Wh-Fronting in a Two-Probe System

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Abstract. Prior work on *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 discussed in the current literature. It will show that Hebrew distinguishes between two kinds of interrogative phrases: those that are headed by a *wh*-word (<u>*wh*-headed phrases</u>: *what*, *who*, [DP *which* X], *where*, *how* ...) and those that contain a *wh*-word but are headed by some other element (<u>*wh*-containing phrases</u>: [NP N *of wh*], [PP P *wh*]). 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 an Agree/Attract operation that ignores the presence of the c-commanding *wh*-containing phrase. The paper develops an account of the sensitivity of interrogative probing operations to the head of the interrogative phrase within Cable's (2010) 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 modifications to the theory can account for the intricate dataset that emerges from the paper. The emerging picture is one in which interrogative probing does not occur wholesale but rather can be sensitive to particular interrogative features on potential goals.

Wh-movement, Q-particles, Superiority, Probe-goal relations.

1. Introduction

Wh-phrases of different levels of complexity may sometimes have varying degrees of freedom in the movement operations that apply to them. In English, for example, superiority-violating multiple questions as in (1)b lead to ungrammaticality (Chomsky 1973).

(1) *Superiority effect (English)*
    a.   Who ___ bought what?
    b. *What did who buy ___ ?

    An early description of the superiority phenomenon is given in Kuno and Robinson (1972):

(2) *Kuno and Robinson's constraint*
    A *wh*-word cannot be preposed crossing over another *wh*.

Following this proposal, superiority violations are explained by a principle such as Attract Closest, requiring an ordering of movement operations (Relativized Minimality: Rizzi 1990, 2001; Minimal Link Condition, MLC: Chomsky 1995, 2000). In this paper, I adopt a version of Attract Closest inspired by Pesetsky (2000) under which it is Agree, not Attract, that is subject to strict locality, (3). 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 (Chomsky 1998, 1999).

(3) *Agree with Closest (AC)*

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).

If we assume that in English multiple questions, all interrogative phrases[1] must move to C by LF in an order preserving manner (tucking in, Richards 1997), and the pronunciation rule in (4):

(4) *Pronunciation rule (English)*   (cf. Pesetsky 1998, 2000)

Pronounce the highest interrogative phrase in Spec,CP in its high position, all other interrogative phrases in their trace positions.

we predict that (1)a may be derived from a structure in which *who* and *what* are Agreed with and Attracted to C in order: [*who*$_1$ [*what*$_2$ [C … t$_1$ … t$_2$]]]. There is no derivation that could allow *what* to occupy the highest specifier of C: to arrive at such a structure we must either leave *who* in situ and attract *what* over it: *[*what*$_2$ [C … *who*$_1$ … t$_2$]]], or we must cross movement paths instead of tucking in when we move *what* following the movement of *who*: *[*what*$_2$ [*who*$_1$ [C … t$_1$ … t$_2$]]]. As a result, (1)b is predicted to be ungrammatical.

Pesetsky (1987) observes that English questions with D-linked interrogative phrases allow superiority violations in cases where simple *wh*-words do not.

(5) *D-linked questions can violate superiority*
  a. Which person ___ bought which book?
  b. Which book did which person buy ___?

We can explain the grammaticality of (5) if we assume that in the case of D-linked English questions, unlike with non-D-linked questions, it suffices that just one interrogative phrase move to C at LF (Pesetsky 2000). Hence, the superiority-obeying (5)a can be derived from a structure in which both interrogative phrases move to C at LF, just as in the case of (1)a. The superiority-violating (5)b is derived from a structure in which both interrogative phrases have been Agreed with but only the lower one has undergone movement, leaving the higher interrogative phrase in situ. The schematic description of superiority-obeying questions and superiority-violating questions is given in (6).

(6) *Structure of superiority-obeying and superiority-violating questions*
  a. [$_{Spec,CP}$ [interrogative phrase$_1$] [interrogative phrase$_2$] [C [$_{TP}$ … t$_1$ … t$_2$]]]   superiority-obeying
  b. [$_{Spec,CP}$ [interrogative phrase$_2$] [C [$_{TP}$ … [interrogative phrase$_1$] … t$_2$]]]   superiority-violating

English Superiority-violating questions have been shown to be sensitive to intervention effects induced by elements like negation and *only* (É. Kiss 1986, Pesetsky 2000). Such effects occur only in superiority-violating questions, (7)b, but not in the corresponding superiority-obeying questions, (7)a.

(7) *Intervention effect in a D-linked question (English)*
  a. Which person ___ didn't buy which book?
  b. *Which book didn't which person buy ___?

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[1] I use the term *interrogative phrase* pre-theoretically to refer to the phrase that is observed to pied-pipe in overt *wh*-movement.

Following Beck (2006), I assume that intervention effects occur when a focus-sensitive element—in the terms of Rooth (1992), an element associated with the squiggle operator, ~C—is introduced between an in-situ *wh*-word and the head with which it Agrees. The structural configuration of an intervention effect is given in (8).

(8)   *LF Configuration of an intervention effect*
          *[C [... INTERVENER ... *wh*-word ...]]   (Beck 2006)

Given this schema for intervention effects, we predict that such effects should arise for superiority-violating questions when an intervener is introduced between the higher *wh*-word, which is left in situ, and C. We expect not to find intervention effects for superiority-obeying questions, since both interrogative phrases in that question move to C by LF. This prediction is summarized in (9) below.

(9)   *The interaction of superiority and interveners at LF*
          a. Superiority-obeying question:
             ✓ [$_{Spec,CP}$ [interrogative phrase$_1$] [interrogative phrase$_2$] [C [$_{TP}$ … intervener … t$_1$ … t$_2$]]]
          b. Superiority-violating question:
             * [$_{Spec,CP}$ [interrogative phrase$_2$] [C [$_{TP}$ …intervener … [interrogative phrase$_1$] … t$_2$]]]

This paper examines in depth the behavior of multiple *wh*-questions in Modern Hebrew. In section 2 of the paper I show that Hebrew questions behave similarly to D-linked English ones: superiority-violating questions are grammatical, but sensitive to intervention; superiority-obeying questions are grammatical and not sensitive to intervention effects. In addition to this familiar pattern, in section 3 I show a novel distinction in Hebrew interrogative phrases. I argue that Hebrew distinguishes between two kinds of interrogative phrases: those that are headed by a *wh*-word (<u>*wh*-headed phrases</u>: *what*, *who*, [$_{DP}$ *which* X], *where*, *how* …) and those that contain a *wh*-word but are headed by some other element (<u>*wh*-containing phrases</u>: [$_{NP}$ N *of wh*], [$_{PP}$ P *wh*]). *Wh*-headed phrases have a privileged status in the language: they can be targeted by Agree/Attract operations that ignore *wh*-containing phrases in the same structure. As a result, in questions with a lower *wh*-headed phrase and a higher c-commanding *wh*-containing phrase, we find superiority-violating questions that are not sensitive to intervention effects. I argue that such questions are derived from a structure in which the first movement operation targets the *wh*-headed phrase, even though it occurs lower in the structure. A subsequent operation attends to the remaining (higher) *wh*-containing phrase. Consequently, it is possible to derive superiority-violating questions from a structure that is predicted not to be sensitive to intervention effects. In section 4, I develop an account of this phenomenon within Q-particle theory (Cable 2007, 2010). I argue that Hebrew has two kinds of interrogative phrases, QPs and *wh*QPs, and two interrogative probes, a Q-probe and a *wh*-probe, each probing for one particular interrogative feature: *wh* or Q. I show how these assumptions derive the behavior pattern of Hebrew multiple questions. In section 5 I present additional evidence for the privileged status of *wh*-headed phrases from the possible readings of the questions. In an appendix to the paper I discuss the methodology used to collect the judgments that this paper is based on.

This paper thus makes two contributions: empirically, it introduces a novel kind of *wh*-fronting language unlike those that are currently discussed in the literature—one in which interrogative probing is sensitive to the head of its potential goals. *Wh*-headed phrases have an additional feature distinguishing them from *wh*-containing phrases, which allows them greater freedom in movement. Theoretically, the paper argues that interrogative probing is sensitive to two features – *wh* and Q – and that the two form dependencies such that interrogative phrases share the Q feature but only a subset of them possess the *wh*

feature. Interrogative probes search for the closest goal *that matches their featural needs* and are blind to all other material in the question, including interrogative phrases that lack the required feature(s).

2. Superiority and intervention effects in multiple questions

In this section I discuss the distribution of superiority and intervention effects in Hebrew mono-clausal multiple questions and in questions that contain a non-finite embedded clause. I show that the correlation observed for D-linked 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). This result supports the structures in (6) and (9) as correct descriptions of the pattern of data observed here. In section 4 I will adopt a reformulation of these analyses based on Q-theory.

Here and throughout the paper, the superiority judgments I report represent some but not all Hebrew speakers, with younger generations generally accepting superiority violations more readily than older ones. Even when acceptable, speakers generally prefer superiority-obeying questions to superiority-violating ones. This phenomenon is not unique to Hebrew, but has also been reported for other languages (e.g. Featherston 2005 for German). In fact, the preference for "canonical" word orders extends to other constructions such as topicalization and scrambling and has been reported for many languages (see Fanselow et al. 2008 for a discussion of this phenomenon in German and Czech). Despite its generality, the preference for canonical orders is normally not stressed enough in the superiority literature. Although it introduces confounds when eliciting judgments for superiority violations—most acutely when eliciting judgments about intervention effects (which are notoriously hard to judge)—speakers consistently report a difference in the acceptability of superiority-obeying and superiority-violating questions. See the Appendix for a discussion of the conditions under which the judgments were obtained.

2.1 Subject-Object questions

I begin the discussion of Hebrew multiple questions by examining simplex questions that inquire about the subject and object of the matrix predicate.[2] Such questions 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 (10)c; (11)c or with stylistic inversion as in (10)b; (11)b.[3] Many speakers find questions with stylistic inversion preferable to ones without it.

Subject-object questions: object can raise over subject

(10) a. [*mi*] ___ kara [*ma*]?
　　　 who 　　read what
　　　 'Who read what?'
　　 b. [*ma*] kara [*mi*] ___?
　　　 what read who

(11) 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

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[2] Here and throughout this paper I restrict my attention to multiple questions that contain exactly two interrogative phrases. I leave the investigation of more complex questions for future work.
[3] 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).

'What did who read?'   'Which book did which boy read?'

c. $^?$[*ma*] [*mi*] kara ___?   c. $^?$[*eyze sefer*] [*eize yeled*] kara ___?
what who read   which book which boy read

'What did who read?'   'Which book did which boy read?'

When an intervener is introduced into (10)a-c, the superiority-obeying question remains grammatical but the superiority-violating questions exhibit intervention effects and are ungrammatical.[4] For consistency, I use negation as the only intervener in all my examples — but the same pattern of grammaticality obtains with other interveners. Since Hebrew is a strict negative concord language, I adopt the proposal argued for by Zeijlstra (2004) that the semantic negation in Hebrew occurs above the subject position and hence higher than the overt sentential negative marker.[5]

(12) *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 Object-Object questions

Hebrew has two classes of two-place verbs. The crucial difference between the two groups of verbs is whether their complements have two possible underlying orders, such that either of the two complements can be higher in the tree (2-order ditransitives), or just one underlying structure, such that one of the complements always appears higher than the other (1-order ditransitives). Whether a verb has just one underlying structure or two can be determined via 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' have only one underlying argument structure.[6]

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[4] For reasons of brevity and readability, in what follows I only present examples with simplex *wh*-words. Questions with D-linked phrases show the same pattern of grammaticality as English D-linked phrases and as the questions with simplex *wh*-words presented here.

[5] Note that here it is crucial to assume that the relevant operator for calculation of intervention effects is the semantic negation which occurs above the subject, and not the sentential negative marker: if the negative marker itself were the intervener then the intervention effect in (12)c would be unexpected, since *lo* is structurally lower than both of the interrogative phrases in the question.

[6] Example (i) below shows that 2-order ditransitives pass the condition A binding test under both constituent orders. Example (ii) shows that 1-order ditransitives pass the test only under one constituent order.

(i)   a. Theme ≫ Goal
      Dan$_i$ *her'a* [et ha-yeladim$_j$] [exad l.a-šeni$_j$]
      Dan   showed OM the-children one to.the-second
      'Dan$_i$ showed the children$_j$ to each other$_j$.'
    b. Goal ≫ Theme
      Dan$_i$ *her'a* [l.a-yeladim$_j$] [exad et ha-šeni$_j$]
      Dan   showed to.the-children one OM the-second

For both verb-classes, it is possible to construct a multiple *wh*-question moving either of the two complements to the higher Spec,CP position. Example (13) shows this for a 2-order ditransitive verb, and example (14) shows this for a 1-order ditransitive verb. Crucially, given that 2-order ditransitives have two possible underlying structures, I assume that the overtly moved interrogative phrase in both examples (13)a and (13)b started out in the structurally higher position. In (14), only one underlying complement order is possible, as indicated in the example. This gives each question-type the least-marked argument structure possible.

(13) *Questions with 2-order ditransitives*: both complements can raise to Spec,CP
    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?'

(14) *Questions with 1-order 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?'

The fact that 2-order ditransitives have two underlying argument structures entails that both (13)a and (13)b can be construed as superiority-obeying questions. Since 1-order ditransitives take their complements in just one order, it follows that (14)a is a superiority-obeying question but (14)b is superiority-violating. Given this, our analysis makes different predictions for possible intervention effects in questions with two-place predicates: 2-order ditransitives should never exhibit intervention effects, and 1-order ditransitives should exhibit intervention effects for the superiority-violating question but not for the superiority-obeying one. Examples (15)-(16) confirm these predictions: we observe an intervention effect for the superiority-violating question with a 1-order ditransitive but no intervention effect for the questions with 2-order ditransitives.[7]

    'Dan$_i$ showed the children$_j$ to each other$_j$.'
(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)

[7] See Belletti and Shlonsky (1995) for a different view of ditransitives, under which ditransitives with NP and PP complements have the underlying order NP PP. The order PP NP is derived as the result of focalization. This theory predicts that 2-order ditransitives and 1-order ditransitives should pattern alike with regard to intervention effects. In particular, we expect questions with the order PP NP to be sensitive to intervention effects, contrary to fact. To maintain this theory we would have to explain why focalization bleeds intervention effects for verbs with NP PP

(15) *2-order 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?'

(16) *1-order ditransitives:* Negation causes an intervention effect in superiority-violating question
    a. [im *mi*] ha-ozer   šel-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-ozer   šel-i   **lo** diber [im *mi*] ___?
       about what the- assistant of-1sg neg spoke with whom
       'About what didn't my assistant speak with whom?'

2.3   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 structure in which the higher interrogative phrase overtly moves to Spec,CP and a superiority-violating structure in which the lower interrogative phrase is moved over the higher interrogative phrase to Spec,CP, (17). As before, there is again a general preference for the superiority-obeying question over the superiority-violating question, but both are grammatical.

(17) *Questions with non-finite embedded clause:* lower *wh* can raise over higher *wh*[8]
    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?'

When an intervener is introduced into the question above the lower copy (or trace) of *et mi*, we observe an intervention effect for the superiority-violating question but not for the superiority-obeying one.

(18) *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

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complements, but not for verbs with PP PP complements. A theory that explains superiority in terms of scrambling (e.g. Wiltschko 1997, Fanselow 1998) faces a similar challenge. I leave this issue open at this time.
[8] Here and in other similarly complex examples, some speakers prefer to have additional material in the embedded clause in order to improve the prosody of the question – for example, temporal adjuncts such as "*for next week's class*" or sentential embedding under "*Guess …*" This added material does not affect grammaticality judgments, rather it appears to improve the prosody of the question and ease pronunciation, and is hence omitted here. See the Appendix for more discussion of this fact.

'What did the teacher not persuade whom to read?'

If negation is placed lower in the question – below the lower copy (or trace) of *et ma* but above *et mi*, as in (19) – the resulting questions in both the superiority obeying (19)a and the superiority-violating (19)b are judged as grammatical. This teaches us that 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, the resulting question is grammatical. Only when negation occurs between the *wh*-in-situ and C does an intervention effect arise.

(19) *Negation causes an intervention effect in superiority-violating question*
  a. [et *mi*] ha-mora   šixne'a ___ [**lo** likro   [et *ma*]]?
    OM who the-teacher persuaded   neg to.read OM what
    'Who did the teacher not persuade to read what?'
  b. [et *ma*] ha-mora   šixne'a   [et *mi*] [**lo** likro ___]?
    OM what the-teacher persuaded OM who neg to.read
    'What did the teacher not persuade whom to read?'

To summarize the findings of this section, we observe a consistent pattern of grammaticality in Hebrew multiple questions: superiority-violating questions exhibit intervention effects, but superiority-obeying questions do not. This pattern follows if we assume that superiority-obeying questions are derived from a structure in which at LF, no *wh*-word is left below any potential intervener. Superiority-violating questions are derived by attracting a lower interrogative phrase over a higher interrogative phrase that is left in-situ, exposing it to potential intervention effects from intervening focus-sensitive elements, (20).

(20) *The interaction of superiority and interveners at LF*
   a. superiority-obeying question:
    ✓ [$_{\text{Spec,CP}}$ [interrogative phrase$_1$] [interrogative phrase$_2$] [C [$_{\text{TP}}$ … intervener … t$_1$ … t$_2$]]]
   b. superiority-violating question:
    * [$_{\text{Spec,CP}}$ [interrogative phrase$_2$] [C [$_{\text{TP}}$ …intervener … [interrogative phrase$_1$] … t$_2$]]]

3 Two kinds of interrogative phrases in Hebrew

In this section I turn to my argument that Hebrew distinguishes between two kinds of interrogative phrases:[9] 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 that appear not to be sensitive to the presence of c-commanding *wh*-containing phrases in the same structure. 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. The grammaticality pattern that will emerge in this section is unpredicted and not explained by existing theories of superiority and intervention effects. In section 4 I develop an analysis of the data that is based on Cable's (2010) Q-particle theory, with two modifications: a formal way of distinguishing between *wh*-headed phrases and *wh*-containing phrases, and a probing system that is sensitive to this distinction.

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[9] Recall that I use this phrase to refer to the phrase that would front, should overt *wh*-movement occur.

In section 2 we observed a correlation between superiority and intervention effects in 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 that unexpectedly do not exhibit intervention effects, despite an intervener occurring in identical configurations to those discussed above, which are predicted to yield such effects.

The data comes from a closer examination of questions with a non-finite embedded clause such as (17)-(18), repeated here as (21)-(22). The data in (21)-(22) 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.

(21) *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?'

(22) *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 in examples (21)-(22), the object marker *et* precedes the *wh*-word *ma* ('what'). Following Danon (2001), I note that *et* can optionally be omitted when it occurs before *ma* and that it fulfills a role similar to that of D-linking in English, in requiring an answer chosen from a contextually-familiar set.[10] Other characterizations of *et* argue that it must precede specific or definite objects in Hebrew (see for

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[10] Unlike *ma*, the object marker cannot be omitted from *mi* 'who'. Thus, the question in (ib) is degraded compared to (ia), whereas both (iia) and (iib) are grammatical questions in Hebrew. This effect, I believe, is due to the special status of *mi* and not that of *ma*: *et* must precede animate objects and proper names, whereas it can be omitted before inanimate objects under certain circumstances. As a result, *et* must always precede *mi* but it can be omitted before *ma*.

    (i) a. mi   ra'a et mi?
             who saw OM who
        b. *mi   ra'a   mi?
    (ii) a. mi   ra'a et ma?
             who saw OM what
        b. mi   ra'a   ma?

As an anonymous reviewer points out, this pattern follows the general typological pattern of differential argument encoding (Aissen 1999, 2003 and references therein). If *et* is viewed as a differential object marker, then, it follows that its presence or absence has visible effects on the syntax. Consequently, theories which suggest that differential object marking is purely a morphological phenomenon (e.g. Keine and Müller 2009) cannot be maintained.

example Winter 1999, Falk 2001). In this paper, I will treat *et* as a preposition, following Danon (2001) and Falk (2001).[11] This means that there are two additional relevant structures that we should examine—those that contain a lower bare *ma* without the object marker. These examples are given in (23). We observe that, as before, a superiority-obeying question and a superiority-violating question are both grammatical.

(23) *Questions with non-finite embedded clause:* lower *wh* can raise over higher *wh*
    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 (23), we observe a surprising result: *negation does not cause an intervention effect in the superiority-violating question (24)c, despite appearing to create the illicit configuration* *[C [... INTERVENER ... wh-word ...]]. Compare again the parallel question that does contain the object marker, (24)b (=21b), 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 the object marker.

(24) *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 (25)-(26) below. I note that since the contexts that 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 (24), *which*-phrases also introduce a number presupposition (i.e., *which boy* requires answer-pairs that necessarily consist of a single boys and a second member of the pair, *which boys* requires answer-pairs of plural boys and a second member of the pair). For the questions in (25)-(26) 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 (25)-

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[11] Parallel examples with full-fledged prepositions replicate the judgments reported here. This data is omitted from the paper for space reasons – but, importantly, it again highlights the fact that the behavior reported in the paper is not a special property of the object marker *et* but rather of the structure of interrogative phrases in Hebrew.

(26). Despite the complication of the elaborate context, the speakers I have consulted detect a difference between the status of (25)b and that of (26)b. Since, unlike in the case of (24)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, these examples crucially show that the phenomenon discussed in this paper is not limited to particular features of the object marker but rather extend to a larger class of interrogative phrases. Examples (25)-(26) below show one more case in which these effects are reproduced.

(25) *Well-behaved data from superiority-violating questions with* which-*phrase containing PP*
    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?'

(26) *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 factor 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 intervening *wh*-containing phrases. As a result, examples like (24)c can be derived from a structure in which no interrogative 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. As a result, (24)c can be derived from a superiority-obeying-like structure, predicting that it will not be sensitive to intervention effects. (24)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 operation in the derivation. As a result, we correctly predict that (24)b will be sensitive to intervention effects while (24)c will not.

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 it is not the case that *wh*-headed phrases and *wh*-containing phrases are attracted by completely different means. Rather, there is an asymmetry in the status of the two types of interrogative phrases in Hebrew: while a *wh*-headed phrase may be targeted by an operation that ignores *wh*-containing phrases, any operation that can apply to a *wh*-containing phrase can also apply to a *wh*-headed-phrase. As a result, *wh*-headed phrases can never be ignored by an interrogative Agreement operation. At the same time, there are no operations that privilege *wh*-containing phrases. Consequently, in a question with a higher *wh*-headed phrase and a lower *wh*-containing phrase, we observe a grammaticality pattern that conforms to the generalization regarding superiority and intervention effects that was developed in section 2: a superiority-violating question is grammatical, (27)a, but it is sensitive to intervention effects, (27)b.

(27) *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. [al *eyze* maške] ha-mad'an   šixne'a [*eyze* mištatef]   [le-hacbi'a ___]?
        to which beverage the-scientist asked   which participant to.point
        'Which beverage did the scientist persuade which participant to point to?'
    b. *[al *eyze* maške] ha-mad'an **lo** šixne'a [*eyze* mištatef]   [le-hacbi'a ___]?
        to which beverage the-scientist neg asked   which participant to.point
        'Which beverage did the scientist not persuade which participant to point to?'

To summarize, we have seen several cases in which in a configuration as in (28), the lower *wh* appears to enter into a direct relation with the probe, skipping the higher *wh*.

(28) [Probe … [P wh_1] … wh_2]

One might imagine that this results from the fact that the higher *wh* fails to c-command the lower *wh* because it is contained inside a PP. Hence both *wh*s are equidistant from the probe, and there exist two derivations, each with a different *wh* being the target of the first probing operation, predicting the lack of intervention effects. While this line of explanation could predict that a bare *wh* may be privileged over a [P *wh*], it has unwelcome consequences when we consider a wider range of data. [12]

The assumption that wh_1 does not c-command wh_2 in the configuration above leads us to predict that wh_1 does not c-command wh_2 in the configuration in (29) as well:

(29) [Probe … [P wh_1] … [P wh_2]].

This would lead to the prediction that no intervention effects should be observed in this case. As was shown in section 2, this is true for 2-order ditransitives but not for 1-order ditransitives, cf. (15)-(16). To solve this problem, we may pursue an explanation that requires counting the number of "barriers"—phases, maximal projections, or some other relevant notion—separating the *wh* from the probe. Although we may be able to predict that wh_2 is farther away from the probe, we again make unwanted predictions. In particular, we predict that we should see the behavior pattern observed in this section in configurations in which a higher *wh* is embedded sufficiently deep inside a large structure, and the lower-occurring *wh* is less embedded. That is, we predict that wh_2 may be as close, or even closer, to the probe than wh_1 in configurations such as (30), and hence that a superiority-violating question can be assigned superiority-obeying like structures, contrary to fact[13]. In the following section I will not pursue this line of explanation any further, and rather develop an analysis that is grounded in Q-particle theory.[14]

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[12] Another reason why this proposal might be unlikely is that, in general, prepositions do not block c-command between a DP and an anaphor or bound-variable pronoun for the purpose of establishing binding relations, as shown in the data in footnote 6. Since Hebrew DPs that are contained inside PPs—including *et*-marked DPs—can serve as antecedents for anaphors and pronouns, we may infer that these prepositions also do not block c-command relations for the purpose of interrogative feature-checking. I thank Marcel den Dikken for pointing this out to me.

[13] Furthermore, this approach predicts that we should not encounter an intervention effect in (ib) since it can be derived from the same superiority-obeying like structure as postulated in examples (24)c and (26)b. However, (ib) is judged as ungrammatical.

    (i) a. [al   *ma*] ha-ozer   šel-i diber [im ha-mazkira shel *mi*]?
          about what the-assistant of-1sg spoke   with the-secretary of who
          'About what did my assistant speak with whose assistant'
      b. *[al   *ma*] ha-ozer   šel-i **lo** diber [im ha-mazkira shel *mi*]?

(30)   [Probe … [P [D [P wh_1]]] … [P wh_2]]
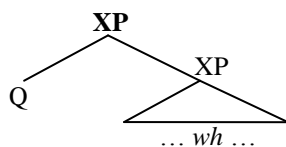
4.   Multiple questions in Q-particle theory

In this section I develop an analysis of the surprising findings of section 3 within the framework of Q-particle theory (Cable 2007, 2010). I first provide a brief survey of the theory in section 4.1, and then present my account of Hebrew questions in section 4.2.

## 4.1   Q-particles and the theory of multiple questions

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 et seq.). In Cable's work, overt movement of *wh*-phrases as well as so-called pied-piping are recast as instances of Q-movement (cf. Hagstrom 1998 and subsequent work). 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 (or Q-morpheme), which must move to C in time for interpretation. The Q-particle attaches directly to a *wh*-word or to some larger structure that contains a *wh*-word—an interrogative phrase, marked as XP in (31).

(31) *Possible QP structures in Cable (2010)*
        (a) *wh*-in-situ languages   (b) *wh*-fronting languages

XP   **QP**
Q   XP   Q   X   XP
        … wh …   … wh …
                                                          Agree
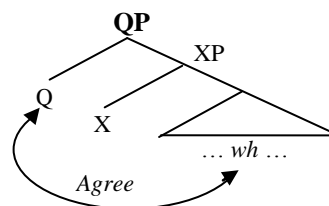
The possible merger sites of the Q-morpheme are regulated via a locality-sensitive Agree operation between the Q-particle and the *wh*-word. The difference between *wh*-in-situ languages and *wh*-fronting languages lies in the way in which Q-morphemes project after they have been merged into the derivation: if X projects, we derive a *wh*-in-situ language in which Q alone must move to C, (32).

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        about what the- assistant of-1sg neg spoke with the-secretary of   who
   'About what didn't my assistant speak with whose assistant'

[14] I thank Norvin Richards and an anonymous reviewer for a discussion of this alternative analysis.

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

CP
CP   Q
TP   C_Q
XP
Adjunction { XP   Q   *Agree/ Attract*
... *wh*-word ...   *(covert/overt) movement*
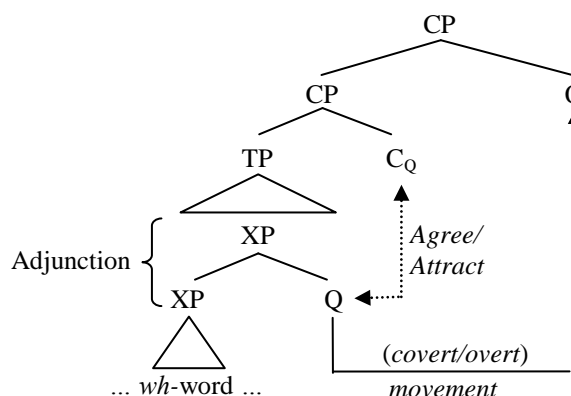
If following merger with XP, Q projects a QP layer, it is the whole QP—Q along with its sister—that is attracted to C following interrogative probing, (33). The result is movement of a structure containing a *wh*-word and potential additional structure, commonly referred to as pied-piping. Q-theory thus provides an explanation for pied-piping that does not rely on feature-percolation.

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

CP
QP   XP
Complementation { XP   Q   C_Q   TP
... *wh*-word ...   *Agree/ Attract*   QP
Overt movement
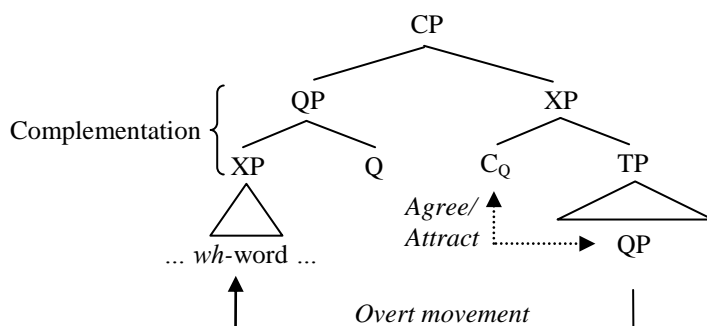
In this framework, interrogative syntax and semantics involve two crucial components: a *Q-particle* which undergoes Agree with *wh*-words and regulates their semantics, and a *Q-probe* in the CP layer which is responsible for Agree and movement operations of QPs and for interrogative meaning. Crucially for Q-theory, natural language has only 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. *I will argue below that although the theory excludes wh-movement, it must nonetheless include a wh-probe*, in order to account for the Hebrew data.

Within Q-theory, grammatical superiority violations in English questions with D-linked phrases are explained by assuming that it is possible for such questions to contain fewer Q-particles than *wh*-words. Furthermore, it is proposed that all QPs must move to the left edge of the clause in order to be interpreted as interrogatives, using a choice-function semantics equivalent to the Karttunen (1977) semantics for questions.[15] Adopting the theory of the left-periphery in Rizzi (1997), Cable argues that QPs move to the Specifier of a Focus projection directly below the interrogative Force head which is responsible for probing for Q-elements and for Q-movement, as shown in (34). We also assume that movement obeys

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[15] Cable assumes existential closure over choice functions at the IP level. As a result, QPs that do not move to the CP periphery are interpreted as *wh*-indefinites and not as interrogatives.

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).

(34)   *The left periphery of interrogative clauses*
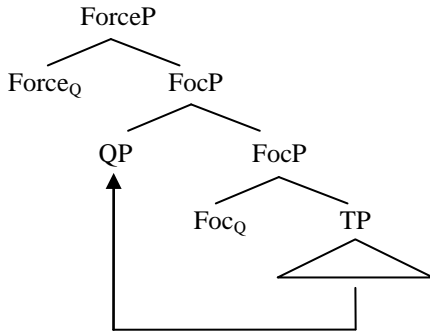
Lastly, we assume the pronunciation rule as in (35), the English equivalent of which was given in (4) above: when there are multiple elements in the specifiers of FocP, the highest one is pronounced at the head of its movement chain and the rest are pronounced at the tail of their respective chains.

(35) *Pronunciation rule (Hebrew)*
     Pronounce the highest QP in FocP in its high position, all other QPs in their trace positions.

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. To derive superiority-violating questions, on the other hand, the higher interrogative phrase must not have a Q-particle as its sister; rather, it must remain in situ, allowing the lower interrogative 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 (36)a-b below.[16]

(36) *Structure of superiority-obeying and superiority-violating questions*
     a. [$Force_Q$ [$_{Spec,FocP}$ [[interrogative phrase$_1$] Q] [[interrogative phrase$_2$] Q] [$_{TP}$ … t$_1$ … t$_2$]]]   sup.-obeying
     b. [$Force_Q$ [$_{Spec,FocP}$ [[interrogative phrase$_2$] Q] [$_{TP}$ … [interrogative-phrase$_1$] … t$_2$]]]   sup.-violating

Turning our attention to the Hebrew data presented in section 2, we find at first blush that Hebrew behaves like D-linked English: superiority-violating questions are grammatical, but they are sensitive to intervention effects. Cable's analysis of intervention effects in Q-theory is sketched in (37). When an interrogative phrase is not merged with Q, it must be interpreted using a mechanism of percolation of focus-alternatives from the in-situ interrogative phrase to the Force head in the CP layer that is responsible for assigning the question interrogative semantics.[17] Any focus-sensitive element that occurs

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[16] 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 interrogative phrase that is overtly moved. This option is already present in the analyses proposed by Pesetsky (2000) and Cable (2010). In fact, Cable (following Beck 2006) assumes that this is the only possible analysis of multiple questions in German. What is crucial is that the analysis presented in the text is available in Hebrew and English. Consequently, superiority-obeying questions in Hebrew and English can be derived from a structure in which all interrogative phrases are merged with Q and moved to C by LF. Hence, we can predict that superiority-obeying questions in Hebrew and English, but not German, are not sensitive to intervention effects.

[17] This mechanism is equivalent to the use of Hamblin sets, and the semantics Cable assigns to the Force head that interprets these sets is equivalent to the Hamblin (1973) semantics for questions.

between the wh-in-situ and C intervenes in this process and causes ungrammaticality.[18] All the data in section 2 can be explained by assuming that they behave as in (36)-(37).

(37) *The interaction of superiority and interveners at LF*
      a. Superiority-obeying questions: no intervention effect
         ✓ [Force$_Q$ [$_{Spec,FocP}$ [[interrogative phrase$_1$] Q] [[interrogative phrase$_2$] Q] [$_{TP}$ … intervener … t$_1$ … t$_2$]]
      b. Superiority-violating questions: intervention effects
         * [Force$_Q$ [$_{Spec,FocP}$ [[interrogative phrase$_2$] Q] [$_{TP}$ …intervener … [interrogative phrase$_1$] … t$_2$]]]

4.2 Interrogative probing in a two-probe system

The lack of intervention effects in some of the superiority-violating questions in section 3 is surprising under the theory sketched in section 4.1 as well as in other 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 that trigger these operations.[19] As a result, Cable's theory predicts that all multiple questions behave similarly with respect to superiority and intervention effects: superiority-obeying questions do not exhibit intervention effects, but superiority-violating questions do. In what follows I will adopt this analysis. To predict the possibility of the Hebrew pattern observed in section 3, I propose two modifications to this analysis: first, I propose that Hebrew distinguishes between QPs and *wh*QPs; and second, I introduce a *wh*-probe into the probing system: unlike the Q-probe, this probe will only be able to find *wh*QPs but not regular QPs. The *wh*-probe is incapable of triggering movement on its own, but it can set a sequence of events into motion that will result in the movement of *wh*QPs. As a result, a superiority-violating question with a lower *wh*QP and a higher QP can be derived from a superiority-obeying-like structure in which the *wh*QP is targeted by the first instance of probing by the *wh*-probe, and a subsequent operation targets the higher QP. By the end of the derivation both phrases move to C, predicting the lack of intervention effects.

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 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. Hence, 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

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[18] The need to treat all interveners, including negation, as focus-sensitive elements despite the fact that they do not show clear effects of association with focus is somewhat disturbing. In future work, I hope to develop a better characterization of these intervention effects, which I hope will not affect the analysis provided in this paper.

[19] I note exceptions such as Hornstein and Weinberg (1990), who explain the pattern of English superiority effects—that is, the fact that simple questions do not allow superiority-violations but D-linked questions do—by exploiting the fact that in D-linked phrases, the interrogative phrase contains additional material beside the *wh*-word *which*. This allows Hornstein and Weinberg to develop a theory that explains superiority effects in D-linked questions by assuming that it is possible for *which* to move alone, stranding its sister NP in its base-generated position. Such an option is not available to simplex *wh*-words. While sensitivity to the presence or absence of additional material in the interrogative phrase is critical for this theory, the nature of that content is immaterial to the theory. Below I will argue that the nature of the interrogative phrase—that it, its headedness—is critical for the analysis of Hebrew. I thank an anonymous reviewer for brining this point to my attention.

movement operation, resulting in a superiority-obeying-like structure with both interrogative 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 QPs and *wh*QPs. 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 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 interrogative phrases. As we saw in section 4.1, QPs in a *wh*-fronting language are created by merging Q with some phrase that contains a *wh*-word and projecting Q. The size of constituent to which a Q-morpheme can attach 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. Once the 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, (38). Head-movement is blocked, however, if an intervening head occurs between *wh* and Q.[20]

(38) *EPP feature of Q*
   Q has an EPP feature that can trigger head-movement of the *wh*-word to Q.

Furthermore, I adopt the analysis of head-movement as *Project Both* (Citko 2008, but see also other work arguing for similar conclusions, e.g. Abney 1987 on the need for sensitivity to properties of N as well as D, and the *extended projections* idea of Grimshaw 2005 [1991], Radford 1993, among others). Under this account of head-movement, the Probe and the Goal both project once movement has occurred. Citko (2008) shows that this proposal has welcome consequences in predicting syntactic and semantic effects of head-movement (unlike PF accounts of the phenomenon) and in avoiding violations of the Extension Condition.

Given *Project Both*, *w*e 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 interrogative phrases in Hebrew: *wh*-headed phrases, or *wh*QPs, and *wh*-containing phrases, or QPs.[21] The

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[20] A reviewer asks why intervening P and D heads should block head movement of *wh* to Q. If nothing blocks this movement, we predict a language that only contains *wh*QPs. Such a language will behave the same as English; that is, it is not distinguishable from a language in which Q has no EPP feature at all. A different pattern would emerge from a language that has at its disposal a Q with an EPP feature and a second one that does not have an EPP feature, since this allows us to observe both QPs and *wh*QPs within the same language. This is one way to interpret the optionality of *wh*-to-Q movement in Hebrew.

[21] Alternatively one may assume that QP is a phase, and furthermore that it is only the complement of the head of the phase that becomes opaque when the phase is shipped to the interfaces. Consequently, *wh* will be visible for outside probing operations when it is the head of the phrase that Q merges with, following head movement of *wh* to

derivation of *wh*-in-situ languages and of English/German *wh*-fronting languages proceeds as described in Cable (2010) (cf. (31) above).

(39) *Proposed Hebrew QP structure*

    (a) *wh*-headed phrases: Q-*wh* Agree/move (b) *wh*-containing phrases: Q-*wh* Agree only
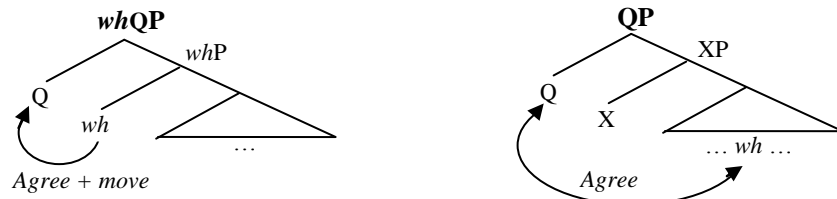
With this distinction in mind we must now explain how Agree/Attract operations interact with the two kinds of QPs we have created. Let us assume that like other *wh*-fronting languages, Hebrew has in its inventory a Q-probe that can target any QP. This probe operates in Hebrew just as in English and German: it can Agree with any Q-headed phrase, hence with both kinds of QPs, (39)a and (39)b, in Hebrew. In addition to the Q-probe, I propose that all languages have in their lexicon a <u>*wh-probe*</u>, which like the Q-probe, occurs on the interrogative Force head.[22] This probe can find two kinds of targets: it can find bare *wh*-<u>*words*</u> which did not project any structure, and it can find *wh*-headed <u>*phrases*</u>, that is *wh*QPs as in (39)a.[23]

Despite being able to trigger Agreement, the *wh*-probe cannot by itself trigger movement.[24] That is, the *wh*-probe does not have an EPP feature of its own. What is special about a *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 C head. Hence, a *wh*QP can move as soon as it has been Agreed with by *some* probe, regardless of which one it is.[25] 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

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Q. *wh* will be invisible if it is contained inside larger structure – that is, inside a *wh*-containing phrase – since it cannot head-move out of this structure and adjoin to Q. In that case, only the Q-feature is visible to outside probing operations but the *wh*-feature is not. In this way, we can derive the *wh*QP – QP distinction without assuming co-headedness of interrogative phrases.

[22] This proposal thus joins a large body of work that argues that different kinds of A-bar movement can be triggered in more than one way, for example by using different probes or by leaving behind gaps or resumptive pronouns (cf. McCloskey 1990, Manzini 1992, Postal 1998, among many others.)

[23] See Soare (2007) for a similar proposal in which both a Q-head and a *wh*-head exist in the left periphery of the clause, and for the possibility that one or both of these heads could have an EPP feature. This proposal is different than the one advanced here in that the two heads occur in different positions in the structure. As long as the two probes can be activated in either order, however, my proposal is consistent with this state of affairs. I note that my proposal predicts additional movement not predicted by Soare's proposal because of the presence of parasitic Agree.

[24] Such an option would predict the movement of single *wh*-words to C, stranding the interrogative phrases that contain them in their base-position, contrary to fact. The probe's ability to trigger movement of phrase in addition to Agreement with it could be seen as a matter of cross-linguistic variation. Under this view, for example, Japanese would be treated as a language in which only the *wh*-Probe can trigger movement which the Q-probe may Agree with *wh*-phrases but not move them. This would result in movement of the -ka Q-morpheme alone to C, as argued e.g. in Watanabe (1992).

[25] Note that this does not violate Freezing: while the *wh*-word itself cannot move any further following its Agree/move to Q, following Agreement the QP has its own active *wh*-feature which can be found by the *wh*-Probe.

Parasitic Agreement (cf. Bhatt 2005 on infinitival agreement, Adger 2007) for this state of affairs (see also Miyagawa 2010 and Richards, ms., for similar proposals).[26]

(40) *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.[27]

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 phrase$_1$] $\gg$ [*wh*-headed phrase$_2$], (41)a, but that in other configurations, (41)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.

(41) *Possible configurations of questions with two interrogative phrases*

a. *wh*-containing-phrase	$\gg$	*wh*-containing-phrase	[XP$_{wh}$] $\gg$ [XP$_{wh}$]
b. *wh*-headed phrase	$\gg$	*wh*-headed phrase	[*wh*P] $\gg$ [*wh*P]
c. *wh*-containing-phrase	$\gg$	*wh*-headed phrase	[XP$_{wh}$] $\gg$ [*wh*P]
d. *wh*-headed phrase	$\gg$	*wh*-containing-phrase	[*wh*P] $\gg$ [XP$_{wh}$]

Let us begin by considering the derivation of the superiority-obeying questions and superiority-violating questions with structures as in (41)a-b, that is, questions that contain two interrogative phrases of the same kind. Since there are no features distinguishing the two phrases in these questions, we predict that they will exhibit similar behavior to that of D-linked English: in order to attract the lower phrase to the highest specifier of FocP, it is necessary to leave the higher phrase in situ. As a result, we predict that the superiority-violating question in both structures will be sensitive to intervention effects. Below I give a detailed derivation of the question in (41)a.

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[26] An anonymous reviewer notes that parasitic Agree allows the MLC to be violated in certain configurations. I would like to argue that this outcome is in fact desirable. It does not require an abandonment of the MLC but rather suggests that optimal links can be obtained in more than one way in different derivations.

[27] An anonymous reviewer suggests that the notion of Minimality (Starke 2001, Rizzi 2001, a.o.) can replace the notions of Parasitic Agree and Project both, if both Q and *wh* are viewed as interrogative features. Under this view, a phrase with more features is a "better" candidate for movement than one with less features. Consequently, a *wh*-headed phrases are better targets than a *wh*-containing phrases, even if they occur in a structurally lower position in the structure, predicting that they will be preferred by the interrogative probe. I note that this straightforward proposal makes the undesirable prediction that a derivation in which the *wh*-containing phrase is overtly moved must result in a superiority-violating structure, and should be sensitive to intervention effects. This is not the case, as we have seen above. As a result, the theory will have to be changed to accommodate the apparent optionality in movement operations in derivations with a base-generated *wh*XP $\gg$ *wh*P structure. I leave the matter of whether or not this optionality can be encoded in this framework open for future research.

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 with a base-generated $[XP_{wh1}] \gg [XP_{wh2}]$ configuration, a Q-particle is merged with every interrogative phrase. When interrogative probing occurs, either the Q-probe or the *wh*-probe can be activated first. If the *wh*-probe is used first, it will fail to find a suitable target. Following Preminger (2011), I assume that this does not cause the derivation to crash: the probe must *attempt* to find a goal, but its failing to find a suitable target does not cause ungrammaticality.[28,29] Next, the Q-probe will begin to probe: it will first find the higher QP, Agree with it and Attract it to Spec,FocP. Then it will find the lower QP, Agree with it and Attract it to a second specifier of FocP, tucking in below the QP which is already in Spec,FocP. The resulting derivation is one with no *wh*-in-situ, as in the simplified tree in (43).

(42) *Derivation of* $[XP_{wh}] \gg [XP_{wh}]$ *superiority-obeying question*
    a. Step 1: Q-particles are merged with both interrogative phrases
              $[_{TP} \; [QP_1] \; [QP_2]]$
    b. Step 2: Interrogative probing occurs
            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
              $[Force_Q \; [_{Spec,FocP} \; [QP_1] \; [QP_2] \; [_{TP} \; t_1 \; t_2$
    d. Expect: No intervention effects.

(43) *Tree for* $[XP_{wh}] \gg [XP_{wh}]$ *superiority-obeying question*

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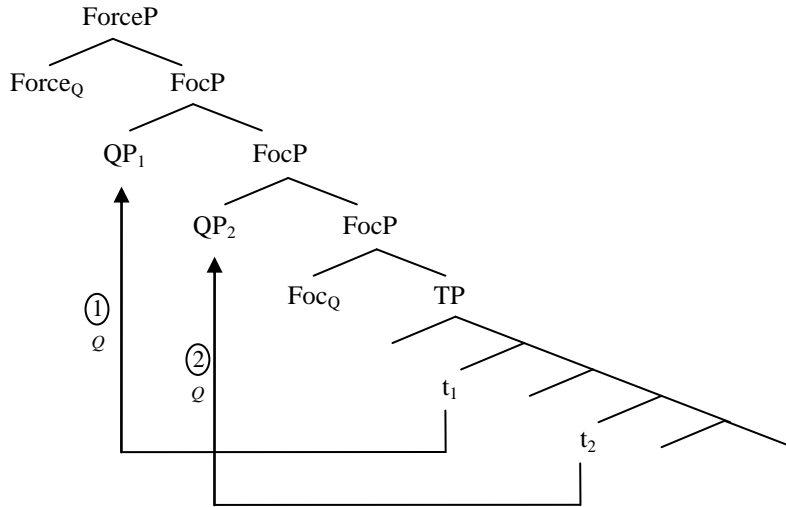
[28] In all following derivations I will ignore the possibility of extraneous probing operations that result in a failure to Agree and concentrate on operations that have consequences for the derivation.
[29] Alternatively, one may imagine that while the Q-probe is necessarily present on C, the *wh*-probe may optionally occur on C, but if it does then it must be activated *before* the Q-probe. The resulting derivations are all equivalent to the ones presented in the text above, as far as I can tell. However, Preminger (2010, 2011) argues in detail for the need for a model of grammar in which a probe that has been activated but has failed to find a suitable target does not cause the derivation to crash. Consequently, I adopt a system that is consistent with this architecture of probing rather than assume optionality in the interrogative probes that can occur on C.

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, only the lower XP is merged with a Q-morpheme. When interrogative probing occurs, the Q-probe Agrees with the only QP in the derivation and Attracts it to C. The *wh*-probe Agrees with the *wh*-word inside the higher XP but cannot Attract it, since *wh*-words can't move on their own. The resulting derivation contains one fronted QP and one *wh*-in-situ, as in (45). The order in which the *wh*-probe and the Q-probe are activated does not alter the outcome of the derivation. In this case we correctly predict that the question will exhibit intervention effects.[30]

(44) *Derivation of* [XP*wh*] ≫ [XP*wh*] *superiority-violating question*
    a. Step 1: Only the lower interrogative phrase is merged with Q-particle
            [$_{TP}$ [XP*wh1*] [QP$_2$]]
    b. Step 2: Interrogative probing occurs
            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$_Q$ [$_{Spec,FocP}$ [QP$_2$] [$_{TP}$ [XP*wh1*] t$_2$]
    d. Expect: Intervention effects.

(45) *Tree for* [XP*wh*] ≫ [XP*wh*] *superiority-violating question*
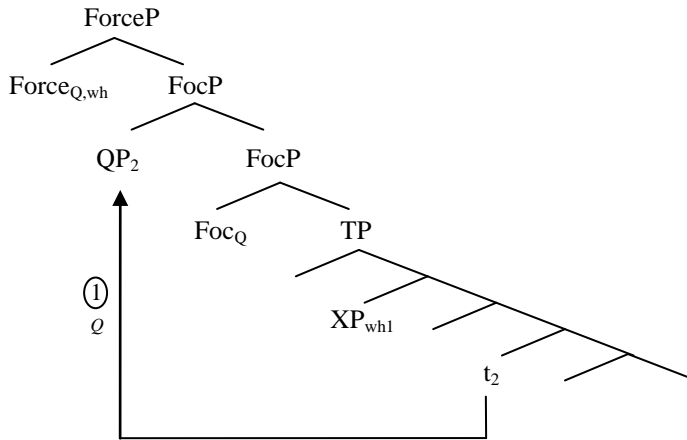
Let us next turn our attention to the critical case of questions with a high *wh*-containing phrase and a lower *wh*-headed phrase, (41)c. To derive the grammaticality pattern of section 3, we must be able to provide derivations for the superiority-obeying question as well as the superiority-violating question that, crucially, do not lead us to expect intervention effect. In this structural configuration, as we will see, the availability of two distinct interrogative probes will lead us to this exact prediction.

As always, the [XP*wh1*] ≫ [*wh*P$_2$] superiority-obeying question is derived from a structure in which both interrogative phrases are attracted to Spec,FocP. We begin this derivation by merging both of the interrogative phrases in the question with Q-particles. Next, we allow the Q-probe to operate first; this

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[30] The derivations of (41)b questions are parallel to those of (41)a questions with the exception that it is also possible to begin probing with the *wh*-probe, not the Q-probe. The outcome is identical regardless of which probe is activated first: since both phrases in this question are *wh*Ps, the highest one that is merged with Q will be found and moved by whichever probe is used in a given derivation.

probe will find the higher QP, Agree with it and attract it to the outer specifier of Spec,FocP. The Q-probe will then find the lower *wh*QP, Agree with it and attract it to an inner specifier of FocP, leaving no *wh*-in-situ in the question, as in (47). We expect no intervention effects for this structure.

(46) *Derivation of* [XP*wh*] ≫ [*wh*P] *superiority-obeying question*
   a. Step 1: Q-particles are merged with both interrogative phrases
      $[_{TP}$ [QP$_1$] [*wh*QP$_2$]]
   b. Step 2: Interrogative probing occurs
      i. Q-probe finds QP$_1$, Agrees with it and Attracts it to Spec,FocP.
      ii. Q-probe finds *wh*QP$_2$ and Agrees with it Attracts it to Spec,FocP.
   c. Result: Superiority-obeying structure
      [Force$_Q$ [$_{Spec,FocP}$ [QP$_1$] [*wh*QP$_2$] [$_{TP}$ t$_1$ t$_2$
   d. Expect: No intervention effects.

(47) *Tree for* [XP*wh*] ≫ [*wh*P] *superiority-obeying question*
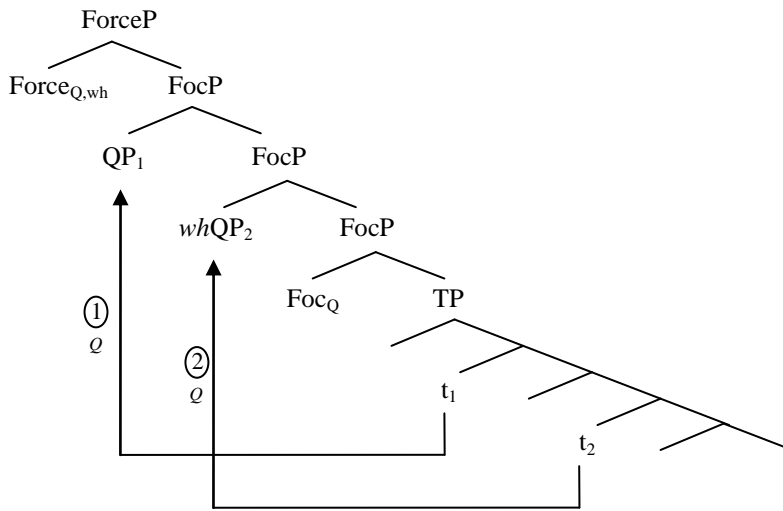
   Consider now the option of activating the probes in the opposite order than in derivation (46). Instead of activating the Q-probe, we choose to make the *wh*-probe responsible for the first instance of interrogative probing. In that case, the resulting structure is unlike any that we have seen before. 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*-word is left in situ. Consequently, we expect the question not to exhibit intervention effects.

(48) *Derivation of* [XP*wh*] ≫ [*wh*P] *superiority-violating question*
   a. Step 1: Q-particles are merged with both interrogative phrases
      $[_{TP}$ [QP$_1$] [*wh*QP$_2$]]
   b. Step 2: Interrogative probing occurs
      i. *wh*-probe finds *wh*QP$_2$ and Agrees with it.
         Via parasitic agreement, Q-probe also Agrees with *wh*QP$_2$.
         Q-probe triggers movement of *wh*QP$_2$ to Spec,FocP

ii. Q-probe finds QP_1, Agrees with it and Attracts it to Spec,FocP.
   c. Result: Superiority-obeying-like structure

$$[\text{Force}_Q \; [_{\text{Spec,FocP}} \; [wh\text{QP}_2] \; [\text{QP}_1] \; [_{\text{TP}} \; t_1 \; t_2$$

   d. <u>Expect: No intervention effects</u>.

(49) *Tree for* $[\text{XP}_{wh}] \gg [wh\text{P}]$ *superiority-violating question*
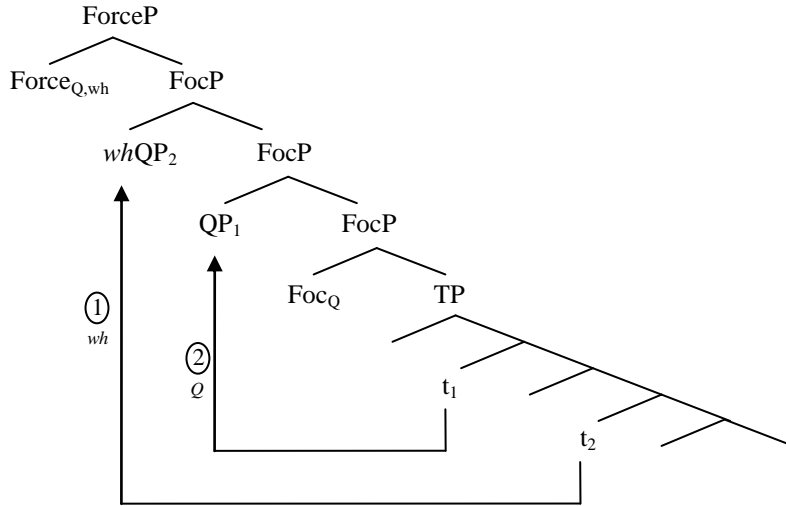
    Activating the *wh*-probe first in a derivation in which all interrogative phrases have been merged with a Q-morpheme thus yields a superiority-obeying like derivation that is predicted not to be sensitive to intervention effects, as needed. As we have seen above, when the two interrogative phrases in the question are of the same type, there are no consequences to the order in which the probes are activated. Lastly, let us confirm that this probing architecture does not cause unwanted results in the last remaining structural configuration of questions: $[wh\text{P}_1] \gg [\text{XP}_{wh2}]$, (41)d. To see that it does not, observe that if *wh*P is merged with Q then it becomes a suitable goal for both the Q-probe and the *wh*-probe. In a superiority-obeying question, then, the *wh*QP will be the first goal that is 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 again yield English-like predictions for intervention effects.

(50) *Derivation of* $[wh\text{P}] \gg [\text{XP}_{wh}]$ *questions*
   i. Superiority-obeying question
     a. Step 1: Q-particles are merged with both interrogative phrases

$$[_{\text{TP}} \; [wh\text{QP}_1] \; [\text{QP}_2]$$

     b. Step 2: Interrogative probing occurs
        i. Q-probe or *wh*-probe finds $wh\text{QP}_1$ and Agrees with it.
          Via parasitic agreement, the other probe also Agrees with $wh\text{QP}_1$.
          Q-probe triggers movement of $wh\text{QP}_1$ to Spec,FocP.
        ii. Q-probe finds QP_2, Agrees with it and Attracts it to Spec,FocP.
     c. Result: Superiority-obeying structure

$$[\text{Force}_Q \; [_{\text{Spec,FocP}} \; [wh\text{QP}_1] \; [\text{QP}_2] \; [_{\text{TP}} \; t_1 \; t_2$$

d. Expect: No intervention effects.

  ii. Superiority-violating question
    a. Step 1: Only the lower interrogative phrase is merged with Q-particle
          $[_{TP}$ $[whP_1]$ $[QP_2]]$
    b. Step 2: Interrogative probing occurs
          i. *wh*-probe finds the higher *wh*, Agrees with it but cannot Attract it
          ii. Q-probe finds QP_2, Agrees with it and Attracts it to Spec,FocP.
    c. Result: Superiority-violating structure
          $[Force_Q$ $[_{Spec,FocP}$ $[QP_2]$ $[_{TP}$ $[whP_1]$ t_2
    d. Expect: Intervention effects.

To summarize, we observe that whenever the Q-probe is activated first in a derivation, the resulting structure behaves in a manner similar 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 interrogative phrases. Consequently, if it is activated before a Q-probe, its selective nature yields an unusual movement pattern in which certain lower phrases are moved over higher ones that appear to be invisible. This pattern is precisely what the surprising data introduced in section 3 exemplify.

Consider again the two superiority-violating questions in (51)a-b. In (51)b, if we assume that bare *ma* is a *wh*-headed phrase and *et mi* is a *wh*-containing phrase headed by *et* then we can use a derivation as in (48) to yield a structure in which all interrogative phrases move to C at LF.[31] We correctly predict that question will not exhibit intervention effects. The question in (51)a cannot be derived from a parallel structure. Rather, both interrogative phrases in this structure are *wh*-containing phrases. Hence, the only way to attract the lower interrogative 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 interrogative 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 (51)b, we expect the question to exhibit intervention effects. This is indeed the attested pattern.[32]

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[31] Note that this predicts that speakers for whom *et* is a genuine case marker and not a preposition will find (51)a grammatical and crucially different from questions with unambiguous full-fledged prepositions. So far I have only been able to find one speaker for whom this appears to hold. All the other speakers I have consulted with (who accept the section 3 pattern) do not perceive a difference between *et* and other prepositions.

[32] At this stage, the reader may wonder if this pattern is preserved in case the interrogative phrases are separated by a finite clause boundary. In general, superiority violations in such a configuration are ungrammatical. One example of this state of affairs is given in (i) below. This pattern is preserved in $[XP_{wh}] \gg [XP_{wh}]$, $[whP] \gg [whP]$ and $[whP] \gg [XP_{wh}]$ configurations. Crucially, this is caused by the fact that the lower phrase crosses a finite clause boundary as it moves over the higher phrase. If the two phrases originate from the lower clause, superiority violating questions become grammatical again.

(i) 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?'

(51) *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?'

  To conclude, I would like to point out some general consequences of the system developed in this section. First, it can capture cross-linguistic variation between different *wh*-fronting languages using two properties of the theory: the number of Q-morphemes available in a question and the EPP feature on Q.[33] 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.[34] An English D-linked *wh*-question 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.[35] 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.[36]

(52) *Hebrew vs. D-linked English questions*
    The 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.[37]

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  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?'

There is just one exception to the ban on superiority-violating: in the configuration [XPwh] ≫ [whP], the superiority-violating question is grammatical, as shown in (ii). Surprisingly, it is sensitive to intervention effects. I leave the investigation of the factors that govern these phenomena to future work, but I note that they, too, support the special status of *wh*-headed phrases over superiority-violating phrases.

  (ii) ?[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?'

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

[34] 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 after Agreement by either the Q-probe or the *wh*-probe.

[35] Non-D-linked *wh*-phrases in English also have as many Q-morphemes but must be interpreted by a C head which requires multiple *wh*-phrases to appear in its specifiers. Hence, the superiority-violating structure is predicted to be impossible with these phrases. See Pesetsky (2000), Cable (2007,2010) for a discussion of these structures.

[36] Note that following Cable, we must also assume that Hebrew and English differ in the kinds of C heads in their lexicon: English uses a head which can only host one *wh*-phrase in its specifier, while Hebrew uses a head which can host multiple *wh*-phrases.

[37] 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*wh*₁] ≫ [*wh*P₂], it should exhibit the same behavior we observed for questions in which the two phrases are separated by a non-finite clause boundary. As far as I can tell, however, all

5. More on the privileged status of *wh*-headed phrases

In this section I discuss one additional case in which *wh*-headed phrases behave in a privileged way in Hebrew questions, involving the possible readings of multiple questions. I sketch a proposal for the analysis of the data surveyed here, but leave a full investigation of this data for future work. Whatever analysis of the data turns out to be correct, their importance lies in exemplifying again the special status of *wh*QPs.

In addition to the correspondence between superiority and intervention effects, a third factor co-varies with the grammaticality pattern of question types in Hebrew:

(53) *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.

Multiple questions such as the ones discussed in this paper 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 interrogative phrase is paired with a member of the set quantified over by the in-situ interrogative phrase; and (b) Functionhood (Point-wise uniqueness): that every member of the set quantified over by the overtly moved interrogative phrase is paired with no more than one member of the set quantified over by the in-situ interrogative phrase. Because of these presuppositions, pair-list answers to superiority-obeying questions and superiority-violating questions are distinct from one another. The single-pair answers to both questions are equivalent, however.

Golan (1993) and Reinhart (1998) suggest a view of superiority under which a superiority-violating question is possible only when its meaning is different from that of the superiority-obeying one. That is, economy principles like "shortest move" should be relativized to interpretation: 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. Similar suggestions are made in Fox (2000), showing that optional movement is motivated only if it has an effect on the output. Here I adopt a formulation of an economy principle proposed in Fox (ms.).

(54) *Semantically Sensitive version of Shortest Move (SSSM)*   (Fox, ms.)
 C must attract the closest interrogative phrase it can to derive a designated semantic interpretation.

Under SSSM we predict that superiority violations are impossible on a single-pair reading, because a derivation with shorter links, namely the superiority-obeying one, is available and yields the same meaning. 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. Examples (55)-(56) provide possible answers to superiority-obeying and superiority-violating questions. Indeed, we observe that a continuation to a superiority-violating construction that lists a single pair is odd.

(55) *Possible answers to superiority-obeying question:* single-pair or pair-list
 ani yoda'at [*mi*] kara [*ma*]

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the Hebrew two-place predicates that take a whP as one of their complements are 2-order ditransitives and hence can have two underlying structures, as shown in section 2 above. Consequently, it is impossible to test this prediction.

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*.

(56) *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

    Similarly, when the context limits the possible pairs to a single one, the superiority-violating questions in (b) are judged by speakers as inappropriate. This is so because by asking such a question, the speaker is perceived to be assuming that there is more than one pair in the answer set.

(57) *Ungrammaticality caused by unavailability of single-pair answer (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]?

    Wiltschko (1997) observes this pattern in German multiple questions, and describes it as superiority violations: superiority-violating questions whose answers are contextually constrained to single-pair only are ungrammatical. Example (58) illustrates one such case.[38]

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[38] A reviewer calls the validity of these judgments into question. Similar concerns are also raised for the parallel Hebrew examples. I note that for Hebrew, I have found that the judgments in (57) represent a large proportion of the native speakers who I have been in contact with, including some who do not perceive the QP vs. *wh*QP distinction. In fact, these speakers find the judgments about the availability of readings quite clear. However, still other speakers do not agree with these judgments and perceive no difference between superiority-obeying and superiority-violating

(58) *Ungrammaticality caused by unavailability of single-pair answer (German)*
    I am sure that Peter and Mary must have talked to each other on the phone.
    a. Weiβt du, wer wen angerufen hat?
       know you who whom called has
       'Do you know who called whom?'
    b. * Weiβt du, wen wer angerufen hat?   Wiltschko (1997)

For speakers who perceive the correlation between readings and superiority and who also perceive the QP vs. *wh*QP distinction, there is one exception to the generalization in (53): in questions with the structure: $QP_1 \gg whQP_2$, 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 $QP_1 \gg QP_2$ question in (59)a cannot be used, but the parallel $QP_1 \gg whQP_2$ question in (59)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.

(59) *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 given the analysis proposed in section 4.2, the behavior of the $QP_1 \gg whQP_2$ superiority-violating question is expected under a reformulation of the SSSM that does not conceive of C as an opaque unit but rather is sensitive to the different probes on C, (60).[39]

(60) *Semantically Sensitive version of Shortest Move (revised)*
    Interrogative probes on C must attract the closest interrogative phrase they can to derive a designated semantic interpretation.

As we have seen, it is possible to derive (59)b from a superiority-obeying-like structure in which the *wh*-probe attracts the closest target it can find—$whQP_2$—and the Q-probe then attracts the closest target it can find, QP_1. Furthermore, it is not possible to assign (59)a a parallel derivation. Instead, (59)a must be derived from a superiority-violating structure in which the higher interrogative phrase is not merged with Q and is left in situ to allow QP_2 to be attracted the outermost specifier FocP. Consequently, (59)b constitutes an as-good LF for the single-pair reading as the superiority-obeying LF, but (59)a is not as good: in this derivation, The Q-probe did not attract the closest interrogative 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

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questions. I have found similar behavior among English speakers who were asked about the English parallel of (57). At this time I cannot offer speculations as to what characterizes the different speakers.

[39] A similar explanation for the data provided here may be given along the lines of the analysis in Fanselow (2004). This analysis argues for relativizing the MLC for interpretation: if two competing derivations yield the same LF but only one of them obeys the MLC, it is to be preferred. If the MLC-violating derivation yields an LF that cannot be obtained otherwise, it is to be allowed nonetheless.

despite the apparent counter-example.[40] Not only does (59) 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 questions.

6.   Conclusion

This paper introduced several novel observations regarding the behavior of Hebrew multiple *wh*-questions. It established a correlation between the phenomena of superiority and intervention effects in Hebrew that is similar to the one found with D-linked interrogative phrases in English: Superiority-obeying questions never exhibit intervention effects; superiority-violating questions are grammatical but they are sensitive to intervention effects. These facts are captured within the theory of Q-particles under standard assumptions about superiority and intervention effects. The paper further argued that one additional factor correlates with superiority and intervention effects: superiority-obeying questions have pair-list as well as single-pair answers, but superiority-violating questions only have pair-list answers.

The main empirical contribution of this paper is in showing that Hebrew distinguishes between two kinds of interrogative 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*]). *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 intervention effects in multiple questions, and from possible readings of the questions. 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 c-commanding *wh*-containing phrase in the same structure.

The sensitivity of interrogative probing operations to the head of the interrogative phrase is surprising and unexpected within current theories of interrogative probing. I proposed to capture the intricate behavior that this sensitivity gives rise to within Q-particle theory by making two modifications to the theory: first, 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 interrogative 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, 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. Interrogative probing is thus relativized to two kinds of interrogative features and does not happen wholesale.

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[40] As a reviewer notes, this is a transderivational constraint that must take into consideration not only the derivation at hand but also other potential derivations that could result in the same meaning. I refer the reader to Fox (2000) for extensive argumentation for this kind of economy constraint.

Acknowledgements

Appendix: On collecting judgments

In this section I expand on the conditions under which the judgments discussed in this paper were obtained. All of the sentences discussed in the paper contain multiple *wh*-questions, where two conditions are varied for each basic example: (a) whether it is *superiority-obeying* or *superiority-violating*, and (b) whether it contains an *intervener* or not. Several factors must be controlled in order to ensure that native speakers can access their intuitions about the sentences. Below I discuss each factor in turn, and discuss generalizations regarding the data.

(61) *Factors controlled for during data collection*
      a. The acceptability of superiority-violating vs. superiority-obeying questions
      b. Pair-list readings of multiple questions and their presuppositions
      c. Focus association of the intervener

Acceptability of superiority-violating vs. superiority-obeying questions: As noted by Featherston (2005) and Fanselow et al. (2008), superiority-obeying questions are generally preferred over superiority-violating ones in languages that reportedly do not have superiority effects. That is, the superiority-obeying question (10)a (repeated here as (62)a) is considered by many speakers to be more natural than the superiority-violating questions in (62)b-c (that is, the superiority-violating variants of the (62)a with and without stylistic inversion). Therefore, it is important to compare the acceptability of superiority-violating questions to the acceptability of other superiority-violating question as well as to the corresponding superiority-obeying question, to bring out larger and smaller contrasts among pairs of similar examples.

(62) *Simple subject-object multiple question*
      a. [*mi*] ＿＿ kara [*ma*]?
        who   read   what
      'Who read what?'
      b. [*ma*]   kara [*mi*] ＿＿?
        what   read   who
      'What did who read?'
      c. $^{?}$[*ma*] [*mi*] kara ＿＿?
        what   who   read
      'What did who read?'

For many Hebrew speakers, the status of superiority-violating questions improved when they were introduced within 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 paper topics to suggest to each of the class participants.*" In some cases the added material, e.g. temporal or locational adjuncts appearing at the end of the question, improved the prosody of the question and helped sharpen the judgments.

Pair-list readings of multiple questions and their presuppositions: Since the examples discussed in the paper contrast the presence and absence of interveners in multiple questions, it was important to ensure that they all had pair-list readings.[41] As discussed in section 5, Dayal (2002) shows that pair-list readings presuppose (a) Exhaustivity: that every member of the set quantified over by the overtly moved interrogative phrase is paired with a member of the set quantified over by the in-situ interrogative phrase; and (b) Functionhood: that every member of the set quantified over by the overtly moved interrogative phrase is paired with no more than one member of the set quantified over by the in-situ interrogative phrase. The element of the pair to which these presuppositions apply in the case of superiority-obeying questions and superiority-violating questions is marked with a box in (63)-(64) below.

(63) Superiority-obeying question: *which student cooked which dish*?
⟨ student1 , dish a ⟩
⟨ student2 , dish b ⟩
⟨ student3 , dish c ⟩
           ...

(64) Superiority-violating question: *which dish did which student cook?*
⟨ dish a , student1 ⟩
⟨ dish b , student2 ⟩
⟨ dish c , student3 ⟩
           ...

To accommodate these presuppositions and to allow the questions the best chance of being grammatical, each question discussed in the paper was presented in a supporting context that made the pair-list reading accessible and salient, and which satisfied the presuppositions of the question. Moreover, the questions all used singular *wh*-phrases; this was done in order to ensure that speakers accessed a pair-list answer to the question instead of a single-pair of pluralities.[42]

Focus association of the intervener: In all of the examples, the association of negation and other interveners with focus was controlled. This ensured a natural reading of the questions, and that all speakers were judging questions with the same focus association and hence with the same truth conditions. In the case of negation, it was also important to ensure that negation was not construed as constituent negation, since constituent negation may occur too low to intervene (see discussion in §2.1).

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[41] It has been reported that some speakers can avoid intervention effects in single-pair construals of multiple questions (Pesetsky 2000). This reading must therefore be ignored if the relevant judgments are to be collected.
[42] That is, the necessary answer had to be of the form in (i) and not of the form in (ii):

(i) ⟨ John , the pizza ⟩
⟨ Mary , the cake ⟩
⟨ Sue , the salad ⟩
(ii) ⟨ John⊕Mary⊕Sue, the pizza⊕the cake⊕the salad ⟩

Once all these factors were controlled, the following patterns emerged among the Hebrew speakers consulted for this paper:

(65) *Patterns of grammaticality judgments among Hebrew native speakers*
- Some speakers do not accept superiority violations at all.
- Among those speakers who accept superiority violations, there is a generational difference:
  - Younger speakers (roughly, under 40 years old) mostly accept superiority violations, but some do not accept the QP-*wh*QP distinction.
  - Older speakers do not accept the QP-*wh*QP distinction at all.
- Almost all speakers perceive the distinction between readings discussed in section 5 and find it a very sharp judgment.

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