Danny Fox

Multiple *wh*-questions: uniqueness, pair-list and second order questions

1. Uniqueness Presuppositions and their disappearance in multiple *wh* questions

(1) a. Which boy (among John, Bill and Fred) read the book?
Uniqueness presupposition (UP): exactly one boy read the book.
b. Which boy (among John, Bill and Fred) read which book?
No UP (at least under one reading).

Goal for today

1. To account for the distribution of UPs (taking Dayal's (1996) account of UP in (a) as a starting point, rejecting her account of (b), and instead providing a way to generalize from (a) to (b) based on the assumption (not uncommon in the literature and found elsewhere in Dayal) that multiple questions can denote second order questions.

2. To begin discussing potential ramifications for quantificational variability in questions.

Goals for (some of) our subsequent classes

2.' To continue discussing relevant issues pertaining to quantificational variability
3. To discuss similarities between the properties of (1)b and pair-list readings that arise through universal quantification (of, e.g., *which book did every boy read?*)
4. To continue discussing constraints on pair list readings: the fact that they arise only with universal quantifiers, though other quantifiers seem to be able to outscope questions when they are embedded (Szabolsci 1997).
5. To draw consequences for superiority, and in particular exceptions to superiority (given the perspective of Golan 1993)
6. To discuss consequences for the distribution of covert *wh* movement.

2. Karttunen Semantics

(2) $[\![C_{int}]\!] = \lambda p_{\alpha}.\lambda q_{\alpha}.p=q$ (*i.e., the relation of identity*)

In order to avoid any appeal to a special composition rule (or a special meaning for a *wh*-feature), we will assume that one argument of q is saturated by a variable bound by a lamda abstractor:

(3) Which boy came?
LF:
λp [which boy λx [[C_{int} p] λw. x came$_w$]]
Denotation (in a world w^0):
$\lambda p.\ [\![\text{some boy}]\!]^{w0}\ (\lambda x.\ p = \lambda w.\ x \text{ came in } w)$ (*$[\![\text{some boy}]\!] = [\![\text{which boy}]\!]$*)

(4) Question: How do we get the variable p and abstraction over p?
Possible answers:
a. Movement of a semantically vacuous element (as in the formation of relative clauses), which leaves a trace of type st.
b. Movement of an operator which takes question denotations as its argument, e.g., Dayal's *Ans*, or *Filter* (I.e., what we have in (3) is only part of the LF.)

3. Dayal's Account (of the distribution of the UP)

Core Idea: The operator *Ans* must apply to the question denotation (either when it is answered/as-part-of-semantics-of-Q-embedding-verbs or in the syntax itself) hence utterance of a question presupposes that its (HK) denotation has a maximally informative member.

For concreteness, we will incorporate *Ans* to the LF.

(5) Which boy came?
LF: Ans λp [which boy λx [[Q p] λw. x $came_w$]]
Denotation (in a world w^0):
Max_{inf} (λp. $[\![$some boy$]\!]^{w0}$ (λx. p = λw. x came in w))

(6) $[\![Ans]\!](Q) = Max_{inf}(Q)$
$Max_{inf}(Q)(w)$ = the $p \in Q$, s.t. $w \in p$ and $\forall q \in Q(w \in q \rightarrow p \subseteq q)$[1]

[For further evidence, see recent accounts of negative islands: Abrusan (2007), Abrusan and Spector (2012), Beck (2012), Fox and Hackl (2006), Schwarz and Shimoyama (2010).]

We thus predict a UP for all *wh*-questions with singular restrictors:

(7) a. $[\![$which girl came$]\!]^{w0}$ = {λw. x came in w: $x \in [\![girl]\!]^{w0}$}
b. $[\![$which girl read which book$]\!]^{w0}$ =
{λw. x read y in w: $x \in [\![girl]\!]^{w0}$ & $y \in [\![book]\!]^{w0}$}

Conclusion: Good result for simple *wh*-questions. Bad result for multiple *wh*-questions.

Dayal's way of correcting for the bad result: there are two types of C_{int} heads that can head an interrogative CP. The one in (2) would indeed yield a UP (given the obligatoriness of *Ans*). But there is another one, which eliminates UP (and leads to a different presupposition):

(8) a. $[\![C_{int-1}]\!] = \lambda p_{\alpha}.\lambda q_{\alpha}.p=q$
b. $[\![C_{int-2}]\!] = \lambda p_{st}.\lambda R_{<e,<ee,st>>}.\lambda X_{et}.\lambda Y_{et}.$
$\exists f_{ee}$. domain(f) =X & range(f) $\subseteq$Y &
$p = \cap\{p':\exists y \in Y[p'=R(y)(f)]\}$

(9) $[\![$$\lambda$p [which book λy which girl λx [[C_{int-1} p] λw. x $read_w$ y]]]$]\!]^{w0}$
= {λw. x read y in w: $x \in [\![girl]\!]^{w0}$ & $y \in [\![book]\!]^{w0}$}
Hence UP

(10) $[\![$$\lambda$p [book [girl [[$C_{int-2}$ p] λxλf λw. x $read_w$ f(x)]]]$]\!]^{w0}$
= {$\cap${λw. x read f(x) in w: $x \in [\![girl]\!]^{w0}$ }: domain(f) = $[\![girl]\!]^{w0}$ & range(f) $\subseteq$ $[\![book]\!]^{w0}$}
Hence No UP

[1] This is what we called *Ans-weak*$_{Dayal}$ in our previous class.

Advanatages:
1. The new denotation still predicts certain presuppositions that Dayal argues are correct (Exhaustivity and point-wise uniqueness).
2. It is also predicted that UP will re-immerge in the presence of islands for covert movement (assuming that there is a method of deriving the standard denotations, e.g. (7)b).

Dis-advantage: We don't really understand why the predictions ought to hold. In particular, we don't understand why Q_2 exists, nor why it was formulated in the way it was. Furthermore, it doesn't generalize beyond the special case that involves two *wh*-Ps

My main goal: to preserve the advantages and avoid the disadvantage.

4. The Advantages: Exhaustivity, Point-wise Uniqueness and Island Sensitivity

4.1. Exhaustivity

(11) a. Guess which of these 3 kids will sit on which of these 4 chairs
b. #Guess which of these 4 kids will sit on which of these 3 chairs
Suggests that two kids will sit on the same chair.

This is predicted by Dayal's account. Each proposition in the Dayal pair-list denotation [analogous to (10)] is a conjunction of the form:

$\cap\{\lambda w.\ x \text{ will sit on } f(x) \text{ in } w: x\in[\![NP_{subject}]\!]^{w0}\}$,
where f is a function from $[\![NP_{subject}]\!]^{w0}$ to $[\![NP_{object}]\!]^{w0}$.

Such a conjunction can be true only if every member of $[\![NP_{subject}]\!]^{w0}$ will sit on a member of $[\![NP_{object}]\!]^{w0}$.

4.2. Point-wise Uniqueness

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

This is also predicted by Dayal's account. If one boy does more than one chore, there will be two functions from the boys to the chores which will satify a proposition of the form:
$\cap\{\lambda w.\ x \text{ will do } f(x) \text{ in } w: x\in[\![NP_{subject}]\!]^{w0}\}$

Hence the Max_{inf} presupposition will not be satisfied.

4.3. Island Sensitivity (challenged empirically in class)

(13) Which linguist will be offended if which philosopher is invited to give a talk at this conference?

Dayal's observation: this has a UP.

(14) a. For the most part he knows which linguist hates which philosopher.
b. *For the most part he knows which linguist will be offended if which philosopher is invited.

(15) a. Except for the this linguist, he knows which linguist hates which philosopher.
b. *Except for this linguist, he knows which linguist will be offended if which philosopher is invited.

In order to get rid of the UP, the in situ *wh*-P will have to move. But this covert movement is assumed to be island sensitive.

The proposed LF (Dayal 2002, following Reinhart):

(16) $\lambda p\ \exists f_{\text{choice-function}}$ which linguist λx. [[C_{int} p] x will be offended if f(philosopher) is invited to give a talk at this conference]?

Issue: is it indeed true that the disappearance of UP necessitates covert *wh* movement? We've seen some evidence here., but there are other considerations to which we should return. For conflicting evidence, see Pesetsky (2000), Beck (2006) and on the other hand Nissenbaum (2002).

Report of Discussion in Class: David disagreed with the judgment. Hadas read out a contextual setup from Cheng and Demirdache (2009) (attributed to Tancredi) where pair list is clearly possible in (13)). Our conclusion for now: there is no island sensitivity. The pair-list presuppositions requires the accommodation of complicated presuppositions (exhaustivity and point-wise uniqueness). These presuppositions are defined with reference to a complex relation (type <e,et>) and this relationship is more complex the further the two *wh*-phrases are from each other.

Homework

Assume, following Gajewski's rendition of von Fintel, that *except for John* has the denotation in (17) and that the LF of (18)a is something along the lines of (18)b, with the detonation of P – P', as follows:

$$[\![P - P']\!] = \lambda x. [\![P]\!](x)=1 \text{ and } [\![P']\!](x) = 0$$

(17) $[\![\text{EXCEPT for John}]\!] = \lambda P_{et,t}.\ P([\{[\![\text{John}]\!]\}) = 1\ \&\ P(\varnothing) = 0$

(18) a. Except for John he knows which boy read which book
b. EXCEPT for John λP_{et}. he knows which [boy – P] read which book.

Explain the unacceptability of (19) based on exhaustivity and point-wise uniqueness.

(19) *Except for War and Peace he knows which boy read which book

---

5. Families of Questions

Elsewhere in her work, Dayal claimed that multiple movements of wh-phrases to [spec,CP] yield a systematic ambiguity:

(20) Which girl read which book?
LF$_1$ (involves a single occurrence of C_{int}):
λp [which girl λx which book λy [[C_{int} p] λw. x read$_w$ y]]
Denotation (in a world w^0):
λp_{st}. $[\![\text{some girl}]\!]^{w0}$ (λx. $[\![\text{some book}]\!]^{w0}$ (λy. p = λw. x read$_w$ y)) =
λp_{st}. $\exists x \in [\![\text{girl}]\!]^{w0}$ $\exists y \in [\![\text{book}]\!]^{w0}$, s.t.
p = λw. x read y in w
In set notation:
{λw. x read y in w: $y \in [\![\text{book}]\!]^{w0}$ & $x \in [\![\text{girl}]\!]^{w0}$}

(21) Which girl read which book?
LF$_2$ (involves two occurrences of C_{int}):
λQ [which girl λx [C_{int} Q] λp [which book λy [[C_{int} p] λw. x read$_w$ y]]
Denotation (in a world w^0):
$\lambda Q_{st,t}$. $[\![\text{some girl}]\!]^{w0}$ (λx. Q = λp_{st} $[\![\text{some book}]\!]^{w0}$ (λy. p = λw. x read y in w))
=
$\lambda Q_{st,t}$. $\exists x \in [\![\text{girl}]\!]^{w0}$ s.t.
Q = λp_{st}. $\exists y \in [\![\text{book}]\!]^{w0}$, s.t.
p = λw. x read y in w
In set notation:
{{λw. x read y in w: $y \in [\![\text{book}]\!]^{w0}$}: $x \in [\![\text{girl}]\!]^{w0}$}

(22) **Two instantiations of** C_{int}: (*replace Q with C_{int}*)
$[\![C_{int}]\!] = \lambda p_{st}.\lambda q_{st}.p=q$
$[\![C_{int}]\!] = \lambda Q_{st,t}.\lambda Q'_{st,t}.\ Q=Q'$

Crucial Claim (contra Dayal): *wh*-phrases stack in the way that is observed overtly in Bulgarian.[2,3]

The Tucking-in Generalization: Let a question CP be a maximal (extended) projection of C_{int}, which has a *wh*-P, W, as its outer specifier. There cannot be a wh-phrase, W'≠W, such that W' has an occurrence in an A-position which c-commands the highest occurrence of W in an A position.

Consequence for English: Let a question CP be a maximal (extended) projection of C_{int}, which has a *wh*-P, W, spelled-out in its specifier position (overtly moved). The highest occurrence of W must c-command all occurrences of any other *wh*-P within CP.

---

[2] For evidence from English, see Nissenbaum (2000: chapter 3).
[3] Dayal postulated families of questions for a very different reason (accounting for what she called the *wh*-triangle). Given her special purpose, she had to assume that *wh*-Ps nest rather than tuck-in. I have to assume a different account of the *wh*-triangle, e.g. that of Richards 2001.

6. An alternative Account of the distribution of UP

6.1. First Version (inspired by Lahiri, G&S):[4]

Ans takes an ordinary question as argument (set of propositions). In other words, it cannot combine with a family of questions. But we have a covert universal quantifier that can be appended to any expression of a question type.

$$\text{Ans}(\forall\ [\text{which boy read which book}])\ \text{--QR/IR}\rightarrow$$
$$\forall\ [\text{which boy read which book}]\lambda Q\ldots\text{Ans}(Q)$$

(23) $\lambda w \lambda w'.\ \forall\ [\text{which boy read which book}]\lambda Q.\ \text{Ans}(Q)(w)(w')$

This presupposes exhaustivity and point-wise uniqueness.

What about sensitivity to islands? This will follow if we assume that every occurrence of a C_{int} morpheme requires *wh* movement (e.g., has an uniterpretable wh-feature).

6.2. Second Version:

Suppose that questions with multiple *wh* phrases can denote:

a. sets of propositions,
b. sets of sets of propositions,
c. sets of sets of sets of propositions, etc.

(24) α is a question type if it is a member of the smallest set Q, s.t.
a. $<st,t>\in Q$
b. if $\alpha' \in Q$, $<\alpha',t>\in Q$.

(25) $[\![\text{Ans}]\!] = \lambda Q_{q\text{-type}}{:}\forall p,q\in Q(p\cap q=\varnothing).$

$$\lambda w. \begin{cases} \cap\{p\in Q: p(w)=1\} & \text{if Q is of type} <st,t> \\ \cap\{[\![\text{Ans}]\!](p)(w): p\in Q\} & \text{otherwise} \end{cases}$$

The presupposition will require a parse with a covert *only* (from Menendez Benito)

(26) $[\![\cancel{\text{only}}]\!](Q_{<st,t>}) = \{p = \text{Max}_{inf}(Q): p\in Q\}$

(27) Which girl read which book?
LF$_{2'}$ (involves two occurrences of Q and a covert *only*):
$\lambda Q\ [\text{which girl}\ \lambda x\ [C_{int}\ Q]\ \cancel{\text{only}}\ \lambda p\ [\text{which book}\ \lambda y\ [[C_{int}\ p]\ \lambda w.\ x\ \text{read}_w\ y]]$
Denotation (in a world w^0):

[4] This is an improvement (suggested by I. Heim) of a proposal I made in the seminar taught by Irene and Kai. Her suggestion did not involve universal quantification but plural predication of $\text{Ans}_{w,w'}$ on a family of questions, viewed as a plurality.

$\lambda Q_{st,t}$. ⟦some girl⟧^{w0} (λx. Q = ⟦only⟧(λp_{st} ⟦some book⟧^{w0} (λy. p = λw. x read y in w)))
=
=
$\lambda Q_{st,t}$. $\exists x \in$⟦girl⟧^{w0} s.t.
Q = λp_{st}. $\exists y \in$⟦book⟧^{w0}, s.t.
p = λw. x read y in w & $\forall z$ $\in$⟦book⟧^{w0} ($\neg$x read y in w)
In set notation:
{{λw. among the books x read only y in w: y$\in$⟦book⟧^{w0} }: x$\in$⟦girl⟧^{w0}}

(28) ⟦Ans⟧ (⟦(27)⟧ ^{w0})(w^0) =
⟦Ans⟧({{λw. x read only y in w: y$\in B_{w0}$ }: x$\in G_{w0}$})(w^0) =
$\cap$ {⟦Ans⟧({λw. x read only y in w: y$\in B_{w0}$ })(w^0): x$\in G_{w0}$} =
$\cap$ {$\cap$ {λw. x read only y in w: y$\in B_{w0}$ & x read only y in w^0}: x$\in G_{w0}$} =
$\cap$ {λw. x read only y in w: y$\in B_{w0}$ & x$\in G_{w0}$ & x read only y in w^0}

This does not require that the domain of the subject be exhausted (i.e., does not predict the exhaustivity presupposition). But I think there is a natural way to introduce this presupposition.

(29) ⟦Ans⟧ = $\lambda Q_{q\text{-type}}$:$\forall p,q \in Q(p \cap q = \varnothing)$.

$$\lambda w. \begin{cases} \cap\{p\in Q: p(w)=1\}\neq T:\ \ \cap\{p\in Q: p(w)=1\} & \text{if Q is of type <st,t>} \\ \cap\{[\![Ans]\!](p)(w): p\in Q\} & \text{otherwise} \end{cases}$$

This amounts to an existence and uniqueness presupposition at the basic level of the recursion.

Another difference is that what we have now is a strongly exhaustive answer.

6.3. Third Version:

(30) Ans-strong($K_{q\text{-type}}$)(w) =
$$\begin{cases} \cap\{Exh(K)(q): q\in Q\ \&\ Exh(K)(q)(w)=1\} & K \in D_{<st,t>} \\ \cap\{[\![Ans]\!](Q)(w): Q\in K\} & \text{otherwise} \end{cases}$$

(31) $w \in Exh(Q_{st,t})(p_{st}) \Leftrightarrow w \in p\ \&\ \forall p' \in Q[w \in p' \rightarrow p \subseteq p']$

(32) Partition(K) := Set of equivalence classes of W under $\sim_K$
if K is of type <s,t> : $w \sim_K w'$ iff K(w) = K(w')
if K is of a question type: $w \sim_K w'$ iff $\forall Q \in K(w \sim_Q w')$

(33) Cell($K_{q\text{-type}}$,w) := the C$\in$Partition(K), s.t. w$\in$C

(34) ⟦Filter⟧ = $\lambda K_{q\text{-type}} \lambda w$: Cell(K,w) = Ans-strong (K)(w). K

(35) Consider the denotation of (21), in w^0
-K = $\{\{\lambda w.$ x read y in w: $y \in [\![book]\!]^{w0}\}: x \in [\![girl]\!]^{w0}\})$
-For any w, Cell(K,w) is the set of worlds that agree with w in the truth value of every proposition of the form x read y where y is a book in w^0 and x is a girl in w^0.
-Ans-strong (K)(w) is the set of worlds in which every proposition that is true in w of the form x read only y is true in these worlds as well.
The two sets will be identical only if every boy reads exactly one book.

-If there is a girl, *g*, who read no book in w, there will be no way to state this with a proposition of the form Exh(Q)(p) (*Q∈K*). Hence exhaustivity is derived.
In other words, Cell(K,w) will entail that *g* read no book, but Ans-strong (K)(w) will not.
-If there is a girl, *g*, who read more than one book in w, there will be no way to state this with a proposition of the form Exh(Q)(p). Hence point-wise uniqueness is derived.
In other words, Cell(K,w) will entail the *g* read more than one book, but Ans-str(K)(w) will not.

6.4. Possible view of the derivation

Why is *Ans*/*Filter* necessary?
Perhaps: This is the only existing element the movement of which will form a question.

Derivation with one C_{int}:

[C_{int} Ans] λw. Which girl $read_w$ which book --multiple wh-movment -->
Which girl λx. which book λy. [C_{int} Ans] λw. x $read_w$ y --movement of Ans -->
Ans λp. Which girl λx. which book λy. [C_{int} p] λw. x $read_w$ y

Derivation with two C_{int} :[5]

[C_{int} [C_{int} Ans]] λw. Which girl $read_w$ which book --first wh moves-->
which book λy. [C_{int} [C_{int} Ans]] λw. Which girl $read_w$ y -- [C_{int} Ans]] moves-->
[C_{int} Ans] λp. which book λy. [C_{int} p] λw. Which girl $read_w$ y --second wh moves -->
Which girl λx. [C_{int} Ans] λp. which book λy. [C_{int} p] λw. x $read_w$ y --Ans moves -->
Ans λQ. Which girl λx. [C_{int} Q] λp. which book λy. [C_{int} p] λw. x $read_w$ y

6.5. How could we learn if we are on the right track here?

Is there independent evidence for families of questions?

7. The relative acceptability of plural agreement

Imagine that at the end of the school year (11-12th grade) the teacher meets with every student to discuss plans for the future.

(36) a. The question she will ask, who has plans to apply to college, is critical for the advice she will give.

[5] Inspired by Shimada's view of head-movement and extended projections.

b. The question she will ask, who will apply to which university, is critical for the advice she will give.

(37) a. * The questions she will ask, who has plans to apply to college, are critical for the advice she will give.
b. ? The questions she will ask, who will apply to which university, are critical for the advice she will give.

Report on Discussion in Class:

Edwin and Irene: when questions are subjects of predicates they never show plural agreement:

(38) a. Which boy will be admitted to which department depend*(s) on SAT scores
b. Which boy will be admitted to which department is the question we ought to ask (*are the questions…)

Kai:

(39) * The two questions she will ask, namely which of the two students will apply to which college are critical for the advice she will give.

8. Lahiri and Quantificational Variability

Berman's Generalization: Quantification Variability in questions is restricted to verbs that take both questions and propositions.

(40) a. For the most part, he knows who voted for resolution 380.
b. *For the most, he wonders who voted for resolution 380.
c. *For the most, he wants to know who voted for resolution 380.

Lahiri's account (greatly simplified):

(41) a. [For the most part Q] [λp. he knows p].
b. *[For the most part Q] [λp. he wonders p].
c. *[For the most part Q] [λp. he wants to know p].

(42) a. $[\![\text{For the most part}]\!]^{w}(Q)(Q') = 1$ iff
for most $p \in Q$, p is entailed by Ans(Q)(w), $p \in Q'$.
b. $[\![\text{For the most part}]\!]^{w}(Q)(Q') = 1$ iff
for most p s.t. $Q(p)=1$ & $p \in \text{Domain}(Q')$, $Q'(p) = 1$.

9. Prediction given our analysis of multiple questions

Prediction (based on A. Williams, who argued that the prediction is wrong): in multiple questions we will see systematic counter-examples to Berman's generalization. Moreover, the counter-examples will reflect the tucking in generalization we've been assuming.

(43) **Evidence for a multiple question effect**:

I. a. *For the most part I would like to know who will vote for John in the upcoming elections.
b. (?)For the most part I would like to know who will vote for whom in the upcoming elections.

II. a. *In every case I would like to know who voted for Bush (except for Bill).
b. (?)In every case I would like to know who voted for whom (except for Bill).

III. a. *With no exceptions, I would like to know who voted for Bush.
b. With no exceptions, I would like to know who voted for whom.

(44) **Evidence for tucking-in where superiority is obviated**:

a. I would like to know which resolution(s) Scott Brown voted for.
(?)In fact, in every case I would like to know which senator voted for which resolution(s).
b. I would like to know which senator(s) voted for resolution 380.
(*)In fact, in every case I would like to know which senator(s) voted for which resolution.
c. I would like to know which senator(s) voted for resolution 380.
(?)In fact, in every case I would like to know which resolution which senator(s) voted for.

A. Williams (2000: p. 579) noticed that such a prediction would be made, but claimed that it is false: “This has the interesting implication that, if there were interrogatives that denoted a plurality of questions, an adverb could quantify over them, yielding a higher-order QV reading. Seems to me, this does not happen, which suggests that no interrogative denotes a plurality of questions.”

His justification:

(45) a. For the most part, Al wondered who drank what.
b. a≠For most q, $q \in$ {who drank a, who drank b,…}: Al wondered q.
c. a≠For most q, $q \in$ {What did C drink, What did D drink,…}: Al wondered q.

I am not absolutely sure, but I tend to agree with these judgments. I don’t have an account of what might account for a contrast between *wonder* and *would like to know*. My hope is that *would like to know* is the indicative case. For me, the relevant meanings are harder to state with *wonder* even when QV is not at stake:

(46) a. Every boy is such I would like to know which book he read.
b. ?Every boy is such that I wonder which book he read.

Ask

(47) **Evidence for a multiple question effect**:
Your assistant never asks for advice.
a. That not true. *For the most part, he asked me which strategies this case deserves.
b. That not true. For the most part, he asked me which case deserves which strategies.

10. Some more on why *would like to know* provides a good test

I've used *would like to know* rather than *wonder*.

This might raise suspicions: *would like to know* contains the verb *know*. Hence we might expect it to select for propositions (in complement position of *know*). In fact, the following is not ungrammatical:

(48) I would like to know that you would come on time.

However, Berman (and to some extent Lahiri) has made an additional claim, namely that QV depends on a factive (or at least presuppositional) interpretation of the verb *know* (see (42)b). Since in (48), *know* is not factive, it need not bother us.

> In fact, I suspect that we can understand why *know* is not factive in (48): had it been factive we would have had a conflict between the presupposition triggered by *want*/*would-like-to* and the way *want* projects the presupposition of its complement.
>
> Homework (for all of us, including me): to compute and see if this is right. If so, we can think of *wonder* seriously as involving decomposition into *want to know* and of the unavailability of *wonder p* in terms of a presupposition clash. The missing piece would be to block local accommodation (an operator) intervening between *want* and *know*.

11. Summary

1. *Wh*-phrases with singular agreement lead to a uniqueness presupposition. This follows from the presuppositions of *Ans/Filter*/$\max_{\text{inf}}$, which also account for negative islands.
2. Multiple *wh*-phrases with singular agreement are ambiguous: they either have a uniqueness presupposition or point-wise uniqueness for every element of the overtly raised (higher) *wh*-phrase.
3. This follows from an ambiguity in the C system. Multiple occurrences of C_{int} yield families of questions and this affects the presupposition.
4. Evidence for families of questions comes from agreement and QV.

12. Open Questions

1. Evidence for families of questions, as we will see, extends to pair list readings that arise through universal quantification (those discussed in our first class). If we are

correct, the latter should also denote families of questions.

2. We've made simplifying assumptions about QV. Is that a problem?
3. In particular, Lahiri's proposal does not make use of Dayal's *Ans*. Is there a natural way to modify it so that QV will not eliminate the effects of Max_{inf}?
4. Beck and Sharvit raise various challenges to Lahiri's proposal. Is it realistic to rely on this proposal?