On the Ambiguity of Multiple Questions*

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June 1st 2015

PhD Day, University College London

Claim: multiple questions may either denote a *set of propositions*, or a *set of questions*. This ambiguity has consequences for the 'interface global economy' theory of superiority effects, first proposed by Golan (1993), giving rise to new predictions. Fox (2012) claims that these predictions are correct. I sound a note of caution here, arguing that this conclusion is too hasty.

1 Introduction

- Roadmap:
  - I summarize Dayal's (1996) argument that multiple questions must be ambiguous.
  - Following Hagstrom (1998) a.o., I sketch an account where multiple questions are *type*-ambiguous: they may either denote (i) a set of propositions, or (ii) a set of questions.
  - I summarize Reinhart's (1998) take on Golan's (1993) economy-based theory of economy, and Fox's arguments that the ambiguity of multiple questions generates correct new predictions.
  - I argue that Fox's data is better-explained in terms of the information-structural status of the *wh*-expressions.
  - I conclude with some open issues.

*This talk is largely based on material from Elliott (2015a), and bits of Elliott (2015b). Thanks but no blame goes to Klaus Abels, Yasu Sudo, Hans van de Koot, Matt Barros, and Gary Thoms, and a long-suffering group of English informants, who are too many to list here.

2 A Family of Questions

- A question with two *wh*-expressions can be given either a *Single-Pair* (SP) answer, as in (1b), or a *Pair-List* (PL) answer, as in (1c).[1][2]

(1) a. Which customer ordered which beer?
b. John ordered the Sierra Nevada. SP
c. John ordered the Sierra Nevada, Andrew ordered the Blue Moon. PL

- The claim: this difference in possible answers reflects a genuine ambiguity in the LF of the question (see e.g., Comorovski 1996, Dayal 1996, Hagstrom 1998, Nicolae 2013 and Kotek 2014).

- Motivation: a constituent question with a singular *which*-phrase carries a uniqueness presupposition.

(2) a. Which beer did Andrew order?
b. #The Sierra Nevada and the Blue Moon.

- One possibility – singular *which*-phrases are presupposition triggers. This would explain the datum in (2).

- If this were the case, we'd expect multiple questions to only have a SP reading, contrary to fact (cf. (1b) and (1c)).

- A solution: multiple questions are (often) ambiguous between a SP reading and a PL reading. Under the PL reading, the multiple question denotes a distinct semantic object, with distinct answerhood conditions.

- Here I follow Hagstrom (1998), Fox (2012), Nicolae (2013) and Kotek (2014) in assuming that, under the PL reading, a multiple question denotes a *Family of Questions* (FoQ).[3]

(3) $[\![\text{Which customer ordered which beer?}_{\text{PL}}]\!] = \left\{ \begin{array}{c} \text{Which beer did Andrew order?,} \\ \text{Which beer did John order?,} \\ \text{...} \end{array} \right\}$

[1] More generally, a question with $n \in \mathbb{N}$ *wh-expressions* can be given either a *single n-tuple* answer, or a *list of n-tuples* answer, of which the SP and PL answers respectively are a special case.

(i) a. Which woman took which man to which restaurant?
b. Mary took John to Carluccios. single n-tuple
c. Mary took John to Carluccios, Sally took Joe to Odette's, etc. list of n-tuples

[2] Boškovic (2001) claims that multiple questions in English lack a SP reading, but it is relatively easy to produce acceptable counter-examples, e.g.,

(i) I can hear a student talking about one of the teachers, but I can't make out which student is talking about which teacher.

[3] In the following I use SP/PL both (i) to label the different answers that can be given to a multiple question, and (ii) to label the two different readings that the question can receive, under the FoQ hypothesis.

- Both simple constituent questions and SP multiple questions are taken to denote a set of possible answers (following Hamblin 1973, Karttunen 1977, and much subsequent work).[4]

(4) $[\![\text{Which beer did Andrew order?}]\!] = \left\{ \begin{array}{c} \text{that Andrew ordered the Sierra Nevada,} \\ \text{that Andrew ordered the Blue Moon,} \\ \text{...} \end{array} \right\}$

(5) $[\![\text{Which customer ordered which beer?}_{\text{SP}}]\!] = \left\{ \begin{array}{c} \text{that Andrew ordered the Sierra Nevada,} \\ \text{that John ordered the Blue Moon,} \\ \text{...} \end{array} \right\}$

- Informally, the idea is that to provide an answer to a FoQ is to provide an answer to every question in the FoQ. The uniqueness requirement is relativized to each member of the set.

- The uniqueness presupposition: I follow Dayal's (1996) influential proposal that a question presupposes the existence of a *unique, maximally informative true answer*. We can cash this out as an operator ANS in the LF of a question, which is essentially a definite determiner that applies to a question meaning.

- One further assumption is required to derive the correct result: singular NPs denote sets of atomic individuals (whereas plural NPs may range over atoms and pluralities.[5]

(6) $[\![\text{customer}]\!] = \{\text{John, Andrew, Nathan,...}\}$

(7) $[\![\text{customers}]\!] = \left\{ \begin{array}{c} \text{John, Andrew, Nathan,} \\ \text{John}\oplus\text{Andrew, John}\oplus\text{Nathan, Andrew}\oplus\text{Nathan,} \\ \text{John}\oplus\text{Andrew}\oplus\text{Nathan} \end{array} \right\}$

- When we apply ANS to a constituent question, it will only be defined if the question-denotation (modelled as a set of propositions) contains a unique, maximally informative member.

- A question such as *which beer did Andrew order?* will denote a set of propositions of the form *x ordered the beer* where *x* is an atomic individual. ANS will only be defined if the question denotation contains one such proposition (as in (8)), i.e., if there is a unique beer that Andrew ordered. This is because in (9), both propositions denoted by the question are equally informative.

(8) $[\![\text{ANS which beer did Andrew order?}]\!]$
$= \text{ANS}\{\text{that Andrew ordered the Sierra Nevada}\}$
$= \text{that Andrew ordered the Sierra Nevada}$

(9) $[\![\text{ANS which beer did Andrew order?}]\!]$
$= \text{ANS}\left\{ \begin{array}{c} \text{that Andrew ordered the Sierra Nevada,} \\ \text{that Andrew ordered the Blue Moon} \end{array} \right\} = \text{undefined!}$

[4]Ultimately we want to say something about how to compositionally derive both simple question, and FoQ readings of multiple questions. I don't give a concrete account here, but there are a number of possibilities, e.g., recursively stacking *Q*-operators as in Kotek (2014), or by positing an additional head in the left-periphery of a PL question as in Fox (2012), Nicolae (2013) and Elliott (2015b).

[5]See Sauerland et al. (2005) for arguments that plural NPs include atoms in their denotations.

- This derives the uniqueness presupposition of a constituent question with a singular *which*-phrase.[6]

- When we have a PL multiple question, denoting a FoQ, the idea is that ANS applies *point-wise* to each question in the FoQ, and gives back the conjunction of the unique, maximally informative answers to the questions.

(10) ⟦ANS which customer ordered which beer?⟧

$$= \text{ANS}\left\{\begin{array}{c}\text{which beer did Andrew order?,}\\ \text{which beer did John order?}\end{array}\right\}$$

$$= \text{ANS}\{\text{that Andrew ordered the Sierra Nevada}\} \text{ and } \text{ANS}\{\text{that John ordered the Blue Moon}\}$$

$$= \text{that Andrew ordered the Sierra Nevada and John ordered the Blue Moon.}$$

- These answerhood conditions capture Dayal's (2002) observation that PL multiple questions carry two distinct presuppositions: (i) *domain exhaustivity*, and (ii) *point-wise uniqueness*.

(11) *Domain Exhaustivity* (informal)
Each member of the domain of the moved *wh*-expression is paired with a member of the domain of the in-situ *wh*-expression.

(12) *Point-wise Uniqueness* (informal)
Each member of the domain of the moved *wh*-expression is paired with no more than one member of the domain of the in-situ *wh*-expression.

3 Consequences for Superiority and Global Interface Economy

- The idea that a multiple question is ambiguous between a SP and a PL reading has consequences for the global interface economy account of superiority effects, first proposed by Golan (1993), and subsequently adopted by Reinhart (1998) a.o. First, a refresher on superiority.

3.1 Superiority and Its Exceptions

- In English, a one and only one *wh*-expression must be overtly fronted in a *wh*-question (unlike, e.g., Bulgarian, which instantiates the pattern in (13b), and Mandarin Chinese, which instantiates the pattern in (13c)).

(13) a. Bill asked which postcard$_i$ John sent t_i to which family member?
b. *Bill asked which postcard$_i$ which family member$_j$ John sent t_i to t_j?

[6]Further motivation for the maximal informativity presupposition encoded by ANS can be found in work on weak island phenomena in the semantics literature, in which ANS is crucially invoked (see Abrusán 2014 for an overview).

c. *Bill asked John sent which postcard to which family member?

- *Superiority* is a constraint on *wh*-movement, which can be stated descriptively (for English) as follows:

(14) **Superiority**
When an interrogative clause contains two *wh*-expressions, the one that undergoes *wh*-movement is the one closest to the interrogative C.

(15) a. John asked who$_i$ t_i bought what?
b. *John asked what$_i$ who bought t_i?

- Superiority effects are ameliorated somewhat when the *wh*-expressions in question are *which*-phrases ('D-linked' *wh*-phrases, in Pesetsky's 1987 parlance).

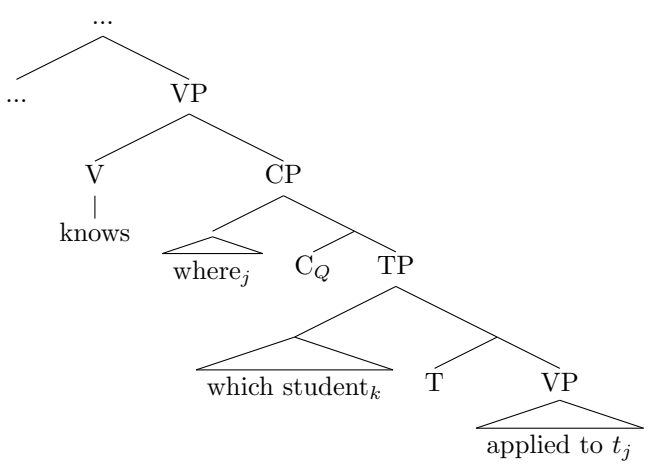
(16) a. John asked which contestant$_i$ t_i won which prize.
b. ?John asked which prize$_i$ which contestant won t_i.

- The descriptive generalization in (14) has some other systematic exceptions (see Lasnik and Saito 1992). Consider the following:

(17) Which teacher knows where$_i$ who$_j$ t_j applied t_i?

- Movement of *where* to the embedded interrogative C violates superiority.

(18)



- The status of (17) as a root question seems crucial in licensing the superiority violation in the embedded clause.

(19) *John knows where$_i$ who$_j$ applied t_i.

- It is also possible to have the same configuration without violating superiority in the embedded clause.

(20) Which teacher knows who$_i$ t_i applied where$_j$?

3.2 Global Interface Economy

- Observing this, Reinhart (1998) (citing Golan 1993) argues that the reason why superiority does not apply in this particular case is because the superiority-violating case (17) and the superiority-obeying case (20) ask different questions.

(21) a. Which teacher knows where WHO applied?
b. Andrew knows where Kevin applied, Nathan knows where Matthew applied.

(22) a. Which teacher knows who applied WHERE?
b. Andrew knows who applied to Harvard, and Nathan knows who applied to UCLA.

- Reinhart (1998) observes that in (21a) *who* takes sentential scope, because it is directly questioned, whereas in (22a) *where* takes matrix scope. An answer to (22a), and vice versa.[7]

- The idea then is that the superiority violation in (21a) is the only, and therefore the most economical way to derive this particular question meaning.

- Crucially, economy must be computed *globally*, not *locally* (internal to the embedded clause). If economy were computed locally, we could not capture the contrast between (21a) and (19).

(23) "...if at the stage of translating a given convergent derivation D into some semantic representation we discover that an equivalent semantic representation could be obtained by a more economical derivation D', D' blocks D." (Reinhart 1998, p. 50)

3.3 More Meanings

- Reinhart (1998) only considers cases concerning embedded vs. sentential *wh*-scope, glossing over the difference SP and PL readings.

- Having motivated the idea in §2 that multiple questions are ambiguous between SP and PL readings, which carry distinct presuppositions, global interface economy starts doing some real work. Fox (2012) explores these predictions and argued that they are correct.

[7] Note that if in-situ *wh*-expressions were to take scope via covert movement, the movements necessary in (21a) and (22a) violate the (weak) *wh*-island constraint (and also the clause-boundedness constraint on covert movement).

(i) #How$_i$ are you wondering whether to behave t_i?

Whether or not *wh*-expressions do covertly raise has been a topic of fierce debate. In any case, this is not an issue for Reinhart (1998), since she assumes that *wh*-expressions can take scope via in-situ mechanisms.

- Prediction 1: Both superiority-obeying and -violating multiple questions are predicted to be acceptable under a pair-list reading, since Dayal's *domain exhaustivity* presupposition is different in each case.

- (24a) presupposes that:
  $\forall x[\text{boy}(x) \rightarrow \exists y[\text{girl}(y) \wedge \text{likes}(x,y) \wedge \forall z[\text{girl}(z) \wedge \text{likes}(x,z) \rightarrow z = y]]]$
  (24b) presupposes that:
  $\forall x[\text{girl}(x) \rightarrow \exists y[\text{boy}(y) \wedge \text{likes}(y,x) \wedge \forall z[\text{boy}(z) \wedge \text{likes}(z,x) \rightarrow z = y]]]$
  Therefore, (24a) and (24b) are not equivalent.

(24) a. $[\![\text{Which boy}_i\ t_i \text{ likes which girl?}]\!] = \left\{ \begin{array}{c} \text{Which girl does Tom like?,} \\ \text{Which girl does Dick like?,} \\ \text{Which girl does Harry like?,} \\ \text{...} \end{array} \right\}$

b. $[\![\text{Which girl}_i \text{ does which boy like } t_i\text{?}]\!] = \left\{ \begin{array}{c} \text{Which boy likes Sally?,} \\ \text{Which boy likes Jane?,} \\ \text{Which boy likes Mary?,} \\ \text{...} \end{array} \right\}$

- Fox (2012) considers this to be a good prediction, but my informants all find superiority-violating questions unacceptable in an environment where a PL reading is forced, e.g., embedded under the predicate *list*.

(25) I know that each boy likes a different girl.
  a. List which boy likes which girl.
  b. ?*List which girl which boy likes.

- There is disagreement here in the literature. Hagstrom (1998) and Boškovic (2001) in fact claim that only the SP reading is available in a superiority-violating multiple question. Some of the subsequent literature however follows Pesetsky (2000) in assuming that PL readings *are* in fact available. I do not think this has ever been firmly established however, and most of my informants agree with Hagstrom and Boškovic.

- Furthermore, consider (26):

(26) a. *Which school does which teacher know who applied to?
  (cf. ?Which school does John know who applied to?)
  b. Which teacher knows who applied to which school?

- Global interface economy should license (26a), since *domain exhaustivity* applies to *schools*, whereas in the superiority-obeying version (26b), *domain exhaustivity* applies to *teachers*.

- Prediction 2: Superiority-violating questions should disallow a SP reading.

(27) $[\![\text{Which boy}_i\ t_i \text{ likes which girl?}]\!] =$
$[\![\text{Which girl}_i \text{ does which boy like } t_i\text{?}]\!] = \left\{ \begin{array}{c} \text{that Tom likes Sally,} \\ \text{...} \end{array} \right\}$

- Again, this is considered by Fox (2012) to be a good prediction, arguing, that in an environment where the PL reading is independently ruled-out, superiority-violating questions are unacceptable. Kotek (2014) gives the following example:[8]

(28) Context: Scientists have discovered a new planetary system, consisting of just two stars. They appear to be interacting with one another because of their gravitational fields. Researchers are now asking:

a. Which revolves around which?
b. *Which does which revolve around?

- I argue that what is responsible for the unacceptability of the superiority-violation in (28b) is the fact that both *wh*-phrases range over the same set of individuals. Consider the following example:

(29) Context: There are three well-known linguists (Ross, McCawley and Lakoff) here.

a. Which admires which?
b. *Which does which admire?

(30) a. $[\![(29a)]\!] = \left\{ \begin{array}{c} \text{Which linguist does Ross admire?,} \\ \text{Which linguist does McCawley admire?,} \\ \text{Which linguist does Lakoff admire?} \end{array} \right\}$

b. $[\![(29b)]\!] = \left\{ \begin{array}{c} \text{Which linguist admires Ross?,} \\ \text{Which linguist admires McCawley?,} \\ \text{Which linguist admires Lakoff?} \end{array} \right\}$

- (29b) is judged to be just as bad as (28b), but global interface economy predicts it to be acceptable. This is because a PL reading is not independently ruled out, and (29a) and (29b) give rise to different presuppositions.

- (29a) presupposes that for each of the three linguists, there is a unique linguist that they admire. This would be satisfied, e.g., if everyone, including himself, admired Ross). (29b) presupposes that for each of the three linguists, there is a unique linguist that admires them, which fails to be satisfied in this context.

- Furthermore, global interface economy predicts that there should be a contrast if we pick a symmetric, non-reflexive predicate such as *collaborated with*.

(31) Context: There are three well-known linguists (Ross, McCawley and Lakoff) here.

a. Which collaborated with which?
b. *Which did which collaborate with?

[8] The PL reading is unavailable in (28) because both wh_1 and wh_2 range over the same two individuals: $star_1$ and $star_2$. Under the PL reading, the question in (27) would presuppose that for each of the two stars, there is a unique star that it rotates around. Since the stars cannot rotate around themselves, or each other (the *rotate around* relation is *non-reflexive* and *anti-symmetric*), the presupposition of the PL reading can never be satisfied.

(32) a. $[\![(31a)]\!] = \left\{ \begin{array}{c} \text{Which linguist did Ross collaborate with?,} \\ \text{Which linguist did McCawley collaborate with?,} \\ \text{Which linguist did Lakoff collaborate with?} \end{array} \right\}$

b. $[\![(31b)]\!] = \left\{ \begin{array}{c} \text{Which linguist collaborated with Ross?,} \\ \text{Which linguist collaborated with McCawley?,} \\ \text{Which linguist collaborated with Lakoff?} \end{array} \right\}$

- (31a) presupposes that: for each of the three linguists, there is a unique linguist whom they collaborated with. (31b) presupposes that: for each of the three linguists, there is a unique linguist who collaborated with them. There is no context in which one of the presuppositions will be satisfied, but the other will not.
- Fox therefore predicts (31b) to be worse than (29b), but they are both equally unacceptable.
- Finally, Fox (2012) predicts that in a context where wh_1 and wh_2 range over different sets of individuals, but the superiority -obeying and -violating question LFs are nonetheless equivalent under the PL reading, the superiority-violating LF should be ruled out.

(33) Context: You attend a social event for married couples only, and encounter a group consisting of three men and three women.

a. Which of these three men is married to which of these three women?
b. ?Which of these three women is which of these three men married to?

(34) a. $[\![(33a)]\!] = \left\{ \begin{array}{c} \text{Which of these three women is Tom married to?,} \\ \text{Which of these three women is Dick married to?,} \\ \text{Which of these three women is Harry married to?} \end{array} \right\}$

b. $[\![(33b)]\!] = \left\{ \begin{array}{c} \text{Which of these three men is married to Mary?,} \\ \text{Which of these three men is married to Jane?,} \\ \text{Which of these three men is married to Sally?} \end{array} \right\}$

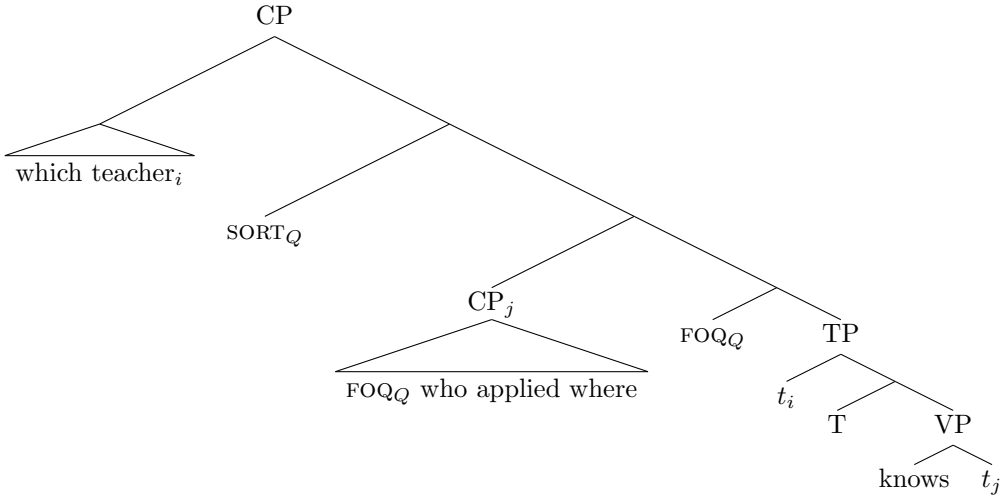
- (33a) presupposes that: for each of these three men, there is a unique woman whom he is married to. (33b) presupposes that: for each of these three woman, there is a unique man who is married to her. Since *is married to* is symmetric, and non-reflexive, and the cardinality of both sets is the same, there is no context in which one of the presuppositions will be satisfied while the other will fail to be.
- Fox (2012) therefore predicts (33b) to be just as bad as (29b) and (28b) under the PL reading, whereas in fact it is a lot better.
- Global interface economy makes the wrong predictions once we take the semantic-richness of multiple questions into account.
- An alternative account.

(35) **Topicality requirement:**
A superiority-violating question is only possible if the overtly-moved *wh*-phrase is topical.

- For the overtly-moved *wh*-phrase to be topical, there must be an information-structural asymmetry between the two *wh*-phrases. This captures the fact that superiority-violations are highly degraded, even with *which*-phrases, when both whs range over the same set of individuals.

- In Elliott (2015a), I proposed a pied-piping account of the Lasnik and Saito (1992) cases that motivated Reinhart's account.

(36) a. Which teacher knows who applied where?

b. 

- The idea is that the whole embedded question behaves like a complex *wh*-phrase. This has the advantage of unifying the locality conditions on *wh*-scope with quantifier scope. Superiority effects fail to manifest in the embedded CP because it lacks the head that drives superiority effects SORT$_Q$ in its left-periphery. A semantics for pied-piping is given from which the interpretation of (36) can be derived from the LF shown.

4 Conclusion

- The bigger picture: to what extent is global interface economy justified in the grammar?

(37) "...this is a costly calculation, and we may expect not to find too manly instances of it. Indeed, the economy strategies of the derivational type dramatically reduce the instances where this could be relevant. So far, **superiority is the only known instance in cases of movement**."
(Reinhart 1998, p. 50, my emphasis)

- Once we consider the fact that multiple questions is ambiguous, global interface economy turns out to make the wrong predictions.

- This could be considered a good result, since trans-derivational are problematic from the viewpoint of complexity. This result indicates that we should move away from global interface economy, at least for *wh*-questions (Chomsky 1995, 2000, 2001 a.o.).

- This leaves an explanatory gap, which we need a more fine-grained syntax to fill.

- An open question: if multiple questions are *type*-ambiguous, why are there no predicates which select for a FoQ meaning?

- One possible candidate is *list*, but it is also felicitous with a simple *wh*-question with a plural *wh*-expressions.

  (38) a. #Some boy likes some girl; can you list which boy likes which girl?
  b. Each boy likes a different girl; can you list which boy likes which girl?

  (39) Can you list which boys are here?

- One undesirable consequence of this approach is that *rogative* predicates (those which express a relation between an individual and a question, rather than between an individual and an answer to a question) must be ambiguous too.

  (40) a. John knows that some boy likes some girl, but he's wondering$_1$ [which boy likes which girl]$_{SP}$
  b. John knows that each boy likes a different girl, but he's wondering$_2$ [which boy likes which girl]$_{PL}$

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A A Problem with Simplex *Wh*-Expressions

- In §2 I motivated the ambiguity between SP and PL readings of multiple questions by discussing Dayal's (1996) solution to the problem of uniqueness presuppositions with singular *which*-phrases. Note that simplex *wh*-expressions carry no uniqueness presupposition.

  (41) a. What did Andrew order?
  b. The Sierra Nevada.
  c. The Sierra Nevada and the Blue Moon.

- Dayal's (1996) solution: simplex *wh*-phrases are underspecified for number, and therefore range over both atoms and pluralities. In other words, they are semantically plural (there are many arguments that plural NPs must also range over atoms; see e.g., Sauerland et al. 2005).

- Ans therefore does not impose a uniqueness requirement.

  (42) $[\![\text{what}]\!] = \left\{ \begin{array}{c} \text{the Sierra Nevada, the Blue Moon, ...} \\ \text{the Sierra Nevada}\oplus\text{the Blue Moon, ...} \\ \text{...} \end{array} \right\}$

- Problem 1: Simplex *wh*-phrases often trigger singular, not plural, subject-verb agreement.

  (43) a. ?*What are available to buy?

b. What is available to buy?

- For a subset of speakers, simplex *wh*-phrases are sometimes marginally compatible with both singular and plural subject-verb agreement. However, as illustrated in (44), even for these speakers, when the subject-verb agreement is singular, there is no uniqueness presupposition.

(44) a. Who is in the living room?
b. John.
c. John and Bill.

(45) a. %Who are in the living room?
b. John.
c. John and Bill.

- Problem 2: Absence of *maximize presupposition* effects.

- Consider the following:

(46) a. Hans knows which student got an A, namely John.
b. #Hans knows which student got an A, namely John and Paul.

(47) a. #Hans knows which students got an A, namely John.
b. Hans knows which students got an A, namely John and Paul.

- As the paradigm in (46) and (47) demonstrates, the use of a plural NP is often taken to imply non-atomicity. This is somewhat mysterious under the assumption that plural NPs range over atoms and pluralities. A prominent explanation for this is the principle *Maximize Presupposition* (Heim 1991).

(48) *Maximize Presupposition* An utterance of ϕ_p is infelicitous in a context c if there is an alternative ψ_q[9]
a. The assertions of ϕ_p and ψ_q are contextually equivalent in c, and;
b. q asymmetrically entails p, and;
c. q is satisfied in c.

- If we compare a simplex *wh*-expression to a singular *wh*-phrase, as in (49) (with the domain suitably restricted), *Maximize Presupposition* predicts that the simplex *wh*-expression should imply non-atomicity.

(49) a. ϕ_p = (Of the students), Hans knows who got an A.
b. ψ_q = (Of the students), Hans knows which student got an A.

- This is not the case however.

(50) a. Of the students, Hans knows who got an A, namely John.
b. Of the students, Hans knows who got an A, namely John and Bill.

[9] ϕ_p is used to mean a sentence ϕ whose presupposition is p.

- One possible solution: *Maximize presupposition* is computed locally (see Singh 2011). The idea is that *Hans knows who got an A* and *Hans knows which student got an A* do not contribute contextually equivalent assertions in a local context c' due to the absence vs. presence of an NP restrictor. This need to be fleshed out.

B QR and Local Interface Economy

- Note suspiciously that a quantifier in an embedded question (as opposed to say, an embedded declarative) may exceptionally take sentential scope (Szabolcsi and Moltmann 1994, Fox 1998), but only if the embedded question independently allows for a pair-list reading.

(51) a. Some librarian knows who stole each book. *each > some*
(cf. who stole each book?, PL)
b. Some library knows who stole most books. *#most > some*
(cf. who stole most books?, #PL)

- Fox (1998) argues that this phenomenon should be explain in terms of *local* interface economy – according to fox, movement of the DP to the edge of the embedded clause is licensed locally in (51a) because it gives rise to a new reading (the pair-list reading). Movement may then take place from the edge of the embedded clause to the matrix clause.

- Even though movement of *most* to the matrix clause in (51b) would give rise to a new reading, it is not allowed, since the initial short movement step is not licensed by local interface economy. Global interface economy considerations cannot license QR!

- This looks strikingly similar to the phenomenon whereby a *wh*-expression in an embedded question can apparently easily achieve sentential scope, but the latter case crucially *cannot* be explained in terms of local interface economy, as this wrongly predicts superiority violations.

(52) a. Which teacher knows where who applied?
b. *John knows where who applied.