Pair-List with Universal Quantifiers

Goal for today

- To discuss a problem for our approach to questions with *wh* phrases: we have argued that pair-list readings of such questions (W-pair list) results from a family of questions denotation. Our first goal is to challenge this proposal by observing that the arguments for such a denotation extend to cases where the higher *wh*-phrase is replaced by a universal quantifier (to ∀-pair-list). Although various authors have suggested a family of questions denotation for ∀-pair-list, the syntactic and semantics mechanisms we've postulated do not yield this result.
- To present a method for extending the proposal (following Pafel 1999, and Preuss 2001)

1. The Problem

The two sentences in (1) seem equivalent on the pair list reading (exhaustivity, point-wise uniqueness).

(1) a. Which girl read which book?
b. Which book did every girl read?

Moreover, our arguments for families of questions seem to extend:

(2) **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.
a. *The questions she will ask, (namely) who has plans to apply to college, are critical for the advice she will give.
b. ? The questions she will ask, (namely) which student will apply to which university, are critical for the advice she will give.
b. ? The questions she will ask, (namely) to which university will every student apply, are critical for the advice she will give.

(3) **Quantificational variability:**
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.
c. For the most part I would like to know for whom every one of my friends will vote in the upcoming elections.

[(4) **Exceptives:**
a. *I would like to know which one of my friends will vote for Scott Brown except for my neighbor Fred.
b. I would like to know which one of my friends will vote for whom except for my neighbor Fred.
c. I would like to know for whom every one of my friends will vote except for my neighbor Fred.]

The family of questions analysis was automatic in the case of multiple *wh*-phrases (W-pair-list). But it is far from so, in the case of ∀-pair-list

My goal: to present a family of questions analysis for ∀-pair-list (a version of a proposal made in Pafel 1999, and Preuss 2001).

2. Enrichment of Karttunen's mechanisms

2.1. Reminder

(5) a. $[\![C_{int}]\!] = \lambda p_\alpha.\lambda q_\alpha.p=q$ (*i.e., the relation of identity*)
b. $[\![\text{which boy}]\!] = [\![\text{some boy}]\!] = \lambda P_{et}.\exists x[x \text{ is a boy and } P(x)=1]$

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

(7) Which girl read which book?
LF_1 (single occurrence of C_{int} → simple question → unique answer):
λp [which girl λx which book λy [[C_{int} p] λw. x $read_w$ y]]
Denotation (in a world w^0):
$\lambda p_{st}.\ [\![\text{some girl}]\!]^{w0} (\lambda x.\ [\![\text{some book}]\!]^{w0} (\lambda y.\ p = \lambda w.\ x\ read_w\ y)) =$
$\lambda p_{st}.\ \exists x \in [\![\text{girl}]\!]^{w0}\ \exists y \in [\![\text{book}]\!]^{w0}$, s.t.
$p = \lambda w.\ x \text{ read } y \text{ in } w$
In set notation:
$\{\lambda w.\ x \text{ read } y \text{ in } w: y \in [\![\text{book}]\!]^{w0}\ \&\ x \in [\![\text{girl}]\!]^{w0}\}$

(8) Which girl read which book?
LF_2 (involves two occurrences of C_{int} → multiple questions → multiple answers):
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):
$\lambda Q_{st,t}.\ [\![\text{some girl}]\!]^{w0} (\lambda x.\ Q = \lambda p_{st}\ [\![\text{some book}]\!]^{w0} (\lambda y.\ p = \lambda w.\ x \text{ read } y \text{ in } w))$
=
$\lambda Q_{st,t}.\ \exists x \in [\![\text{girl}]\!]^{w0}$ s.t.
$Q = \lambda p_{st}.\ \exists y \in [\![\text{book}]\!]^{w0}$, s.t.
$p = \lambda w.\ x \text{ read } y \text{ in } w$
In set notation:
$\{\{\lambda w.\ x \text{ read } y \text{ in } w: y \in [\![\text{book}]\!]^{w0}\}: x \in [\![\text{girl}]\!]^{w0}\}$

2.2. Up to a higher type and back down with MIN

Is there a way for *which book every girl read?* to have the denotation in (8)?

Yes: with the addition of two extra-pieces to the structure:
-Null operators that can be merged in various positions and move.
-A covert minimization operator, MIN (Pafel)

(9) Which book did every girl read?
LF_1 (single occurrence of C_{int} and no extra-machinery→ simple question → unique answer):
λp [which book λy [[C_{int} p] λw. every girl λx x $read_w$ y]]
Denotation (in a world w^0):
λp_{st}. ⟦some book⟧^{w0} (λy. p = λw. every $girl_{w/w0}$ $read_w$ y)) =
λp_{st}. $\exists x \in$⟦girl⟧^{w0}, s.t.
p = λw. every girl {in w, in w^0} read y in w
In set notation:
{λw. every girl read y in w: $y\in$⟦book⟧^{w0}}

(10) Which book did every girl read?
LF_2 (single occurrences of C_{int} + null operator movement + QR above C +MIN → family of questions → multiple answers):

Min($\lambda K_{<Q,t>}$ [every girl λx K λp [which book λy [[C_{int} p] λw. x $read_w$ y]]
(where Q = <st,t>)

Denotation (in a world w^0):
⟦Min⟧(λK. ⟦every girl⟧^{w0} (λx. K(λp_{st} ⟦some book⟧^{w0} (λy. p = λw. x read y in w))

=
⟦Min⟧(λK. ⟦every girl⟧^{w0} (λx. {λw. x read y in w: $y\in$⟦book⟧^{w0}} $\in$ K)
=
⟦Min⟧ ({K: $\forall x\in$⟦girl⟧^{w0}[{λw. x read y in w: $y\in$⟦book⟧^{w0}} $\in$ K}])
the minimal set of questions that for every girl g has a member the question which book did g read?

=
{ {λw. x read y in w: $y\in$⟦book⟧^{w0} }: $x\in$⟦girl⟧^{w0}}

⟦Min⟧($K_{<\alpha t,t>}$) = the $Q\in K$, s.t. $\forall Q'\in K$ $Q\subseteq Q'$ (undefin. if a unique Q doesn't exist)

3. The distribution of pair list and Szabolcsi's Observation

As Pafel points out, we can continue to account for the restriction on pair-list readings. With any quantifier other than a universal, *min* will not be defined.

4. If (only) wh-phrases were universal quantifiers

Then we would have an identical account for W- and ∀-pair-list

More on Quantificational Variability

Goal for today

- To discuss a problem for my reliance on Lahiri in the context of an account based on Dayal. One of my arguments for families of questions was based on a very partial discussion of Lahiri's assumptions about QV. But can these assumptions live peacefully with Dayal, or at least with a Max_{inf} pressuppositon?
- To show that things are simple for veridical predicates, but less so for non-veridical predicates.
- To work towards an account of QV with non-veridical predicates that would still rely on Dayal's presuppositions for questions.
- To bring up some of the problems for a Lahiri type account of QV, raised by Beck and Sharvit.

1. Veridical Predicates

1.1. For veridical predicates it simple enough to modify Lahiri so that *Ans* is involved.

(11) For the most part he knows who came.
For most p∈H s.t. p is entailed by Ans(H)(w^0) and Aomic(p,H), he knows p
Where H = {λw. x came in w: x ∈ ⟦person⟧^{w0}}
Atomic(p,$Q_{st,t}$) $\Leftrightarrow_{def}$ p∈Q & ∀p'∈Q[p⊆p' → p'=p] (p is a weakest member in Q)

1.2. An analogy with definite descriptions

(12) a. For the most part John knows who came.
True in w iff
for most p such that p is an atomic (weakest) true proposition of the form *x came*
John knows in w that p.

b. For the most part John read the books.
True in w iff
For most x such that x is an atomic part of *the books*,
John read x in w.

(13) a. For the most part John knows who came.
True in w iff
for most p such that p is an atomic part of Ans(⟦who came⟧(w),
John knows in w that p.

b. For the most part John read the books.
True in w iff
For most x such that x is an atomic part of ⟦the books⟧(w),
John read x in w.

1.3. Analogous syntax and semantics[1]

(14) a. ⟦For the most part⟧(p_{st})($Q_{st,t}$) = 1 iff
for most q such that q is entailed by p and is an atomic (weakest) element in Domain(Q), Q(p) =1.

b. ⟦For the most part⟧(x_e)($Q_{e,t}$) = 1 iff
for most y, such that y is a part of x and is an atomic element in Domain(Q), Q(p) =1.
(*identical entries if *entailed by* is the relevant *part of* relation on D_{st}*)

(12)' Logical Forms for (12) (QR Sportiche like + Trace Conversion)

a. For the most part ~~the True~~ who came
λp. John knows the λq [p ∈ ~~True~~ who came & q = p]

b. For the most part the books
λx. John read the λy. [y∈ books & y = x]

(15) a. ⟦The⟧($Q_{<s, <\alpha,t>>}$)(w) = the unique individual x∈D_α such that Q(w)(x)=1 and ∀y[(Q(w)(y)=1) → {w:Q(w)(x) =1} ⊆ {w:Q(w)(y) =1} (FF&I)

b. ⟦True⟧($Q_{<st,t>}$)(w) = {p∈Q: p(w) =1}

(16) a. ⟦The True Q_{st}⟧ = λw.the unique proposition p ∈ ⟦True Q⟧(w) such that ∀q∈⟦True Q⟧(w) → {w: p∈⟦True Q⟧(w)} ⊆ {w: q∈⟦True Q⟧(w)}
= λw. the unique p∈⟦Q⟧ such that p(w)=1 and ∀q∈⟦Q⟧(q(w) =1 → p ⊆ q
= λw. Max_{inf}(Q)(w)

(12)" Logical Forms for (12)a (QR Sportiche like + Trace Conversion + world variables)
λw. For the most part [~~the True~~ who came](w)
λp. he $knows_w$ [the_p ~~True~~ who came](w)

(17) ⟦λp. John $knows_w$ [the_p ~~True~~ who came](w)⟧ =
λp: p(w) =1 & p ∈ ⟦who came⟧. In w John knows that p

2. The problem of non-Veridical Predicates

(18) a. For the most part John and Mary agree on who came.
NOT
True in w iff

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[1] Loosely based on Magri's (2007) claim that distributivity is based on a "sortal" part whole relation: https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxtYWdyaWdyZ3xneDo2ODM3Yjk5MjI1NTgwMDYz&pli=1

for most p such that p is an atomic part of Ans(⟦who came⟧(w),
John and Mary agree with each other in w that p.

b. For the most part John is certain about who came.
NOT
True in w iff
for most p such that p is an atomic part of Ans(⟦who came⟧(w),
John is certain in w that p.

3. My Eventual Goal

To keep the analogy with definite descriptions and to connect the problem of non-veridical predicates to the problem we see in the following. In these examples we need the world argument of *the unicorns* to be bound locally despite quantificational variability, just like the word variable of *Ans*/*The-True*

(19) While John was dozing he imagined that there were 50 unicorns in his garden. For the most part he wanted to ride the unicorns.

4. An alternative for now

(20) Movement + Reconstruction:
For the most part, he is certain who came.
For the most part λp. John is certain the_p Filter who came.

(21) Association with Presupposition:
⟦For the most part⟧ ($Q_{st,t}$) = 1 iff
for most p such that Atomic(p,Domain(Q)): [Q(p)=1]

(22) Denotation of nuclear scope:
$[\![\lambda p.\text{ John is certain the}_p\text{ who came}]\!]^{w0}$ =
λp: p∈H & John believes that p is possible & John believes that Filter(H) is defined. John is certain that p
Where $H=\{\lambda w.\ x\ came_w: x \in [\![person]\!]^{w0}\}$

5. A paraphrase (building on Egré-and-Spector)

5.1. First pass

We can't employ E&S directly: E&S involves existential quantification over worlds which yields a strong enough result by virtue of reliance on Ans-Strong. But this (rather ingenious) maneuver is no longer effective once QV is introduced.

(23) a. For the most part John and Mary agree on [$_Q$ who came].
NOT
True in w iff ∃w' for most p such that p is an atomic member of ⟦Q⟧ entailed by

Ans-Strong(⟦Q⟧)(w), John and Mary agree with each other in w that p.

b. For the most part John is certain about who came.
NOT
True in w iff ∃w' for most p such that p is an atomic member of ⟦Q⟧ entailed by Ans-Strong(⟦Q⟧)(w), John is certain in w that p.

5.2. An alternative to E&S

(24) John V Q is true in w0 iff
∀w J V Ans-weak(Q)(w) is defined → John V Ans-weak(Q)(w) is true in w0

(25) John sometimes, mostly, always, never V Q is true in w0 iff
∀w J V Ans-weak(Q)(w) is defined →
[For some/most/all/no p an atomic member of {p∈Q: Ans(Q)(w) entails p}
John V p is true in w0]

6. Goal – Not there yet

To derive this paraphrase from reasonable assumptions in syntax and semantics