take a complement project (otherwise, there would be no head-complement relation here). Furthermore, if all labeling were to take place at the phasal level we would actually never reach the phasal level in the first place. As discussed above, reaching the phasal level presupposes labeling (since phases are labeled objects like CP, DP…), which means that some labeling needs to be done before the phasal level is

movement and labeling interact rather strongly: unlabeled elements cannot undergo movement, unlabeled elements do not function as interveners, and movement cannot target unlabeled elements.

Above, I have discussed consequences of the traditional freezing ban for the smuggling derivation of passives proposed in Collins (2005a), and smuggling more generally. In the next section I will address another construction where a smuggling-style analysis has been proposed, namely the *tough*-construction. What is interesting regarding the analysis in question, which will be modified in light of the above discussion of the freezing ban, is that smuggling is not done to avoid an RM violation, but a violation of a different constraint. Consequences of that account for several aspects of the *tough*-construction will also be discussed, and the account will be compared to the null Operator (Op) account of *tough*-constructions.[15]

3. *Tough*-movement

3.1. Complex Op or simple Op?

The *tough*-construction, illustrated by (36), has received a good deal of attention in the literature, both in the Government and Binding framework and within Minimalism.

(36) These sonatas(k) are tough to play __(k).

There are a number of approaches to *tough*-constructions. Two of them are given below:[16]

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reached, a problem which is resolved if the result of the head-phrase merger is labeled immediately (see Bošković 2016b for additional arguments).

Bearing this in mind, consider (i) before the second wh-phrase moves. Given that the result of a head-phrase merger is labeled immediately but the result of a phrase-phrase merger is labeled only after the phase is completed, the merger of C-Q (i.e. +wh-C) with IP results in labeling, the relevant object being labeled as CP, but the merger of this CP and the wh-phrase *koj* does not result in immediate labeling (it will be labeled only after the phase is completed, which means after the second wh-phrase moves). This is shown in (ii). As a result, if *kogo* were to merge on top of *koj* in (ii), the movement in question would target an unlabeled element. However, this is not the case if *kogo* merges under *koj* (the movement then targets CP). The tucking in effect then follows from the requirement that movement target only labeled elements (Bošković 2016b actually deduces this requirement, in other words, the requirement is a theorem).

(ii) $[_{?}$ *koj* $[_{CP}$ C-Q $[_{IP}$ …*kogo*…]]]

[15]Note that the goal of the following section is not to provide a comprehensive discussion/account of *tough*-constructions (as a result, the discussion will also not give exhaustive references on various aspects of *tough*-constructions). Rather, given the nature of this volume, the goal is simply to elaborate on the smuggling analysis of *tough*-construction, modify it in light of the discussion above, and show how certain aspects of *tough*-constructions can be handled under that analysis, where these aspects are more difficult to handle under the traditional null Op analysis of *tough*-constructions (other approaches to *tough*-constructions will not be discussed—the discussion will thus be rather limited in scope).

[16]Another approach that is often adopted but which will not be addressed here (examples (44)-(45), discussed below, can be accounted for under this approach in essentially the same way as under the complex Op approach), is the improper movement analysis (see e.g. Postal 1971, Brody 1993), where *these sonatas* in (36) is base-generated in the position of (k) and moves to the matrix subject position, undergoing traditional "improper" movement through the embedded clause SpecCP. The account thus implies that the Improper Movement ban (i.e. the ban on A-A'-A movement) should be dispensed with. (I will not discuss this approach given that one of the reasons for the smuggling analysis of *tough*-constructions is the preservation of the ban in question.)

-*The null Op-movement analysis* (Chomsky 1977), where there is no movement out of the *tough* complement. A null Op moves to SpecCP of the infinitival complement of *tough* and stays there.

(37) These sonatas are tough [$_{CP}$ Op$_i$ [to play t$_i$]].

-The complex Op+smuggling analysis (Hicks 2009), where a null Op is merged with *these sonatas* in (36). The complex operator Op+*these sonatas* moves to the SpecCP of the *tough* complement. Then, *these sonatas* moves out of the complex operator (I will refer to this movement as *tough*-movement; see also below for the internal structure of the complex operator).

(38) These sonatas$_j$ are tough [$_{CP}$ [Op+t$_j$]$_i$ [to play t$_i$]].

The second approach in a sense combines the null Op approach and the improper movement approach noted in fn 16, since it involves both operator movement to the infinitival SpecCP and movement of *these sonatas* to the matrix SpecIP, where the first movement essentially smuggles *these sonata* with respect to the traditional Improper Movement ban (which can then be maintained). In other words, complex Op movement involves smuggling, but not with respect to intervention effects/RM, as in Collins's original cases, but with respect to a different mechanism, namely the Improper Movement ban. The logic behind smuggling is still the same as in Collins's cases. The configuration in (39) results in a violation due to the presence of t'. The violation is voided by the smuggling movement of ZP in (40), which avoids creation of t'$_i$ by avoiding the offending movement step (from t$_i$ to t'$_i$).

(39) XP$_i$ t'$_i$ [$_{ZP}$ ... t$_i$ ...]
(40) XP$_i$ [$_{ZP}$ ... t$_i$ ...]$_j$ t$_j$

There is actually another smuggling component here. The subject of *tough*-constructions is Case-licensed in the higher clause, not in the embedded clause, as indicated by the fact that it must bear nominative case, accusative being disallowed.

(41) They/*Them are tough to play.

The complex Op can be taken to smuggle the subject of the *tough*-construction with respect to Case-licensing, enabling it to avoid getting Case-licensed in the embedded clause (notice that the pronoun is not the object of *play* in (41), the complex operator DP (see below for its structure), which dominates the pronoun, is). To be accessible to a DP-external Case-licensor the pronoun needs to extract out of the big DP, which happens only after the big DP moves to SpecCP. The complex Op thus smuggles the *tough*-subject both with respect to the Improper Movement ban and Case-licensing.

This is the point where we need to become more precise regarding the actual structure of the complex operator. Hicks (2009) assumes the structure in (42), where *John* is the complement of Op, which heads the NP complement of D. Another possibility is (43), where *John* is located in SpecDP (Op still heads the NP complement of D). Given that DP is a phase, in Hicks's (42) *John* will move to SpecDP prior to movement out of DP. The complex DP will then eventually have a trace as its edge in both (42) and (43), which will be required under the analysis of certain *tough*-constructions proposed below.

(42) [$_{DP}$ [$_{NP}$ [$_{N'}$ Op John]]]
(43) [$_{DP}$ John [$_{D'}$ D [$_{NP}$ [$_{N'}$ Op]]]]

However, under the account of the ban on movement out of moved elements in Bošković (2018), where, as discussed above, this ban holds only for successive-cyclic movement, (43) has to be the input to *tough*-movement, which involves movement out of a moved element under the complex Op analysis. (42) would be viable only if movement to SpecDP in (42) would otherwise be obligatory (which means it would involve feature-sharing), not simply a reflex of successive-cyclicity, since, as discussed above, under Bošković's (2018) account, the ban on movement out of moved elements holds only for successive-cyclic movement. Notice also that under Hicks's analysis, what is traditionally assumed to be one DP actually consists of two DPs. Hicks assumes that both DPs have their own phi-features, which are actually identical. It is possible that this sharing of phi-features is established under traditional Spec-Head agreement, after movement of *John* to SpecDP, which would also suffice to establish a feature-sharing relation necessary for labeling (see in this respect Bošković's 2018 discussion of the agreement requirement on Q-float, which holds in a number of languages). The point of the discussion here is that *John* either must be generated in the Spec of the big DP or move to the Spec of this DP independently of successive-cyclic movement.[17]

Returning to the two analyses of *tough*-constructions summarized above, under both approaches there is movement to the Spec of the *tough* complement—the approaches differ with respect to what exactly moves there and what happens after that movement. I will simply refer to the movement(s) discussed above as *tough*-formation movement, using this as a neutral term (the term *tough*-movement will be reserved for movement to SpecIP of the *tough*-clause when it is necessary to differentiate this movement from other movements involved in *tough*-formation).

The goal of this section is to flesh out the smuggling analysis of the *tough*-construction, also exploring some of its consequences, and to provide an argument that favors this approach over the null Op-movement approach.

I will start the discussion with the contrast between (44) and (45) (cf. Chomsky 1981).

(44) *Which sonatas$_i$ are these violins$_j$ tough to play t_i on t_j?
(45) ?Which violins$_i$ are these sonatas$_j$ tough to play t_j on t_i?

Consider how (44) can be handled under the complex Op and the null Op analysis, starting with the former. (44) involves two movements to the Spec CP of the infinitive. Following standard accounts of Bulgarian multiple wh-fronting, which involves the same configuration (see Rudin 1988, Richards 2001, Bošković 2002b and the discussion in fn 14), I assume Superiority forces the wh-moving element to move first, with the *tough*-formation movement tucking in, as in Richards (2001), in the lower SpecCP (since t_i asymmetrically c-commands t_j in (44)). We then get (46) (recall that *these violins* is the Spec of the complex Op at this point of the derivation).

(46) [$_{CP}$ [which sonatas] [these violins+Op] C….]]

Consider how the movements into the matrix clause proceed here. Bošković (2016a) argues that in a configuration where a phase has multiple edges, which is the case with (46), only the outmost edge is accessible from the outside (see also Rackowski and Richards 2005, Wurmbrand 2013, and Yoo 2018). As an illustration of the outmost edge effect, Bošković (2016a) argues that

[17]There is actually another possibility. Suppose *John* is base-generated at the big DP edge but not as its Spec, but adjunct. *John* could then be inserted into the structure after the big DP moves to SpecCP, given the possibility of acyclic insertion of adjuncts (Lebeaux 1988). Under this analysis, there would be no smuggling in Collins's sense here since *John* would start higher than the position which would require smuggling.

(47) involves a configuration where the TNP phase has multiple edges, *onu* and *staru* (see Bošković 2016a for evidence that these elements are located within the same projection in SC, where demonstratives are actually adjectival). These elements can extract on their own. However, when both are present, only the higher edge, *onu*, can extract (cf. (47b) vs (47c)). Bošković (2016a) argues that the paradigm should be analyzed in terms of the PIC, where in multiple-phase-edge configurations only the highest edge is accessible from the outside. It will also be relevant below that, in contrast to (47c), (48) is acceptable. Regarding this contrast, Bošković (2016a) argues that traces do not count as edges for the PIC, which means that traces void PIC effects. The PIC effect that is at work in (47c) is then voided in (48).

(47) a. On prodaje [onu staru kuću].
he is.selling that old house
b. Onu$_i$ prodaje [t_i staru kuću].
c. *Staru$_i$ prodaje [onu t_i kuću].
d. Staru$_i$ prodaje [t_i kuću].
(48) Onu$_i$ staru$_i$ prodaje [t_i t_j kuću].
that old is.selling house (Serbo-Croatian)

Returning to (46), the configuration that Bošković (2016a) was concerned with, where a phase has multiple edges, is in fact what we have in (46), given that [which sonatas] and [these violins+Op] are multiple Specs of the same head (namely C). As noted above, only the outmost edge is accessible from the outside in this configuration, with traces voiding the locality effect in question: if the element in the higher edge undergoes movement, turning the edge into a trace, the locality effect is voided (see (47)-(48)). What all this means is that only *which sonatas* is accessible for movement into the higher clause in (46).[18] However, once *which sonatas* moves, the lower Spec is also accessible for movement (recall that under the complex Op analysis, *these violins* undergoes movement in (46)). The outmost edge effect thus enforces a particular order of movements in (44)/(46). However, the problem is that this order of movements violates the cycle. The landing site of *these violins*, SpecIP, is lower than the landing site of wh-movement, which is SpecCP. If *which sonatas* moves first (to SpecCP), followed by movement of *these violins* (to SpecIP), we then get a cycle violation. (44) is then ruled out under the complex Op approach: if wh-movement takes place first a problem with respect to the cycle arises, and if *tough*-movement takes place first, a problem regarding the outmost edge effect arises.[19]

In short, given superiority, *which sonatas* must move first to the infinitival SpecCP in (44), with complex Op+*these violins* tucking in in the lower SpecCP. Due to the outmost edge effect, *these violins* then cannot move into the matrix clause (it can after *which sonatas* moves, but this ordering of movements violates the cycle).

Consider now (45), which contrasts with (44). Note first that the issue just noted regarding (44) does not arise in (45). [These sonatas+Op] is the higher infinitival SpecCP in (45), since wh-movement tucks in in (45) given superiority (the base position of the *tough*-moving element is higher than that of the wh-moving element).

[18]I assume here that the first phase in the matrix clause is CP. Nothing would, however, change if the first phase in the matrix clause is AP, as would be the case under Bošković's (2014) approach to phases. The problem about to be discussed would just be moved one phase up.

[19]It should be noted that the analysis of (44) given above relies on Chomsky's (2000) approach to the PIC, not Chomsky's (2001) approach. In the former the PIC effect kicks in immediately, while in the latter it kicks in only after the higher phase head, which is C, enters the structure. As a result, in the latter, but not in the former approach, T should be able to attract an element from a lower phase in violation of the PIC.

(49) [$_{CP}$ [these sonatas+Op] which violins C….]]

No problem then arises with movement of *these sonatas* to SpecIP. How about wh-movement, given that the wh-phrase is located in the lower SpecCP? What is relevant here is an intervention voiding effect noted in Bošković (in press a).

It is well-known that intervention effects are also voided with traces. The relevant situation regarding intervention effects, given in (50), is illustrated by (51). A-movement across an experiencer is disallowed in Italian, which is standardly analyzed as an intervention effect: (51) involves A-movement across an A-Spec. Crucially, the intervention effect is voided if the intervener is turned into a trace, as shown by (52).

(50) Traces do not count as interveners (Chomsky 1995, Bošković 2011b, among others)
(51) *****Gianni$_i$ sembra a Maria [t$_i$ essere stanco].
Gianni seems to Maria to.be ill
(52) A Maria$_j$, Gianni$_i$ sembra t$_j$ [t$_i$ essere stanco].

Importantly, Bošković (in press a) argues that intervention effects are voided not only when the intervener itself is a trace, but also when its edge is a trace. One case of this sort is provided by coordinated Japanese numeral constructions like (53a), where, as discussed in e.g. Watanabe (2006) and Bošković (in press a), the NP moves to the edge of the bracketed TNP, which I will refer to as ClassP, within each conjunct (for ease of exposition I ignore this movement in (53b-d)). As discussed below (see (68)), extraction is possible out of the first conjunct (cf. (53b)) but not out of the second conjunct (cf. (53c)) of coordinated ClassPs in Japanese. However, extraction out of the second conjunct becomes possible if it also takes place out of the first conjunct, as in (53d) (non-clitic conjunction *sosite* can optionally occur between the fronted elements in (53d)).

(53) a. John-ga [$_{VP}$ [$_{PP}$ yaoya-kara] [mikan-o$_i$ 3-ko t$_i$]-to [banana-o$_i$ 5-hon t$_i$] katta.
John-NOM vegetable store-from orange-ACC 3-CL and banana-ACC 5-CL bought
'John bought [3 oranges and 5 bananas] from a vegetable store'
b. John-ga mikan-o$_i$ yaoya-kara [t$_i$ 3-ko]-to [banana-o 5-hon] katta.
John-NOM orange-ACC vegetable store-from 3-CL-and banana-ACC 5-CL bought
c. *John-ga banana-o$_j$ yaoya-kara [mikan-o 3-ko]-to [t$_j$ 5-hon] katta.
John-NOM banana-ACC vegetable store-from orange-ACC 3-CL-and 5-CL bought
d. John-ga mikan-o$_i$ (sosite) banana-o$_j$ yaoya-kara (sorezore) [t$_i$ 3-ko]-to
John-NOM orange-ACC and banana-ACC vegetablestore-from respectively 3-CL-and
[t$_j$ 5-hon] katta.
5-cl bought

(H. Tada, p.c.)

I will discuss extraction out of coordinated structures in more detail in section 3.2, where I also show why extraction is possible out of the first conjunct, as in (53b), but not out of the second conjunct, as in (53c). The gist of the discussion is that (53c) involves an intervention effect: being higher than the second conjunct, the first conjunct blocks extraction out of the second conjunct (note that extraction out of a conjunct is in principle possible here, as shown by (53b), which will be discussed below). What is important here is that the intervention effect we see at work in (53c) is voided in (53d). Crucially, the intervener is not a trace in (53d), as it is in (52); only its edge is a trace (recall that *mikan-o* moves to SpecClassP). Bošković (in press a) gives additional examples of this kind, which all show that traces at the edge of an intervener void the

intervention effect. In other words, traces as well as elements that have a trace at their edge do not function as interveners.

What is relevant for our purposes here regarding (45)/(49) is that just like traces, elements that have a trace at their edge do not count as interveners. Given that traces in general void both the PIC effect and the intervention effect, as discussed above regarding (48) and (51) respectively, the trace-at-the-edge voiding effect should then also hold for the PIC. I suggest that this is what is going on in (45)/(49): The higher Spec in (49) has a trace at its edge after *these sonatas* undergoes *tough*-movement (see (54)), hence it is irrelevant for the purpose of the outmost edge effect. As discussed above, *these sonatas* is either generated in the Spec of the complex DP, or it moves there. Either way, the complex DP in question has a trace at its edge, which voids the locality problem that this DP could induce for wh-movement of the lower Spec.

(54) [$_{IP}$ these sonatas$_i$…[$_{CP}$ [t$_i$+Op] which violins C….]]

The complex Op analysis thus accounts for the contrast between (44) and (45).

Turning now to the null Op account and starting with (44), which needs to be ruled out, the problem discussed above with respect to the complex Op analysis of this example does not arise under the null Op analysis. The structure of the embedded clause CP field of (44) under the null Op analysis at the point when the embedded CP is completed is given in (55). (Recall that *which sonatas* moves to SpecCP before Op, which then tucks in, *which sonatas* being higher than Op in the base positions of these elements.)

(55) [$_{CP}$ [which sonatas] Op C ….]]

The outmost edge/cycle problem discussed above does not arise here for the simple reason that there is no *tough*-movement into the matrix clause (Op stays where it is). (44) then appears to raise a problem for the null Op analysis, favoring the complex Op analysis. More precisely, accounting for (44) requires adopting additional assumptions under the null Op analysis, which is not the case under the complex Op analysis.

Consider then what kind of assumptions we would need to make to account for (44) under the null Op analysis. The null Op analysis assumes that there is a predication relation between the null Op and the subject of the higher clause. One possibility is that this predication relation requires the Op to be the (outmost) edge of the *tough* complement, which is not the case in (44)/(55). As discussed above, the outmost edge effect is treated as a PIC effect in Bošković (2016a): this would then mean that Op in the *tough* complement needs to be PIC-accessible to the matrix subject (see also Rezac 2004 for a slightly different Agree account). Implementing this is, however, tricky. We would need to assume that the locality relation in question is checked derivationally, before the wh-phrase in the higher Spec moves out of the embedded CP (cf. (55)), given that traces void the outmost edge effect (i.e. they don't count as edges for the purpose of the PIC). After wh-movement of *which sonatas*, the null Op will be PIC-accessible to the matrix subject in (44)/(55), so the problem in question would not arise.

There is a potential alternative. *Tough*-formation movement to the embedded SpecCP must involve feature-sharing, in fact under both analyses of *tough*-constructions under consideration, since this is the final landing site of the movement (Op/complex Op movement) under both analyses. Wh-movement to the embedded SpecCP is different in this respect—we are dealing here with successive-cyclic movement, which, as discussed above, does not involve feature-sharing. The embedded CP (i.e. the *tough* complement) then has both a feature-sharing and a non-feature-sharing Spec. The suggestion is then that in the case of "mixed" Specs of the same phrase, where one Spec is feature-sharing and the other is not, the non-feature-sharing Spec

must be lower than the feature-sharing Spec. The result of this would be that the *tough*-formation Spec, i.e. the Spec occupied by null Op, would have to be higher than the wh-movement Spec. This, however, cannot be accomplished in (44) due to superiority/tucking in. As discussed above, superiority forces wh-movement to take place first in (44), with null Op-movement then tucking in in the lower Spec (cf. (55)). The assumption regarding the relative height of mixed Specs of the same phrase would then enable us to account for (44) under the null Op analysis (the assumption is not inconsistent with the complex Op analysis; however, it is not needed to account for (44) under that analysis). A question then arises if there is independent evidence for the assumption in question. Without it, we would have an assumption that is made specifically to resolve a problem that arises under the null Op analysis of *tough*-constructions.

At any rate, it seems clear that it is easier to account for (44) under the complex Op analysis than under the null Op analysis.

(45) is even more problematic since null Op is actually located in the higher SpecCP in the embedded clause here, given Superiority (since Op is higher than *which violins* in the base position).

(56) ?Which violins$_i$ are these sonatas$_j$ tough [$_{CP}$ Op$_j$ t$_i$ [to play t$_j$ on t$_i$]]?

To account for the grammaticality of (45), i.e. for wh-movement to be able to take place in (45)/(56), the outmost edge effect needs to be somehow voided (since Op is in the higher Spec). We have seen above that the effect can be voided under the complex Op analysis, given that not just traces, but also traces at the edge of the relevant phrase, void locality effects (which is independently motivated, as discussed above). That analysis crucially appeals to *tough*-movement into the matrix clause, which however does not take place in (45)/(56) under the null Op analysis. It appears that the only way to account for (56) in light of the above discussion would be to assume that not only traces, but null elements in general void locality effects. The possibility was actually considered in Bošković (2011b) and argued against, given that there are cases where null operators do induce this kind of locality effects. One such case is given in (57), which displays a wh-island effect. It is standardly assumed that the wh-island effect, which is an RM effect, in (57) is induced by the presence of a null Op in the embedded question CP.

(57) ??What$_i$ do you wonder [$_{CP}$ Op if John likes t$_i$]

I then conclude that the paradigm in (44)-(45) favors the complex Op analysis, which involves smuggling, over the null Op analysis of *tough*-constructions.

3.2. Coordinated *tough*-constructions

In this section I will address an issue regarding extraction out of coordinated *tough*-constructions that arises under the complex Op analysis of *tough*-constructions. The issue concerns constructions like (58), where only the first conjunct is a *tough*-construction. In other words, (58) involves coordination of a *tough*-infinitive (cf. (59)) and a non-*tough* infinitive (cf. (60)).

(58) *John is tough [to please t] and [to keep others happy].
(59) John is tough to please.
(60) a. *John is tough to keep others happy.
b. John tried to keep others happy.

The ungrammaticality of examples like (58) can be interpreted as arguing for approaches where there is movement out of the complement of *tough*. (58) can then be treated in terms of the

Coordinate Structure Constraint (CSC), which bans extraction out of conjuncts (the constraint goes back all the way to Ross 1967; note that below I will ignore the second part of the CSC, which bans extraction of conjuncts, since it is not relevant for our purposes). Under the complex Op analysis, (58) involves a violation of the CSC. The complex Op moves to the edge of the first conjunct, which is followed by movement of *John* out of the conjunct, in violation of the CSC.

(61) *John$_i$ is tough [[t_i+Op]$_j$ to please t_j] and [to keep others happy].

The situation is far from straightforward under the null Op analysis since under that analysis there is no extraction out of the coordination in (58): null Op moves to the edge of the first conjunct and stays there.

(62) *John is tough [Op$_i$ to please t_i] and [to keep others happy].

Additional assumptions then need to be adopted to account for (58) under that analysis. Recall that additional assumptions were already needed regarding constructions like (44). The assumption regarding the ordering of multiple Specs discussed above regarding (44) would not help here, since there is no multiple-Spec configuration in (58). The alternative assumption explored above regarding (44) was that the predication relation between the null Op and the matrix subject requires that the null Op be PIC-accessible to the matrix subject. The assumption might be relevant to (58) though the issue is far from clear. First, it is not completely clear whether the CSC involves a PIC/phase effect. Treating conjuncts as phases, as argued in Bošković (in press a) and discussed below, would not suffice here since null Op moves to SpecCP, which is the edge of the first conjunct. For a PIC-accessibility account it would be necessary to treat ConjP as a phase too, which is what Oda (2017) and Bošković (in press b) actually argue for. Still, it is not clear that even that assumption would work, the issue being whether the edge of the edge of phase XP (null Op is at the edge of the edge of ConjP, as shown in (63)) is accessible from outside of XP.

(63) *John is tough [$_{ConjP}$ [$_{CP}$ Op$_i$ to please t_i] and [to keep others happy]].

Under Chomsky's (2000, 2001) approach to phases/PIC it is accessible, under Hiraiwa's (2005) and Bošković's (2015) approach it is not accessible (note that the discussion of the complex Op analysis has tacitly assumed the former approach, since the *tough*-subject otherwise would not be able to move out of the complex Op). At any rate, it appears that, as in the case of (44), it is easier to account for (58) under the complex Op than under the null Op analysis, since the former (but not the latter) involves movement out of the complement of *tough*, which means movement out of the first conjunct of (58), allowing us to treat (58) in terms of a CSC violation.

However, it turns out that the appearances may be deceiving here: the status of (58) with respect to the CSC is more complicated than what the appearances indicate. What is relevant here is Bošković's (in press a) observation regarding a class of exceptions to the CSC. In particular, Bošković (in press a) shows that elements that are base-generated at the edge of a conjunct or move there obligatorily prior to extraction out of the conjunct, can extract out of conjuncts. A number of relevant cases are given below.

(64) shows that SC possessors, which we have seen above are base-generated at the edge of their TNP, hence at the edge of the conjunct in (64), can extract out of a conjunct.

(64) Markovog$_i$ je on [t_i prijatelja] i [Ivanovu
Marko's.ACC.MASC.SG is he friend.ACC.MASC.SG and Ivan's.ACC.FEM.SG

sestru] vidio.
sister.ACC.FEM.SG seen
'He saw Marko's friend and Ivan's sister.'

Galician (65), which involves article-incorporation (i.e. D-to-V movement, see Uriagereka 1988, 1996, Bošković 2011b, 2013), shows that the head of a conjunct, which is also located at the conjunct edge (the concept of *edge* here corresponds to the PIC/phasal edge, where the Spec and the head of a phase are located at the edge), can also undergo movement out of the conjunct.

(65) Vistede-lo$_j$ [$_{DP}$ [$_{D'}$ t$_j$ [$_{NP}$ amigo de Xan]]] e-mais [a Diego] onte.
(you)saw-the friend of Xan and Diego yesterday
'You saw the friend of Juan and Diego yesterday.'

Turning now to cases involving movement to the edge of a conjunct, recall that *r*-pronouns in Dutch obligatorily move to the edge of PP. Importantly, they can move out of a PP conjunct.

(66) Ik heb daar$_i$ boeken [[t$_i$ op t$_i$] en [op deze tafel]] gelegd.
I have there books on and on this table put

Another case involves Japanese numeral constructions like (67).

(67) a. John-wa [hon-o san satsu] katta.
John-TOP book-ACC 3 CL bought
'John bought three books.'
b. Hon-o John-wa san-satsu katta.

Recall that, as discussed above, *hon-o* moves to the edge of the bracketed TNP (ClassP) in (67a). *Hon-o* can also move outside of ClassP, as in (67b). Importantly, the floating movement is also possible out of coordinations, as in (68).

(68) Ringo-o$_i$ Taro-wa [t$_i$ san ko] to [banana-o ni hon] tabeta.
apple-ACC Taro-TOP 3 CL and banana-ACC 2 CL ate
'Taro ate 3 apples and two bananas.'

Bošković (in press a) provides a number of additional cases of this kind, all of which show that elements that are base-generated at the edge of a conjunct or obligatorily move to the edge of a conjunct prior to extraction out of the conjunct can be extracted out of the conjunct.

This is in fact the same exception as the one noted in Bošković (2018), and discussed above, with respect to the freezing ban. Recall that elements that are base-generated at the edge of a moved element or which move there independently of successive-cyclic movement can move out of moved elements. In fact, based on such cases Bošković (2018) argues that the traditional freezing ban should be restricted to successive-cyclic movement out of the moved element. Based on cases like (64)-(68) (and a number of additional cases), Bošković (in press a) argues that the same restriction to successive-cyclic movement holds in the case of the CSC. In fact, the standard illustrations of the CSC ban on extraction out of conjuncts all involve successive-cyclic movement out of the conjunct. This is e.g. the case with (69), where under the standard assumption that movement out of DP must proceed via SpecDP, *who* must undergo successive-cyclic movement through the edge of the conjunct.

(69) *Who$_i$ did you see [t_i enemies of t_i] and John?

Bošković (in press a) argues that conjuncts are quite generally phases (see also Oda 2017), which follows from the contextual approach to phases argued for in Bošković (2014).[20] This means that movement out of a conjunct must proceed via the conjunct edge. What the above facts then show is that if an element can get to the edge of a conjunct independently of successive-cyclic movement, it can extract out of the conjunct; if it cannot, the extraction is banned.

Returning to the unacceptability of (58) (recall that only the first conjunct is a *tough*-construction), the *tough*-movement extraction out of the first conjunct under the complex Op analysis appears to fit the window for acceptable extraction out of a conjunct we have seen at work above. Under the complex Op analysis, there is obligatory movement to the edge of the conjunct in (58) which is independent of successive-cyclicity (see (61)). There is still a difference from the cases discussed above: while in the examples given in (64)-(68) the element located at the edge of the conjunct extracts, this is not the case in (58), where the edge of the edge undergoes extraction (see (61)). As noted above, under the complex Op analysis we need to assume that the edge of the edge of phase XP is accessible from the outside. This is necessary to derive even the basic *tough* cases, where the *tough*-subject is located at the edge of the complex operator DP in SpecCP, after complex operator DP undergoes movement to the infinitival SpecCP (as in [$_{CP}$ [$_{DP}$ John [$_{D'}$…). (58) is actually different in that respect. If ConjP is a phase, as argued in Bošković (in press b) and Oda (2017), what we are dealing with here is the edge of the edge of the edge: As shown in (70) (which is the structure prior to *tough*-movement to the matrix SpecIP), *John* in (58) is located in SpecDP, which is the edge of the DP phase. The DP phase itself is located at the edge of the CP phase, which is in turn located at the edge of the ConjP phase. If in this configuration *John* is not accessible outside of the highest phase, ConjP, the ungrammaticality of (58) could still be accounted for.[21]

(70) [$_{ConjP}$[$_{CP}$[$_{DP}$ John [$_{D'}$[$_{C'}$[$_{Conj'}$ ….

However, the issue here is that (58) becomes acceptable under across-the-board movement (ATB), as in (71).The same triple edge configuration is present in the first conjunct of (71) under the complex Op analysis. The acceptability of (71) indicates that the triple edge configuration cannot be the reason for the unacceptability of (58), otherwise (71) would also be ruled out (see fn 23 for an account of ATB in Bošković's (in press a) approach to CSC effects where in ATB cases extraction takes place only out of the first conjunct). More generally, the fact that (58) improves under ATB indicates that (58) should indeed be ruled out by the CSC.

(71) These violins$_i$ are tough [to play t_i] and [to keep t_i balanced].

What is relevant at this point is that Bošković (in press a) deduces the traditional ban on extraction out of conjuncts, the ATB exception to the CSC, illustrated by (72) below, where movement takes place out of each conjunct, as well as the restriction of the CSC effect to successive-cyclic movement discussed above, from the Coordination of Likes Condition (CL), which requires conjuncts to be parallel in their categorial status (CL goes back to Chomsky

[20]In Bošković (2014), the highest projection in the extended domain of a lexical head (or the clause) functions as a phase. Merger of (a projection of) the Conj head with a conjunct closes the extended domain of the conjunct in Bošković (2014), making the highest projection of the conjunct a phase.

[21]It should be noted that any attempt to move *John* to the edge of one of the phases in question prior to extraction out of ConjP would violate antilocality, the ban on movement that is too short, under the approach to antilocality in Bošković (2016b).

1957; see also Schachter 1977, Williams 1978, Sag et al 1985, Bowers 1993, Beavers and Sag 2004, Chaves 2006, among many others).[22] The gist of the account is the following: Conjuncts are phases (as discussed above). As a result, movement from a conjunct must proceed successive-cyclically via the edge of the conjunct. In the labeling framework, successive-cyclic movement through the conjunct edge delabels the conjunct, changing its category. As a result, if movement takes place only out of one conjunct, a violation of the CL requirement obtains. Thus, as a result of successive-movement to the conjunct edge, the first conjunct in (69) is unlabeled, while the second conjunct is labeled (it is a DP), resulting in a CL violation (importantly, CL is checked at the point when ConjP is formed so that it is not affected by any later movement out of ConjP). The CL violation is remedied if movement takes place out of each conjunct, as with ATB in (72), where both conjuncts are delabeled (see also fn 23).

(72) Who$_i$ did you see [t_i friends of t_i] and [t_i enemies of t_i]?

The analysis restricts the CSC effect to successive-cyclic movement (which has a delabeling effect), which means that elements which are base-generated at the conjunct edge, or which move to the conjunct edge independently of successive-cyclic movement, are extractable, which is indeed the case as we have seen above.[23]

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[22]Sag et al (1985) also appeal to CL in the account of the CSC (see also Takahashi 1994). However, their analysis cannot capture the exceptional CSC-violating constructions discussed above.

[23]It should be noted that all the CSC-violating extractions in (64)-(68) are possible only from the first conjunct, as illustrated in (i) with possessor extraction in SC (cf. (64)).

(i) *Ivanovu$_i$ je on [Markovog prijatelja] i
Ivan's.ACC.MASC.SG is he Marko's.ACC.MASC.SG friend.ACC.MASC.SG and
[t_i sestru] vidio.
sister.ACC.FEM.SG seen

There should be no CSC violation in (i): if the CSC were to ban poss-extraction from conjuncts in SC it would also rule out (64). Given the well-known fact that the first conjunct is higher than the second conjunct, Bošković (in press a) argues that (i) involves an intervention effect, where the first conjunct, which is higher than the second, blocks movement from the second conjunct. As for why the effect doesn't arise in ATB examples like (72), where it appears that movement from the second conjunct crosses the first, Bošković (in press a) observes that the intervention issue is resolved under Nunes's (2004) sideward movement analysis of ATB. Under this analysis, *who* in (72) is merged in its θ-position in the second conjunct, moving to the edge of the conjunct. (Islandhood effects show that there is movement to the edge of this conjunct. Bošković's account of the CSC actually explains why this movement, which delabels the second conjunct, takes place since without it, a CL violation would occur.) It is then re-merged in its θ-position in the first conjunct, moving to its edge. Movement to the edge of the conjuncts delabels the conjuncts, so that there is no violation of CL. *Who* then undergoes movement from the first conjunct edge. (The copy of *who* at the second conjunct edge does not count as a trace hence is not ignored for labeling at the point when ConjP is formed since there is no higher copy of *who* that c-commands it at this point, the relevant chain being formed only after movement out of ConjP). Importantly, there is no movement from the second conjunct that crosses the first conjunct with ATB, which resolves the intervention issue. It should, however, be noted that the intervention effect can be voided in (72) even independently of Nunes's analysis of ATB given that elements that have a trace at their edge do not function as interveners since the first conjunct does have a trace at its edge. However, this is not the case in *tough* examples like (ii), where under the complex Op account the edge of the first conjunct is actually not a trace (the edge is the complex operator [these sonatas+Op], which itself does not undergo further movement). On the other hand, Nunes's analysis applies equally to (ii) (both conjuncts are actually labeled in (ii) since complex Op movement to SpecCP is not successive-cyclic movement).

Returning to (58), under the complex Op account the movement that takes place to the edge of the first conjunct is not successive-cyclic movement (see the structure in (61)), which means that the movement does not delabel the conjunct, in contrast to the movement to the edge of the conjunct in (69). In other words, (58) patterns with the acceptable (64)-(68), not the unacceptable (69), in the relevant respect, which means that its unacceptability does raise an issue for the complex Op account.

Notice, however, that under the complex Op analysis, the infinitival complement of *tough* must be a CP. Now, a number of authors have argued that control infinitives like (73) are not CPs. Thus, Bošković (1997a) argues that control infinitives that do not have anything present in SpecCP (like the indirect question control infinitive in (74) does) are actually IPs (in other words, there is no vacuous CP field in control infinitives; CP is present only when there is something in SpecCP, as in (74)).

(73) John tried [$_{IP}$ PRO to leave].
(74) John asked [$_{CP}$ what PRO to buy].

Bošković's main argument is that control infinitives occur in all contexts where declarative clauses without overt complementizer *that* are disallowed in English, as illustrated below. Taking the unacceptable examples in (75) to be ruled out due to the licensing conditions on null C (all these examples become acceptable if the null C is replaced by the overt complementizer *that*), Bošković (1997a) concludes that the control infinitives in (76) are not headed by a null C, i.e. they are IPs.[24]

(75) a. John believes [$_{CP}$ C [$_{IP}$ he is crazy]].
b. *[$_{CP}$ C [$_{IP}$ He would buy a car]] was believed at that time.
c. *John believed at that time [$_{CP}$ C [$_{IP}$ he was crazy]].
d. *What the doctors believe is [$_{CP}$ C [$_{IP}$ they will visit the hospital]].
e. *They suspected and we believed [$_{CP}$ C [$_{IP}$ Peter would visit the hospital]].
f. *Mary believed Peter finished school and Bill [$_{CP}$ C [$_{IP}$ Peter got a job]].

(76) a. [$_{IP}$ PRO to buy a car] was desirable at that time.
b. I tried at that time [$_{IP}$ PRO to fail her].
c. What the doctors tried was [$_{IP}$ PRO to visit the hospital].
d. They demanded and we tried [$_{IP}$ PRO to visit the hospital].
e. Mary tried to finish school and Peter [$_{IP}$ PRO to get a job].

Under this analysis, (58) involves coordination of a CP infinitive (the *tough*-infinitive, which, like the infinitive in (74), has an operator in its Spec) and an IP infinitive (the regular control infinitive), hence can still be ruled out by CL.[25] Furthermore, Schachter (1977) argues that there is both a syntactic and a semantic component to the CL requirement: conjoined elements also must be of the same semantic type (thus, declarative and non-declarative (e.g. question) CPs cannot be coordinated). Given the well-known peculiarities of *tough*-constructions (see Gluckman 2019 and references therein for relevant discussion of their semantic properties), it is

(ii) These sonatas are tough [to play] and [to arrange].

[24] Based on such considerations, Messick (2014) argues that *tough*-infinitives are CPs, see in this respect the contrast between **The Pope will be tough tomorrow to get an audience with* and *It will be tough tomorrow to get an audience with the Pope* from Bruening (2014) (though see Bošković and Lasnik 2003 for a potentially interfering factor when applying this test to CPs with a filled SpecCP).

[25] This analysis would, however, extend to the null Op account of *tough*-constructions.

not out of question that the coordination of *tough*-infinitives and regular non-*tough* infinitives violates the semantic CL (independently of the syntactic category of the infinitives in question).

There is, however, a potential issue for the CL analysis. (58) remains ungrammatical even when the coordination is below the level of the full infinitive, as in (77).

(77) *John is tough to [please t] and [keep others happy].

I will refer to such cases as "smaller coordinations". Smaller coordinations have some rather interesting properties. Thus, the interpretation of (78a) is that it involves balancing while playing, which contrasts with (78b), where the simultaneity is not imposed. Notice also that (79a) is pragmatically awkward since it involves parking while handling in curves, an issue which does not arise in (79b).

(78) a. These violins$_i$ are tough to [play t_i] and [keep t_i balanced].
b. These violins$_i$ are tough [to play t_i] and [to keep t_i balanced].
(79) a. This car is easy to [park t_i] and [handle t_i in curves].
b. This car is easy [to park t_i] and [to handle t_i in curves].

What this indicates is that, in contrast to (78b)/(79b), (78a)/(79a) involve coordination below the TP level, which means that there is only one T in the *tough* complement. This in itself is interesting, since it argues against analyses that place *to* low in the structure (given that what differentiates (78b)/(79b) and (78a)/(79a) is the presence of one vs two *to*-s, cf. Travis 1994, 2000, Wurmbrand 2001). In light of this I will assume that smaller coordinations like (78a)/(79a) involve vP coordination.

Notice, however, that the above CL analysis of the larger coordination in (58) does not extend to (77). The CL analysis is based on *tough*-infinitives, which have an operator in their Spec, and non-*tough* infinitives, which do not have it, being different either in their categorial status (CP vs IP) or their semantic type. The issue does not arise in (77), where the coordination is on a lower level.

(77), however, can still be accounted for under CL. The second conjunct in (77) is a traditional vP. Chomsky (2013) argues that the subject does not undergo feature-sharing with its sister in its base position, which means that the second conjunct in (77) is actually unlabeled when ConjP is formed (it is labeled as vP only after subject movement).[26]

Regarding the first conjunct, the issue of object shift arises here. Following the spirit of the early minimalist system where object shift targets AgroP (see Chomsky 1993), which is higher than the subject θ-position, I assume that the object shift position is higher than the subject θ-position (see Bošković 1997b for evidence to this effect), i.e. the edge of vP targeted by object movement is higher than the subject θ-position (the subject SpecvP can be created via tucking-in after the object SpecvP is created; see also Abels 2007). Now, Bošković (1997b) argues that objects undergoing wh-movement undergo object shift on the way up (in fact even in languages that otherwise do not have object shift). Returning to (77), complex Op movement to the edge of the first conjunct will then involve object shift, which results in labeling (like movement to SpecIP, object shift results in labeling). The first conjunct is then labeled, while the second conjunct is not, which results in a CL violation.[27]

[26]The subject here is PRO.

[27]Note that due to the clause-boundedness of *tough*-formation movement (see Stowell 1986 and Hattori 2017), I consider only *tough*-infinitives without further clausal embedding.

Note also that in ATB (i), there is object shift in both conjuncts, so that both conjuncts are labeled.

(58) and (77) can then be accounted for under the complex Op analysis within Bošković's (in press a) approach to CSC effects, which eliminates the traditional CSC, deducing its effects from CL.

4. Conclusion

In conclusion, the paper has explored the consequences of the freezing ban for smuggling and discussed in more detail one particular case of smuggling, namely the smuggling analysis of *tough*-constructions. Regarding the latter, a modification of Hicks's (2009) complex Op analysis of *tough*-constructions was proposed regarding the structure of the complex Op which has made it consistent with the approach to the freezing ban in Bošković (2018). The paper has also provided arguments that favor the smuggling analysis of *tough*-constructions over the null Op analysis and pointed out that CSC effects found with coordinations involving *tough*-constructions can be captured under the smuggling analysis in light of Bošković's (in press a) approach to the CSC, which allows extraction out of conjuncts in well-defined contexts, deducing CSC effects from Coordination of Likes, if this requirement prohibits coordination of *tough* and non-*tough* infinitives. The discussion of *tough*-construction coordinations has also provided evidence against analyses which place infinitival *to* low in the structure.

Regarding the problem that the traditional freezing ban, which bans movement out of moved elements, raises for smuggling, which quite generally involves such movement, we have seen that the problem can be resolved under Bošković's (2018) approach to the freezing ban, which does not actually ban movement out of moved elements, i.e. where there is nothing wrong in principle with movement out of moved elements. There is in fact no such thing as the general freezing ban. Extraction from moved elements is generally possible. In the cases where it appears not to be possible, the relevant problem does not arise when YP moves from moved XP but with the movement of XP itself; i.e., moving XP does not freeze the internal structure of XP for movement–movement of YP to the edge of XP prevents movement of XP. Furthermore, only successive-cyclic movement of YP to the edge of XP has this effect, which restricts traditional freezing ban effects to successive-cyclic movement out of moved elements. This approach then allows smuggling as long as smuggling of KP does not involve successive-cyclic movement of KP through the edge of the larger constituent ZP that smuggles KP. We have also seen that the reformulation of the traditional freezing ban given in Bošković (2018), on which phases with non-agreeing Specs, i.e. unlabeled elements in Chomsky's (2013) labeling system, cannot move, has a slightly different effect on smuggling in this respect from Bošković's (2018) deduction of the generalization in question, which relied on Chomsky's assumption that only phases can undergo movement (in addition to Chomsky's 2013 labeling system). As a result, the latter ruled out certain smuggling derivations, like the one given in Collins (2005b) for passives, because they involve movement of phrases that are not phases. Since Bošković's (2018) new descriptive generalization that replaces the traditional freezing ban did not itself have that effect, I have suggested a new deduction of the generalization that does not require that only phases move which relied on incorporating one aspect of Bošković's (2007) system, namely the assumption that X moves only if it has an uninterpretable/unvalued feature, into Chomsky's (2013) labeling system, the combination of the two systems being rather natural in this respect given that both systems are base- rather than target-driven (more precisely, in both systems something goes wrong in the base position of movement if it does not take place). The end result of all this is that movement out of a moved element, including smuggling that involves such movement, is possible as long as such movement does not require pure successive-cyclic movement through

(i) These sonatas are tough to play and arrange.

the edge of the moved element (in other words, YP can move out of moved XP if YP is base-generated at the edge of XP or if it obligatorily moves to the edge of XP (independently of successive-cyclic movement), or if it moves out of XP without moving through the edge of XP).

Chomsky's (2013) labeling system has played a central role in the discussion. The gist of the discussion regarding labeling is the following: The traditional freezing ban was dispensed with and replaced by the generalization that phases with non-agreeing Specifiers cannot move, which in Chomsky's (2013) labeling system means that unlabeled elements cannot move (since a non-agreeing Spec leads to the lack of labeling). The generalization follows independently on the view on which movement is driven by an uninterpretable/unvalued feature of the moving element, as in Bošković (2007, 2011a), since an unlabeled element could not have such a feature under the assumption that labeling is necessary for projecting any features. More precisely, for the syntactic object ? formed by the merger of X and Y to be able to move, either X or Y must have a uK feature and pass this feature to ? by labeling it (so, if X has the uK feature, then X must project and label ?). Labeling is then necessary for ? to have a uK and be able to move, which means that unlabeled elements cannot move.

In this respect, the discussion in the paper has strengthened the overall relationship between movement and labeling argued for in various works by Bošković (see Bošković 2016b, 2018, in press a): unlabeled elements cannot undergo movement, unlabeled elements do not function as interveners, and movement cannot target unlabeled elements.

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