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# Dissociating intervention effects from Superiority in English *wh*-questions

**Abstract:** In *wh*-questions, intervention effects are detected whenever certain elements—focus-sensitive operators, negative elements, and quantifiers—c-command an in-situ *wh*-word. Pesetsky (2000) presents a comprehensive study of intervention effects in English multiple *wh*-questions, arguing that intervention correlates with superiority: superiority-violating questions are subject to intervention effects, while superiority-obeying questions are immune from such effects. This description has been adopted as an explanandum in more recent work on intervention, such as Beck (2006) and Cable (2010), a.o. In this paper, I show instead that intervention effects in English questions correlate with the available LF positions for *wh*-in-situ and the intervener but not with superiority. The grammar allows for several different ways of repairing intervention configurations, including *wh*-movement, scrambling, Quantifier Raising, and reconstruction. Intervention effects are observed when none of these repair strategies are applicable, and there is no way of avoiding the intervention configuration—regardless of superiority. Nonetheless, I show that these results are consistent with the syntax proposed for English questions in Pesetsky (2000) and with the semantic theory of intervention effects in Beck (2006).

**Keywords:** *wh*-questions, intervention effects, *wh*-in-situ, covert movement, superiority

## 1 Introduction

This paper studies the distribution of intervention effects in English multiple *wh*-questions. Descriptively, intervention is said to occur when an *intervener* c-commands an in-situ *wh*-word in a question, and it is avoided if the *wh*-phrase is moved above the intervener. Intervention effects are most easily observed in *wh*-in-situ languages such as Japanese and Korean. Example (1a) provides a canonical *wh*-question in Japanese, showing that the language generally forms questions without *wh*-movement to the edge of the clause. Example (1b) shows that if an intervener (here: the NPI **anyone**) is introduced into the structure in place of the unquantified subject in (1a), the result is an ungrammaticality,

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described as an intervention effect.<sup>1</sup> Example (1c) shows that this ungrammaticality can be avoided by scrambling the *wh*-phrase above the intervener.

(1) **Japanese: Intervention effects avoided through scrambling**<sup>2</sup>

- a. ✓ *Hanako-ga nani-o yon-da-no?*  
 Hanako-NOM what-ACC read-PAST-Q  
 ‘What did Hanako read?’
- b. ?\* *Dare-mo nani-o yom-ana-katta-no?*  
 who-MO what-ACC read-NEG-PAST-Q
- c. ✓ *Nani-o dare-mo \_\_\_ yom-ana-katta-no?*  
 ↑—————↓  
 what-ACC who-MO read-NEG-PAST-Q  
 ‘What did no one read?’  
 (based on Tomioka 2007: 6)

Example (2) shows an intervention effect in a *wh*-question in German, now affecting the in-situ *wh*-phrase in a multiple question. The data parallels the simpler Japanese example in (1): Example (2a) provides a baseline, illustrating the basic word order in a multiple question that does not contain an intervener. If an intervener (here: **no one**) is introduced into the structure, the result is an ungrammaticality, described as an intervention effect, (2b). Intervention is avoided if the in-situ *wh*-phrase is scrambled above the intervener, (2c).

(2) **German: Intervention effects avoided through scrambling**

- a. ✓ *Wer hat Luise wo angetroffen?*  
 who has Luise where met  
 ‘Who met Luise where?’
- b. ?? *Wer hat niemanden wo angetroffen?*  
 who has no-one where met

<sup>1</sup> The characterization of the set of interveners has been the source of much debate in recent literature. Kim (2002); Beck (2006) and Beck and Kim (2006) have identified a number of focus-sensitive operators, including *only*, *also*, *even*, and negation, as a relatively cross-linguistically stable set of interveners. Other approaches to the nature of intervention can be found in Beck (1996); Butler (2001); Grohmann (2006); Tomioka (2007); Mayr (2014); Li and Law (2014), a.o. Here I will use the interveners identified in Pesetsky (2000), but will not comment on this issue any further.

<sup>2</sup> Throughout, interveners are bolded. Overt movement is indicated with solid arrows and covert movement is indicated with dashed arrows.

- c. ✓ Wer *hat* wo **niemanden** \_\_\_ *angetroffen*?  
↑—————↓  
 who has where no-one met  
 ‘Who met no one where?’  
 (based on Beck 1996: 6)

Pesetsky (2000, Ch. 5) provides an extensive study of intervention effects in English *wh*-questions. The study concentrates on questions with two D-linked *wh*-phrases, as in (3c–d), which allow superiority violations.

- (3) **Only D-linked questions allow superiority violations in English:**
- a. ✓ Who \_\_\_ *read* what? superiority-obeying
  - b. ?? What *did* who *read* \_\_\_? superiority-violating
  - c. ✓ Which *boy* \_\_\_ *read* which *book*? superiority-obeying
  - d. ✓ Which *book did* which *boy read* \_\_\_? superiority-violating

Pesetsky finds that when an intervener is introduced into structures like (3c–d), only the superiority-obeying question remains grammatical. The superiority-violating question is ungrammatical, a fact that he describes as an intervention effect. This intervention effect is often diagnosed by the loss of the pair-list reading of the question (4b). A single-pair reading as in (4a) may survive.<sup>3,4</sup>

- (4) **Single-pair and pair-list readings of *Which boy read which book*:**
- a. *John read Robinson Crusoe.*
  - b. *John read Robinson Crusoe, Bill read Moby Dick, and Fred read Don Quixote.*

Examples (5)–(9) from Pesetsky (2000) illustrate intervention effects in English questions using **sentential negation, only, very few, never, and no one** as interveners.

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**3** Pesetsky (2000) credits this original observation to É. Kiss. He reports that at least in some cases of intervention effects in multiple *wh*-questions, many speakers report that the question is ungrammatical while some others report that the question’s single-pair reading is maintained but its pair-list reading is lost. See Dayal (1996) for more discussion of the semantics of the readings, Pesetsky (2000); Butler (2001); Kotek (2014) for a discussion of the judgments, and Beck (1996) for a similar observation in German. Pesetsky uses the notation ?? to indicate this loss of the pair-list reading due to intervention effects. For transparency, I will use the notation \*<sup>PL</sup> instead.

**4** Note the importance of using singular *which*-phrases, to ensure that we are dealing with a pair-list reading. If plural *which*-phrases are used, e.g. *which boys read which books?*, it is possible to give a single-pair answer where each member of the pair is a plurality: *John, Bill, and Fred read Robinson Crusoe, Moby Dick, and Don Quixote, (respectively).*

- (5) **Sentential negation, *only*, *very few*, *never*, and *no one* cause intervention effects in superiority-violating questions:**
- a. Which *boy didn't* \_\_\_ read which *book*?                    superiority-obeying
- b. \*PL Which *book didn't* which *boy* read \_\_\_?                    superiority-violating
- (6) a. Which *girl did only* *Mary* introduce \_\_\_ to which *boy*?
- b. \*PL Which *boy did only* *Mary* introduce which *girl* to \_\_\_?
- (7) a. Which *picture did very few* children want to show \_\_\_ to which *teacher*?
- b. \*PL Which *teacher did very few* children want to show which *picture* to \_\_\_?
- (8) a. Which *student did he never* claim \_\_\_ would talk about which *topic*?
- b. \*PL Which *topic did he never* claim which *student* would talk about \_\_\_?
- (9) a. Which *book did no one* give \_\_\_ to which *student*?
- b. \*PL Which *student did no one* give which *book* to \_\_\_?

To explain the relation between superiority and intervention effects, Pesetsky (2000) argues that superiority-obeying and superiority-violating questions are derived from different LF structures. The proposed LFs for (5a–b) are illustrated in (10a–b).<sup>5</sup>

(10) **LFs of superiority-obeying and superiority-violating questions:**

- a. Superiority-obeying:

[CP *which* boy *which* book C [TP \_\_\_ read \_\_\_ ]]

The diagram for (10a) shows the LF structure [CP *which* boy *which* book C [TP \_\_\_ read \_\_\_ ]]. A solid arrow points from the first blank in the TP to the *which* before 'boy'. A dashed arrow points from the second blank in the TP to the *which* before 'book'.

- b. Superiority-violating:

[CP *which* book C [TP *which* boy read \_\_\_ ]]

The diagram for (10b) shows the LF structure [CP *which* book C [TP *which* boy read \_\_\_ ]]. A solid arrow points from the blank in the TP to the *which* before 'book'.

Of particular note is the fact that the LF in (10a) for superiority obeying questions allows for multiple instances of *wh*-movement—in this case, overt movement of *which* *boy* and covert movement of *which* *book*. On the other hand, the LF in (10b) for superiority violating questions forces the base-generated

<sup>5</sup> Throughout, I use solid arrows to illustrate overt movement and dashed arrows to illustrate covert movement.

higher *wh*-phrase—here, *which boy*—to remain in-situ at LF and hence to be interpreted without movement.<sup>6</sup>

Pesetsky proposes the following derivation for superiority-obeying questions: (i) an interrogative probe on C probes its c-command domain. The principle *Attract Closest* (Rizzi, 1990, cf. Chomsky 1995, 2000) dictates that the base-generated higher *wh*-phrase (in (10a): *which boy*) will be the probe's first target, since it's closer to C than *which book*.<sup>7</sup> (ii) C agrees with *which boy*, and attracts it to its specifier. (iii) C continues probing its c-command domain. Its next goal is *which book*. (d) C agrees with *which book* and attracts it to an inner CP specifier, where it tucks in below *which boy* (Richards, 1997). A pronunciation rule as in (11) derives the desired word order.

(11) **Pronunciation rule for English questions (Pesetsky, 2000):**

Pronounce the highest phrase in Spec,CP at the head of its movement chain, and all other *wh*-phrases at the tail of their respective chains.

The derivation of a superiority-violating question is different from that of the corresponding superiority-obeying question in one important way. The derivation begins as with a superiority-obeying question: (i) an interrogative probe on C probes its c-command domain. *Attract Closest* dictates that the base-generated higher *wh*-phrase (in (10b): *which boy*) will be the probe's first target. (ii) C agrees with *which boy*, but — unlike in the superiority-obeying question — C does not attract *which boy* to its specifier but instead leaves it in-situ.<sup>8</sup> (iii) C continues probing its c-command domain and finds its next goal, *which book*. (iv) C agrees with *which book* and attracts it to its specifier. The pronunciation rule (11) now dictates that *which book* will be pronounced in its moved position and *which boy* in its base position, yielding the superiority-violating word order.<sup>9</sup>

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**6** In Kotek (2014) I develop a semantic system which relies on Rooth-Hamblin alternative computation for *wh*-in-situ. This system, combined with Beck's (2006) theory of intervention effects, can account for the pattern of intervention effects observed in this paper. See Chapter 4 for details.

**7** X is closer to A than Y iff X asymmetrically c-commands Y.

**8** To be precise, Pesetsky (2000) proposes that the in-situ *wh*-phrase in (10b) undergoes *feature movement* to C, and cannot undergo *phrasal movement*. Feature movement, but not phrasal movement, will be sensitive to intervention effects in the schema in (12). Here I use the parallel but more modern terms of Agree/Attract. See Kotek (2014) for details.

**9** Under this proposal, it is crucial for the derivation of the superiority-violating word order that the higher *which boy* is left LF-in-situ. If *which boy* were moved, the pronunciation rule (11) would lead to a superiority-obeying word order.



## 2.1 Restricted movement & intervention: NPIs

I begin by using Negative Polarity Items (NPIs) to restrict covert *wh*-movement. As is well-known, NPIs must be licensed by a downward entailing environment (Ladusaw, 1980). Example (13) illustrates this with negation as the licenser. Notice that the multiple question itself is not a sufficient licenser in the absence of negation.

(13) **NPIs are licensed in downward entailing environment:**

- a. *Mary* \*(**didn't**) read any books.
- b. Which *boy* {✓ **didn't** give, \*gave} which *girl* any flowers?

If an NPI occurs inside a *wh*-phrase, this *wh*-phrase will not be able to move out of the scope of the NPI's licenser. Here I will use negation, hence the *wh* must remain below negation at LF. Recall, moreover, that negation acts as an intervener in English *wh*-questions (see (5)). Hence, we predict an intervention effect in such a configuration: the (phonologically) in-situ *wh*-phrase may be able to undergo covert movement, but the target position of movement is necessarily below the intervener, leading to the illicit intervention configuration in (12a).<sup>12</sup>

Examples (14)–(15) instantiate this configuration. Example (14) provides a baseline to show that an NPI must be licensed by a *c*-commanding negation. Example (15a) provides a second baseline, a multiple question with a (phonologically) in-situ *wh*-phrase that contains a non-NPI, *some*. This question is grammatical despite the presence of sentential negation, because the *wh*-phrase is able to move above the intervener at LF, undoing the intervention configuration. Example (15b) shows that intervention effects re-emerge in this superiority-obeying question when an NPI occurs inside a (phonologically) in-situ *wh*-phrase, because now the *wh*-phrase is unable to move above the intervener, leading to the illicit intervention configuration.

(14) **NPI licensed in question when negation is present:**

Which *boy* {✓ **didn't** read, \*read} [*a book about* any president]?

(15) **NPI restricts covert movement of *wh*-in-situ, causing an intervention effect:**

- a. ✓ Which *boy* **didn't** read [which *book about a/some* president]?
- b. \*<sup>PL</sup> Which *boy* **didn't** read [which *book about any* president]?

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<sup>12</sup> Alternatively: the *wh*-phrase moves above negation to avoid an intervention effect, but leaves the NPI unlicensed, again leading to ungrammaticality.

We thus observe an intervention effect in a superiority-obeying question, when covert movement of the (phonologically) in-situ *wh*-phrase is restricted to a position necessarily lower than an intervener in the structure.

## 2.2 Restricted movement & intervention: Focus association

The next argument comes from the behavior of Association with Focus (Rooth, 1985, 1992, a.o.). The interpretation of focus-sensitive operators such as *only* depends on the presence of an F-marked constituent within the scope of the operator. F-marked constituents that occur outside the scope of the operator do not contribute to the evaluation of that operator. This is explained through the *Principle of Lexical Association* (Tancredi, 1990, p. 30):

(16) **The Principle of Lexical Association (PLA):**

An operator like *only* must be associated with a lexical constituent in its c-command domain.

Evidence motivating this structural restriction on Association with Focus is shown in (17)–(18). The *wh*-question in (17a) is ungrammatical with the intended interpretation. The corresponding echo question in (17b), with the F-marked constituent within the scope of the operator, is grammatical. Similarly, the topicalization example in (18a) is ungrammatical, but the corresponding example with in-situ focus is grammatical, (18b) (F-marked constituents are underlined).

(17) **F-marked constituents may not move out the scope of *only*:**

- a. \* Who<sub>F</sub> do you *only* like \_\_\_?  
Intended: Who *x* is such that you like only *x*?
- b. ✓ You *only* like who<sub>F</sub>?

- (18) a. \* Mary<sub>F</sub>, John *only* likes \_\_\_.  
Intended: ‘As for Mary, John only likes her<sub>F</sub> (and no one else).’
- b. ✓ John *only* likes Mary<sub>F</sub>.

Given the PLA, if F-marking is placed inside a *wh*-phrase, this *wh*-phrase will not be able to move out of the scope of the associating operator. In (19), the associating operator is *only*. Hence, to satisfy the PLA, *wh* must remain within the scope of *only* at LF. However, recall from (6a–b) that *only* acts as an intervener in English questions. Hence, we predict an intervention effect in such



a configuration.<sup>13</sup> Example (19a) provides a baseline, superiority-obeying multiple question that is able to have a pair-list answer. Example (19b) shows that intervention effects re-emerge when F-marking is introduced inside the (phonologically) in-situ *wh*-phrase in this question, as predicted.<sup>14</sup>

(19) **The PLA restricts covert movement of *wh*-in-situ, causing an intervention effect:**

- a. Baseline: I can tell you *which* student read *which* book.
- b. Context: The students in the class were supposed to read one book *and* one article about syntax. However, everyone got confused and read one book *or* one article. I've been reading everyone's squibs. I've finished all the ones about books, so:

\*PL I can tell you which student **only** read [which book<sub>F</sub> (*about syntax*)].

We thus again observe an intervention effect in a superiority-obeying question, when covert movement of the (phonologically) in-situ *wh*-phrase is restricted to a position necessarily lower than an intervener in the structure. As an anonymous reviewer observes, when *only* associates with focus at a distance, in a way that does not block covert *wh*-movement, no intervention is observed.

(20) **No intervention with long-distance Association with Focus:**

I can **only** tell you *which* student read *which* book<sub>F</sub>.

Here, the availability of a pair-list is expected, as covert movement of the *wh*-phrase at LF will target a position that is still in the scope of *only*, but is above the position at which the interrogative complementizer occurs, thus not interfering with the interpretation of the question. Indeed, in the configuration in (20), the pair-list reading is available.

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**13** Alternatively, we would find a violation of the PLA, again leading to ungrammaticality.

**14** This example is slightly modified from Erlewine (2014), with an added context. Erlewine reports that this question retains its single-pair reading but loses its pair-list reading. See also footnote 3 on the importance of the pair-list context for diagnosing intervention effects.

## 2.3 Restricted movement & intervention: Binding

Finally, I use binding principles A and B to restrict the possible covert movement of a (phonologically) in-situ *wh*-phrase in a multiple question. As in the cases we saw above, when movement is restricted, intervention effects re-emerge above the landing site of movement in superiority-obeying questions.

As a first step, I provide definitions of binding conditions A–B and of the Binding domain:

- (21) **Condition A:** An anaphor must have a binder in its binding domain.
- (22) **Condition B:** A pronoun must be free in its binding domain.
- (23) **Definition: Binding domain**  
 The binding domain of a DP  $\alpha$  is:  
 – if  $\alpha$  is the subject of a tensed TP, the smallest TP containing  $\alpha$ .  
 – otherwise, the smallest TP containing  $\alpha$  and a DP c-commanding  $\alpha$ .

Lebeaux (2009) shows that Condition A of binding theory applies at LF, whereas Conditions B and C apply at every stage of the derivation (including LF). Hence, we can use these binding principles to restrict covert *wh*-movement in a multiple *wh*-question. In particular, if a *wh*-phrase contains a bindee, we expect that it cannot take scope above its binder at LF. Consequently, if an intervener is placed above this position, we expect to find an intervention effect.

Example (24) is one relevant test case. Example (24a) provides a baseline for a superiority-obeying multiple question with an intervener, **no girl**. As with other such examples (cf (5)–(9) above), the pair-list reading of the question is available despite the presence of the intervener — that is, we do not observe an intervention effect. Following Pesetsky (2000), this is because the (phonologically) in-situ *wh*-phrase in this superiority-obeying question is able to undergo covert movement to a position above the intervener at LF, thus avoiding the illicit intervention configuration.

Examples (24b–c) contain an anaphor and a bound pronoun, respectively, occurring inside the (phonologically) in-situ *wh*-phrase in the questions. The binder of this pronoun is the DP *no girl*, which also serves as an intervener (see (9a–b)). These examples are judged by native speakers as degraded.

- (24) **Binding conditions A and B block covert *wh*-movement and lead to intervention:**
- a. ✓ Which *boy* gave **no girl** [which *picture of Kennedy*]?
- b. \*PL Which *boy* gave **no girl** [which *picture of herself*]?
- c. \*PL Which *boy* gave **no girl** [which *picture of her best friend*]?

The nature of the degraded status of (24) differs across speakers. For some, the pair-list reading of the questions disappear — due to an intervention effect. However, at least some speakers prefer an interpretation of these questions that appeals to a functional reading.<sup>15</sup> For those speakers, examples (24a–b) may not be a fair test case, and I hence provide an additional set of examples below to further illustrate this point.

These examples additionally serve to show the importance of the intervention configuration. If movement can undo the intervention configuration, the pair-list reading of the question is available. Only if movement is forced to target a position below the intervener do we observe an intervention effect. This is illustrated in examples (25a–b), which vary minimally in the phrase that serves as the binder of a reflexive pronoun hosted by the (phonologically) in-situ *wh*-phrase. In example (25a) the binder is *daughter*, and the pair-list reading is available, since there are possible landing sites for movement (above *only John* but below *which daughter*) that would undo the intervention configuration but preserve the binding relation. On the other hand, in example (25b) the binder is *John*, and the pair-list reading is unavailable, because there is no landing site of movement that is both above the intervener and below the binder. Hence, an intervention effect is observed.

(25) **No intervention if intervention configuration can be undone:**

Context: John has two daughters.

- a. ✓ Which daughter showed **only John** [which picture of herself]?
- b. \*<sup>PL</sup> Which *daughter* showed **only John** [which picture of himself]?

To summarize, we have seen three different ways of restricting covert *wh*-movement in a superiority-obeying multiple question: using NPI licensing, constraints on focus association, and constraints on binding. When covert *wh*-movement is restricted so it cannot target a position above an intervener at LF, intervention effects are observed.<sup>16</sup>

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**15** For example, they prefer an answer such as ‘John gave no girl her least favorite picture.’

**16** In all of the cases presented here, the barrier to movement also acted as the intervener. See Kotek (2016) for a case where the two are distinct: syntactic islands block movement, and interveners are then introduced at different positions in the structure. Only interveners occurring *above* the island cause intervention, not interveners occurring *inside* the island. Kotek (2016) argues that this shows that covert *wh*-movement must be able to target positions other than interrogative C at LF.

### 3 Missing intervention effects in superiority-violating questions

In this section I turn to the second half of Pesetsky’s correlation: superiority-violating questions are subject to intervention effects. Following Pesetsky’s analysis, this is because the (phonologically) in-situ *wh*-phrase in a superiority-violating question is interpreted in-situ at LF, and cannot covertly move above any interveners in the structure. Below I show that intervention can be avoided in superiority-violating questions in at least three different cases: if (a) the intervener can scope out of the question; (b) the intervener can reconstruct below the in-situ *wh*; or (c) the in-situ *wh* can be given exceptionally wide scope through non-interrogative movement.

#### 3.1 No intervention if intervener scopes out of question

I begin by showing that intervention effects in superiority-violating questions can be avoided if the intervener can take scope outside of (and above) the question. This observation is already reported in Pesetsky (2000) for English, following an earlier parallel observation in Beck (1996) for German. Schematically, the LF implicated in this situation is given in (26):

(26) **No intervention when the intervener scopes out of the question:**

LF: ✓ **intervener** [<sub>CP</sub> *wh*<sub>2</sub> C ... **intervener** ... *wh*<sub>1</sub> ... *t*<sub>2</sub>]  
 ↑-----↑-----↓

Crucially, in this configuration, the intervener is no longer separating the in-situ *wh*-phrase from the interrogative complementizer that must interpret it. Therefore the illicit intervention configuration in (27a), repeated from (12a), is avoided, despite the fact that covert movement of the (phonologically) in-situ *wh*-phrase as in (27b) is not possible.

(27) **The intervention schema (Pesetsky, 2000; Beck, 2006):** (= 12)

- a. \* LF: [<sub>CP</sub> C ... **intervener** ... *wh* ]  
 b. ✓ LF: [<sub>CP</sub> *wh* C ... **intervener** ... \_\_\_ ]  
 ↑-----↑-----↓

The ability to QR out of the question is a property of universal quantifiers.<sup>17</sup> Consider first the superiority-obeying question in (28), which has two possible readings. The first reading, (28a), is a list of triples, derived by assigning *everyone* wide scope over the question. In this case, people, newspapers, and books, all vary at the same time. The second reading, (28b), is a list of pairs, derived by assigning *everyone* narrow scope, in its pronounced position. Here, only books and newspapers vary. Pesetsky (2000) notes that the superiority-violating variant of the question in (29) only has one reading, described in (28a) — the list of triples reading.

(28) ***Everyone* must scope out of the superiority-violating question to avoid intervention:**

Which *newspaper* did ***everyone*** write to \_\_\_ about which *book*?

- a. Wide-scope answering pattern ( $\forall > \textit{newspaper-book pairs}$ ):  
 Bill wrote to the New York Times about book X,  
 Mary wrote to the Boston Globe about book Y, and  
 Tom wrote to the Maquoketa Sentinel about book Z.
- b. Narrow-scope answering pattern ( $\textit{newspaper-book pairs} > \forall$ ):  
 Everyone wrote to the New York Times about book X,  
 everyone wrote to the Boston Globe about book Y, and  
 everyone wrote to the Maquoketa Sentinel about book Z.

(29) Which *book* did ***everyone*** write to which *newspaper* about \_\_\_?  
 Only has answer pattern a, but not b.

We see, then, that the list-of-pair reading is lost in (29). This is precisely the reading that would give rise to the illicit intervention configuration in (27a) — with *everyone* taking narrow scope at LF, c-commanding the in-situ *wh*-phrase *which newspaper* and separating it from its interpreting complementizer. The absence of this reading in (29) is due to an intervention effect. On the other hand, in the list-of-triples reading, the intervener no longer separates *wh*-in-situ from C, and hence this reading is not blocked.

Pesetsky additionally shows that floating the quantifier (here: *each*) fixes its scope in its pronounced position. This prevents the quantifier from moving out of the way of the in-situ *wh*. As a result, the intervention configuration in (27a) cannot be avoided, and the result is an intervention effect:

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<sup>17</sup> See Pesetsky (2000) p. 64 et seq. for what happens if we attempt to give such wide scope to other interveners. See Krifka (2001) for more on universal quantifiers quantifying into questions.

- (30) **Floated quantifier blocks wide scope reading of *each*, leading to intervention:**

\*PL *Tell me which book the kids will **each** try to persuade which adult to read \_\_\_\_.*

### 3.2 No intervention if intervener reconstructs below (phonologically) in-situ *wh*

A second way to create a superiority-violating structure that does not exhibit intervention effects is to reconstruct the intervener below the in-situ *wh*-phrase in the structure. This is illustrated schematically in (31). This structure again eliminates the intervention configuration in (27a) without allowing the in-situ *wh*-phrase to undergo covert movement.

- (31) **No intervention when intervener reconstructs below in-situ *wh*:**

LF:  $\checkmark$  [CP  $wh_2$  C ... **intervener** ...  $wh_1$  ...  $t_2$  **intervener**]

To illustrate this configuration, we begin with a baseline in (32), in which *all* is pronounced in an unraised position. This question has the reading that we are after: it is interpreted as a request for topic-professor pairs, such that the professor thought that all of the students enjoyed the topic — that is, a list-of-pairs reading.<sup>18</sup>

- (32) **Baseline: Superiority-violating question with a raising predicate and low *all*:**

Context: The first-year students took several classes this past semester, taught by different professors. Each professor thought that the students particularly enjoyed one topic that she taught. Tell me,

$\checkmark$  Which *topic did it seem to which professor that **all** of the students enjoyed \_\_\_\_?*

Example (33) provides a second baseline, showing that a raised universal quantifier is generally able to reconstruct to its base position and take narrow scope in our test environment.

<sup>18</sup> A parallel grammaticality pattern to the one that will be shown in (32)–(36) obtains with the universal quantifier *each*.

- (33) **Baseline: *All* can reconstruct to its base position, inverse scope is possible:**

*[All of the students]<sub>1</sub> seemed to some professor *t*<sub>1</sub> to have enjoyed learning about binding.*

$\checkmark \forall > \exists, \checkmark \exists > \forall$

Example (34) provides the crucial test-case. When read with the same context as in (32), supporting the list-of-pairs reading with narrow scope for the quantifier, the question is judged as grammatical, despite the (surface) intervening quantifier:

- (34) **Superiority-violating question with raised *all* can have reconstructed reading:**

*Context: The first-year students took several classes this past semester, taught by different professors. Each professor thought that the students particularly enjoyed one topic that she taught. Tell me,*

*✓ Which topic did **all** of the students seem to which professor to have enjoyed \_\_\_?*

That is, we have successfully avoided intervention, despite appearing to have an illicit intervention configuration on the surface. However, at LF, the intervener is given narrow scope, below the in-situ *wh*, as is required to derive the list-of-pairs reading. That is, intervention is avoided by undoing the intervention configuration through reconstruction of the intervener to a position below *wh*-in-situ.

Notice that when the quantifier is floated, preventing it from reconstructing to its base position, the question is judged as degraded: the list-of-pairs reading becomes unavailable, and the list-of-triples reading causes an intervention effect.

- (35) **Intervention effects reemerge with floated *all*:**

*\*<sup>PL</sup> Which topic did the students **all** seem to which professor to have enjoyed \_\_\_?*

The question again becomes grammatical if the quantifier is floated in a lower position, below *wh*-in-situ. The narrow scope reading for *all* now becomes not only possible, but necessary.

- (36) **Intervention effects disappear if *all* is floated below *wh*:**

*✓ Which topic did the students seem to which professor to have **all** enjoyed \_\_\_?*

### 3.3 No intervention if (phonologically) in-situ *wh* scopes above intervener through non-interrogative movement

Although—following Pesetsky (2000)—*wh*-in-situ in superiority-violating questions cannot undergo covert *wh*-movement,<sup>19</sup> we predict that intervention can be avoided if *wh* can be assigned wide scope above an intervener through another type of movement, which I will simply call non-interrogative movement. Here I show that this is the case with Right-Node Raising (RNR) constructions.<sup>20</sup>

It is well known that RNR constructions allow exceptional extraction of *wh*-elements across certain islands (Bachrach and Katzir, 2009, , a.o.). Example (37a) illustrates a canonical relative clause island, which is ungrammatical. This example dramatically improves when it occurs as part of a RNR construction, (37b).<sup>21</sup>

- (37) **RNR allows exceptional extraction of *wh*-items out of islands:**
- a. \* Which *book* did John meet the man who wrote *t* ?
  - b. ✓ Which *book* did [John meet the man who wrote \_\_\_], and [Mary meet the man who published \_\_\_] *t* ?

It is additionally possible to extract only part of a RN, leaving overt material on the right. The conjuncts in (38), again from Bachrach and Katzir (2009), contain relative clause islands, making it unlikely that the *wh*-phrase was extracted before RNR applied to the remnant. Instead, it appears that the availability of RNR facilitates the exceptional *wh*-movement.

- (38) **Movement can target just part of the *wh*-phrase:**  
Which *animal* did John say that Mary knew [a man who wrote], and [a woman who published \_\_\_] an encyclopedia article about *t*<sub>1</sub> ?

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**19** This must be the case in order to preserve our previous understanding of intervention effects in multiple questions — that is, why superiority-violating questions are usually subject to intervention effects, unless a manipulation like the ones shows in this section is used — and the pronunciation rule introduced in Section 1.

**20** See Branan (2017) for two additional cases of exceptionally wide scope for *wh*-in-situ in English superiority-violating questions that is achieved through non-interrogative movement — extraposition and high attachment of a parasitic gap. Branan shows that, just like in the cases I present here, when *wh*-in-situ is given wide scope, intervention effects disappear.

**21** For notational convenience, I am illustrating the fact that the RN is shared across both conjuncts with a \_\_\_, and the exceptional wide scope (which feeds *wh*-movement) with a *t*(race).



Given this state of affairs, we predict that a multiple question with RNR should allow the in-situ *wh*-phrase to take exceptionally wide scope, allowing it to evade intervention effects despite being in a superiority-violating structure. This is indeed the case, as exemplified in examples (39)–(40).

(39) **No intervention in superiority-violating question with RNR:**

- a. \*<sup>PL</sup> Which *book* did **only John** allow which *student* to read \_\_\_?
- b. ✓ Which *book* did [**only John** allow \_\_\_], and [**only Mary** prohibit \_\_\_], which *student* to read *t*?

(40) a. \*<sup>PL</sup> Which *topic* did he **never** claim which *student* would talk about \_\_\_?

- b. ✓ Which *topic* did [John **never** claim \_\_\_], and [Mary **never** promise \_\_\_], (*that*) which *student* would talk about *t*?

Here, examples (39a) and (40a) are classic intervention effect examples modeled after Pesetsky’s (5)–(9). Examples (39b) and (40b) add an RNR configuration. Now the structure is no longer subject to intervention, because in this case *wh* is able to take scope above the intervener at LF.

## 4 Discussion and conclusion

The data presented in Sections 2–3 has consequences for the correct characterization of the environments that lead to intervention effects in English, and hence for the types of theories that might be able to provide a correct description of the phenomenon.<sup>22</sup> I have shown that **intervention does not correlate with superiority**. Instead, it is the product of the LF configuration in (41).

(41) **The intervention configuration (Pesetsky, 2000; Beck, 2006):**

- \* LF: [<sub>CP</sub> C ... **intervener** ... *wh* ]

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<sup>22</sup> I leave aside at this point an extension of this work to other languages. Although there is significant overlap in particular interveners and environments that lead to intervention cross-linguistically, the judgments are notoriously subtle. Some remaining issues, pointed out by a reviewer, include contrasts between root and embedded questions in Korean and Japanese (Hagstrom, 1998; Tomioka, 2007), as well as the report that Amharic and Shona show no intervention effects at all (Eilam, 2008; Zentz, 2016), although see Zentz (2016) for a potential explanation of this latter point. In both cases, I believe that a closer examination is required in order to decide whether the phenomenon is indeed the same as the one in English, and to diagnose the potential presence of covert movement in the structures. This goes beyond the scope of this paper.

The grammar provides us with several different ways of avoiding or undoing this intervention configuration. **Intervention effects are observed when there is no way of avoiding this configuration.**

Pesetsky (2000) proposed that in superiority-obeying questions, the in-situ *wh*-phrase undergoes covert *wh*-movement (42a), explaining its insensitivity to intervention effects. In this paper I showed that when this covert *wh*-movement is restricted, intervention does emerge in superiority-obeying questions.<sup>23</sup> This was done by tying the *wh*-phrase to an NPI below its licenser, a focused constituent below its associating operator, and a bindee below its binder. Since covert movement of the *wh*-word is now restricted, we predict and indeed find intervention effects when an intervener is introduced above the highest position where the *wh* may take scope.

Pesetsky (2000) also proposed that in superiority-violating questions, covert *wh*-movement is not available, due to the nature of the derivation, explaining their sensitivity to intervention. I showed that intervention effects can be avoided in superiority-violating questions if independent movement operations can be used to evade the intervention configuration. One option is to give *wh*-in-situ wide scope above the intervener through non-interrogative movement, as in the case of Right Node Raising and as observed overtly in the case of scrambling in the Japanese (1b) and the German (2b). This is exemplified in the schema in (42b).<sup>24</sup> Alternatively, we may scope the intervener out of the way, either above the question, (42c), or below *wh*-in-situ, (42d).

(42) **Strategies for avoiding the intervention configuration (41):**

- a. ✓ LF: [<sub>CP</sub> *wh* C ... **intervener** ...       ] *wh*-movement  
           ↑-----↑
- b. ✓ LF: [<sub>CP</sub> C ... *wh* **intervener** ...       ] scrambling  
           ↑-----↑
- c. ✓ LF: **intervener** [<sub>CP</sub> C ... **intervener** ... *wh*] QR  
           ↑-----↑
- d. ✓ LF: [<sub>CP</sub> C ... **intervener** ... *wh* ... **intervener**] reconstruction  
   ↑-----↑

**23** For another case of intervention effects in superiority-obeying English questions, but with very different characteristics, see Kotek and Erlewine (2016). There, intervention effects occur inside pied-piping constituents.

**24** See Kotek (2014) for a proposal that, in fact, covert movement in English always resembles scrambling in German, thereby assimilating the structures in (42a) and (42b). Movement is illustrated in these schemas as covert — using dashed arrows — but in some cases and in some languages, the relevant movements may be overt.

The crucial conclusion, then, is that we require an interrogative system that allows a syntax in which *wh*-phrases may either (covertly) move or remain in-situ at LF and be interpreted without movement, without any apparent effect on the semantics (see Kotek 2014 for such a system). Intervention effects are tied to movement, both overt and covert: when movement is available, intervention is avoided. When movement is blocked, intervention emerges.

Although Pesetsky's claimed correlation between superiority and intervention is thus ultimately incorrect, his analysis of English multiple *wh*-questions in (10) nonetheless stands. That is, covert *wh*-movement must generally be available in superiority-obeying questions, unless it is blocked by independent factors; and covert *wh*-movement is not allowed in superiority-violating questions, although other types of movement may still apply to the in-situ *wh* to give it wider scope at LF than its pronounced position.

These results limit the types of theories that may explain intervention effects in English, and more generally cross-linguistically. For one, theories that rely on prosody alone — such as proposed in Tomioka (2007) for Japanese — will have difficulty explaining the effects discovered here, as prosody does not reflect covert movement or in-situ interpretation. Intervention may also not be given a purely syntactic account that directly ties it to the derivational probing mechanism for *wh*-phrases. Although we have seen that the derivations of superiority-violating and obeying questions may differ, we find that intervention is possible in both types of questions, regardless of their superiority status.

Instead, **theories of intervention must make reference to the LF representation of the question.** In particular, the intervention configuration (41) teaches us that *wh*-phrases are sensitive to the presence of a *c*-commanding intervener when they are interpreted through a non-movement mechanism. Theories such as Beck (2006) and its re-formulated version in Cable (2010) propose that this non-movement mechanism is the projection of focus-alternatives between the *wh*'s base position and C (Hamblin, 1973; Rooth, 1985, 1992, a.o.), and that intervention is caused because this projection of alternatives is disrupted by the intervener, which blocks them from reaching C. Other possible accounts of intervention which rely on a choice-function theory of *wh*-in-situ (e.g. Reinhart, 1998), instead of on focus alternatives, have to my knowledge not been explored in the literature, but are left as a possibility for future work.

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