

Wh-Fronting in a Two-Probe System

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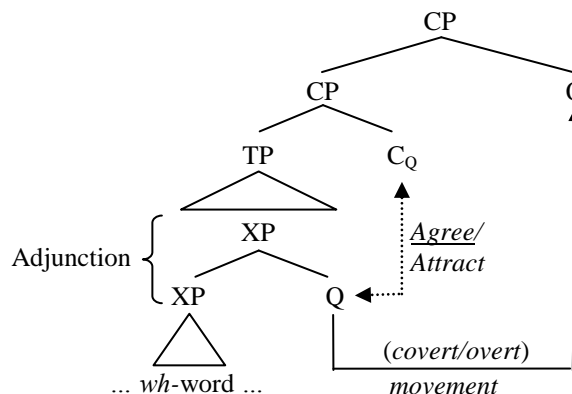
Abstract. The study of *wh*-movement has distinguished among several types of *wh*-fronting languages that permit distinct patterns of overt and covert movement, instantiated for example by the Slavic languages, English and German. This paper extends the cross-linguistic typology of multiple questions by arguing that Hebrew instantiates a new kind of *wh*-fronting language, unlike any that are presently discussed in the literature. It will show that Hebrew distinguishes between two kinds of *wh*-phrases: those that are headed by a *wh*-word (*wh*-headed phrases: *what*, *who*, [_{DP} *which* X], *where*, *how* ...) and those that contain a *wh*-word but are headed by some other element (*wh*-containing phrases: [_{NP} N *of wh*], [_{PP} P *wh*]). The evidence for the existence of two kinds of *wh*-phrases will come from three sources: superiority, intervention effects and possible readings of the questions. We observe the special status of *wh*-headed phrases when one occurs structurally lower in a question than a *wh*-containing phrase. In that case, the *wh*-headed phrase can be targeted by Agree/Attract operations that ignore the presence of *wh*-containing phrases in the same structure. The paper develops an account of the sensitivity of interrogative probing operations to the head of the *wh*-phrase within Q-particle theory. It proposes that the Hebrew Q has an EPP feature which can trigger head-movement of *wh* to Q and that a *wh*-probe exists alongside the more familiar Q-probe, and shows how these two modest modifications to the theory can account for the intricate dataset that emerges from the paper, which is otherwise left unexplained.

1. Introduction

Q-particles have been argued to be central to the analysis of *wh*-in-situ languages as well as *wh*-fronting languages (Hagstrom 1998, Miyagawa 2001, Kishimoto 2005, Cable 2007; 2008; 2010). Following Cable (2007 et seq.), pied piping and *wh*-movement do not exist: instead, what has been previously described as *wh*-movement is recast in terms of Q-movement. Cable shows that *wh*-in-situ languages and *wh*-fronting languages share a very similar structure. In all languages, *wh*-words are rendered interpretable through the help of a Q-particle, which must move to C in time for interpretation. The difference between the two language-types lies in the way in which Q-particles are merged into the derivation and how they project. *Wh*-in-situ languages are *Q-adjunction* languages: in those languages, Q does not project and hence it moves to C by itself, (1).

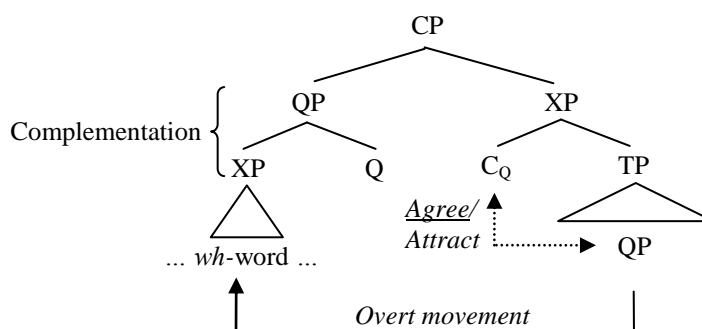
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(1) *Q-movement in wh-in-situ languages: Q-adjunction (Sinhala, Japanese...)*



Wh-fronting languages are *Q*-projection languages: in these languages, *Q* is merged with some XP that contains a *wh*-word and projects a QP phrase. It is the whole QP – *Q* along with its sister – that moves to a projection in the CP Layer, (2). The result is movement of a structure containing the *wh*-word and potential additional structure, commonly referred to as pied-piping. The possible attachment sites of the *Q*-morpheme are regulated via a locality-sensitive Agree operation between the *Q*-morpheme and the *wh*-word. *Q*-theory thus provides an explanation for pied-piping which does not rely on feature-percolation.

(2) *Q-Movement in wh-fronting languages: Q-projection (English, German...)*



In this framework, interrogative syntax and semantics involve two crucial components: a *Q*-particle (or: *Q*-morpheme) which undergoes Agree with *wh*-words and regulates their semantics, and a *Q*-probe in the CP layer which is responsible for Agree and movement operations of QPs and for interrogative meaning. Section 2 of the paper provides a more extensive survey of these properties of the theory through the prism of Hebrew multiple questions and shows that they yield the correct interrogative syntax and semantics of *wh*-questions.

Importantly for *Q*-theory, natural language only has *Q*-movement at its disposal. Independent *wh*-movement does not exist. This correlates with the existence of a *Q*-probe in the theory and the absence of a *wh*-probe from it. *My goal in this paper is to show that although wh-movement is excluded from the theory, it must nonetheless contain a wh-probe.* Specifically, I will argue that a two-probe system can naturally accommodate a rich and intricate set of phenomena in Hebrew multiple questions which is unpredicted by the current theory and is otherwise very mysterious.

The main empirical contribution of this paper lies in showing that Hebrew distinguishes between two kinds of *wh*-phrases¹: those that are headed by a *wh*-word (*wh*-headed phrases: *what*, *who*, [_{DP} *which* X], *where*, *how* ...) and those that contain a *wh*-word but are headed by some other element (*wh*-containing phrases: [_{NP} N *of wh*], [_{PP} P *wh*]). *Wh*-headed phrases have a “privileged”

¹ Within *Q*-particle theory, the term *wh*-phrase may be regarded as misleading. Throughout this paper, I will use it (as well as *wh*-headed phrase and *wh*-containing phrase) to refer to the XP with which a *Q*-morpheme may potentially merge, regardless of whether or not this has in fact occurred in any particular derivation.

status in the language, in that they can be targeted by Agree/Attract operations that ignore *wh*-containing phrases in the same structure. There are no operations that target *wh*-containing phrases only, however. Instead, any operation that can target *wh*-containing phrases can also target *wh*-headed phrases.

I begin the paper by examining the behavior of multiple *wh*-questions in Hebrew. I observe that, as with D-linked *wh*-phrases in English, cf. (3), there is a correlation in Hebrew between apparent superiority violations and intervention effects (Pesetsky 2000).

(3) *Negation causes an intervention effect in superiority-violating question (English)*

- a. Which person ____ didn't read which book?
- b. *Which book didn't which person read ____ ?
[cf. *Which book did which person read ____ ?*]

In section 4 I add a third correlate to this finding, concerning possible readings of the questions, yielding the following generalization:

(4) *Superiority, intervention effects and readings of Hebrew questions*

- a. Superiority-obeying questions never exhibit intervention effects; they may have single-pair answers as well as pair-list answers.
- b. Superiority-violating questions are grammatical but they are sensitive to intervention effects; they may have pair-list answers but not single-pair answers.

These facts can be captured within the theory of Q-particles under standard assumptions about superiority and intervention effects (Pesetsky 2000, Beck 2006, Cable 2010). In these theories, in the derivation of superiority-obeying questions, all *wh*-phrases move to Spec,CP by LF. In the derivation of superiority-violating questions the higher *wh*-phrase is left in situ, allowing the lower *wh*-phrase to be the first element attracted to Spec,CP. Intervention effects arise when a focus-sensitive element occurs between the *wh*-in-situ and the head with which it Agrees, as illustrated in simplified derivations in (5)-(6). I adopt a revised version of Attract Closest which induces a strict ordering on Agree operations, and an economy principle on LFs based on the work of Fox (2000) which, together with the work of Dayal (2002) on the presuppositions of single-pair and pair-list answers, can explain the distribution of possible readings of superiority-obeying and superiority-violating questions.

(5) *Derivation of superiority-obeying question*

- a. Structure of (3)a before movement:
[C_Q didn't [TP [Q [which person]] read [Q [which book]]]]²
- b. *Step 1*: Q-probe agrees with [Q [which person]] and attracts it to its specifier.
[CP [Q [which person]]₁ [C_Q didn't [TP t₁ read [Q [which book]]]]]
- c. *Step 2*: Q-probe agrees with [Q [which book]] and attracts it to its specifier (tucking in below all already present QPs in the specifier)
[CP [Q [which person]]₁ [Q [which book]]₂ [C C_Q didn't [TP t₁ read t₂]]]
- d. *Result*: [QP₁ QP₂ C_Q **intervener** t₁ t₂] → *no intervention effect* ✓

(6) *Derivation of superiority-violating question*

- a. Structure of (3)b before movement:
[C_Q didn't [TP *which person* read [Q [which book]]]]
- b. *Step 1*: *which person* is not merged with Q, hence not found by Q-probe and left *in situ*
[C_Q didn't [TP *which person* read [Q [which book]]]]
- c. *Step 2*: Q-probe agrees with [Q [which book]] and attracts it to its specifier.
[CP [Q [which book]]₂ [C_Q didn't [TP *which person* read t₂]]]
- d. *Result*: [QP₂ C_Q **intervener** *wh* t₂] → *intervention effect* ✗

² The cause of T-to-C movement is independent of our current concerns; see e.g. Pesetsky & Torrego (2000). It is obligatory in questions when the nearest subject isn't the *wh*-phrase which has moved to [spec, CP], and is impossible otherwise.

In section 3 I use superiority and intervention effects as diagnostics for the existence of two kinds of *wh*-phrases in Hebrew. The special status of *wh*-headed phrases is observed when a *wh*-headed phrase occurs structurally lower in a question than a *wh*-containing phrase. In that case, certain operations can target the lower *wh*-headed phrase and entirely overlook the presence of the higher *wh*-containing phrase. This allows the resulting superiority-violating question to be derived from a superiority-obeying-like structure in which no *wh*-phrase remains in situ at LF. The first operation in the derivation is one that only targets *wh*-headed phrases and a subsequent operation is one that can target the (higher) *wh*-containing phrase. This derivation correctly predicts that such questions—just like superiority-obeying questions—are not sensitive to intervention effects. In section 4, I show that the prediction that these questions may have single-pair answers (as well as pair-list answers) is also borne out.

One example of the privileged status of *wh*-headed phrases is illustrated by the minimal pairs in (7a-c). These examples contain the optional object marker *et*—analyzed here as a preposition—on the direct object of *read*. When *et* is present, the phrase *et ma* is headed by *et* and is hence a *wh*-containing phrase; when *et* is absent, bare *ma* is a *wh*-headed phrase. Questions with the base-generated configuration [*wh*-containing phrase₁] >> [*wh*-containing phrase₂] behave as expected: the superiority-obeying question is grammatical despite the presence of a potential intervener (here: negation), (7a). When an intervener occurs between the *wh*-in-situ and the head with which it Agrees in the superiority-violating question (7b), the result is an intervention effect and ungrammaticality. This is contrasted with the superiority violating question with the base-generated configuration [*wh*-containing phrase₁] >> [*wh*-headed phrase₂] in (7c): this question is unexpectedly not sensitive to the presence of an intervener. Furthermore, it can have a single-pair answer as well as a pair-list answer, just like the superiority-obeying question.

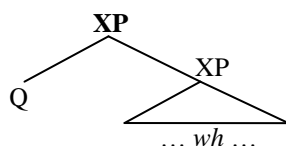
(7) *Unexpected lack of intervention effect in superiority-violating question*

- a. [et mi] ha-mora lo šixne'a ___ [likro (et) [ma]]?
OM who the-teacher neg persuaded to.read OM what
'Who did the teacher not persuade to read what?'
- b. *[et ma] ha-mora lo šixne'a [et mi] [likro ___]?
OM what the-teacher neg persuaded OM who to.read
- c. ?[ma] ha-mora lo šixne'a [et mi] [likro ___]?
what the-teacher neg persuaded OM who to.read
'What did the teacher not persuade whom to read?'

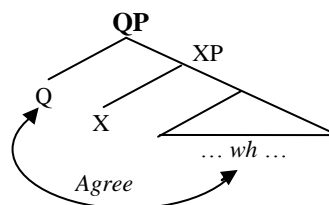
The sensitivity of interrogative probing operations to material inside QP—in particular, to the head of Q's sister—is surprising and unexpected within Cable's Q-theory framework. In the construction of QP, Cable suggests that Q Agrees with the *wh*-word that it c-commands within some local domain, as in (8)b.³

(8) *Proposal in Cable (2010)*

(a) *wh*-in-situ languages, cf. (1)



(b) *wh*-fronting languages, cf. (2)



This is so in order to restrict the possible merge sites of Q and hence of possible “pied-piped” movement to the set of attested movement options observed in natural language. Once QP is constructed, given that only a Q-probe is available and that all QPs have undergone Agreement

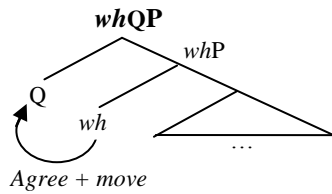
³ There is nothing stopping Agreement from taking place between *wh* and Q in *wh*-in-situ languages as well. Since there is no visible reflex of this operation, I ignore it here.

with *wh*, we expect all QPs to behave similarly for the purposes of interrogative Agreement and Q-movement. This is indeed the attested behavior pattern of languages like English and German, which Cable's theory is design to capture.

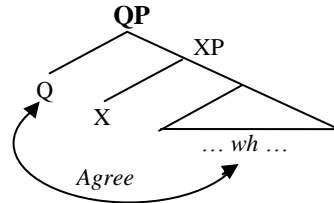
I develop an explanation of Hebrew's sensitivity to material inside QP that is rooted in a two-Probe interrogative system, which is a modest modification to Cable's original work. I propose that in Hebrew, Q has an EPP feature which can be satisfied by head-movement of *wh* to Q, but that this movement is crucially blocked if there is intervening material between Q and *wh*. Furthermore, I adopt an analysis of head-movement as *project both* (cf. Citko 2008). We hence predict that in Hebrew, *wh* will project to the QP layer only if it is the head of the phrase that Q merged with and not otherwise. This allows us to distinguish between *wh*-headed phrases, *wh*QP in (9)a, and *wh*-containing phrases, QP in (9)b. *Wh*-containing phrases, QPs, are thus one of two kinds of *wh*-phrases in Hebrew but the only kind available in languages like English and German.

(9) *Proposed Hebrew QP structure:*

(a) *wh*-headed phrases: Q-*wh* Agree/move



(b) *wh*-containing phrases: Q-*wh* Agree only



Moreover, I propose that although the only kind of interrogative movement allowed in language is Q-movement, our theory must have both a *wh*-probe and a Q-probe. The Q-probe operates in the familiar way, targeting any kind of QP. The *wh*-probe, on the other hand, only targets *wh*QP (as well as bare *wh*-words that have not been merged with a Q-morpheme) and cannot detect the presence of “regular” QPs. Finally, I adopt and expand the principle of *Parasitic Agreement* (cf. Bhatt 2005, Adger 2007): once a probe on a given head has found an appropriate goal, other probes on the same head can also Agree with that same goal. This system, as I will show, correctly predicts that *wh*-headed phrases have more movement options available to them than *wh*-containing phrases when they appear in certain syntactic configurations.

My proposal, I argue, incorporates all of the advantages of Cable's original theory but also provides an explanation for an intricate set of data that is otherwise unexplained. In addition, it is conceptually more appealing than the original theory, since it allows for all interrogative phrases in a question to undergo syntactic Agreement, whereas in Cable's theory some phrases trigger interrogative semantics but are invisible to the otherwise corresponding syntax.

The complex pattern of interrogative probing that emerges from the addition of a second probe interacts in interesting ways with locality restrictions: Superiority reemerges when a finite clause-boundary is introduced between the two *wh*-phrases. In this configuration, superiority can be violated just in case a lower *wh*-headed phrase is moved over a higher *wh*-containing phrase, see (10a-b). Unlike in the case of the non-finite embedded clause in (7), we now find that (10b) can only have a pair-list answer, and that the presence of an intervener causes ungrammaticality, (10c). In an appendix to the paper I will show how my proposal can be extended to account for these surprising facts.

(10) *Superiority effect when wh's separated by clause boundary, and the exception to the rule*

- a. *[et *ma*] ha-mora šixne'a [et *mi*] [_{CP} še-Yosi kara ____]?
OM what the-teacher persuaded OM who that-Yosi read
- b. ?[*ma*] ha-mora šixne'a [et *mi*] [_{CP} še-Yosi kara ____]?
what the-teacher persuaded OM who that-Yosi read
'What did the teacher persuade whom that Yosi read?'
- c. *[*ma*] ha-mora **lo** šixne'a [et *mi*] [_{CP} še-Yosi kara ____]?
what the-teacher neg persuaded OM who that-Yosi read
'What did the teacher persuade whom that Yosi read?'

2. Superiority and intervention effects in multiple questions

In this section I discuss the distribution of superiority and intervention effects in Hebrew monoclausal multiple questions and in questions that contain a non-finite embedded clause, and introduce the assumptions that I adopt regarding the analysis of these two phenomena. I will show that the correlation observed for D-linked *wh*-phrases in English between superiority and intervention effects also holds in Hebrew: superiority-obeying questions do not exhibit intervention effects, while superiority-violating questions are sensitive to intervention effects (cf. Pesetsky 2000). In section 4 I will discuss a third factor that correlates with superiority and intervention effects in multiple questions: the possible readings of the questions.

2.1 Superiority and the syntax of Q

The empirical characterization of the Superiority effect is that in languages like English and Hebrew, when only one *wh*-phrase is (overtly) fronted in a multiple question, it is the highest *wh*-phrase (i.e. the one that asymmetrically c-commands the other *wh*-phrases) that is fronted. This restriction on *wh*-movement is responsible for the difference between the grammatical question in (11)a, in which the higher *wh*-phrase *who* fronts and *what* is pronounced in its base position, as opposed to the ungrammatical (11)b, in which *what* is moved to Spec,CP over *who*.

(11) *Superiority effect (English)*

a. Who ___ bought what?

b. *What did who buy ___ ?

(Pesetsky 2000)

To explain the Superiority effect, I adopt a modified version of Attract Closest (AC) (Relativized Minimality: Rizzi 1990; Minimal Link Condition: Chomsky 1995, 2000) modeled after Pesetsky (2000), according to which it Agree, not Attract, that is subject to strict locality.

(12) *Agree with Closest*

A Probe K can Agree with a goal α only if there is no goal β that is closer to K than α is. (α is closer to K than β iff α asymmetrically c-commands β , and K c-commands both α and β).

AC induces a strict ordering on Agree operations, such that higher targets must be Agreed with before lower targets may be attended to. An Attract operation may be triggered immediately following an Agree operation. In a language in which Attract is not obligatory, we may find that while all targets undergo Agree, only some of them undergo movement. This allows for grammatical derivations of superiority-violating questions, which would be ungrammatical under the traditional AC. In section 4 and in the appendix I discuss the need to constrain the possible set of Attract operations in order to account for the behavior of questions with a finite clause boundary and for possible readings of superiority-obeying and superiority-violating questions. For our present purposes, however, it suffices to concentrate on the ordering of Agree operations.

AC allows for an explanation of the fact that in English, questions with D-linked *wh*-phrases can violate superiority. Thus the questions in (13)a-b are both grammatical questions.

(13) *D-linked wh-phrases can violate superiority*

a. Which person ___ bought which book?

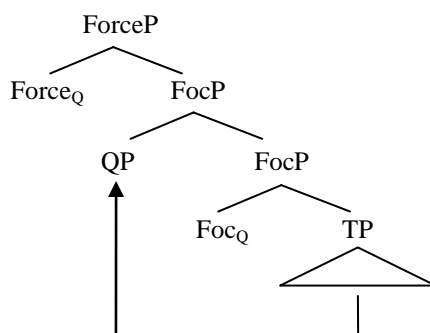
b. Which book did which person buy ___ ?

(Pesetsky 2000)

Within Q-theory, these data are explained by assuming that it is possible for a question in (D-linked) English to contain fewer Q-particles than *wh*-words. Furthermore, we assume that every QP must move to the left edge of the clause in time for interpretation, to a Spec position below the interrogative Force head which is responsible for probing for Q-elements and for Q-movement, as

shown in (14).⁴ We also assume that movement obeys tucking-in, so that the element that moves first occupies the outermost specifier of FocP and other elements occupy inner specifiers, preserving the order in which they moved (Richards 1997).

(14) *The left periphery of interrogative clauses*



Lastly, we assume a pronunciation rule as in (15), according to which in English—and similarly in Hebrew—when there are multiple elements in the specifiers of FocP, the highest one is pronounced at the head of its movement chain and the rest are pronounced at the tail of their respective chains.

- (15) *Pronunciation rule (English, Hebrew)* (cf. Pesetsky 2000)
Pronounce the highest QP in FocP in its high position, all other QPs in their trace positions.

Following the standard view that Attract is parasitic on Agree, it follows that superiority-obeying questions can be derived from a structure that contains as many Q-particles as *wh*-words: by the end of the derivation, all QPs move to Spec,FocP in a structure-preserving order.⁵

To derive superiority-violating questions, on the other hand, the higher *wh*-phrase must not have a Q-particle as its sister; rather, it must remain in situ, allowing the lower *wh*-phrase—which does have Q as its sister—to be Attracted by Force_Q to the outermost specifier of FocP. The resulting structures of superiority-obeying questions and superiority-violating questions are sketched in (16)a-b below, where “*wh*-phrase” is used in the traditional sense to refer to the *wh*-word along and whatever other structure would be “pied-piped” as the result of Q-movement.

- (16) *Structure of superiority-obeying and superiority-violating questions*⁶
- | | |
|--|-----------------------|
| a. [Force _Q [Spec,FocP [[<i>wh</i> -phrase ₁] Q] [[<i>wh</i> -phrase ₂] Q] [TP ... t ₁ ... t ₂]] | superiority-obeying |
| b. [Force _Q [Spec,FocP [[<i>wh</i> -phrase ₂] Q] [TP ... [<i>wh</i> -phrase ₁] ... t ₂]] | superiority-violating |

Turning our attention to Hebrew data, we find at first blush that Hebrew is a “well-behaved” English: all *wh*-words in mono-clausal questions appear to follow the schema of D-linked questions in English. That is, it is possible to violate superiority in subject-object questions, in object-object questions and in questions in which the two *wh*-words are separated by a non-finite clause-boundary.⁷ Data illustrating these facts are presented in sections §2.1.1-§2.1.3.

⁴ For concreteness, I have chosen to adopt Q-theory’s structural assumptions regarding the position targeted by interrogative movement. Nothing hinges on these particular assumptions: the arguments presented in this paper remain unchanged if we adopt the more conventional assumption that movement targets the specifier of the attracting head, whatever that head may be.

⁵ Note that it is also possible to derive a superiority-obeying question from a structure that contains just one Q-particle which is merged with the *wh*-phrase that is overtly moved. What is crucial is that the alternative analysis with multiple Q-particles is available in English and in Hebrew; as we will see below, in case an intervener is present in the question, the latter derivation is the only legal derivation, the other becoming impossible. This will distinguish the behavior of Hebrew and English from that of German, which is assumed to only have one Q-particle available in any question.

⁶ Here and throughout this paper I restrict my attention to multiple questions that contain exactly two *wh*-phrases. I leave the investigation of more complex questions for future work.

⁷ See the appendix for a discussion of questions in which the two *wh*-words are separated by a finite clause boundary.

2.1.1 Subject-object questions

Questions that ask about the subject and one other *wh*-phrase have three possible word-orders. The canonical subject>>object order is preferred; additionally, the object can raise over the subject, violating superiority, in one of two ways: either with the verb remaining in situ as in (17)-(18)c or with stylistic inversion as in (17)-(18)b.⁸ Many speakers find questions with stylistic inversion preferable to ones without it, perhaps because in that case there is phonological material separating the two *wh*-phrases.

Subject-object questions: object can raise over subject

- (17) a. [mi] ____ kara [ma]? b. [ma] kara [mi] ____? c. ?[ma] [mi] kara ____?
 who read what what read who what who read
 ‘Who read what?’ ‘What did who read?’ ‘What did who read?’
- (18) a. [eyze yeled] ____ kara [eize sefer]?
 which boy read which book
 ‘Which boy read which book?’
 b. [eyze sefer] kara [eize yeled] ____?
 which book read which boy
 ‘Which book did which boy read?’
 c. ?[eyze sefer] [eize yeled] kara ____?
 which book which boy read
 ‘Which book did which boy read?’

As a general rule, superiority-obeying questions are preferred over superiority-violating ones in Hebrew. This effect seems to be due to information structure: the canonical question is the one that obeys Attract Closest and “shortest move”; this structure does not require much contextual support. On the other hand, superiority-violating structures, while possible, require more contextual support. For some speakers, such questions remain ungrammatical even then.⁹ For other speakers the status of superiority-violating questions improves when the questions are introduced with supporting contexts or in embedded structures like “guess *what read who*” or inside structures that provide immediate context for producing the superiority-violating sentence, for example: “if I knew *what read who* I would know what squib topics to suggest to each of the class participants.” In some cases added material, for example temporal or locational adjuncts appearing at the end of the question, improve the prosody of the question and hence help sharpen judgments. All these details are omitted from the examples in this paper for space reasons. Also see section 4 for another reason for the preferred status of superiority-obeying questions.

The phenomenon of preference for superiority-obeying questions over superiority-violating ones in languages which generally do allow such structures has been noted, for example, for German by Featherston (2005). However, it is normally not stressed enough in the superiority literature. This preference is not a special feature of Hebrew; rather it appears to hold generally across many languages. Although this introduces confounds when eliciting judgments for superiority-violating questions and more acutely when eliciting judgments about intervention effects in such questions, speakers report a difference in the acceptability of these questions when they are introduced in a context that controls for the general dispreferred status of superiority-violating questions.

⁸ Stylistic or triggered inversion has been analyzed as head movement of the verb to T (Borer 1995) or to C (Shlonsky and Doron 1992, Shlonsky 1997).

⁹ There appears to be a clear generational difference, with younger speakers accepting superiority-violating structures much more readily than older speakers.

2.1.2 Object-object questions

Hebrew has two kinds of two-place verbs. The crucial difference between the two groups of verbs is whether their complements have two possible underlying structures, such that either of the two complements can be higher in the tree (true ditransitives), or just one underlying structure, such that one of the complements always appears higher than the other ((not-)ditransitives). Whether a verb has just one underlying structure or two can be determined with binding tests (Landau 1994, Preminger 2005). These tests show that *he'ra* 'show' and *hixzir* 'return' have two underlying orders, while *diber* 'talk' and *katav* 'write' only one underlying argument structure.¹⁰

For both verb-classes, it is possible to construct a multiple *wh*-question moving either of the two complements to the higher Spec,FocP position. Example (19) shows this for a true-ditransitive verb, and example (20) shows this for a “(not-)ditransitive” verb.¹¹ Crucially, given that true-ditransitives have two possible underlying structures, I assume that the overtly moved *wh*-phrase in each version of the multiple question in (19) started out in the structurally higher position. In (20), only one underlying complement order is possible, as indicated in the example. This gives each question-type the least-marked argument structure possible; it will also have implications for the predictions the theory makes when interveners are introduced into the questions, as will become apparent when we discuss intervention effects below.

- (19) *Questions with (true) ditransitives*: both complements can raise to Spec,FocP
- a. [ma] ha-bos her'a ____ [le-mi]?
 what the-boss showed to-who
 ‘What did the boss show to whom?’
- b. [le-mi] ha-bos her'a ____ [ma]?
 to-who the-boss showed what
 ‘To whom did the boss show what?’
- (20) *Questions with (not-) ditransitives*: lower complement can raise over higher complement
- a. [im mi] dibar-ta ____ [al ma]?
 with who spoke-2sg_M about what
 ‘Who did you speak to about what?’
- b. [al ma] dibar-ta [im mi] ____ ?
 about what spoke-2sg_M with whom
 ‘About what did you speak with whom?’

¹⁰ Example (i) below shows that a condition A binding test for a true-ditransitive passes under both constituent orders. Example (ii) shows that (not-)ditransitives pass the test only under one constituent order.

- (i) a. Theme >> Goal
 Dan_i her'a [et ha-tinok_j] [le-acmo_j]
 Dan showed OM the-baby to-himself
 ‘Dan_i showed the baby_j to itself_j.’
 b. Goal >> Theme
 Dan_i her'a [l.a-tinok_j] [et acmo_j]
 Dan showed to.the-baby OM himself
 ‘Dan_i showed the baby_j to itself_j.’
- (ii) a. *with*-phrase >> *about*-phrase
 Dan_i *diber* [im ha-yeladim_j] [exad al ha-šeni_j]
 Dan talked with the-children one about the-second
 ‘Dan_i talked with the children_j about each other_j.’
 b. **about*-phrase >> *with*-phrase
 *Dan_i *diber* [al ha-yeladim_j] [exad im ha-šeni_j]
 Dan talked about the-children one with the-second
 Intended: ‘Dan_i talked about the children_j with each other_j’

(Preminger 2005)

¹¹ For reasons of brevity and readability, in what follows I only present examples with simplex *wh*-words. Questions with D-linked *wh*-phrases show the same pattern of grammaticality as English D-linked phrases and as the questions with simplex *wh*-words presented here—they too do not exhibit the superiority effect.

2.1.3 Questions with a non-finite embedded clause

Like the other cases above, questions with a non-finite embedded clause allow for two structures – a superiority-obeying one in which the higher *wh*-phrase overtly moves to Spec,FocP and a superiority-violating one in which the lower *wh*-phrase is moved over the higher *wh*-phrase to Spec,FocP, (21).

(21) *Questions with non-finite embedded clause: lower wh can raise over higher wh*¹²

- a. [et *mi*] ha-mora šixne'a ____ [likro [et *ma*]]?
OM who the-teacher persuaded to.read OM what
'Who did the teacher persuade to read what?'
- b. ?[et *ma*] ha-mora šixne'a [et *mi*] [likro ____]?
OM what the-teacher persuaded OM who to.read
'What did the teacher persuade whom to read?'

As before, there is again a general preference for the superiority-obeying question over the superiority-violating question, but both are grammatical. It is crucial in these examples that they contain a non-finite embedded clause. Matters change considerably when a finite clause-boundary is introduced, as discussed in the appendix.

The data in sections §2.1.1-§2.1.3 can all be analyzed within Q-particle theory using Cable's proposals introduced above: the superiority-obeying questions have derivations in which there are as many Q-particles as *wh*-words and in which all QPs have been Attracted to Spec,FocP in an order-preserving manner by LF. Superiority-violating questions are derived by letting the higher *wh*-word remain *in-situ*, not having been merged with a Q-particle. The lower *wh*-phrase receives a Q-particle sister and is Attracted to Spec,FocP.

(22) *Structure of superiority-obeying and superiority-violating questions*

- a. [Force_Q [Spec,FocP [[*wh*-phrase₁] Q] [[*wh*-phrase₂] Q] [TP ... t₁ ... t₂]] superiority-obeying
- b. [Force_Q [Spec,FocP [[*wh*-phrase₂] Q] [TP ... [*wh*-phrase₁] ... t₂]] superiority-violating

2.2 Intervention effects and the semantics of Q

Example (23) below illustrates a typical intervention effect from German: a question becomes ungrammatical with the quantified DP 'nobody' but not with the simple DP 'Hans', (24).

(23) *Intervention effect in a partial-movement question (German)*

- ??Was glaubt **niemand**, wen Karl gesehen hat?
what believes nobody whom Karl seen has
'Who does nobody believe that Karl saw?' (Beck 1996)

(24) *Intervention effect disappears with a non-quantified DP (German)*

- Was glaubt **Hans**, wen Karl gesehen hat?
what believes Hans whom Karl seen has
'Who does Hans believe that Karl saw?' (Beck 1996)

In D-linked questions in English and in the corresponding Hebrew questions surveyed below, we systematically find intervention effects in superiority-violating questions but not in superiority-obeying questions.

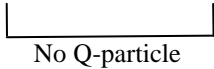
(25) *Intervention effect in a D-linked question (English)*

- a. Which person ____ didn't buy which book?
- b. *Which book didn't which person buy ____? (Pesetsky 2000)

¹² Some speakers prefer to have additional material in the embedded clause in order to improve the prosody of the question – for example, adjuncts such as “for next week's class”. This added material does not affect grammaticality judgments and is hence omitted here.

This grammaticality pattern can be naturally accommodated within the theory introduced thus far. Recall that superiority-obeying questions are derived from structures that contain as many Q-particles as *wh*-words. By the end of the derivation all QPs must move to Spec,FocP for interpretation. AC requires Agree/Attract to operate in an order-preserving manner. The resulting structure contains no element below negation that could be subject to intervention effects. Superiority-violating questions, on the other hand, are derived from structures in which at least one *wh*-word remains in-situ. The schema in (26) represents the structure under which superiority and intervention effects arise in Q-theory.

(26) *The interaction of superiority and interveners at LF*

- a. superiority-obeying questions: no intervention effect
 \checkmark [Force_Q [Spec,FocP [[*wh*-phrase₁] Q] [[*wh*-phrase₂] Q] [TP ... intervener ... t₁ ... t₂]]
 - b. superiority-violating questions: intervention effect
 $*$ [Force_Q [Spec,FocP [[*wh*-phrase₂] Q] [TP ...intervener ... [*wh*-phrase₁] ... t₂]]
- 

Following Beck (2006), Cable (2007 et seq.) adopts an analysis of intervention effects under which intervention effects occur when an intervener—a focus-sensitive item—is introduced between a *wh*-in-situ and the Force_Q head that binds it. What is crucial for this analysis is that the semantic interpretation of the *wh*-word is short-circuited due to the semantic content of the intervener: *wh*-words are semantically deficient in a characteristic way, having only a focus-semantic value, their normal-semantic value being undefined.

(27) *Semantics of WHAT*

- | | | |
|-------------------|---|--|
| normal-semantics: | $\llbracket \text{what} / \text{ma} \rrbracket$ | = undefined |
| focus-semantics: | $\llbracket \text{what}_F / \text{ma}_F \rrbracket^F$ | = { $x_{\langle \text{se} \rangle} : x \notin \text{human} \}$ |

(28) *Semantics of WHO*

- | | | |
|-------------------|--|---|
| normal-semantics: | $\llbracket \text{who} / \text{mi} \rrbracket$ | = undefined |
| focus-semantics: | $\llbracket \text{who}_F / \text{mi}_F \rrbracket^F$ | = { $x_{\langle \text{se} \rangle} : x \in \text{human} \}$ |

To arrive at an interpretable structure, every *wh*-word must be c-commanded by a Q-particle. The Q-particle is the only focus-sensitive operator whose meaning does not also take as input the normal-semantic value of its sister. All other focus-sensitive operators require as input both the normal-semantic value and the focus-semantic value of their sister, and they reset the value of focused elements inside their sister to their normal-semantic value. But *wh*-words have no normal-semantic value—it is undefined. This undefinedness is inherited by the larger structure, resulting in an ungrammatical sentence. The configuration in (29) will thus trigger an ungrammaticality which we can diagnose as an intervention effect:

(29) *Configuration of an intervention effect*

- $*[Q [\dots \sim C \dots \text{wh-word} \dots]]$ (Beck 2006)

Because of the semantics of the Q-particle, *wh*-phrases that are merged with their own Q-particle are predicted not to be sensitive to intervention effects: the meaning of Q_{*i*} relative to a variable assignment *g* is the value that *g* assigns to the index *i*, which is stipulated to be some element from the domain of choice functions, (30)a. Following Beck, when Q_{*i*} composes with its sister it takes as its argument the focus-semantic value of its sister. Once the meaning of QP has been computed, the focus-semantic value of XP is reset to a normal semantic value that is used by the rest of the computation, (30)b. Higher focus-sensitive operators cannot intervene, since the focus-alternatives introduced by the *wh*-word have already been taken care of. QPs therefore shield *wh*-words from potential interveners. Simple *wh*-questions that contain just one QP are interpreted using the Force_Q head in (30)c. Force_Q contributes exactly one existential quantifier to the meaning of the question, which binds the choice-function variable introduced by Q. QP is assumed to obligatorily move to a specifier of FocP which is selected by the Force head.

(30) *The semantics of Q*

- a. $\llbracket Q_i \rrbracket = g(i) \in D_{cf}$
- b. $\llbracket Q_i \text{ XP} \rrbracket = \llbracket Q_i \rrbracket (\llbracket \text{XP} \rrbracket^F)$
- c. $\llbracket \text{Force}_{Q_i} \text{XP} \rrbracket^g = \lambda p [\exists f . p = \llbracket \text{XP} \rrbracket^{g(i/f)}]$ (Cable 2010)

To interpret superiority-obeying questions with two *wh*-words, Cable (2007 et seq.) introduces an additional Q-operator, Force_{Q_2} , which can yield a multiple question meaning and at the same time bind both of the Q-particles in the question.¹³ It does this by binding the choice function variables introduced by the two Q-particles. Under the assumption that there are at least as many choice functions over a certain set as there are elements in that set, the resulting meaning of the question is equivalent to the standard interrogative semantics assigned to *wh*-questions in a Hamblin (1973)/Karttunen (1977) framework.

(31) *Force_{Q2} in the semantics of superiority-obeying questions*

$$\llbracket \text{Force}_{Q_2 i j} \text{XP} \rrbracket^g = \lambda p [\exists f . \exists h . p = (\llbracket \text{XP} \rrbracket^{g(i/f)(j/h)})] \quad \text{Cable (2010)}$$

To derive a suitable question-meaning for a superiority-violating question with a *wh*-word in-situ, Cable assumes a Force_{Q_+} head which can give a *wh*-in-situ an appropriate interrogative meaning without attracting it to its specifier: this is an operator that will yield a multiple-question meaning but which can only bind *one* Q-particle: the other *wh*-word in the question must not be merged with a Q-particle and hence must be left in-situ. The *wh*-in-situ is interpreted using the mechanism of focus-alternatives; this is compatible with Beck's (2006) view that intervention effects follow from focus-sensitive items that intervene between the *wh*-in-situ and the head with which it Agrees: in order for the alternatives of the *wh*-word to reach the Force head and be interpreted, they must not be reset by any other focus-sensitive operator along the way.

(32) *Force_{Q+} in the semantics of superiority-violating questions*

$$\llbracket \text{Force}_{Q_+ i} \text{XP} \rrbracket^g = \lambda p [\exists f . \exists h . p = h (\llbracket \text{XP} \rrbracket^{g(i/f)})] \quad \text{Cable (2010)}$$

By assuming the existence of Force_{Q_+} alongside Force_{Q_2} in the lexicon of English, we can explain the correlation between superiority and intervention effects in D-linked questions. Similar assumptions can be made about the lexical inventory of Hebrew, which we will see exhibits the same correlation as English. That is, The Hebrew lexicon contains the interrogative heads: Force_{Q_0} , Force_{Q_2} and Force_{Q_+} . German, on the other hand, is assumed to have a Force_Q head and Force_{Q_+} head but not a Force_{Q_2} head, correctly predicting that it will exhibit intervention effects not only in superiority-violating questions but also in superiority-obeying questions.

In sections §2.2.1-2.2.3 I survey the distribution of intervention effects in subject-object questions, object-object questions and questions with a non-finite clause-boundary and show that the pattern of grammaticality judgments reported in Pesetsky (2000) is replicated in Hebrew. The emerging generalization will be that superiority-obeying questions never exhibit intervention effects, while superiority-violating questions exhibit intervention effects when an intervener is introduced in an appropriate position in the structure. This pattern is precisely what the analysis of superiority and intervention effects surveyed above predicts.

2.2.1 Subject-object questions

Recall that when no intervener is present, both superiority-obeying questions and superiority-violating questions are grammatical, (17)a-c. As we will see in this section, when an intervener is introduced, superiority-obeying questions are grammatical but superiority-violating questions exhibit intervention effects and are ungrammatical.¹⁴ For consistency, I use negation as the only intervener in all my examples. The same patterns of grammaticality obtain with other interveners.

¹³ I abstract away from the D-linking presupposition. See Cable (2010, p.133) for a discussion.

¹⁴ As before, the same pattern of grammaticality judgments are observed for questions with D-linked *wh*-phrases. The data is omitted here.

Since Hebrew is a strict negative concord language, I adopt the assumption in Zeijlstra (2004) that the semantic negation in Hebrew occurs above the subject position and hence higher than the overt sentential negative marker.¹⁵

(33) *Negation causes intervention effect in superiority-violating question*

- a. [mi] ____ lo kara [ma]?
who neg read what
'Who didn't read what?'
- b. ??[ma] lo kara [mi] ____?
what neg read who
'What didn't who read?'
- c. *[ma] [mi] lo kara ____?
what who neg read
'What didn't who read?'

2.2.2 Object-object questions

In section 2.1.2 we distinguished between two types of two-place verbs: true ditransitives have two underlying argument structures, such that either complement can be higher than the other, while (not-)ditransitives take their complements in just one order, so that one of the complements is always higher than the other. For both types of verbs, it is possible to raise either one of the two complements of the verb to the highest Spec,FocP position. Crucially, we assumed that in true ditransitives, both questions can be derived from a structure in which the element that ends up in the highest specifier started out highest in the structure; hence, both questions are superiority-obeying, (19)a-b. In (not-)ditransitives, one question is superiority-obeying but the other is superiority-violating, (20)a-b. Given these assumptions, our analysis makes different predictions for possible intervention effects in questions with verbs from these two classes: true-ditransitives should never exhibit intervention effects and (not-)ditransitives should exhibit intervention effects for the superiority-violating question but not for the superiority-obeying one.

Examples (34)-(35) confirm that the predictions our analysis makes about true-ditransitives and (not-)ditransitives are met: we observe an intervention effect for the superiority-violating question with a (not-)ditransitive but not for both questions with true-ditransitives.

(34) *True-ditransitives: Negation does not cause an intervention effect*

- a. [ma] ha-bos lo her'a ____ [le-mi]?
what the-boss neg showed to-who
'What didn't the boss show to whom?'
- b. [le-mi] ha-bos lo her'a ____ [ma]?
to-who the-boss neg showed what
'To whom didn't the boss show what?'

(35) *Not-ditransitives: Negation causes an intervention effect in superiority-violating question*

- a. [im mi] ha-ozet sel-i lo diber ____ [al ma]?
with who the-assistant of-1sg neg spoke about what
'With whom didn't my assistant speak about what?'
- b. *[al ma] ha-ozet sel-i lo diber [im mi] ____?
about what the-assistant of-1sg neg spoke with whom
'About what didn't my assistant speak with whom?'

¹⁵ Note that here it is crucial to assume that the relevant operator for calculation of intervention effects is the semantic negation which is located above the subject, and not the sentential negative marker: if the negative marker itself were the intervener then the intervention effect in (33)c would be unexpected, since *lo* is structurally lower than both of the *wh*-phrases in the question.

2.2.3 Questions with a non-finite embedded clause

When no intervener is present, multiple questions in which the two *wh*-words are separated from each other by a non-finite clause-boundary allow for both a superiority-obeying structure and a superiority-violating structure, (21)a-b. As expected, when an intervener is introduced into the question we observe an intervention effect for the superiority-violating question but not for the superiority-obeying one.¹⁶

(36) *Negation causes an intervention effect in superiority-violating question*

- a. [et *mi*] ha-mora **lo** šixne'a ____ [likro [et *ma*]]?
 OM who the-teacher neg persuaded to.read OM what
 'Who did the teacher not persuade to read what?'
 b. *[et *ma*] ha-mora **lo** šixne'a [et *mi*] [likro ____]?
 OM what the-teacher neg persuaded OM who to.read
 'What did the teacher not persuade whom to read?'

To summarize, we observe a consistent pattern of grammaticality: superiority-violating questions exhibit intervention effects, but superiority-obeying questions are not sensitive to the presence of interveners. This pattern is naturally explained in the Q-particle framework under the assumption that superiority-obeying questions are derived in such a way that by LF, no *wh*-word is left below any potential intervener. Superiority-violating questions are derived by attracting a lower *wh*-phrase over a higher *wh*-word which is left in-situ, forcing the latter to be interpreted using the mechanism of focus-alternatives and hence exposing it to potential intervention effects from intervening focus-sensitive elements.

3 Two kinds of *wh*-phrases in Hebrew

In this section I turn to my argument that Hebrew distinguishes between two kinds of *wh*-phrases: those that are headed by a *wh*-word (*wh*-headed phrases) and those that contain a *wh*-word but are headed by some other element (*wh*-containing phrases). I will show that *wh*-headed-phrases are "privileged" in the sense that they can be targeted by Agree/Attract operations than appear not to be sensitive to the presence of *wh*-containing-phrases. The evidence I discuss will come from intervention effects in questions with a configuration in which a *wh*-headed phrase is positioned structurally lower than a *wh*-containing phrase yet appears to be targeted by the first Agree/Attract operation that occurs in the derivation. In section 4 and in the appendix I discuss two further sources of evidence for the existence of two kinds of *wh*-phrases in Hebrew, based on superiority effects in questions in which the two *wh*-phrases are separated by a finite embedded clause and on possible readings of superiority-obeying vs. superiority-violating questions.

The grammaticality pattern that will emerge in this section is unpredicted and not explained by existing theories of superiority and intervention effects. In section §3.2 I develop an analysis of the data that is based on two modest, yet significant, additions to Cable's (2010) theory. These involve (i) positing an EPP feature on the Hebrew Q that can trigger head-movement of *wh* to Q, thus making it possible to distinguish between QPs and *wh*QPs, and (ii) adding to the theory a *wh*-probe which can interact in interesting ways with the Q-probe. I present derivations that show how the intricate data presented here can be captured by these two additions to the theory. In addition, I argue that these modifications are not only empirically motivated but are also conceptually more appealing than the original theory since they allow for all interrogative phrases in a questions to undergo Agreement, whereas in Cable's theory some interrogative phrases trigger interrogative semantics but are invisible to the otherwise corresponding syntax.

¹⁶ It is not the mere presence of negation that causes ungrammaticality. Rather, the position of negation in the question is crucial: if negation occurs below the *wh*-in-situ, for example inside the embedded clause, the resulting question is grammatical.

3.1 *Wh*-headed-phrases and *wh*-containing-phrases

In section 2 we observed a correlation between superiority, intervention effects and readings of Hebrew questions: Superiority-obeying questions never exhibit intervention effects, while superiority-violating questions are sensitive to the presence of interveners. In this section I present data that appear to violate this generalization. Specifically, I show certain superiority-violating questions which do not exhibit intervention effects. The data comes from a closer examination of questions with a non-finite embedded clause such as (37)-(38), repeated here for convenience. The data in (37)-(38) themselves conform to the generalization above: both a superiority-obeying question and a superiority-violating question are grammatical, and we observe that the superiority-violating question is sensitive to intervention effects.

(37) *Questions with non-finite embedded clause: lower wh can raise over higher wh*

- a. [et mi] ha-mora šixne'a ____ [likro [et ma]]?
OM who the-teacher persuaded to.read OM what
'Who did the teacher persuade to read what?'
- b. ?[et ma] ha-mora šixne'a [et mi] [likro ____]?
OM what the-teacher persuaded OM who to.read
'What did the teacher persuade whom to read?'

(38) *Negation causes an intervention effect in superiority-violating question*

- a. [et mi] ha-mora lo šixne'a ____ [likro [et ma]]?
OM who the-teacher neg persuaded to.read OM what
'Who did the teacher not persuade to read what?'
- b. *[et ma] ha-mora lo šixne'a [et mi] [likro ____]?
OM what the-teacher neg persuaded OM who to.read
'What did the teacher not persuade whom to read?'

Note that examples (37)-(38) contain an object marker on the *wh*-word *ma* ('object-marker what').¹⁷ The object marker *et* obligatorily occurs on animate or syntactically definite direct objects in Hebrew; it optionally occurs on inanimate objects (Danon 2001). This means that there are two additional relevant structures which we should examine—those that contain a lower bare *ma* without the object marker. These examples are given in (39). We observe that, as before, both a superiority-obeying question and a superiority-violating question are grammatical.

(39) *Questions with non-finite embedded clause: lower wh can raise over higher wh*¹⁸

- a. [et mi] ha-mora šixne'a ____ [likro [ma]]?
OM who the-teacher persuaded to.read what
'Who did the teacher persuade to read what?'
- b. ?[ma] ha-mora šixne'a [et mi] [likro ____]?
what the-teacher persuaded OM who to.read
'What did the teacher persuade whom to read?'

When intervening negation is introduced into the questions in (39), we observe a surprising result: negation does not cause an intervention effect in the superiority-violating question (40)c, despite appearing to create the illicit configuration *[Q [... ~C ... *wh*-word ...]]. Compare again the parallel question that does contain the object marker, (40)b (= (38)b), which conforms to the generalization regarding the correlation between superiority and intervention effects described above. The difference between the two questions is particularly striking because they appear to be otherwise identical, with the exception of the presence of an overt object marker.

¹⁷ I will be treating *et* as a preposition; equivalent data to those presented above and to those which will be presented below for *et ma* that contain full-fledged prepositions replicate the judgments reported here.

¹⁸ As before, some speakers find that the prosody of the questions improves when some material is added to the embedded clause – for example, temporal or locational adjuncts like “for class next week.”

(40) *Unexpected lack of intervention effect in superiority-violating question*

- a. [et mi] ha-mora lo šixne'a ____ [likro [ma]]?
OM who the-teacher neg persuaded to.read what
'Who did the teacher not persuade to read what?'
- b. *[et ma] ha-mora lo šixne'a [et mi] [likro ____]?
OM what the-teacher neg persuaded OM who to.read
- c. ?[ma] ha-mora lo šixne'a [et mi] [likro ____]?
what the-teacher neg persuaded OM who to.read
'What did the teacher not persuade whom to read?'

Similar contrasts can be observed for *which*-phrases, as shown in examples (41)-(42) below. I note that since the contexts which make such examples felicitous are quite elaborate, judging the grammaticality of these examples is rather difficult. That is, in addition to the already-complicated scenarios of examples like (40), *which*-phrases also introduce a number presupposition (i.e., *which boy* assumes that there is just one salient boy in the domain, *which boys* assumes a salient set of boys). For the questions in (41)-(42) we could imagine, for instance, a scenario in which an experimenter asks participants to choose their preferred beverage out of two options, which vary by participant. Participants are then asked to either drink one of the two beverages or point at one of the two beverages. Reactions to this experimental 'manipulation' are expected to vary according to whether a given participant was assigned the beverage of her choice or the other beverage. We can then ask about a particular participant in the experiment the questions in (41)-(42).¹⁹ Despite the complication of the elaborate context, the speakers I have consulted with detect a difference between the status of (41)b and that of (42)b. Since, unlike in the case of (40)b-c, these examples contain more than minimal changes, I cannot rule out the possibility that the difference in judgments is due to some other aspect of my chosen examples. However, see examples (44)-(45) below for one more case which reproduces these effects.

(41) *Well-behaved data from superiority-violating questions with which-phrases*

- a. [al eyze maške] ha-mad'an bikeš [mi-eyze mištatef] [le-hacbi'a ____]?
to which beverage the-scientist asked from-which participant to.point
'Which beverage did the scientist ask which participant to point to?'
- b. *[al eyze maške] ha-mad'an lo bikeš [mi-eyze mištatef] [le-hacbi'a ____]?
to which beverage the-scientist neg asked from-which participant to.point
'Which beverage did the scientist not ask which participant to point to?'

(42) *Unexpected lack of intervention effect in superiority-violating question with which-phrase*

- a. [eyze maške] ha-mad'an bikeš [mi-eyze mištatef] [lištot ____]?
which beverage the-scientist asked from-which participant to.drink
'Which beverage did the scientist ask which participant to drink?'
- b. ?[eyze maške] ha-mad'an lo bikeš [mi-eyze mištatef] [lištot ____]?
which beverage the-scientist neg asked from-which participant to.drink
'Which beverage did the scientist not ask which participant to drink?'

The crucial aspect that causes the difference between the new data presented in this section and the data in section 2 is the difference in status between *wh*-headed-phrases and *wh*-containing-phrases in Hebrew. As I will argue below, *wh*-headed-phrases are potential targets for Agree/Attract operations that ignore the presence of *wh*-containing-phrases. As a result examples like (40)c can be derived from a structure in which no *wh*-phrase remains in-situ at LF; the first operation in the derivation is one that only targets *wh*-headed phrases and a subsequent operation is one that can target the (higher) *wh*-containing phrase. (40)b cannot be given a similar derivation; instead it must be derived from a structure in which the higher *wh*-containing phrase has been left in-situ, allowing the lower *wh*-containing phrase to be the target of the first Agree/Attract

¹⁹ As in previous examples, additional material following the infinitival verb (e.g. 'during the experiment') improves the prosody of the question, as does embedding the question in a larger phrase like 'I wonder ...'

operation in the derivation. As a result, we correctly predict that (40)b will be sensitive to intervention effects and that (40)c will not be sensitive to intervention effects.

Before developing this analysis, however, I would like to present additional data that will bear on the correct analysis of the Hebrew pattern. In particular, I note that any operation which can apply to a *wh*-containing-phrase can also apply to a *wh*-headed-phrase: there are no operations that privilege a *wh*-containing-phrase. That is, in a question with a higher *wh*-containing-phrase and a lower *wh*-headed-phrase, we observe the grammaticality pattern which conforms to the generalization regarding superiority and intervention effects which was developed in section 2: a superiority-violating question is grammatical, (43)a, but it is sensitive to intervention effects, (43)b.

(43) *Question with lower wh-containing-phrase and higher wh-headed-phrase*: lower phrase can raise over higher phrase but intervening negation causes an intervention effect

- a. [le-*ma*] ha-texna'i nisa lešaxne'a [*ma*] [lehixaber otomatit ____]?
to-what the-technician tried to.persuade what to.connect automatically
'To what did the technician try to convince what not to connect automatically?'
- b. *[le-*ma*] ha-texna'i **lo** nisa lešaxne'a [*ma*] [lehixaber otomatit ____]?
to-what the-technician neg tried to.persuade what to.connect automatically
'To what didn't the technician try to convince what to connect automatically?'

The privileged movement options of *wh*-headed phrases are not confined only to bare *what* and to similar data with *which*-phrases. Rather, they extend to other *wh*-headed phrases. The examples below demonstrate that the same unexpected grammaticality pattern in questions with the (base-generated) configuration [*wh*-containing-phrase₁] >> [*wh*-headed-phrase₂] is replicated when the lower phrase is a *wh*-adjunct. In examples with an embedded clause, a *wh*-adjunct can modify either the matrix predicate or the embedded predicate. In examples (44)a-b, the *wh*-adjunct *eyx* ('how') can modify either the higher predicate ('how did the teacher do the persuading?') or the lower predicate ('how was the traveling done?'), indicated by underlining in the glosses. Hence, it is possible to construct a superiority-obeying question and a superiority-violating question from two different underlying structures: one in which *eyx* originates in the matrix clause and one in which it is generated in the embedded clause. For both attachment sites of the *wh*-adjunct, both the superiority-obeying question and the superiority-violating question are grammatical, as expected.

(44) *Both superiority-obeying and superiority-violating questions possible*; *wh*-adjunct can modify both the higher and lower predicate

- a. [et *mi*] ha-mora šixne'a ____ [linsoa li-yrušalayim [*eyx*]?
OM who the-teacher persuaded to.travel to-Jerusalem how
'Who did the teacher persuade to travel to Jerusalem how?'
'Who did the teacher persuade to travel to Jerusalem how?'
- b. [*eyx*] ha-mora šixne'a [et *mi*] [linsoa li-yrušalayim ____]?
how the-teacher persuaded OM who to.travel to-Jerusalem
'How did the teacher persuade whom to travel to Jerusalem?'
'How did the teacher persuade whom to travel to Jerusalem?'

When an intervener is introduced into the questions in (44)a-b, we expect to find intervention effects in the superiority-violating questions. In particular, when *eyx* modifies the embedded predicate in (44)b there is no doubt that it originates from a lower position than *et mi*. According to the Beck/Cable analysis of superiority and intervention effects, *et mi* must remain in-situ and therefore not be merged with a Q-particle. Only *eyx* is merged with a Q-particle and is Attracted to Spec,FocP. A Force_{Q+} head then binds the *wh*-in-situ and gives it an appropriate question meaning, but any intervening focus-sensitive operator should cause an intervention effect. The data in (45)b

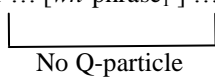
exhibits the illicit intervention effect configuration: *[Q [... ~C ... *wh*-word ...]], yet we do not observe an intervention effect. This is surprising and unexpected in the current theory.

- (45) *No intervention effects in superiority-violating question with *wh*-adjunct*
- a. [et *mi*] ha-mora **lo** šixne’a ____ [linsoa li-yrušalayim [eyx]?
 OM who the-teacher neg persuaded to.travel to-Jerusalem how
 ‘Who did the teacher not persuade to travel to Jerusalem how?’
 ‘Who did the teacher not persuade to travel to Jerusalem how?’
- b. [eyx] ha-mora **lo** šixne’a [et *mi*] [linsoa li-yrušalayim ____ ?
 how the-teacher neg persuaded OM who to.travel to-Jerusalem
 ✓ ‘How did the teacher not persuade whom to travel to Jerusalem?’
 ✓ ‘How did the teacher not persuade whom to travel to Jerusalem?’

3.2 Proposal: Multiple questions in a two-probe system

The lack of intervention effects in some of the superiority-violating questions in section 3.1 is surprising under current theories of interrogative probing and *wh*-fronting. This is so because these theories do not predict any sensitivity to the internal structure of the phrases that Agree/Attract operations apply to, only to the presence of the relevant features which trigger these operations.

Within the Q-particle framework surveyed in section 2, we predict that all multiple questions will behave similarly, an appropriate result if we limit our discussion to the analysis of languages like English and German. The analysis of superiority-obeying questions and superiority-violating questions which I adopted for the data in section 2 is repeated in (46) and (47) below; in what follows I will propose to adopt this analysis unchanged. To predict the possibility of the Hebrew pattern, I propose two modifications to this analysis: first, that Hebrew distinguishes between QPs and *wh*QPs and second, that a *wh*-probe must be added to the probing system in order to explain the sensitivity of Agree/Attract operations to the head of the phrase to which they apply.

- (46) *Structure of superiority-obeying questions and superiority-violating questions*
- a. [Force_Q [_{Spec,FocP} [[*wh*-phrase₁] Q] [[*wh*-phrase₂] Q] [_{TP} ... t₁ ... t₂]] superiority-obeying
 b. [Force_Q [_{Spec,FocP} [[*wh*-phrase₂] Q] [_{TP} ... [*wh*-phrase₁] ... t₂]] superiority-violating
- (47) *The interaction of superiority and interveners at LF*
- a. Superiority-obeying questions: no intervention effect
 ✓ [Force_Q [_{Spec,FocP} [[*wh*-phrase₁] Q] [[*wh*-phrase₂] Q] [_{TP} ... intervener ... t₁ ... t₂]]
- b. Superiority-violating questions: intervention effects
 * [Force_Q [_{Spec,FocP} [[*wh*-phrase₂] Q] [_{TP} ...intervener ... [*wh*-phrase₁] ... t₂]]
- 

If we take the occurrence of intervention effects as a diagnostic for movement in a question, the generalization that emerges from the data in section 3.1 is that *wh-headed-phrases are targets for more Agree/Attract operations than *wh*-containing-phrases*. More precisely, *wh*-containing phrases are legitimate targets for a subset of the Agree/Attract operations that can target *wh*-headed-phrases. That is, we can explain the unexpected data if we assume that a *wh*-headed phrase that appears lower in the structure than a *wh*-containing-phrase can be targeted by an Agree/Attract operation for which the higher phrase is not an eligible candidate; there is an Agree/Attract operation for which the (lower) *wh*-headed-phrase is the highest potential target. The (higher) *wh*-containing-phrase can then be the target of a second movement operation, resulting in a superiority-obeying-like structure with both *wh*-phrases in specifiers of FocP and no *wh*-in-situ, predicting the lack of intervention effects.

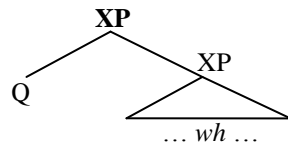
To arrive at an analysis that privileges the Agree/Attract operations available to *wh*-headed phrases, two components must be in place. First, we must be able to distinguish between different kinds of QPs according to the head of Q’s sister—that is, to distinguish between simple QPs and co-headed *wh*QPs. This is not possible in the current design of the Q-framework, which treats all

QPs equally. Second, we must explain what Agree/Attract operations are available to QPs and to *wh*QPs.

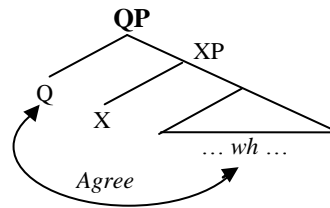
Let us begin by developing a QP structure that will allow for sensitivity to the head of Q's sister. Recall again that the crucial unexplained data in section 3.1 involve what appears to be a privileged status of *wh*-headed-phrases compared to *wh*-containing-phrases. Cable's (2010) Q-theory does not allow us to distinguish between these two kinds of *wh*-phrases. To see why, consider the architecture of QPs in *wh*-fronting languages. In Q-theory, *wh*-fronting and *wh*-in-situ are derived from different merging options of Q and its XP sister: an adjunction structure in which X projects leads to *wh*-in-situ, (48)a. A complementation structure in which Q projects leads to *wh*-fronting and "pied-piping," (48)b. The size of constituent to which a Q morpheme can be merged is regulated by forcing Agreement between Q and the *wh*-word it c-commands within some local domain. In languages like Hebrew, English and German, that domain will include intervening DP and PP layers, to allow Q to merge above a preposition, but not VPs, since phrases of that size are never "pied-piped" in *wh*-questions in those languages.

(48) Possible QP structures in Cable (2010)

(a) *wh*-in-situ languages



(b) *wh*-fronting languages



In a *wh*-fronting language, when a QP is constructed, its content becomes opaque to the outside derivation. In particular, information regarding the head of the XP sister of Q is not available to probes in higher portions of the tree. This is a desired result for German and English which do not appear to be sensitive to material inside QP. Hebrew, however, does appear to distinguish between different QPs based on their internal structure.

To explain this I propose that the construction of QP in Hebrew-type *wh*-fronting languages involves one additional step following Q-*wh* Agreement – head-movement of *wh* to Q following Agreement, (49). Head-movement is blocked, however, if an intervening head occurs between *wh* and Q. The EPP feature on Q thus constitutes the only relevant difference between Hebrew and D-linked English.

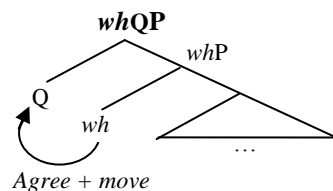
(49) EPP feature of Q

Q has an EPP feature which can trigger head-movement of the *wh*-word to Q.

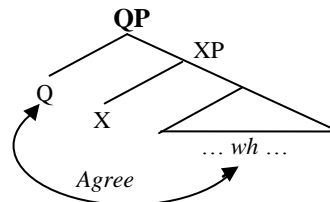
Furthermore, I adopt the analysis of head-movement as *project both* (cf. Citko 2008, but also previous works that show the need for sensitivity to properties of the nominal material inside DP, e.g. Abney 1987, the *extended projections* idea of Grimshaw 2005 [1991], Radford 1993, among others). We thus predict that a *wh*-word will project to the QP layer when it is the head of XP but not when it is buried somewhere inside XP. This allows us to distinguish between two kinds of *wh*-phrases in Hebrew: *wh*-headed phrases, or *wh*QPs, and *wh*-containing phrases, or QPs. The derivation of *wh*-in-situ languages and of English/German *wh*-fronting languages proceeds as described in Cable (2010) (cf. (48) above).

(50) Proposed Hebrew QP structure

(a) *wh*-headed phrases: Q-*wh* Agree/move



(b) *wh*-containing phrases: Q-*wh* Agree only



With this distinction in mind we must now explain how Agree/Attract operations interact with the two kinds of QPs we have created. Let us assume that like other *wh*-fronting languages, Hebrew has in its inventory a Q-probe that can target any QP. This probe operates in Hebrew just as in English and German: it can Agree with any Q-headed phrase, hence with both kinds of QPs, (50)a and (50)b, in Hebrew. In addition to the Q-probe, I propose that all languages have in their lexicon a *wh*-probe. This probe can find two kinds of targets: it can find bare *wh*-words which did not project any structure, and it can find *wh*-headed *phrases*, that is *wh*QPs as in (50)a. The *wh*-probe supplies an important missing piece in the theory in Cable (2007 et seq.): it allows for all interrogative phrases in a question to undergo syntactic Agreement. In Cable's theory *wh*-words that are not merged with Q trigger interrogative semantics but are invisible to the otherwise corresponding syntax.

Despite being able to trigger Agreement, the *wh*-probe cannot by itself trigger movement. Rather, it is crucial for Q-theory that *wh*-movement does not exist. This is the case not only because it would undo Q-theory's achievement in solving the question of pied-piping, but also because its presence would eliminate our ability to predict the correlation between superiority and intervention observed in Hebrew. That is, it must be the case that (1) there is an operation that can *find wh*-words (and give them an appropriate interrogative semantics), and (2) that movement can only be triggered immediately following Agree. Crucially, movement can only be triggered by a Q-probe, not by a *wh*-probe.

What is special about *wh*QP is that once it has been Agreed with by a *wh*-probe, it can satisfy the EPP feature of a Q-probe which occurs on the same head. To implement this, I propose that once some probe on a given head has found an appropriate target, other probes on the same head can also Agree with that same element. I adopt and expand the term *Parasitic Agreement* (cf. Bhatt 2005 on infinitival agreement, Adger 2001) for this state of affairs (See also Richards (ms.) and Miyagawa 2010 for similar proposals).

(51) *Parasitic Agreement*

If a Probe on a certain head H has found a goal G, other probes on H can also enter into Agree/Attract relations with G.

Parasitic agreement is a condition which requires optimization of Agreement operations: if the features of a goal found by a certain probe match the features required by some other probe on the same head, parasitic agreement allows for both probes to Agree with that goal at the same time.

Let us see how a system with two probes and a fine-grained QP structure can explain the surprising lack of intervention effects in certain superiority-violating questions. To foreshadow, we will see that it is possible to give these questions a superiority-obeying-like structure, predicting that they should in fact exhibit the exact properties that we observe. On the other hand, the questions that lead to ungrammaticality cannot be given an alternative analysis within our new theory that makes them grammatical. More precisely, we will see that we predict a larger array of possible movement operations in questions with the configuration: [*wh*-containing-phrase₁] >> [*wh*-headed phrase₂], (52)a, but that in other configurations, (52)b-d, we predict Hebrew to behave the same as D-linked English. For brevity I use [*XP*_{*wh*}] for *wh*-containing-phrase and [*wh*P] for *wh*-headed phrase. When these phrases are merged with Q, I use the abbreviations [QP] and [*wh*QP] to indicate the material that is visible to outside probing operations.

(52) *Possible configurations of questions with two wh-phrases*

- | | | | |
|---------------------------------|----|------------------------------|--|
| a. <i>wh</i> -containing-phrase | >> | <i>wh</i> -headed phrase | [<i>XP</i> _{<i>wh</i>}] >> [<i>wh</i> P] |
| b. <i>wh</i> -containing-phrase | >> | <i>wh</i> -containing-phrase | [<i>XP</i> _{<i>wh</i>}] >> [<i>XP</i> _{<i>wh</i>}] |
| c. <i>wh</i> -headed phrase | >> | <i>wh</i> -headed phrase | [<i>wh</i> P] >> [<i>wh</i> P] |
| d. <i>wh</i> -headed phrase | >> | <i>wh</i> -containing-phrase | [<i>wh</i> P] >> [<i>XP</i> _{<i>wh</i>}] |

Let us begin by considering the derivation of the superiority-obeying questions and superiority-violating questions with the structure in (52)b: [*XP*_{*wh*}] >> [*XP*_{*wh*}].

Superiority-obeying questions can be derived from a structure that contains as many Q-particles as *wh*-words. Therefore, as a first step in the derivation of a superiority-obeying question we merge a Q-particle with every *wh*-phrase. Next, two probes are merged on Force_{Q2}. If a *wh*-probe is merged in this case, it will be activated and will fail to find a suitable target. I follow Preminger (2011) in assuming that this is a “legal” state of affairs: as long as the probe *attempted* to find a goal, failing to find a suitable target does not cause ungrammaticality.²⁰ As a result, at some point in the derivation we must merge two Q-probes onto Force_{Q2}. The first Q-probe will find the higher QP, Agree with it and Attract it to its specifier.²¹ The second Q-probe will find the lower QP, Agree with it and Attract it to its specifier. The resulting derivation is one with no *wh*-in-situ. Note that in this derivation there is no consequence to the addition of the *wh*-probe to the system. Just as in the one-probe system, we correctly predict that the question will not exhibit intervention effects.

(53) *Derivation of [XP_{wh}] >> [XP_{wh}] superiority-obeying question*

- a. Step 1: Q-particles are distributed; one is merged with every *wh*-phrase
[_{TP} [QP₁] [QP₂]]
- b. Step 2: Probes are merged onto Force_{Q2}
 - i. Q-probe finds the higher QP, Agrees with it and Attracts it to Spec,FocP
 - ii. Q-probe finds the lower QP, Agrees with it and Attracts it to Spec,FocP
- c. Result: superiority-obeying structure
[Force_{Q2} [_{Spec,FocP} [QP₁] [QP₂]] [_{TP} t₁ t₂]]
- d. Expect: no intervention effects.

To derive a superiority-violating question with a base-generated [XP_{wh1}] >> [XP_{wh2}] configuration, it is necessary to leave the higher *wh* in situ in order to allow the lower XP to be attracted to the highest specifier of FocP. Consequently, in the first step of the derivation we merge just one Q-morpheme with the lower XP. Next, probes are merged onto the Force_{Q+} head: A Q-probe will Agree with the only QP in the derivation and Attract it to its specifier. A *wh*-probe will Agree with the *wh*-word inside the higher XP but will not be able to Attract it, since *wh*-words cannot move on their own. The resulting derivation contains one fronted QP and one *wh*-in-situ. In this case we correctly predict that the question will exhibit intervention effects.

(54) *Derivation of [XP_{wh}] >> [XP_{wh}] superiority-violating question*

- a. Step 1: Q-particles are distributed; only lower phrase is merged with Q-particle
[_{TP} [XP_{wh1}] [QP₂]]
- b. Step 2: Probes are merged onto Force_{Q+}
 - i. Q-probe finds the (lower) QP, Agrees with it and Attracts it to Spec,FocP
 - ii. *wh*-probe finds the (higher) *wh*, Agrees with it but cannot Attract it
- c. Result: superiority-violating structure
[Force_{Q+} [_{Spec,FocP} [QP₂]] [_{TP} [XP_{wh1}] t₂]]
- d. Expect: intervention effects.

Note that in (54), the order in which the probes are merged does not matter: we would achieve the same result if chose to activate the *wh*-probe before the Q-probe.

Similar derivations can be given to questions with the structures: [*wh*P₁] >> [*wh*P₂] and [*wh*P₁] >> [XP_{wh2}]. Sketches of the derivations are given in (55)-(56). In such questions it is important to note that when a *wh*P is merged with Q, both the Q-probe and the *wh*-probe can find that *wh*QP. Given parasitic agreement, both probes will Agree with that *wh*QP at the same time and the Q-probe will trigger movement of the *wh*QP to its specifier. As will become apparent, the order in

²⁰ In all following derivations I will ignore the possibility of extraneous probing operations that result in a failure to Agree and concentrate on operations that have consequences for the derivation.

²¹ Or to be more precise, to the specifier of the Focus projection that is directly below Force_Q, cf. (14) in section 2.

which the probes are merged does not affect the derivation. The resulting derivations make the same predictions about intervention effects as Cable's original theory.

In the case of a $[whP_1] \gg [whP_2]$ superiority-obeying question, the first two probes of any kind that are activated in the derivation will trigger order-preserving movement of the two wh QPs in the question. In a superiority-violating question, the higher wh P must not be merged with Q in order to be left in situ, allowing the lower wh to be attracted to the highest specifier of FocP. The resulting structures give the expected predictions for intervention effects: the superiority-obeying structure contains no wh -in-situ and is hence predicted not to be sensitive to intervention effects; the superiority-violating structure does contain a wh -in-situ which must be interpreted using focus alternatives, so a focus-sensitive intervener that occurs between this wh -word and $Force_{Q+}$ is predicted to cause ungrammaticality.

(55) *Derivation of $[whP] \gg [whP]$ questions*

i. Superiority-obeying question

- a. Step 1: Q-particles are distributed; one is merged with every wh -phrase

$[_{TP} [whQP_1] [whQP_2]]$

- b. Step 2: Probes are merged with $Force_{Q2}$

- i. Q-probe or wh -probe finds $whQP_1$ and Agrees with it.

Via parasitic agreement, the other probe also Agrees with $whQP_1$.

Q-probe triggers movement of $whQP_1$ to Spec,FocP.

- ii. Q-probe or wh -probe finds $whQP_2$ and Agrees with it.

Via parasitic agreement, the other probe also Agrees with $whQP_2$.

Q-probe triggers movement of $whQP_2$ to Spec,FocP

- c. Result: superiority-obeying structure

$[Force_{Q2} [_{Spec,FocP} [whQP_1] [whQP_2]] [_{TP} t_1 t_2]$

- d. Expect: no intervention effects.

ii. Superiority-violating question

- a. Step 1: Q-particles are distributed; only lower phrase is merged with Q-particle

$[_{TP} [whP_1] [whQP_2]]$

- b. Step 2: Probes are merged with $Force_{Q+}$

- i. wh -probe finds the higher wh , Agrees with it but cannot Attract it

- ii. Q-probe or wh -probe finds $whQP_2$ and Agrees with it.

Via parasitic agreement, the other probe also Agrees with $whQP_2$.

Q-probe triggers movement of $whQP_2$ to Spec,FocP

- c. Result: superiority-violating structure

$[Force_{Q+} [_{Spec,FocP} [whQP_2]] [_{TP} [whP_1] t_2]$

- d. Expect: intervention effects.

In the case of $[whP_1] \gg [XP_{wh2}]$ questions, both the Q-probe and the wh -probe can find the higher wh QP, and only a Q-probe can find the lower QP. In a superiority-obeying question, then, the wh QP will be found by any probe that is activated. Via parasitic agreement, it will be Agreed with by both the wh -probe and the Q-probe, and the latter probe will trigger movement of wh QP to the outer specifier of FocP. Next, a Q-probe will find the lower QP, Agree with it and Attract it to an inner specifier of FocP. In a superiority-violating question the higher wh P must not be merged with Q in order to be left in situ, allowing the lower QP to be attracted to the highest specifier of FocP. The resulting structures give the expected predictions for intervention effects.

(56) *Derivation of $[whP] \gg [XP_{wh}]$ questions*

i. Superiority-obeying question

- a. Step 1: Q-particles are distributed; one is merged with every wh -phrase

$[_{TP} [whQP_1] [QP_2]]$

- b. Step 2: Probes are merged with $Force_{Q2}$

- i. Q-probe or *wh*-probe finds *wh*QP₁ and Agrees with it.
Via parasitic agreement, the other probe also Agrees with *wh*QP₁.
Q-probe triggers movement of *wh*QP₁ to Spec,FocP.
- ii. Q-probe finds QP₂, Agrees with it and Attracts it to Spec,FocP.
- c. Result: superiority-obeying structure
[Force_{Q2} [Spec,FocP [whQP₁] [QP₂] [TP t₁ t₂]
- d. Expect: no intervention effects.
- ii. Superiority-violating question
 - a. Step 1: Q-particles are distributed; only lower phrase is merged with Q-particle
[TP [whP₁] [QP₂]
 - b. Step 2: Probes are merged with Force_{Q+}
 - i. *wh*-probe finds the higher *wh*, Agrees with it but cannot Attract it
 - ii. Q-probe finds QP₂, Agrees with it and Attracts it to Spec,FocP.
 - c. Result: superiority-violating structure
[Force_{Q2} [Spec,FocP [QP₂] [TP [whP₁] t₂]
 - d. Expect: intervention effects.

The derivations in (53)-(56) all share an insensitivity to the choice of probes in the derivation and to the order in which they are activated. This is so because under any choice of distribution of Q-particles, both probes will cause movement of the same elements in the same order. In the [XP_{wh1}] >> [XP_{wh2}] case a *wh*-probe will never be able to cause movement of either of the XPs; a Q-probe will attract the highest QP in a given structure: the higher XP in a superiority-obeying question and the lower one in a superiority-violating question. This is the familiar pattern from section 2.

In a [whP₁] >> [...] configuration, we again expect to find the familiar section 2 pattern: in a superiority-obeying question the higher *wh*P will be found by either the *wh*-probe or the Q-probe and moved to the outermost specifier of FocP, since in that configuration it is merged with a Q-particle. That same *wh*P must not be moved in a superiority-violating question, in order to allow the lower phrase to be attracted to the outermost specifier of FocP. Hence only the lower *wh*-phrase may be merged with Q. The resulting pattern will again exhibit the familiar behavior observed for D-linked *wh*-phrases in English.

The picture changes when we consider the configuration: [XP_{wh1}] >> [whP₂]. Here, the order in which the probes are activated affects the resulting derivations. As always, we can derive a superiority-obeying question in which both *wh*-phrases are attracted to Spec,FocP. We begin this derivation by merging both of the *wh*-phrases in the question with Q-particles. Next, we allow a Q-probe to operate first; it will find the higher QP, Agree with it and attract it to the outer specifier of Spec,FocP. The lower *wh*QP can then be found either by a *wh*-probe or by a Q-probe; following parasitic agreement it will be attracted to an inner specifier of FocP, leaving no *wh*-in-situ in the question. As always, we expect no intervention effects for this structure.

(57) *Derivation of [XP_{wh}] >> [whP] superiority-obeying question*

- a. Step 1: Q-particles are distributed; one is merged with every *wh*-phrase
[TP [QP₁] [whQP₂]
- b. Step 2: Probes are merged onto Force_{Q2}
 - i. Q-probe finds QP₁, Agrees with it and Attracts it to Spec,FocP.
 - ii. Q-probe *wh*-probe finds *wh*QP₂ and Agrees with it.
Via parasitic agreement, the other probe also Agrees with *wh*QP₂.
Q-probe triggers movement of *wh*QP₂ to Spec,FocP
- c. Result: superiority-obeying structure
[Force_{Q2} [Spec,FocP [QP₁] [whQP₂] [TP t₁ t₂]
- d. Expect: no intervention effects.

Consider now the option of activating the probes in the opposite order than in derivation (57). Instead of activating the Q-probe, we choose to make the *wh*-probe responsible for the first

instance of interrogative probing. In that case, the resulting structure is unlike any that we have seen before. The *wh*-probe will find the *lower wh*QP, since it is the first (and only) legitimate target for this probe; following parasitic agreement, both the *wh*-probe and the Q-probe will Agree with this phrase and the Q-probe will attract it to the *outer* specifier of FocP. Next, a Q-probe is activated; it will Agree with the remaining QP—the one which originates in the *higher* position in the tree—and Attract it to an *inner* specifier of FocP. The result is a superiority-obeying-like structure in which, crucially, no *wh*-phrase was left in situ. Consequently, we expect the question not to exhibit intervention effects.

(58) *Derivation of [XP_{wh}] >> [whP] superiority-violating question*

- a. Step 1: Q-particles are distributed; one is merged with every *wh*-phrase
[_{TP} [QP₁] [whQP₂]]
- b. Step 2: Probes are merged onto Force_{Q2}
 - i. *wh*-probe finds whQP₂ and Agrees with it.
Via parasitic agreement, Q-probe also Agrees with whQP₂.
Q-probe triggers movement of whQP₂ to Spec,FocP
 - ii. Q-probe finds QP₁, Agrees with it and Attracts it to Spec,FocP.
- c. Result: superiority-obeying-like structure
[Force_{Q2} [_{Spec,FocP} [whQP₂] [QP₁] [_{TP} t₁ t₂]]
- d. Expect: no intervention effects.

We observe, then, that whenever the Q-probe is activated first in a derivation, the resulting structure behaves similarly to English D-linked questions. This is not surprising, since the Q-probe is what is responsible for the derivation of English interrogative structures. The *wh*-probe in a language like English can never trigger movement. In Hebrew, on the other hand, the *wh*-probe can initiate a sequence of events that results in the (Q-)movement of *wh*-phrases. Consequently, if it is activated before a Q-probe, its selective nature yields an unusual movement patterns in which certain phrases are moved over others which appear to be invisible. This pattern is precisely what the surprising data introduced in section 3.1 exemplifies. The addition to the theory of a *wh*-probe that can trigger the movement of a subset of the legitimate targets of the Q-probe yields the exact behavior observed there. Consider again the two superiority-violating questions in (59)a-b.

(59) *Unexpected lack of intervention effect in superiority-violating question*

- a. *[et ma] ha-mora lo šixne'a [et mi] [likro ____]?
b. ?[ma] ha-mora lo šixne'a [et mi] [likro ____]?
(*OM) what the-teacher neg persuaded OM who to.read
'What did the teacher not persuade whom to read?'

In (59)b, if we assume that bare *ma* is a *wh*-headed-phrase and *et mi* is a *wh*-containing-phrase headed by *et*—analyzed here as a preposition—then we can use a derivation as in (58) to yield a structure with no *wh*-in-situ.²² We correctly predict this question will not exhibit intervention effects. The question in (59)a cannot be derived from a parallel structure. Rather, both *wh*-phrases in this structure are *wh*-containing-phrases. Hence, the only way to attract the lower *wh*-phrase over the higher one is by not merging a Q-particle with the higher phrase. If a Q-particle were merged with the higher phrase, it would necessarily be the first QP to be found by any probe and it would have to be attracted to the outermost specifier of FocP. Therefore, the higher *wh*-phrase must be left in-situ in order to allow the lower phrase to move to the outermost specifier of FocP, yielding the desired superiority-violating structure. In this case, unlike in the derivation of (59)b, we expect the question to exhibit intervention effects. This is indeed the attested pattern.

²² Note that this predicts that speakers for whom *et* is a genuine case marker and not a preposition will find (59)a grammatical and importantly different from questions with unambiguous full-fledged prepositions. So far I have only been able to find one speaker for whom this generalization appears to hold. All the other speakers I have consulted with (who accept superiority violations in general) do not perceive a difference between *et* and other prepositions.

Conclusion. To conclude, let me repeat the main arguments that I have made in this section. The exceptional behavior of Hebrew questions with the base-generated configuration: [*wh*-containing-phrase₁] >> [*wh*-headed phrase₂] led me to suggest that these two *wh*-phrases have a different status in Hebrew. In particular, I argued that *wh*-headed phrases are legitimate target to more Agree/Attract operations than *wh*-containing phrases. To capture this fact, I proposed two modifications to Cable's original theory. First, I proposed that in Hebrew, Q has an EPP feature which can cause head-movement of *wh* to Q when there are no intervening heads between the two.

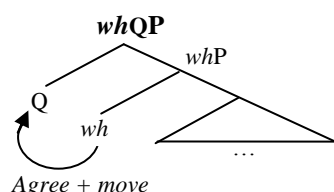
(60) *EPP feature of Q*

Q has an EPP feature which can trigger head-movement of the *wh*-word to Q.

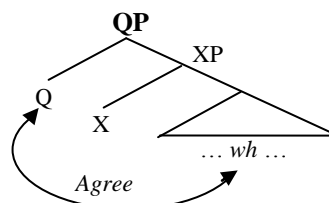
This allowed us to distinguish between *wh*-headed phrases, *wh*QPs, in which both *wh* and Q head the interrogative phrase, and *wh*-containing phrases, QPs, which are headed by Q alone.

(61) *Proposed Hebrew QP structure*

(a) *wh*-headed phrases: Q-*wh* Agree/move



(b) *wh*-containing phrases: Q-*wh* Agree only



Second, I proposed the addition of a *wh*-probe to the theory, while at the same time maintaining that Q-movement is the only available interrogative movement in natural language. The *wh*-probe can find a subset of the targets of the Q-probe—namely *wh*-headed phrases but not *wh*-containing phrases. The two probes can be activated freely in any derivation in any order we choose. I adopted the *parasitic Agreement* condition on probing, which states that once a probe on a given head has found an appropriate target, other probes on the same head may also Agree with that target. I showed that these two adjustments to the theory can correctly capture the complex set of facts observed in Hebrew multiple questions.

(62) *Parasitic Agreement:*

If a Probe on a certain head H has found a goal G, other probes on H can also enter into Agree/Attract relations with G.

Two properties – the number of Q-morphemes available in a question and the EPP feature on Q – thus predict the behavior of German, D-linked English and Hebrew.²³ German only has one Q-morpheme available per question. Hence we predict that it will exhibit intervention effects in superiority-obeying questions as well as superiority-violating ones.²⁴ D-linked English allows multiple Q-morphemes but does not have an EPP feature on Q, hence we predict that superiority-violating questions will uniformly all display intervention effects but that superiority-obeying ones will not. Hebrew allows multiple Q-morphemes and has an EPP feature on Q, hence we predict that along with superiority-obeying questions, some superiority-violating questions will also not display intervention effects, while others will.

(63) *Hebrew vs. D-linked English questions*

The only difference between Hebrew and D-linked English is in the EPP feature on Q.

The proposal advanced here thus incorporates all of the advantages of Cable's original theory but provides an explanation for an intricate set of data that is otherwise unexplained, as I have shown above. In addition, this proposal is conceptually more appealing than the original theory

²³ A third property – pronunciation of head vs. tail copies of movement chains – will predict the behavior of multiple *wh*-fronting languages like Bulgarian.

²⁴ Note that in languages that only allow one Q-morpheme per question, the possible effects of an EPP feature on Q are impossible to detect. Only one QP (or perhaps *wh*QP) may, and must, occur in the question in such a language, hence it will trigger movement by either the Q-probe or the *wh*-probe.

since allows us to provide a unified analysis of all interrogative probing: we may assume that every language has in its inventory both a *wh*-probe and a Q-probe. Hence, all QPs *and all wh-words* will be agreed with by an interrogative probe on the Force head. But since only QPs can move, we predict different semantic interpretation mechanisms and consequently different behavior patterns for moved QPs and for *wh*-in-situ—the former being impervious to interveners and the latter needing to transmit focus-alternatives up the tree, exposing them to intervention effects caused by other focus-sensitive elements in the derivation.

In Cable's (2007 et seq.) original work, only QPs are agreed with. *Wh*-words are semantically *bound* by a Force head, but they are in essence invisible to the outside syntax. The mechanism of *wh*-probing and Agreement is in place, but it is only used QP-internally to constrain the size of possible QPs in different languages. All QPs in *wh*-fronting languages are assumed to have the same structure, preventing any sensitivity to the content of QP. As we have seen, this result makes it impossible to account for Hebrew's sensitivity to material inside QP.

Finally, I note that the theory above makes one additional prediction: if we can find a two-place predicate that necessarily takes its complements in the order: $[XP_{wh1}] \gg [whP_2]$, it should exhibit the same behavior we observed for questions in which the two phrases, $[XP_{wh1}] \gg [whP_2]$, are separated by a non-finite clause boundary. As far as I can tell, however, all the Hebrew two-place predicates that take a *whP* as one of their complements are true ditransitives and hence can have two underlying structures, as shown in section 2 above. Consequently, it is impossible to test this prediction.

4. Readings of multiple questions²⁵

In addition to the correspondence between superiority and intervention effects, a third fact covaries with the grammaticality pattern of question types in Hebrew: superiority-obeying questions may have pair-list answers as well as single-pair answers, while superiority-violating questions may only have pair-list answers.

(64) *Superiority, intervention effects and readings of Hebrew questions*

- a. Superiority-obeying questions never exhibit intervention effects; they may have single-pair answers as well as pair-list answers.
- b. Superiority-violating questions are grammatical but they are sensitive to intervention effects; they may only have pair-list answers but not single-pair answers.

Golan (1993) and Reinhart (1998) suggest a view of superiority under which a superiority-violating question is possible only when its meaning is different than that of the superiority-obeying question. That is, economy principles like "shortest move" should be relativized to interpretation, (65): one convergent derivation blocks another if it has shorter links and results in an interpretively equivalent LF representation. Derivations resulting in non-equivalent LFs are not compared and hence cannot block each other. This condition is inspired on Fox's (2000) work showing that optional movement is motivated only if it has an effect on the output. Here I adopt a formulation of the semantic sensitive version of shortest move proposed in Fox (ms.).

(65) *Semantically Sensitive version of Shortest Move (SSSM)* Fox (ms.)

C must attract the closest *wh*-phrase it can to derive a designated semantic interpretation.

Questions with two *wh*-phrases can have two kinds of answers: single-pair and pair-list answers. Dayal (2002) shows that pair-list readings presuppose (a) Exhaustivity: that every member of the set quantified over by the overtly moved *wh*-phrase is paired with a member of the set quantified over by the in-situ *wh*-phrase; and (b) Point-wise uniqueness: that every member of

²⁵ I thank Danny Fox for bringing the argument in this section to my attention

the set quantified over by the overtly moved *wh*-phrase is paired with no more than one member of the set quantified over by the in-situ *wh*-phrase. Following Exhaustivity and Uniqueness, pair-list answers to superiority-violating questions and superiority-obeying questions are expected to yield different presuppositions, demonstrated in (66)-(67).

(66) *Exhaustivity presupposition:*

- a. Guess which one of these 3 kids will sit on which of these 4 chairs
good with a single-pair answer and with a pair-list answer
- b. Guess which one of these 4 kids will sit on which of these 3 chairs
only good with a single-pair answer Fox (ms.)

(67) *Uniqueness presupposition:*

- The Jones family (3 boys) will not sit down for dinner before the boys do all of the chores.
- a. I wonder which one of the 3 boys will do which one of the 3 chores.
- b. #I wonder which one of the 3 boys will do which one of the 4 chores.
Suggests that the boys will not do all of the chores. Fox (ms.)

The context in (66)a allows for a pair-list answer as well as a pair-list answer because it is possible to give an exhaustive answer that accounts for each of the children. In the context in (66)b, on the other hand, to give a pair-list answer we would be forced to assume that two kids are assigned to the same chair, making this reading deviant. Hence only a single-pair answer is felicitous in this context. Similarly, (67)a allows for a unique chore to be assigned to each boy, but (67)b leaves one chore that is not assigned to any boy, or else the 1:1 pairing is lost. Hence only a single-pair answer is felicitous in this context.

Under SSSM we predict that superiority violations should be impossible on a single-pair reading. A pair-list reading is licensed by SSSM, however, since overtly raising *wh*₂ over *wh*₁ yields different presuppositions than we would get from moving *wh*₁ overtly. This prediction seems to hold, as shown in (68). That is, both questions have felicitous pair-list answers, as predicted by SSSM. However, in a context in which the only available answer is single pair, the superiority-violating question becomes ungrammatical: the single-pair answer to the superiority-violating question in (68)b is unavailable because it is not semantically different from the single-pair answer to the superiority-obeying question in (68)a, and it is therefore ruled out by SSSM.

(68) *Single-pair reading unavailable for superiority-violating question (English)*

- I know one boy and one girl in this class had an affair. Can you tell me:
- a. Which boy had an affair with which girl?
- b. *Which girl did which boy have an affair with?

Wiltschko (1997) observes a similar pattern in German multiple questions: superiority-violating questions whose answers are contextually constrained to single-pair only are ungrammatical.

(69) *Ungrammaticality caused by blocking of pair-list reading (German)*

- (i) Peter is walking his stubborn dog on the leash. The dog is dragging really hard in the direction of his favorite tree.
 - a. Wer führt denn hier wen an der Leine?
who leads PRT here whom on the leash
'Who is leading whom here on the leash?'
 - b. *Wen führt denn hier wer an der Leine?
- (ii) I have heard that Peter and Mary had an affair. Can you tell me:
 - a. Wer hat wen verführt?
who has whom seduced
'Who seduced whom?'
 - b. *Wen hat wer verführt?

- (iii) I am sure that Peter and Mary must have talked to each other on the phone.
 - a. Weißt du, wer wen angerufen hat?
know you who whom called has
'Do you know who called whom?'
 - b. *Weißt du, wen wer angerufen hat? Wiltschko (1997)

The correlation between superiority and possible answers to questions also holds in Hebrew: superiority-obeying questions may have pair-list as well as single-pair answers. Superiority-violating questions may only have pair-list answers. Single-pair answers are ungrammatical.

(70) *Possible answers to superiority-obeying question: single-pair or pair-list*

- ani yoda'at [*mi*] kara [*ma*]
I know who read what
- a. Yosi kara et *LGB* ve-Dani kara et *Aspects*
Yosi read OM *LGB* and-Danny read OM *Aspects*
'Yosi read *LGB* and Danny read *Aspects*'.
- b. Yosi kara et *LGB*
Yosi read OM *LGB*
'Yosi read *LGB*'.

(71) *Possible answers to superiority-violating question: pair-list only*

- ani yoda'at [*ma*] kara [*mi*]
I know what read who
- a. et *LGB* kara Yosi ve-et *Aspects* kara Dani
OM *LGB* read Yosi and-OM *Aspects* read Danny
'Yosi read *LGB* and Danny read *Aspects*'.
- b. *et *LGB* kara Yosi

As in German, when answers to superiority-violating questions are contextually constrained to single-pair only, the result is ungrammaticality.

(72) *Ungrammaticality caused by blocking of pair-list reading (Hebrew)*

- (i) Peter is walking his stubborn dog on the leash. The dog is dragging really hard in the direction of his favorite tree.
 - a. [*mi*] molix kan [et *mi*] le-tiyul?
who walk here OM whom to-trip
'Who is walking whom here?'
 - b. *[et *mi*] molix kan [*mi*] le-tiyul?
- (ii) I have heard that Peter and Mary had an affair. Can you tell me:
 - a. [*mi*] pita [et *mi*]?
who seduced OM whom
'Who seduced whom?'
 - b. *[et *mi*] pita [*mi*]?
- (iii) I am sure that Peter and Mary must have talked to each other on the phone.
 - a. ata yodea [*mi*] hitkašer [le-*mi*]?
you know who called to-whom
'Do you know who called whom?'
 - b. *ata yodea [le-*mi*] hitkašer [*mi*]?

To summarize, we observe that superiority-obeying questions may have single-pair and pair-list answers, while superiority-violating questions may only have pair-list answers but not single-pair answers. This generalization is explained by the "semantically sensitive shortest move" economy principle, under which one convergent derivation blocks another if it has shorter links and results in an interpretively equivalent LF representation.

There is one (apparent) exception to the generalization about the correlation between readings and superiority: in questions with the configuration: [XP_{wh1}] >> [whP_2], we observe that the

superiority-violating question may have not only a pair-list reading but also a single-pair reading. That is, when the context is restricted so that only a single-pair answer is available, the $[XP_{wh1}] \gg [XP_{wh2}]$ question in (73)a cannot be used, but the parallel $[XP_{wh1}] \gg [whP_2]$ question in (73)b can still be felicitously asked. This is particularly striking because the two questions appear to be otherwise identical, with the exception of the presence of an overt object marker.

(73) *Single-pair answer unexpectedly possible in superiority-violating question*

I know that the teacher assigned one book to one particular child. Can you tell me:

- a. *[et ma] ha-mora šixne’a [et mi] [likro ____]?
OM what the-teacher persuaded OM who to.read
- b. ✓[ma] ha-mora šixne’a [et mi] [likro ____]?
what the-teacher persuaded OM who to.read
‘What did the teacher persuade whom to read?’

I would like to suggest that this behavior of the $[XP_{wh1}] \gg [whP_2]$ superiority-violating question is expected given SSSM. As we have seen, it is possible to derive (73)b from a superiority-obeying-like structure in which the *wh*-probe attracts the closest target it can find— $[whP_2]$ —and the Q-probe then attracts the closest target it can find, $[XP_{wh1}]$. Furthermore, it is not possible to assign (73)a a parallel derivation. Instead, (73)a must be derived from a superiority-violating structure in which $[XP_{wh1}]$ is not merged with Q. Rather, only $[XP_{wh2}]$ is merged with Q and attracted to by the Q-probe, leaving $[XP_{wh1}]$ in-situ. Consequently, (73)b constitutes an as-good LF for the single-pair reading as the superiority-obeying LF, but (73)a is not as good: in this derivation, C did not attract the closest *wh*-phrase that it could have in order to yield the single-pair reading. Instead, this derivation must skip the higher *wh*-word in order to attract the lower one.

As a result, the generalization we have discovered in this section is maintained despite the apparent counter-example. Not only does (73) not break the generalization, rather it strengthens the previous finding in this paper: *wh*-headed phrases are privileged not only with regard to intervention effects but also with regard to possible readings of the questions.

5. Conclusion

This paper provided several novel observations regarding the behavior of Hebrew multiple *wh*-questions. It established a correlation between the phenomena of superiority, intervention effects and possible readings of questions: Superiority-obeying questions never exhibit intervention effects; they may have single-pair answers as well as pair-list answers. Superiority-violating questions are grammatical but they are sensitive to intervention effects; they may have pair-list answers but not single-pair answers. These facts are captured within the theory of Q-particles under standard assumptions about superiority and intervention effects, using the principles of (revised) Attract Closest and the Semantically Sensitive version of Shortest Move.

The main empirical contribution of this paper is in showing that Hebrew has two kinds of *wh*-phrases: those that are headed by a *wh*-word (*wh*-headed phrases: *what*, *who*, $[DP \text{ which } X]$, *where*, *how* ...) and those that contain a *wh*-word but are headed by some other element (*wh*-containing phrases: $[NP \text{ N of } wh]$, $[PP \text{ P } wh]$). *Wh*-headed phrases are privileged in that they can be targeted by more Agree/Attract operations than *wh*-containing phrases. The evidence supporting this claim came from three sources: superiority, intervention effects and readings of the questions. In all these cases, we observe the special status of the *wh*-headed phrase when it is positioned structurally lower in a question than a *wh*-containing phrase: we find that certain operations target the lower *wh*-headed phrase and appear not to notice the presence of the higher *wh*-containing phrase in the same structure at all. There are no operations that target *wh*-containing phrases only, however: instead, we observe that *wh*-containing phrases are legitimate targets for a proper subset of the operations which target *wh*-headed phrases.

The sensitivity of interrogative probing operations to material inside QP is surprising and unexpected within the current Q-theory framework. I proposed to capture the intricate behavior that this sensitivity gives rise to by making two additions to the theory: first, I proposed that the Hebrew Q has an EPP feature that can trigger movement of *wh* to Q when there is no intervening head between the two. This yields two kinds of *wh*-phrases in Hebrew: those that are headed by Q alone (*wh*-containing phrases, QPs) and those that are headed by both *wh* and Q (*wh*-headed phrases, *wh*QPs). Moreover, I proposed that although the only kind of interrogative movement in language is Q-movement, we must assume in our theory a *wh*-probe alongside the Q-probe. The Q-probe operates in the familiar way, targeting any kind of QP regardless of its head. The *wh*-probe, on the other hand, targets *wh*QPs and bare *wh*-words and cannot detect the presence of “simple” QPs. The principle of *parasitic agreement* ensures that after the *wh*-probe Agrees with a *wh*QP, the Q-probe can also Agree with the same phrase and move it to C.

The modified system of interrogative probing developed in this paper correctly predicts all of the intricate data surveyed here. That is, we have the means of predicting that interrogative probing can be sensitive to the head of Q’s sister, and of predicting that *wh*-headed phrases are subject to a wider array of Agree/Attract operations than other phrases. Furthermore, I argued that this proposal is not only empirically superior to the original proposal in Cable (2007 et seq.) but that it is also conceptually more appealing, since it allows all interrogative phrases in a question to be syntactically Agreed with. In the original proposal, only QPs are syntactically visible to the derivation. *Wh*-words that are not merged with Q are given interrogative semantics through a special mechanism that differs from the one that interprets QPs but they are otherwise syntactically invisible to the derivation. The proposal developed here allows for a unification of the syntactic processes that derive interrogative syntax while maintaining that the semantic interpretation of the two kinds of interrogative elements is distinct.

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Appendix: Finiteness and the re-emergence of superiority

All of the data presented so far in the paper came from mono-clausal *wh*-questions and from questions with a non-finite embedded clause. In these configurations, we have seen that Hebrew allows superiority violations. When a finite clause-boundary is introduced between the two *wh*-phrases, however, superiority-violations become ungrammatical. Example (74) shows a superiority effect for a superiority-violating question in which a lower *wh*-containing phrase has been moved over a higher *wh*-containing phrase.

- (74) *Superiority effect when wh-phrases separated by clause boundary*: [XP_{wh}] >> [XP_{wh}]
- a. [et *mi*] ha-mora šixne’a ____ [CP še-Yosi kara [et *ma*]]?
 OM who the-teacher persuaded that-Yosi read OM what
 ‘Who did the teacher persuade that Yosi read what?’
- b. *[et *ma*] ha-mora šixne’a [et *mi*] [CP še-Yosi kara ____]?
 OM what the-teacher persuaded OM who that-Yosi read
 ‘What did the teacher persuade whom that Yosi read?’

Similarly, superiority-violating questions in which a lower *wh*-phrase (of any kind) is moved across a finite clause-boundary over a higher *wh*-headed phrase are ungrammatical, as shown in (75)a-b.²⁶

(75) *Superiority effect when wh-phrases separated by clause boundary*: [*whP*] >> [...]

- a. *[et *ma*] šixne'a [mi] et Dani [_{CP} še-Yosi kara ____]?
OM what persuaded who OM Danny that-Yosi read
'What did who persuade Danny that Yosi read?'
- b. *[*ma*] šixne'a [mi] et Dani [_{CP} še-Yosi kara ____]?
what persuaded who OM Danny that-Yosi read
'What did who persuade Danny that Yosi read?'

A similar effect has been observed for German (see Fanselow 1997, Müller 2003, a.o.).

(76) *Superiority effects with long-distance movement (German)*

- a. wer₁ hat t₁ geglaubt [_{CP} dass der Fritz wen mag
who has believed that the Fritz whom likes
'Who believed that Fritz likes whom?'
- b. *wen₂ hat wer₁ geglaubt [_{CP} dass der Fritz t₂ mag
whom has who believed that the Fritz likes (Müller 2003)

We have seen, then, that long distance movement of a *wh*-phrase out of a lower clause across a *wh*-phrase in a higher clause is not allowed.²⁷

This generalization has just one exception, exemplifying again the privileged status of *wh*-headed phrases: in questions with the base-generated configuration [*XP_{wh}*] >> [*whP*], it is possible to form a superiority-violating question by moving a lower *wh*-headed phrase over a higher *wh*-containing phrase across a clause boundary (cf. (74), repeated here in (77)a-b). Surprisingly, the resulting question is grammatical, but only has a pair-list reading. Furthermore, in this configuration intervening negation causes an intervention effect, (78). Recall that in the parallel question with a non-finite clause boundary negation did *not* cause an intervention effect. The crucial data is repeated in (79).

(77) *No superiority effect in the configuration*: [*XP_{wh}*] >> [*whP*]

- a. [et *mi*] ha-mora šixne'a ____ [_{CP} še-Yosi kara [et *ma*]]?
OM who the-teacher persuaded that-Yosi read OM what
'Who did the teacher persuade that Yosi read what?'
- a. *[et *ma*] ha-mora šixne'a [et *mi*] [_{CP} še-Yosi kara ____]?
OM what the-teacher persuaded OM who that-Yosi read
'What did the teacher persuade whom that Yosi read?'
- b. ?[*ma*] ha-mora šixne'a [et *mi*] [_{CP} še-Yosi kara ____]?
what the-teacher persuaded OM who that-Yosi read
'What did the teacher persuade whom that Yosi read?'

(78) *Negation causes an intervention effect*

- a. [et *mi*] ha-mora **lo** šixne'a ____ [_{CP} še-Yosi kara [*ma*]]?
OM who the-teacher neg persuaded that-Yosi read what
'Who did the teacher not persuade that Yosi read what?'

²⁶ Parallel questions without stylistic inversion are also ungrammatical.

²⁷ Of course it is possible to ask a simple question in which the only *wh*-phrase has moved out of an embedded clause, as in (i), and also to ask multiple questions in which both of the *wh*-phrases originate in an embedded clause, see e.g. examples (83)-(85).

- (i) (et) [*ma*] Dani xošev [_{CP} še-Yosi kara ____]?
OM what Danny think that-Yosi read
'What does Danny think that Yosi read?'

- b. *[*ma*] ha-mora **lo** šixne'a [et *mi*] [_{CP} še-Yosi kara ____]?
 what the-teacher neg persuaded OM who that-Yosi read
 ‘What did the teacher not persuade whom that Yosi read?’

(79) *No intervention effect in question with non-finite clause boundary*

- [*ma*] ha-mora **lo** šixne'a [et *mi*] [likro ____]?
 what the-teacher neg persuaded OM who to.read
 ‘What did the teacher not persuade whom to read?’

Similar effects can be observed with *wh*-adjuncts: Recall that in questions with an embedded clause, *wh*-adjuncts such as *eyx* (‘how’) can modify either the predicate in the higher clause (‘how did the teacher do the persuading?’) or the predicate in the lower clause (‘how was the traveling done?’). In the case of questions with a non-finite clause boundary we observed that it is possible to ask both a superiority-obeying question and a superiority-violating question. Furthermore, as in the case of [_{XP_{wh}}] >> [_{whP}] with bare *what* in (79) above, the superiority-violating question is not sensitive to intervention effects, cf. (44)-(45) in section 3.1.

When a finite clause boundary separates the two predicates that the *wh*-adjunct can modify we observe that as in the case of [_{XP_{wh}}] >> [_{whP}] with bare *what*, it is possible to form both a superiority-obeying question and a superiority-violating question, as indicated by underlining in the glosses in (80)a-b. That is, the version of (80)b in which the *wh*-adjunct originates in the embedded clause and moves over the higher *wh*-containing phrase *is* grammatical. In addition, the version of (80)b in which the *wh*-adjunct originates in the same clause as the *wh*-containing phrase is also grammatical, as we would expect under our present analysis.

(80) *Both superiority-obeying and superiority-violating questions possible; wh-adjunct can associate with both the higher and lower predicate*

- a. [et *mi*] ha-mora šixne'a ____ [_{CP} še-Yosi nasa li-yrušalayim [*eyx*]?
 OM who the-teacher persuaded that-Yosi traveled to-Jerusalem how
 ‘Who did the teacher persuade that Yosi traveled to Jerusalem how?’
 ‘Who did the teacher persuade that Yosi traveled to Jerusalem how?’
- b. [*eyx*] ha-mora šixne'a [et *mi*] [_{CP} še-Yosi nasa li-yrušalayim ?
 how the-teacher persuaded OM who that-Yosi traveled to-Jerusalem
 ✓ ‘How did the teacher persuade whom that Yosi traveled to Jerusalem?’
 ✓ ‘How did the teacher persuade whom that Yosi traveled to Jerusalem?’

As in the case of example (78)b above, the superiority-violating question—in which the *wh*-adjunct is interpreted as modifying the lower predicate and hence must have originated in the embedded clause—is sensitive to intervention effects. Again, this effect only occurs when there is a finite clause boundary and not when there is a non-finite clause boundary, cf. (82). We observe a different behavior when the *wh*-adjunct originates in the higher clause: this question can be given a derivation under which it is not superiority violating, parallel to the derivations we have seen in section 3.2; hence, we expect that it will not be sensitive to interveners. As (81)b shows, this behavior is exactly what we in fact find.

(81) *Intervention effect when how is interpreted in the embedded clause*

- a. [et *mi*] ha-mora **lo** šixne'a ____ [_{CP} še-Yosi nasa li-yrušalayim [*eyx*]?
 OM who the-teacher neg persuaded that-Yosi traveled to-Jerusalem how
 ‘Who did the teacher not persuade that Yosi traveled to Jerusalem how?’
 ‘Who did the teacher not persuade that Yosi traveled to Jerusalem how?’
- b. [*eyx*] ha-mora **lo** šixne'a [et *mi*] [_{CP} še-Yosi nasa li-yrušalayim ?
 how the-teacher neg persuaded OM who that-Yosi traveled to-Jerusalem
 ✓ ‘How did the teacher not persuade whom that Yosi traveled to Jerusalem?’
 * ‘How did the teacher not persuade whom that Yosi traveled to Jerusalem?’

- (82) *No intervention effect in question with non-finite clause boundary*
 [eyx] ha-mora lo šixne'a [et mi] [linsoa li-yrušalayim ____] ?
 how the-teacher neg persuaded OM who to.travel to-Jerusalem
 ✓ 'How did the teacher not persuade whom to travel to Jerusalem?'
 ✓ 'How did the teacher not persuade whom to travel to Jerusalem?'

Lastly, note that this effect only occurs when the two *wh*-phrases are separated by a clause-boundary: as we have seen in section 2, we do not observe superiority effects in matrix questions or in questions with a non-finite embedded clause. We also do not observe any superiority effects when both of the two *wh*-phrases originate in an embedded clause, as demonstrated in examples (83)-(85).

- (83) *No superiority effect with two embedded wh-phrases: [XP_{wh}] >> [XP_{wh}]*

- a. [im mi] ata xošev [CP še-Beni diber ____ [al ma]] ?
 with who you think that-Benny spoke about what
 lit.: 'With who do you think that Benny spoke about what?'
 b. [al ma] ata xošev [CP še-Beni diber [im mi] ____] ?
 about what you think that-Benny spoke with who
 lit.: 'About what do you think that Benny spoke with whom?'

- (84) *No superiority effect with two embedded wh-phrases: [whP] >> [whP]*

- a. [mi] Yosi xošev [CP še-____ amar [ma]] ?
 who Yosi think that said what
 'Who does Yosi think that said what?'
 b. [ma] Yosi xošev [CP še- [mi] amar ____] ?
 what Yosi think that-who said
 'What does Yosi think that who said?'

- (85) *No superiority effect with two embedded wh-phrases: [whP] >> [XP_{wh}]*

- a. [mi] Yosi xošev [CP še-____ rakad [im mi]] ?
 who Yosi think that danced with who
 'Who does Yosi think that danced with whom?'
 b. [im mi] Yosi xošev [CP še- [mi] rakad ____] ?
 with who Yosi think that-who danced
 'What does Yosi think that who said?'

To summarize the finding of this section, we find that as in German, it is generally impossible to move a lower *wh*-phrase over a higher *wh*-phrase across a finite clause-boundary in a Hebrew multiple question. Unlike in German, there is a single exception to this generalization in Hebrew: it is possible to move a *wh*-headed phrase over a *wh*-containing phrase across a clause boundary. This again demonstrates the privileged status of *wh*-headed phrases in Hebrew. Surprisingly, unlike in the case of non-finite clause boundaries, where no intervention effects were observed, in the case of finite clause boundaries the superiority-violating questions are sensitive to the presence of interveners.

Proposal: Locality constraints on the EPP requirement

The data above again exemplify the privileged status of *wh*-headed phrases with regard to movement options, but it also shows that the added freedom of movement of these phrases should be constrained by a locality condition that is sensitive to finiteness of CP.

Recall that in section 2 I argued that Agree is a strictly local operation, such that it induces a strict ordering on all the targets of a given probe based on the notion of c-command. In section 4 I adopted a semantically sensitive version of 'shortest move', SSSM, which requires us to choose the derivation with the shortest possible links given a particular choice of meaning. Hence, single-pair readings can only be obtained from superiority-obeying questions but pair-list readings can be obtained both from superiority-obeying questions and superiority-violating questions. Thus,

Attract too imposes a strict ordering of operations, relative to a choice of meaning. In this section I will argue for a third kind of locality condition on EPP satisfaction which will not induce a strict ordering of operations on probing; rather, it will regard all interrogative phrases in a given (finite) clause as equidistant. I will show how the proposal developed in section 3 of the paper can be extended using this condition to derive the superiority and intervention effect data surveyed here in the appendix.

Like English, Hebrew requires exactly one *wh*-phrase to be overtly pronounced at the head of a question. If several instances of movement occurred in a derivation, it is the highest QP that is pronounced in its moved position. All other movement chains are pronounced at the tail of their respective chains.

(86) *Pronunciation rule (English, Hebrew)*

Pronounce the highest QP in FocP in its high position, all other QPs in their trace positions.

I adopt here the assumption that the EPP is a feature on Force_Q that it is satisfied by the movement of some QP into the specifier of FocP. That is, EPP must be satisfied by some instance of Q-movement triggered by an Agree operation initiated by some interrogative probe on Force_Q. Moreover, I propose that EPP must be satisfied by the first probe that is activated in the derivation and that it must be satisfied within a local domain.^{28, 29}

(87) *EPP Satisfaction Condition (ESC)*

The EPP must be satisfied by the first probe that is activated in the derivation, *in the highest finite clause in which it is possible to do so*.

Following ESC, all *wh*-phrases within a certain finite clause are equidistant in terms of EPP satisfaction. The decision of which element in a set of equidistant targets will be chosen to move first and hence satisfy EPP is relegated to SSSM, which in turn requires movement of the closest possible *wh*-phrase that will result in a desired interpretation. Note that ESC can constrain the possible derivations allowed by SSSM: whenever it is possible to satisfy EPP in a higher clause, it must be done even at the expense of eliminating potential derivations from the grammar.

To see the effect of ESC, consider the possible range of derivation available to [XP_{wh}] >> [XP_{wh}] questions in which the two *wh*-phrases are separated by a finite clause boundary. Following ESC, we prefer to satisfy EPP in the higher clause rather than in the lower clause. Hence, the derivation must proceed by merging a Q-particle with the higher [XP_{wh}]. A derivation which lacks a Q-particle on the higher *wh*-phrase is ruled out by the better derivation which satisfies ESC. Once the higher QP has been moved to Spec,FocP, it is possible to merge a Q-particle with the lower [XP_{wh}] and move it to Spec,FocP as well. As a result we predict that we can only have a superiority-obeying question in this configuration and that it will not exhibit intervention effects.

(88) *Derivation of [XP_{wh}] >> [CP-fin [XP_{wh}] superiority-obeying question*

- a. Step 1: Q-particles are distributed; one is merged with every *wh*-phrase

$$[_{TP} [QP_1] [_{CP-fin} [QP_2]]$$
- b. Step 2: Probes are merged with Force_{Q2}.
 - i. Q-probe finds the higher QP, Agrees with it and Attracts it.
 - ii. Q-probe finds the lower QP, Agrees with it and Attracts it
- c. Result: superiority-obeying structure. ESC is satisfied.

$$[Force_{Q2} [_{Spec,FocP} [QP_1] [_{CP-fin} t_2]] [_{TP} t_1]$$
- d. Expect: no intervention effects. Single-pair and pair-list answers.

²⁸ See Soare (2007) for a proposal under which C has two independent EPP features: a *wh*-EPP feature and a Q-EPP feature.

²⁹ This can be thought of as an instance of the Phase Impenetrability Condition (Chomsky 1998): *Move operates only on locally available items*. What is important is that elements in the edge of a lower clause are accessible for movement operations but that they are not as-good targets for movement as elements in a higher clause.

Note that EPP must be satisfied by a Q-probe. Since there are no *wh*Ps in this question-type, any derivation that attempts to satisfy ESC using a *wh*-probe will not succeed in fulfilling the EPP requirement and will hence be ruled out by a derivation that satisfies ESC using a Q-probe. Note further that a superiority-violating question is ruled out in a $[XP_{wh}] \gg [CP_{fin} [XP_{wh}]]$ configuration because ESC is violated: the availability of the derivation in (88), in which a QP from the higher clause is overtly moved, blocks the derivation in (89) in which a QP from a lower clause would move first, despite the fact that it would lead to a distinct interpretation that is sanctioned by SSSM.

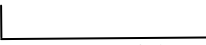
(89) *Derivation of $[XP_{wh}] \gg [CP_{fin} [XP_{wh}]]$ superiority-violating question crashes*

- a. Step 1: Q-particles are distributed; only lower phrase is merged with Q-particle
 $[TP [XP_{wh1}] [CP_{fin} [QP_2]]$
- b. Step 2: Probes are merged with $Force_{Q+}$.
 - i. Attempt to satisfy EPP with Q-probe would violate ESC
 - ii. Attempt to satisfy EPP with *wh*-probe would fail because $[XP_{wh1}]$ can't move.
- c. Result: CRASH
- d. Expect: superiority-violating question is ungrammatical.

The notion of competition is implicit in many other researchers' work, including in the work presented elsewhere in this paper. For example, in the derivation of superiority-obeying questions in section 3.2 I assumed that the "best" derivation given a certain set of constraints on a question is always used. This assumption is needed in order to explain the interaction of superiority-obeying questions with potential interveners in Hebrew and in questions with D-linked *wh*-phrases in English. Recall that superiority-obeying questions are not sensitive to intervention effects; as a result I proposed derivations for these questions that use the $Force_{Q2}$ head which requires movement of both QPs in the question to Spec,FocP (see for example the derivation in (53)). However, as we have also seen, English and Hebrew must in addition have the $Force_{Q+}$ head in their lexicon. This is the head that is responsible for the derivation of superiority-violating questions since it binds one *wh*-word in situ and attracts just one QP to Spec,FocP. In principle, there is nothing preventing the derivation of a superiority-obeying question that contains an intervener from a structure in which only the higher *wh*-phrase has been merged with Q and moved to Spec,FocP, leaving the lower *wh*-phrase in situ, as in (90).

(90) *Unavailable structure for English/Hebrew superiority-obeying questions*

$[Force_Q [Spec,FocP [[wh\text{-phrase}_1] Q] [TP \dots \text{intervener} \dots t_1 \dots [wh\text{-phrase}_2] \dots]]$



No Q-particle

In fact, (90) is the structure we would like to assign to German superiority-obeying questions: unlike Hebrew and English, German exhibits intervention effects for superiority-obeying questions as well as superiority-violating questions. This fact prompted Cable (2007 et seq.) to suggest that German only has a $Force_{Q+}$ head but not a $Force_{Q2}$ head in its lexicon. While we cannot rule out the existence of structures like (90) for Hebrew and English questions when there is no intervener present, we know that it is not the one that is chosen in case there is an intervener present: in that case, the question must be derived from a structure with as many Q-particles as *wh*-phrases and not from one like (90), since we do not observe intervention effects.

A similar logic guides our reasoning with regard to the EPP requirement and ESC: whenever a Q-probe is charged with satisfying EPP, its best recourse is to attract the *wh*-phrase in the higher clause. Hence a derivation in which a Q-particle is not merged with the a higher *wh*-phrase (but rather a lower *wh*-phrase) and instantiates the first occurrence of movement in the question is not by itself illegal, just as the derivation of superiority-obeying questions from a structure like (90) is not by itself illegal—rather it is ruled out by the alternative derivation in which the higher *wh*-phrase is merged with Q and moves, satisfying ESC in the higher clause.

With this discussion in mind, it is easy to see that in a configuration in which any two *wh*-phrases are separated by a finite clause boundary, whenever a Q-probe is charged with satisfying EPP the higher *wh*-phrase must be moved first, else ESC is violated. This predicts that in German, long-distance superiority-violating *wh*-questions will be ungrammatical, as observed in section 4.2. Furthermore, it predicts that in questions with the based-generated configurations $[XP_{wh1}] \gg [XP_{wh2}]$ (as seen above), $[whP_1] \gg [XP_{wh2}]$ and $[whP_1] \gg [whP_2]$, superiority-violating questions will be ungrammatical whenever there is a finite clause-boundary separating the two phrases. For questions with a high *wh*-headed phrase, charging the *wh*-probe with EPP satisfaction will lead to the same result: the “best” target for EPP satisfaction under the ESC is the phrase in the higher clause. Hence, we again predict that superiority-violating questions should not be available in these cases.

Our predictions change when we consider the configuration: $[XP_{wh1}] \gg [whP_2]$. As noted above, whenever a Q-probe is charged with satisfying EPP the resulting question will be superiority-obeying. This generalization holds in this case too, as shown in (91).

- (91) *Derivation of $[XP_{wh}] \gg [CP_{fin} [whP]]$ superiority-obeying question*
- a. Step 1: Q-particles are merged; one is merged with every *wh*-phrase
 $[TP [QP_1] [CP_{fin} [whQP_2]]$
 - b. Step 2: Probes are merged onto $Force_{Q2}$
 - i. Q-probe finds the higher QP, Agrees with it and Attracts it to Spec,FocP
 - ii. Q-probe *wh*-probe finds $whQP_2$ and Agrees with it.
Via parasitic agreement, the other probe also Agrees with $whQP_2$.
Q-probe triggers movement of $whQP_2$ to Spec,FocP
 - c. Result: superiority-obeying structure. ESC is satisfied.
 $[Force_{Q2} [Spec,FocP [QP_1] [whQP_2]] [TP t_1 [CP_{fin} t_2]]$
 - d. Expect: no intervention effects. Single-pair and pair-list answers.

However, if the *wh*-probe is charged with EPP satisfaction—and hence no Q-particle is merged with the higher *wh*-containing phrase—we predict that a superiority-violating question will be available. The *wh*-headed phrase in the lower clause is the best (and only) target that the *wh*-probe can attract to Spec,FocP, satisfying ESC. Within such a derivation, the *wh*-probe will also Agree with the *wh*-word within the higher *wh*-containing phrase but will not Attract it, since it is not merged with a Q-particle. We thus correctly predict that although a superiority-violating question is available, it will be sensitive to potential interveners and it will only have pair-list answers.

- (92) *Derivation of $[XP_{wh}] \gg [CP_{fin} [whP]]$ superiority-violating question*
- a. Step 1: Q-particles are distributed; only lower phrase is merged with Q-particle
 $[TP [XP_{wh1}] [CP_{fin} [whQP_2]]$
 - b. Step 2: Probes are merged onto $Force_{Q+}$
 - i. *wh*-probe finds the (higher) XP_{wh} , Agrees with it but cannot Attract it
 - ii. *wh*-probe finds the (lower) $whQP_2$ and Agrees with it
Via parasitic agreement, the Q-probe also Agrees with $whQP_2$.
Q-probe triggers movement of $whQP_2$ to Spec,FocP
 - c. Result: superiority-violating structure. ESC is satisfied.
 $[Force_{Q+} [Spec,FocP [whQP_2]] [TP [XP_{wh1}] [CP_{fin} t_2]]$
 - d. Expect: intervention effects. Pair-list answers only.

As in the case of the exceptional case of superiority-violating questions with a non-finite clause-boundary, here again we observe the exceptional behavior of *wh*-headed phrases when the derivation proceeds by activating the *wh*-probe before the Q-probe. Furthermore, this is again a case in which the order of activation of the probes yields crucial differences. ESC hence allows for a generalization of the exceptional behavior of *wh*-headed phrases in finite and non-finite contexts.

Since ESC allows different targets to satisfy EPP whenever they are in the same clause or if they are separated only by a non-finite clause boundary, we predict that all of the derivations of mono-clausal questions in section 3 will not be affected by the ESC. Furthermore, we correctly predict the availability of a superiority-violating question alongside a superiority-obeying question whenever both of the *wh*-phrases are in an embedded clause. Lastly, we are able to predict the re-emergence of the superiority effect in bi-clausal questions and the behavior of the exceptions which have the configuration: $[XP_{wh}] \gg [whP]$. Whether ESC can be motivated on independent grounds is left as a matter for future research.