A new syntax for multiple wh-questions

Hadas Kotek, Massachusetts Institute of Technology

Summary: Recent theories of interrogative syntax/semantics adopt two strategies for the interpretation of in-situ whs: covert movement (Karttunen 1977, a.o.) and in-situ interpretation (Hamblin 1973, a.o.). The availability of covert movement is assumed to be all-or-nothing: the in-situ wh covertly moves to C or else stays in its base-generated position and is interpreted without movement at LF. In this talk I argue that this assumption cannot be maintained. I argue based on novel evidence from English multiple wh-questions that wh-phrases require both covert movement and in-situ interpretation for their derivation, and that these operations must take place in a novel order: partial covert movement of the surface in-situ wh occurs first, and it is followed by in-situ computation between the landing site of wh and C.

Interpreting wh-in-situ: The interpretation of wh-questions requires a semantic link between wh-phrases and C. Two mainstream strategies exist for the interpretation of in-situ wh-phrases: covert movement and in-situ interpretation. These approaches make two different predictions about the behavior of wh-questions with regard to islands and to focus intervention effects: (a) covert movement is subject to syntactic islands, while in-situ interpretation is not (Rooth 1985, 1992, a.o). (b) in-situ interpretation is sensitive to intervention effects, while covert movement is not (Beck 2006, a.o.).

An intervention effect occurs when an intervener such as ‘only’ occurs between an in-situ wh-word and C at LF, blocking the link between the two. If the wh is covertly moved above the intervener, the structure can be rescued (1a), but it is ungrammatical if the wh stays below the intervener (1b).

\[ [\text{CP} \text{wh}\ C \ldots \text{only}\ldots \text{t}\ldots] \]

\[ *[\text{CP} \ C \ldots \text{only}\ldots\text{wh}\ldots] \]

Pair-list readings of questions with islands: Multiple wh-questions where the in-situ wh-phrase occurs inside an island cast doubt on the all-or-nothing theory of covert wh-movement. The most often cited example of this type of structure is given in Dayal (2002). Dayal argues that questions such as (2b), containing a wh inside an adjunct island, only have a single-pair reading but not a pair-list reading. However, this judgment has recently been contested by Cheng and Demirdache (2010), citing Chris Tancredi (p.c.). Cheng and Demirdache offer the context in (2a) with the judgment that a pair-list answer (2c) is forced in this case and the single-pair answer is deviant (2d).

(2) a. Context: each of two philosophers will be offended if we invite one of two linguists.
   b. Which philosopher will be offended if we invite which linguist?
   c. ✔ Pair-list: Quine will be offended if we invite Chomsky, and Lewis will be offended if we invite Kayne.
   d. #*/ Single pair: (infelicitous due to context) Quine will be offended if we invite Chomsky.

Novel data from intervention effects and islands: I adopt the above judgment in (2), and introduce focus-sensitive interveners into question such as (3). An intervention effect, diagnosed by the disappearance of the pair-list reading of these questions (cf. Pesetsky 2000 for discussion of this phenomenon), occurs when an intervener (here: only) is placed above the island, but not when it is inside the island. (Note: a single-pair reading of these questions is always available.) This pattern of grammaticality holds for other islands and other interveners as well, leading to the generalization in (4). Further data in supporting contexts (omitted here for space reasons) confirm the judgment in (3).

(3) Pair-list reading lost when intervener is above, but not inside, an island:
   a. Q: \text{Which} philosopher will \text{only} come [if we invite \text{which} linguist]?
      A: * Quine will only come if we invite Chomsky, and Lewis will only come if we invite Kayne.
   b. Q: \text{Which} philosopher will come [if we \text{only} invite \text{which} linguist]?
      A: ✔ Quine will come if we only invite Chomsky, and Lewis will come if we only invite Kayne.

(4) Intervention occurs when an intervener occurs above an island but not when it is inside it.
Proposal: To account for the pattern of data in (4), we need a new theory of question syntax-semantics that allows for movement of wh-phrases to non-scope-taking positions, followed in-situ interpretation between the landing site and C. I propose that such movement is driven by type-reasons, as wh-phrases act as quantifiers (see Mayr 2010 and references therein). These quantifiers may move to privileged positions at the vP and CP edge. This is observed overtly in islands similar to (3) in Bulgarian, where wh-phrases inside the island move to the edge of the clause (data omitted for space reasons).

We thus have a new argument for a theory that combines covert movement and in-situ interpretation within the derivation of a single multiple wh-question (cf. Pesetsky 2000, Beck 2006 for arguments from superiority; Cable 2010, Kotek and Erlewine 2013 for pied piping). Note, however, that the two mechanisms are used here in a novel order of operations: covert movement is the first step of the derivation, and in-situ interpretation is used above the wh’s landing site.

Supporting evidence from sentence processing: To show that whs act as quantifiers that must undergo QR upon integration into the sentence, a self-paced reading study employing a word-by-word moving window methodology will be presented. Following the work of Hackl et al. (2012) we know that the quantifier every undergoes QR to the nearest clausal node as soon as it is encountered, above VP in example (5). This movement preemptively undoes the Antecedent Contained Deletion (ACD) and creates an antecedent for the missing VP in (5b). QR of every thus facilitates ACD resolution if the missing VP is the same size as the movement: if the auxiliary in (5) is changed to was, targeting VP1 instead of VP2, QR is not sufficient to resolve the ACD and the resulting sentence is read significantly slower than with did.

(5) a. John [vp1 was eager to [vp2 read [every book that Mary did (missing VP)]]].
   b. John [vp1 was eager to [every book that Mary did (vp2 read t)]].

A similar approach can be used to test whether a (surface) in-situ wh-phrase moves covertly at LF. If such movement occurs, we expect ACD to be preemptively undone by the same logic as in (5). Thus, if a covert movement approach to questions is correct, we expect ACD to be resolved in (6) with antecedents both the size of the smaller VP2 (marked with did) and the larger VP1 (marked with was), since the wh moves above both these sites to C. If in-situ interpretation is used and no movement occurs, we expect no ACD facilitation to occur. We can compare questions with an in-situ wh to questions with every replacing the wh, (6a-b). Following Hackl et al. (2012)’s findings, we expect every to facilitate the resolution of the smaller ACD significantly more than the larger size.

(6) a. The conductor asked [cp which soloist [vp1 was willing to [vp2 perform {which, every}]]] concerto that the brilliant protégé {did, was} and restructured the rehearsal accordingly.

We find a main effect of ellipsis size (see the figure): The small ACD, resolved to VP2, is read more quickly than the large ACD, resolved to VP1. This is the case for both every and which (linear mixed effects model predicting logRT from determiner (every/which) and ellipsis size (did/was), with random and intercepts for subjects and items; log likelihood test, p<.05). This is unpredicted both by the covert movement and in-situ interpretation approaches. It is only predicted if wh-phrases are quantifiers that QR as soon as they are encountered. Following this movement step, the question semantics is computed using in-situ interpretation. The experimental findings thus further support the theory put forth in this paper. Experimental details and supporting data will be presented.