

## SQUIB

# On reconstruction effects in English *wh*-slifting: Theoretical and experimental considerations

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In this paper, reconstruction for Binding Principles A and C will be (re)considered in *wh*-slifting, a construction which appears to associate a *wh*-interrogative clause with a yes/no-interrogative clause, whose predicate typically selects propositions rather than questions. While the current view is that both binding principles bleed in *wh*-slifting, a thorough examination of Principle C and experimental pilot findings for Principle A reported here suggest the exact opposite conclusion: Binding Principles A and C do not bleed in *wh*-slifting. To the extent that this conclusion is valid, it favors the hypothesis that a *wh*-interrogative clause reconstructs to the complement position of a proposition-selecting predicate. This, in turn, raises non-trivial questions about the syntax and semantics of clausal complement selection, which we leave unanswered.

**Keywords:** reconstruction; *wh*-slifting; clausal selection; Binding Principle A; Binding Principle C; exempt

## 1 Introduction

A phenomenon that has attracted much attention recently, raising important theoretical questions about the grammar of clausal complement selection, is *wh*-slifting, a term borrowed from Ross' (1973) *s(entential) lifting* by Haddican et al. (2014). *Wh*-slifting can be exemplified for English with (1).

- (1) a. Who did Mary see, do you think?  
b. 'For which x, is it the case that you think that Mary saw x?'

As can be seen in (1a), a typical *wh*-interrogative clause (hereafter, *slift*) surfaces at the left of a yes/no-interrogative clause (henceforth, *host*). On the assumption that subject–auxiliary inversion is associated with root clauses, both the *slift* and the *host* display root properties. While the predicate of the *host* (here, *think*) does not typically select “questions” (interrogative clause-types) but “propositions” (declarative clause-types) (e.g., Grimshaw 1979; Ginzburg & Sag 2001; Lahiri 2002), the interpretation in (1b) appears to place the *slift* in the complement position of *think*.<sup>1</sup>

The question then is what the syntax of (1a) is that gives rise to the interpretation in (1b). In other words, it needs to be determined how the *slift* is structurally linked to the *host*:

<sup>1</sup> By saying “in the complement position of *think*”, we do not necessarily imply that, in terms of structure, the *wh*-question itself is the complement of *think*; it may just be part of the complement of *think*. Also, note that this reading is reminiscent of that in long-distance *wh*-questions, such as *Who do you think Mary saw?* (Chomsky 1977). We do not pursue this comparison here.

- *paratactically* — as suggested by the surface syntax of (1a) (e.g., subject–auxiliary inversion) in conjunction with typical patterns of clausal selection or
- *hypotactically* — as alluded to by the interpretation in (1b)

A paratactic association of the two clauses would have to derive the interpretation in (1b) in a non-trivial manner, while a hypotactic association would have to place a “question” in the complement position of a proposition-selecting predicate, which is a non-trivial issue for the theory of clausal selection (an issue that we do not consider further in the present paper, but see Vlachos 2018 for a recent discussion).

Proponents of the paratactic approach (e.g., Haddican et al. 2014; Stepanov & Stateva 2016) argue that the *slift* cannot originate from a position that is hierarchically lower than *think*, on the basis of two types of reconstruction evidence: *Binding Principle A* (2a) and *Binding Principle C* (2b).<sup>2</sup>

- (2) Haddican et al. (2014: (50) & (22) respectively)
- a. \*/?Which picture of himself<sub>i</sub> was downloaded most, did he<sub>i</sub> think?
  - b. What did John<sub>i</sub> buy did he<sub>i</sub> say?

In Haddican et al.’s words, “[2a] is generally unavailable for most speakers [...], though some speakers accept it marginally” (Haddican et al. 2014: 93). This presumably justifies the relevant marking on (2a) either with an asterisk or a question mark. Postponing a more detailed discussion of *Binding Principles A* and *C* for later, in the context of Chomsky’s (1981) formulation of Binding Theory, the alleged ungrammaticality (or marginality) of (2a) is due to the fact that the reflexive *himself* in the *slift* cannot be bound by *he*, which leads to a violation of Principle A. In short, for (2a) to be ungrammatical, it must be the case that the *slift* does not reconstruct to a position below *think*. This is corroborated by the grammaticality of cases like (2b): If the *slift* reconstructed, (2b) would be ungrammatical under the intended reading—contrary to facts, because *he* would bind *John*, which would lead to a Principle C violation.

<sup>2</sup> In fact, there is a third type of reconstruction that Haddican et al. consider in the same context, which falls within backwards variable binding.

- (i) Haddican et al. (2014: (57))
- \*How old is his<sub>i</sub> mother, does everyone<sub>i</sub> think?

For Haddican et al., the empirical import of (i) is that the universal quantifier *everyone* fails to bind the pronoun *his* because the latter is not in the *c*-command domain of the former. For this to be the case, the *slift* does not reconstruct to a position below *think*.

We are rather skeptical about treating (i) as a violation of backwards variable binding due to the following fact about *wh*-slifting, which Haddican et al. (2014) do consider but fail to associate with cases like (i): Quite independently of backwards variable binding, the *host* favors second person subjects, while third person subjects may be felicitous only under the contribution of the relevant context. This “second person” restriction appears to be quite robust, as other types of subjects seem to be excluded as well. Witness (ii) (these facts are repeated from Vlachos 2017: 1193, due to David Adger):

- (ii) a. #How long will the strike take, do most demonstrators think?  
 b. #How long will the strike take, does every demonstrator think?  
 c. #How long will the strike take, does some demonstrator think?  
 d. #How long will the strike take, do two demonstrators think?  
 e. #How long will the strike take, does anyone think?

(ii) shows that the subject of the *host* may not be (crucially) a quantifier (iia), an indefinite, either strong (iib) or weak (iic), a numeral (iic), or an NPI (iie).

So, in light of (ii), we do not consider (i) an instance of reconstruction violation but a semantic/pragmatic restriction that appears to ban quantificational subjects from the *host*.

We will revisit both facts and draw a radically different conclusion with respect to what we term, for convenience, the “reconstruction hypothesis” for *wh*-slifting; the hypothesis that the *slift* reconstructs to a position that is hierarchically lower than the predicate of the *host*. Specifically, we argue that the reconstruction hypothesis in *wh*-slifting is valid and as such strongly suggests a hypotactic treatment. While we do not consider any such treatment here, we motivate this conclusion in two steps. First, we show that, despite initial appearances for the opposite direction (cf. (2b)), Principle C clearly favors the reconstruction hypothesis, offering independent empirical support to an accumulating body of experimental evidence on reconstruction for Principle C (section 2). Second, we present experimental results from a small-scale pilot study that investigates the acceptability of cases like (2a) (section 3). The take-home message of the experimental results seems to be that Principle A either supports or is orthogonal to the reconstruction hypothesis. On both of these interpretations of the results, Principle A judgements are not evidence against the reconstruction hypothesis.

## 2 Reconstruction for Binding Principle C

Let us begin our discussion with Principle C of the Binding theory (hereafter, BT-C), which controls the distribution of R(eferential)-expressions or full N(oun) P(hrase)s, such as proper names, by saying that R-expressions must not be bound anywhere, where binding is defined in (4) (for a recent definition of *c-command*, see e.g. Collins & Stabler 2016; also note that, as nothing hinges on this, in what follows, we draw from Truswell’s 2014 summary of BT, but see Chomsky 1981 for the original source).

- (3) *Binding Principle C* (Truswell 2014: 2018):  
Full NPs are globally free.
- (4) *Binding* (Chomsky 1995: 93):  
 $\alpha$  binds  $\beta$  if  $\alpha$  c-commands  $\beta$  and  $\alpha$ ,  $\beta$  are coindexed.

Haddican et al. (2014) offer (5) against the reconstruction hypothesis in *wh*-slifting (repeated from (2b)):

- (5) What did John<sub>i</sub> buy did he<sub>i</sub> say?

This can only be grammatical if *he* does not c-command *John*, otherwise *he* would bind *John*. So, (5) appears to strongly suggest that the *slift* does not reconstruct in a position below *say*.

Taken in isolation, (5) draws a very narrow picture of the ways in which *wh*-slifting interacts with BT-C. Once this picture is considered in full, the inevitable conclusion is that BT-C effects in *wh*-slifting provide infeasible empirical evidence in favor of the reconstruction hypothesis. Let us begin to draw this bigger picture by commencing from an observation about word order in *wh*-slifting that will prove crucial in the discussion of BT-C effects.<sup>3</sup>

- |     |    |                                   |                |
|-----|----|-----------------------------------|----------------|
| (6) | a. | What did John buy, do you think?  | <i>Initial</i> |
|     | b. | What, do you think, did John buy? | <i>Split</i>   |

<sup>3</sup> In passing, it is worth mentioning that this observation about word order already figures in Haddican et al. (2014), but the authors fail to associate it with the discussion of BT-C. We thank Clemens Mayr (p.c.) for pointing us to this association.

Descriptively speaking, *wh*-slifting features two “alternative” (that is, interpretationally equivalent) surface linear arrangements: In what we term the *initial* order (6a), the entire *slift* linearly precedes the *host*. In the *split* order (6b) (a term we adopt from Haddican et al. 2014: 99, yet only partially, as will become apparent shortly), only the *wh*-phrase introducing the *slift* precedes the *host*, while the rest of the *slift* follows.

Now, let us consider BT-C in the context of the two orders:

- (7) a. What did John<sub>i</sub> buy, did he<sub>i</sub> say?  
b. \*What, did he<sub>i</sub> say, did John<sub>i</sub> buy?

While the *initial* order (7a), which Haddican et al. discuss (repeated from (5)), is grammatical, its *split* counterpart (7b) is not, under the intended reading (see the relevant co-indexing). Crucially, (7b) becomes grammatical once we shift the coreference between *he* and *John*. This means that the source of the ungrammaticality in (7b) is the intended coreference between *he* and *John*, which in turn points at a Condition C violation. Putting aside the grammaticality of (7a) for the moment, the ungrammaticality of (7b) suggests two important conclusions: First, BT-C does not bleed in *wh*-slifting. This means that the *slift* must reconstruct to a hierarchically lower position below *say* so that *he* c-commands, and binds, *John*; and second, the *host* is not inserted as “parenthetical” in between the *slift*, as suggested by Haddican et al.’s (2014: 99) corresponding term “split-parenthetical” for the description of orders like (6b).<sup>4</sup> Instead, the *host* belongs to the same hierarchical line of projections with the *slift*—otherwise *he* would not bind *John*, which would render (7b) grammatical, contrary to evidence.<sup>5</sup>

Coming back to the grammaticality of (7a), it would be too sketchy to conclude that BT-C bleeds in the *initial* configuration given the ungrammaticality of the corresponding order in (8).

- (8) \*How afraid of John<sub>i</sub> are you, does he<sub>i</sub> think?

(8) shows that if the *wh*-phrase is an adjective, BT-C does not bleed in the *initial* order. On analogy with (7b), the ungrammaticality of (8) strongly supports the reconstruction hypothesis.

The comparison between (7a) and (8) appears to suggest that BT-C bleeds in the *initial* order with nominal *wh*-phrases (e.g., *what*), but not with adjectives (e.g., *how afraid*). Despite its initial plausibility, this conclusion still looks rather unpolished under the ungrammaticality of the minimal pair in (9).

<sup>4</sup> To express the latter conclusion in a better way, even if one assumes that the *host* is parenthetical, the empirical facts do not appear to support an approach to *wh*-slifting that draws on an adjunction-based treatment of parentheticals (as is Haddican et al.’s 2014 account), but seem to favor a treatment of *wh*-slifting that builds on Ross’s (1973) complementation view of parentheticals (see Rooryck 2001a; b for a summary of these two competing approaches to parentheticals).

<sup>5</sup> Two reviewers point out that the data in (7) are problematic for the paratactic view of *wh*-slifting only if one accepts that the *split* order is related to *wh*-slifting. In principle, this is true, but it would be counter-intuitive to dissociate the two orders, by assuming that *wh*-slifting is instantiated only by the *initial* order, on the observation that both orders exhibit the same syntactic, semantic, and pragmatic, properties (see Haddican et al. 2014; and Vlachos 2017; 2018, for discussions). Yet, we should emphasize that even if it turns out to be correct that the two orders are unrelated, the conclusion that BT-C does not bleed in *wh*-slifting still holds, in the light of (8) and (9a), which are instances of the *initial* order, in connection with the discussion revolving around the generalization in (12). In short, and anticipating the discussion that follows in the text, we could have drawn the same conclusion by comparing, under (12), only the different instances of the *initial* orders, as exemplified in (7a), (8), and (9a). The inclusion of the *split* order offers a more unified picture of the empirical facts.

- (9) a. \*Which girl<sub>i</sub> saw a unicorn, did she<sub>i</sub> say?  
 b. \*Which girl<sub>i</sub>, did she<sub>i</sub> say, saw a unicorn?

Just like *what* in (7a), *which girl* is a noun, but unlike (7a), the latter leads to a BT-C violation in the *initial* order, as in (9a), while (9b) completes the picture by showing that the same effect holds in the *split* order. In fact, (9) replicates the “strong crossover” effect in the context of *wh*-slifting (e.g., Postal 1971; Wasow 1972; Chomsky 1981; and much work since): *which girl* illegally “crosses over” the co-indexed pronominal *she*. For this crossover to happen in the first place, and to yield an ungrammatical result, it must be the case that *she* c-commands *which girl* at some point in the derivation. This can only be true if the reconstruction hypothesis is valid. Moreover, (9) provides further empirical support to the conclusion drawn previously regarding the alleged “parenthetical” status of the *host* (either in the *initial* or the *split* order): If this clause was parenthetical, a crossover violation would not be possible, contrary to facts.

So, let us set the empirical record straight: A meticulous examination of BT-C effects in *wh*-slifting provides indisputable empirical evidence in favor of the reconstruction hypothesis. However, a single case pertaining to the *initial* order does not seem to fit the equation, which can be described as follows: While a *wh*-adjective does not bleed BT-C (cf. (8)), a *wh*-noun may do so (cf. (7a) with (9a)). In what follows, we make a preliminary attempt to make sense of this empirical pattern by placing it in a more general setting, while drawing from relevant experimental results.

The results obtained by an accumulating body of grammaticality surveys, two of which are of particular interest for our discussion, are consistent with voices that have seriously challenged the conventional wisdom about reconstruction for Principle C. In particular, the typical assumption about reconstruction for Principle C has been that, in *wh*-chains, R-expressions contained within arguments and predicates (usually) reconstruct, while R-expressions contained within adjuncts do not (or, at least, do not have to). This is shown by the ungrammaticality of (10a) and (10b), which contain a *wh*-argument and a *wh*-predicate, respectively, and contrast with the licit (10c), which features a *wh*-adjunct (for the original sources of all the examples cited below, and the way we rest the argument we presently formulate on these examples, see Adger et al. 2017; and Bruening & Al Khalaf 2019).

- (10) a. ??/\*Which argument that John<sub>i</sub> is a genius did he<sub>i</sub> believe? (*argument*)  
 b. \*How afraid of Margaret<sub>i</sub> do you think she<sub>i</sub> expects John to be? (*predicate*)  
 c. Which argument that John<sub>i</sub> made did he<sub>i</sub> believe? (*adjunct*)

At the same time, several authors have raised serious doubts about the soundness of the taxonomy in (10): While the ungrammaticality with predicate reconstruction, like (10b), seems uncontroversial, the apparent argument–adjunct asymmetry that emerges from the comparison between (10a) and (10c) does not seem to be on the right track, as legitimate cases of argument reconstruction suggest.

- (11) a. Which biography of Picasso<sub>i</sub> do you think he<sub>i</sub> wants to read?  
 b. Whose allegation that John<sub>i</sub> was less than truthful did he<sub>i</sub> refuse vehemently?  
 c. Which psychiatrist’s view that John<sub>i</sub> was schizophrenic did he<sub>i</sub> try to get expunged from the trial records?

Two online acceptability judgments tasks, one by Adger et al. (2017), and the other by Bruening & Al Khalaf (2019), shed light on this empirical discrepancy by offering experi-



mental support to the latter view: Predicates reconstruct for Principle C, but the argument–adjunct asymmetry is a non-starter. Of the more general discussion that figures in these surveys about the distribution of Principle C reconstruction, the generalization in (12) is particularly relevant for our discussion about the corresponding distribution in instances of *wh*-slifting.

- (12) *Reconstruction for Binding Condition C* (Bruening & Al Khalaf 2019: 22, (262)):  
Where a phrase XP with head X occupies the head of an A'-chain:
- a. If X is a category V, P, or A, X reconstructs along with the head Y of its complement YP;
  - b. If X is category N, only X reconstructs, none of its arguments or adjuncts do.

Concentrating on the distribution of adjectives and nouns, (12) says that, unlike a *wh*-adjective (cf. (12a)), a *wh*-noun reconstructs without its complement (cf. (12b)).

This generalization predicts the following empirical pattern ((13a) is repeated from (10b); '<...>' indicates the relevant reconstruction site).

- (13) a. \*<sub>[AP]</sub> How afraid [<sub>YP</sub> of Margaret<sub>i</sub>] do you think she<sub>i</sub> expects John to be <...>?  
b. [<sub>NP</sub> Which portrait [<sub>YP</sub> of the countess<sub>i</sub>]] does she<sub>i</sub> consider <...> to be the most valuable?  
c. \*<sub>[NP]</sub> Which girl<sub>i</sub>] does she<sub>i</sub> claim <...> has seen a unicorn?

Keeping things simple, we see from the relevant bracketing that, under (12a), the A(djectival) head *afraid*, in (13a) reconstructs, as does its complement P(preposition) *of* and the N(ominal) head of the P's complement, *Margaret* (YP) (see also Bruening & Al Khalaf 2019: 262). This illegally places the R-expression *Margaret* in the c-command domain of *she*. For clarity, we should note at this point that, as Bruening & Al Khalaf make clear in their discussion of (12), it is not just the head Y that reconstructs (e.g., *of* in (13a)) but other YP material, provided that this material is not dependent of N (hence, the reconstruction of *Margaret* in (13a)).<sup>6</sup> On the typical assumption that the head of the NP in (13b) is *portrait* (as in e.g. Adger's 2003 structural treatment of *wh*-phrases), what reconstructs, under (12b), is *which portrait*, excluding the complement YP *of the countess*. This leads to a grammatical result, under the intended reading, because reconstruction of the NP does not insert the R-expression *countess* in the c-command domain of *she*. On the other hand, (13c) stands for a strong crossover violation (see the relevant discussion above): Reconstruction of the NP must include the *girl*, placing the latter in the c-command domain of *she*; hence, the ungrammaticality under the relevant reading.<sup>7</sup>

The corresponding *wh*-slifting pattern fits quite well with the generalization in (12), and the empirical pattern in (13), laying further empirical support to the above experimental results. Witness the *wh*-slifting facts under consideration with the respective notation (repeated from (8), (7a), and (9a), respectively; the same holds for (9b)).

- (14) a. \*<sub>[AP]</sub> How afraid [<sub>YP</sub> of John<sub>i</sub>] are you does he<sub>i</sub> think <...>?  
b. [<sub>NP</sub> What [<sub>YP</sub> did John<sub>i</sub> buy]] did he<sub>i</sub> say <...>?  
c. \*<sub>[NP]</sub> Which girl<sub>i</sub>] saw a unicorn did she<sub>i</sub> say <...>?

<sup>6</sup> We thank an anonymous reviewer for pointing us to this potentially confusing part of our discussion of Bruening & Al Khalaf's (2019) generalization.

<sup>7</sup> Beyond the descriptive generalization of Bruening & Al Khalaf (2019), Adger et al. (2017) offer a formal analysis of the relevant facts in the text, which combines the *Trace Conversion* of Fox (1999) with the *Distributed Deletion* of Takahashi & Hulsey (2009). Extending this approach to *wh*-slifting seems plausible but is not void of challenges. We thus have to leave this task for future research. The present discussion suffices to place the *wh*-slifting facts within the broader picture of reconstruction for *Binding Principle C*, suggesting that any formal treatment of the latter should extend to the former.

On a par with (13a), the A head in (14a) reconstructs including the complement YP of *John*; hence, the ungrammaticality under c-command by *he*. Unlike the relevant argumentation by Haddican et al. (2014) about (14b), the NP reconstructs without its complement YP that contains the R-expression *John*. This leads to a grammatical result under the corresponding reading, as *John* is not c-commanded by *he* (which is comparable to (13b)). Finally, the strong crossover effect in (14c) is comparable to the one in (13c): Reconstruction of the NP illegally places the *girl* in the c-command domain of *she*.

By way of summary, let us distil the take-home message of this section: Reconstruction for Binding Principle C leads to two structurally-oriented conclusions about *wh*-slifting. The first conclusion concerns the position of the *slift*: It reconstructs to the complement position of the propositional attitude predicate (of the *host*). The second conclusion relates to the position of the *host*: It is not “parenthetical” (either inserted at the right of the *slift*, in the *initial* order, or in between the *slift*, in the *split* order), but both clauses span the same hierarchical line of projections. In short, BT-C facts offer a definitive answer in favor of the reconstruction hypothesis in *wh*-slifting.

### 3 Reconstruction for Binding Principle A

We will now present a pilot study that tests the reconstruction hypothesis in *wh*-slifting on the basis of Principle A.

#### 3.1 Set-up of hypotheses

The distribution of reflexives is controlled by Principle A of the Binding Theory (hereafter, BT-A), as defined in (15), with the auxiliary definition in (16).

- (15) *Binding Principle A* (Truswell 2014: 218):  
Reflexives are bound within their binding domain.
- (16) *Binding domain* (Truswell 2014: 218):  
The binding domain for X is the minimal NP or TP containing:
- (i) X;
  - (ii) X’s case-assigner;
  - (iii) a subject which does not contain X.

(15), together with (16), says that a reflexive is bound by a coindexed antecedent that c-commands the reflexive in its local binding domain. This domain is the minimal NP or TP that contains the reflexive itself, the case-assigner of the reflexive, and a subject that does not contain the reflexive. (17) demonstrates.

- (17) a. [<sub>CP</sub> [<sub>TP</sub> Mary<sub>i</sub> likes herself<sub>i</sub> ]]
- b. [<sub>CP</sub> [<sub>TP</sub> Mary<sub>i</sub> heard [<sub>NP</sub> stories about herself<sub>i</sub> ]]]
- c. [<sub>CP</sub> [<sub>TP</sub> Mary<sub>i</sub> heard [<sub>NP</sub> my<sub>i</sub> stories about myself<sub>i</sub>/\*herself<sub>i</sub> ]]]

(17a) shows that the binding domain of *herself* is the (minimal) TP, as the latter contains the reflexive itself, its case-assigner (*likes/v*), and a subject (*Mary*). In (17b), the NP contains the reflexive and its case-assigner (*about*) but not a subject; hence, the binding domain of *herself* extends to the TP, which contains the subject *Mary*. In contrast to (17b), the NP in (17c) contains, apart from the reflexive itself (*myself*) and its case-assigner (*about*), a subject (*my*), so the binding domain of the reflexive is restricted to this NP. That the TP in (17c) may not serve as a binding domain for a reflexive is further demonstrated by the ungrammaticality of *herself*, which cannot be bound by *Mary*.

Along with the copy theory of movement (see Chomsky 1995), which states that a moved element leaves a copy of itself in every site the moved element vacates, BT-A

predicts the reconstruction (a.k.a. connectivity) effects we observe in typical cases of long-distance *wh*-movement (see Chomsky 1977), like (18).

(18) [<sub>CP</sub> Which picture of himself<sub>i</sub> [<sub>C</sub> did he<sub>i</sub> think [<sub>CP</sub> <...> was downloaded most]]]?

The fact that (18) does not bleed BT-A means that the dislocated *wh*-phrase leaves an interpretable copy in its embedded position (in angle brackets), whose binding domain is the superordinate CP that contains the subject *he*; hence, the relevant connectivity effect. (Here, and throughout, we disregard any further movements such as the base position of the *wh*-phrase after the passive verb *downloaded*.)

Within this frame, consider again Haddican et al.'s (2014) argument about the lack of corresponding connectivity effects in *wh*-slifting, as exemplified in (19), which is repeated from (2a), and is comparable to (18) (for convenience, we include the relevant labeling).

(19) \*/?[<sub>CP</sub> Which picture of himself<sub>i</sub> was downloaded most] did he<sub>i</sub> think?

On Haddican et al.'s assumption that (19) is ungrammatical under the intended reading, CP, which contains the *wh*-phrase, cannot originate from the complement position of *think*, otherwise *he* would c-command the reflexive and the result would have been grammatical, contrary to facts.

Despite the straightforward picture that Haddican et al. appear to draw from the implementation of BT-A in *wh*-slifting, the binding of reflexives that are contained within picture noun phrases (henceforth, PNPs) is far more complicated than the authors (seem to) suggest. An observation that only scratches the surface of what is actually at stake, going back to Jackendoff (1972), is that a PNP need not be c-commanded by its antecedent, as (20) demonstrates (where the relevant coindexing is ours).

(20) Jackendoff (1972: 137: (4.123))  
The fact that there is a picture of himself<sub>i</sub> hanging in the post office is believed  
(by Mary) to be disturbing Tom<sub>i</sub>.

Under the definitions in (14)–(16), *himself* is not bound in its local domain because it is not (and cannot be) c-commanded by *Tom*; yet, the result is grammatical.

Capitalizing on Jackendoff's (1972) observation, Pollard & Sag (1992) call the PNPs that do not require a c-commanding antecedent *exempt anaphors*, emphasizing the fact that such reflexives are actually "exempt" from BT-A, in the sense that they bleed BT-A without leading to ungrammaticality. Pollard & Sag give several examples of such exempt anaphors, also citing other sources, some of which are repeated in (21).

(21) Pollard & Sag (1992: 264)  
a. The picture of himself<sub>i</sub> in the museum bothered John<sub>i</sub>.  
b. The picture of herself<sub>i</sub> on the front page of the *Times* made Mary<sub>i</sub>'s claim seem somewhat ridiculous.  
c. The pictures of each other<sub>i</sub> with Ness made [Capone and Nitty]<sub>i</sub> somewhat nervous.

Like (20), the fact that the reflexives in (21) are not bound by their corresponding antecedents does not lead to an ungrammatical result.

Within this context, it is not always clear whether reconstruction effects in *wh*-movement with PNP-anaphora should fall within BT-A or be exempt from it. This is particularly obvious in the following minimal pair ((22b) is modeled on Truswell 2014: 230).



- (22) a. Which picture of himself<sub>i</sub> does John<sub>i</sub> like <...>?  
 b. Which picture of himself<sub>i</sub> [does John<sub>i</sub> think <...> [Mary likes <...> ]]?

In (22a), the reflexive is bound in its base position by *John*, which is the local binder. However, in (22b), the reflexive may not be bound in its base position by *Mary*, the putative local binder, otherwise we would get an ungrammatical result, contrary to facts. It must be the case, then, that the reflexive is bound in the position of the intermediate copy, where the local binder is *John*. On one hypothesis, (22b) lends further support to the successive cyclic nature of *wh*-movement: The reflexive is bound in its intermediate position only on the assumption that this position is filled by a copy of the moved *wh*-phrase. On another hypothesis, (22b) is an instance of exempt anaphora because, despite violating the requirement that the reflexive be bound in its base position by a local binder (by BT-A), it does not lead to ungrammaticality. As a case of exempt anaphora then, (22b) does not constitute evidence either for or against (the successive cyclic nature of) *wh*-movement.

With the relevant background in place, let us return to *wh*-slifting and consider the minimal pair in (23) as the *wh*-slifting counterpart of the pair in (22) (with (23a) being comparable to Haddican et al.'s example (2b)/(19) from above).

- (23) a. [Which picture of himself<sub>i</sub> will look nice on that wall] does he<sub>i</sub> believe <...>?  
 b. [Which picture of himself<sub>i</sub> will they place <...> on that wall] does he<sub>i</sub> believe <...>?

Descriptively speaking, in (23), the PNP surfaces in a *wh*-question that linearly precedes the antecedent *he* as a “whole”, while in (22) it is only the PNP that precedes the antecedent—hence, in “part”. To put it simply, in (22), what is preposed is a *wh*-phrase (“part”), while in (23), it is a *wh*-clause (“whole”). In the absence of any potential binder within the clausal boundaries of the *wh*-question, the domain below *believe* is the relevant reconstruction site for the PNP in (23a), because this is where the local binder (i.e., *he*) resides. On analogy with (22a), let us call this the “base” position of the PNP for reconstruction purposes, although somewhat misleadingly, because this is not actually the base position of *wh*-movement. On the other hand, the reconstruction site of the PNP in (23b) is not its base position within the *wh*-question, where the local binder *they* resides, but the position below *believe*, where the local binder is *he*. On a par with (22b), let us call this the “intermediate” position of the PNP, though, admittedly, again somewhat misleadingly, on grounds similar to (23a).

Now, let us put the four conditions together with their corresponding predictions. The “part” vs. “whole” conditions examine typical *wh*-movement (cf. (22)) and *wh*-slifting (cf. (23)) respectively. The “base” vs. “intermediate” conditions examine typical PNP-anaphora (cf. (22a)/(23a)) and exempt anaphora (cf. (22b)/(23b)) respectively. Obviously, we expect that all instances of the “part” condition (*wh*-movement) are grammatical. In a sense, the “part” is our control condition. So, we do not consider any further the possible interpretations of the results that the “part” sentences (*wh*-movement) may yield, in either the “base” or the “intermediate” condition. Instead, let us concentrate on the possible interpretations of the results obtained by the “whole” sentences (*wh*-slifting), in both the “base” and the “intermediate” conditions. There are four possible scenarios to consider in turn: in the first two scenarios, the “base” and the “intermediate” conditions yield the same grammaticality results, while in the latter two scenarios, the results of the “base” and the “intermediate” conditions differ in grammaticality. More precisely, one scenario is that both the “base” and the “intermediate” conditions lead to ungrammaticality. In this case, *wh*-slifting does not fall either within PNP-anaphora or exempt anaphora. In other

words, this result would mean that there is actually no way of associating a reflexive with an antecedent in *wh*-slifting. This partition of the results would validate Haddican et al.'s (2014) conclusion that *wh*-slifting falls within BT-A: Ungrammatical instances of BT-A, of the kind considered by Haddican et al., would mean that the *slift* does not reconstruct, in conjunction with the fact that the possibility of exempt anaphora is excluded. In passing, it is worth mentioning that it would be quite surprising if there would be no way to associate a reflexive with an antecedent in *wh*-slifting because, as we have already seen, exempt anaphora is available in (English) grammar, alongside PNP-anaphora, and, unlike PNP-anaphora, exempt anaphora does not assume reconstruction. The second scenario is that both the “base” and the “intermediate” conditions yield grammatical results. If so, then we could safely draw two tightly interwoven conclusions: The first conclusion is that we cannot take for granted that the *slift* reconstructs, on the basis of the BT-A effects alone, because we do not know if these effects suggest PNP-anaphora or exempt anaphora. The second conclusion, which is tied to the previous one, is that Haddican et al.'s ungrammatical examples, like the one in (19), in and of themselves, cannot falsify the reconstruction hypothesis in *wh*-slifting, unless one also shows that what is blocked in (19) is not exempt anaphora but PNP-anaphora. This is actually the scenario that our pilot experimental results seem to favor, as we show below. The third scenario is that the “base” condition leads to ungrammatical results, while the results obtained by the “intermediate” condition are grammatical. This would mean that *wh*-slifting falls within exempt anaphora, while the reasons for any ungrammatical instances of what might look like as PNP-anaphora would have to be sought outside the domain of BT. The fourth and final scenario is that the “base” condition is grammatical but the “intermediate” condition is not. This would mean that *wh*-slifting abides by PNP-anaphora, and excludes exempt anaphora.

To investigate the above scenarios for the “whole” sentences (*wh*-slifting), in comparison with the “part” sentences (typical *wh*-movement), we piloted an online acceptability judgment task that examined reconstruction effects in *wh*-slifting, which we turn to next.

### 3.2 Methodology

The *Wh*-slifting task used in the present study consists of 48 stimuli sentences in total, equally divided into 24 experimental and 24 control items. The experimental items are illustrated in (24). To ease presentation, we slightly change the notational conventions used so far: We mark the relevant anaphoric dependencies with boldface (instead of using indices); enclose the relevant PNP-phrases within square brackets, indexed with ‘k’ and co-indexed with their corresponding reconstruction sites, indicated with traces ‘t’; participants were just given a plain text version.

- (24) a. [[Which picture of **himself**] will look nice  
on that wall]<sub>k</sub> does **he** believe t<sub>k</sub>? (whole–base condition)
- b. [Which caricature of **yourself**]<sub>k</sub> do **you**  
expect [t<sub>k</sub> will be most hilarious]? (part–base condition)
- c. [[Which painting of **herself**]<sub>j</sub> will they find  
t<sub>j</sub> fabulous]<sub>k</sub> does **she** think t<sub>k</sub>? (whole–intermediate condition)
- d. [Which drawing of **themselves**]<sub>k</sub> did **they**  
say [t<sub>k</sub> he will sell t<sub>k</sub>]? (part–intermediate condition)

The task followed a 2 × 2 design: (i) the 24 experimental sentences included 12 lexicalizations of a “whole” and 12 of a “partial” preposing of *wh*-questions; (ii) the sentences of each condition were in turn divided into two levels of representation, with the *wh*-phrase and clause respectively reconstructing either into the “base” or into the “intermediate”

position. To avoid any bias effects, all stimuli sentences, both experimental and fillers, were pseudo-randomized. To eliminate any lexical effects, the same lexicalizations were used in all experimental conditions, as shown in the appendix, which provides a list of the experimental items per condition. More precisely, all lexicalizations follow the same pattern across all conditions: (a) all lexicalizations contain the same set of reflexive pronouns; (b) all lexicalizations contain the same set of *say* and *belief* predicates (i.e., *expect*, *guess*, *believe*, *think*, *imagine*, and *say*; see Hooper 1975). These predicates are the type of “bridge-verbs” that facilitate *wh*-extraction (our “part” condition; see Erteschik-Shir 1973, for a first discussion of “bridge-verbs”), and the type of predicates that permit *wh*-slifting (see Haddican et al. 2014: 95, (58) for a discussion of predicates that allow *wh*-slifting); (c) all lexicalizations contain the same set of PNP-phrases (i.e., *picture of*, *photo of*, *caricature of*, *painting of*, *image of*, and *drawing of*); (d) in all lexicalizations of the “base” condition, the *wh*-phrase is the understood subject of the relevant predicates, while in all lexicalizations of the “intermediate” condition, the *wh*-phrase is the understood object of the relevant predicates; and (e) in all lexicalizations, the same tense sequences are used between the *wh*-question and the yes/no-question, across all conditions.<sup>8</sup>

The control items, which were also used as fillers, were taken from the stimuli of Keller’s (2000) experiment 14: sub-experiment 3 (cf. Gordon & Hendrick 1997), and pointed towards the grammatical aspect of the task. We illustrate them in (25) and describe right after.

- |      |    |  |                        |
|------|----|--|------------------------|
| (25) | a. | <b>His</b> sister admires <b>himself</b> .     | (no <i>c-command</i> ) |
|      | b. | <b>Joan’s</b> father respects <b>herself</b> . | (no <i>c-command</i> ) |
|      | c. | <b>Her</b> brother likes <b>Lisa</b> .         | (no <i>c-command</i> ) |
|      | d. | <b>David’s</b> sister admires <b>David</b> .   | (no <i>c-command</i> ) |
|      | e. | <b>Lisa’s</b> brother likes <b>her</b> .       | (no <i>c-command</i> ) |
|      | f. | <b>Joan</b> respects <b>her</b> .              | ( <i>c-command</i> )   |
|      | g. | <b>She</b> likes <b>Lisa</b> .                 | ( <i>c-command</i> )   |
|      | h. | <b>David</b> admires <b>himself</b> .          | ( <i>c-command</i> )   |

Keller’s (2000) experiment replicated Gordon & Hendrick’s (1997) study that tested native speakers’ knowledge of binding principles using a coreference judgment task. In the task, subjects were asked to judge the acceptability of sentences like (25) under the assumption that the underlined phrases (bold in the original experiment) refer to the same person (see Keller 2000: 218–227). Gordon & Hendrick’s original experiment used proper names and pronouns, testing *Binding Principles B* and *C*. Keller’s addition of reflexives in the stimuli included *Binding Principle A*. An additional condition of *c-command* was manipulated in the stimuli and not in the factorial design, resulting in a total of eight binding configurations (as in (25)).

A total of 30 native speakers of English (15 male) between 24 and 81 years of age (mean: 44.97) participated in the experiment. Participants were asked to provide their gender, native language, country of origin and of current residence, and any other languages they speak, with level of proficiency. All participants were invited to sign a consent form, complete a Google Forms template, and submit the experiment online. A total of 19 participants reported American as their L1, 8 participants reported British, and 3 Canadian English. A total of 28 participants reported the same country as that of

<sup>8</sup> As you may observe in the appendix, in the “whole-base” condition, the lower predicate in the lexicalization 3 is *look nice*, while in the corresponding lexicalization in the “part-base” condition, the relevant predicate is *be nice*. Unfortunately, this mismatch escaped our attention, and we thank an anonymous reviewer for spotting it. Although we can’t be sure if this mismatch has affected the relevant results, we hasten to note that all other experimental items are faithfully matched across all conditions, as described in the text.

their origin and of their current residence; 4 participants reported Canada, 17 reported the USA, and 7 the UK. The remaining 2 participants reported England and Australia as their country of birth, and Thailand and Argentina as the country of their current residence, respectively. Participants were asked to read carefully one by one the sentences of the task and rate the naturalness of each sentence (on a 7-point Likert scale), based on their individual preferences.

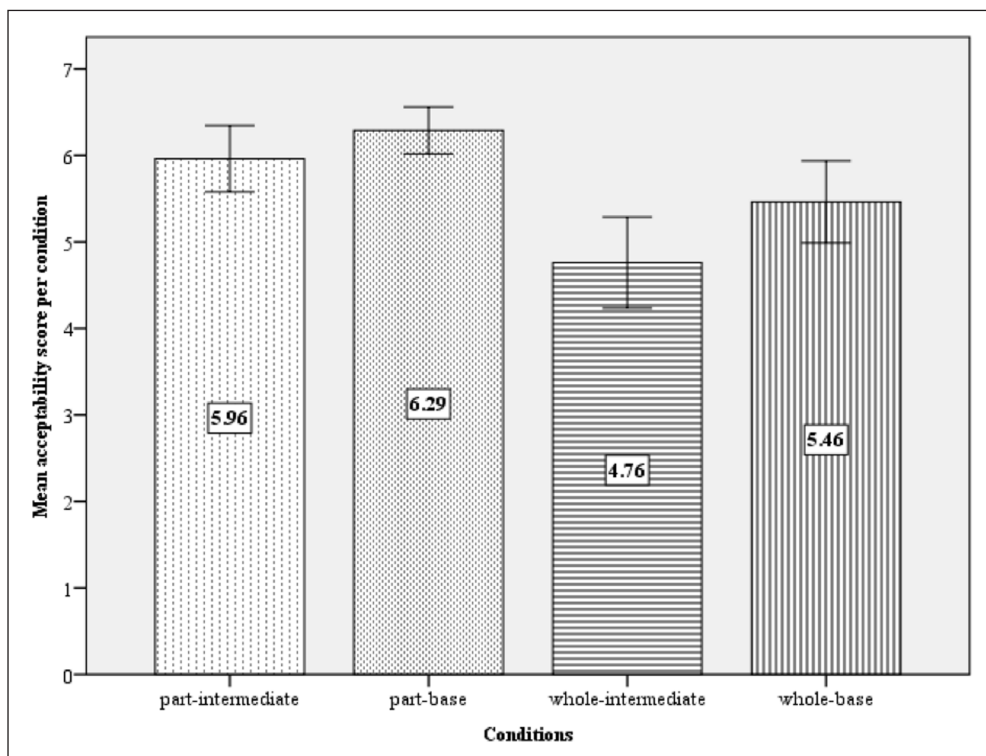
### 3.3 Results

The preliminary descriptive results suggest that the sentences of the “whole–intermediate” condition (24c) were the least acceptable, with a mean acceptability rate of 4.76, while sentences of the “part–base” condition (24b) were the most acceptable, with a mean rate of 6.29, as shown in Figure 1.

The mean acceptability rate of the sentences of the “part–intermediate” condition (24d) was 5.96 and that of the sentences of the “whole–base” condition (24a) was 5.46. No particular variation could be observed between participants or within the items of each condition.

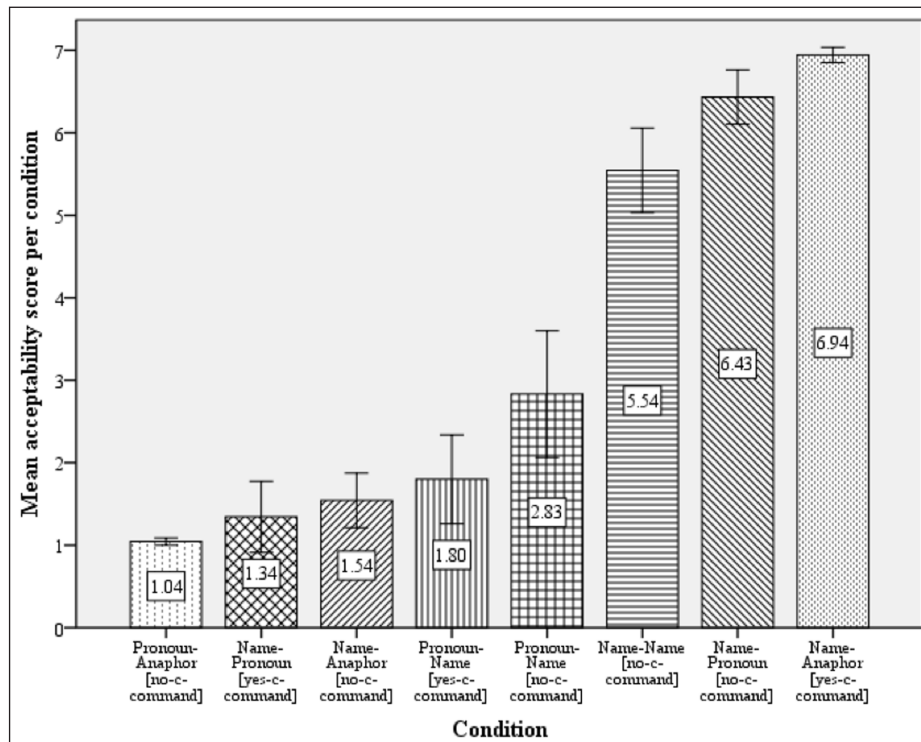
To be sure, the results of the control items in Figure 2 show the same acceptability pattern for each of the binding principles with Keller’s experiment (cf. Keller 2000: 244, Figure 5.3).

Furthermore, we performed a  $2 \times 2$  ANOVA with lexicalization of the *wh*-question (“whole”, “part”) and level of representation of the *wh*-phrase (“intermediate”, “base”) as the within-subjects variables. The analysis revealed (i) a significant effect of lexicalization ( $F(1,29) = 33.154, p < 0.001$ ), so that the sentences with “part” lexicalization of the *wh*-question were more likely to be accepted as grammatical; (ii) a significant effect of level of representation ( $F(1,29) = 37.859, p < 0.001$ ), so that the sentences of the “base” condition were more likely to be accepted as grammatical; and (iii) a two-way interaction between lexicalization and level of representation ( $F(1,29) = 5.554, p = 0.025$ ).



**Figure 1:** Mean acceptability score (based on a 7-point Likert scale) per experimental condition.





**Figure 2:** Mean acceptability scores (based on a 7-point Likert scale) per filler-condition.

To further explore the interaction, additional paired *t*-tests were conducted. These reveal significant differences between the mean rates of acceptability in the “part” and “whole” lexicalizations, in both the “base” ( $t_{29} = 6.24, p < 0.001$ ) and the “intermediate” ( $t_{29} = 6.24, p < 0.001$ ) levels of representation. Additional significant differences were observed between the mean rates of acceptability in the “intermediate” and “base” level, in both the “whole” ( $t_{29} = -5.37, p < 0.001$ ) and the “part” ( $t_{29} = -3.37, p = 0.002$ ) lexicalization of the *wh*-question.

### 3.4 Discussion

The experimental results suggest that the *wh*-slifting sentences are grammatical (we will return to the variation in acceptability shortly). As we have already mentioned, from this grammaticality alone, we cannot draw the conclusion that the *slift* reconstructs, because we do not know if BT-A effects point at PNP-anaphora (in which case, the *slift* would reconstruct) or exempt anaphora (in which case, the *slift* would not reconstruct). However, we can safely conclude that ungrammatical BT-A instances, of the kind discussed by Haddican et al. (2014), do not necessarily suggest lack of reconstruction, but may point at some kind of blocking effect relevant for exempt anaphora. Of course, we do note that, if we take the BT-C effects we discussed in section 2 into consideration, then the results obtained by this pilot study become more conclusive: The *slift* reconstructs to a position below the predicate of the *host*. This means that any ungrammatical instances of BT-A may be attributed to reasons tangential to reconstruction. For example, notice that in Haddican et al.’s ungrammatical case in (19) the predicate of the *host* is in past tense, but in all our grammatical cases in (24) (see also the appendix) the predicate of the *host* is in either present or future tense. Past tense, then, and not lack of reconstruction, may be the reason for the reported ungrammaticality (or deviance) of (19).

Turning to the observed variation in acceptability, let us put the relevant effects into perspective. We have extracted the Grand Average (GA), that is, the mean score of all four subcategories in (24), which is equal to 5.62. Comparing the mean scores of each



category with the GA, we observe that the “part–base” and “part–intermediate” conditions fall above the GA, which is expected. However, the “whole–base” and “whole–intermediate” conditions fall below the GA. Based on the fact that the “whole–base” condition falls within one standard deviation (0.58) below the GA, we consider it to also be marked as acceptable. The only condition that falls outside the standard deviation below GA is the “whole–intermediate” condition, which is, therefore, perceived as the least acceptable one.

The acceptability results regarding *wh*-slifting contrast sharply with the judgments that Haddican et al. report about (19) as being “generally unavailable” or “marginally acceptable”. In fact, quite the opposite seems to be true: The experimental results of the “whole–base” condition (cf. (24a)), which tests the type of *wh*-slifting sentences that Haddican et al. also consider, suggest a “generally available” construction. The experimental results of the “whole–intermediate” condition (cf. (24c)), which tests a type of *wh*-slifting sentence that Haddican et al. do not consider, indicate a “marginally unavailable” construction. Two reviewers wonder why there is a difference in the acceptability between “whole–base” and “whole–intermediate” constructions. As a reviewer correctly puts it: “In principle, we shouldn’t expect to find any differences among the experimental conditions: if *slifts* start out low, all of the items should be acceptable; if they don’t, all should be ruled out.” We have nothing insightful to contribute to this discussion at present, but we want to draw further attention to a pattern: Interestingly, notice that the “intermediate” condition causes a drop in acceptability not only in *wh*-slifting (“whole”), but also in typical *wh*-movement (“part”); in the latter case, from 6.29 of the “part–base” condition, we drop down to 5.96 in the “part–intermediate” condition, which is pretty close to the GA 5.62. This is similar to the drop observed in *wh*-slifting, as we move from the “base” to the “intermediate” condition. Whatever the correct interpretation of this acceptability drop may turn out to be, the pattern suggests that reconstruction in typical *wh*-movement is comparable to reconstruction in *wh*-slifting, and this provides further support to the present discussion.

Finally, we should emphasize that the study reported here is only a preliminary attempt to address the distribution of BT-A in *wh*-slifting. A more thorough examination of the issue at hand should take into account the way *logophoricity* plays out in *wh*-slifting with respect to the relevant structural environments (in the spirit of Charnavel, forthcoming). This would require a redesign of the relevant study, perhaps combined with a structural account, which is well beyond the scope of the present contribution.

#### 4 Conclusion

In this paper, we examined two types of reconstruction effects in *wh*-slifting: *Binding Principle A* and *C*. On the one hand, *Binding Principle C* effects clearly support the conclusion that the *wh*-interrogative clause must *reconstruct*. On the other hand, experimental findings from a small-scale pilot study suggest that *Binding Principle A* effects either support the hypothesis that the *wh*-interrogative clause *reconstructs* or are irrelevant for considerations about *reconstruction* because they are *exempt anaphora*. Any syntactically oriented approach to *wh*-slifting must take this evidence into account, which raises important questions about the syntax and semantics of clausal complement selection, as it appears to associate a proposition-selecting predicate with a typical *wh*-question in a non-trivial manner.

#### Additional File

The additional file for this article can be found as follows:

- **Appendix.** List of experimental items per experimental condition. DOI: <https://doi.org/10.5334/gjgl.717.s1>

## Ethics and Consent

With a letter issued on 10<sup>th</sup> May 2016, with reference number QMREC1505, the Queen Mary Ethics of Research Committee (Queen Mary University of London) confirms that Christos Vlachos completed a Research Ethics Questionnaire with regard to the research conducted by the pilot study reported in the present paper. The result of the Research Ethics Questionnaire was the conclusion that his proposed work did not present any ethical concerns; was extremely low risk; and thus did not require the scrutiny of the full Research Ethics Committee.

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## Competing Interests

The authors have no competing interests to declare.

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