The Quantificational Variability Effect (QVE) to some extent defused and generalized

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0 Introduction

Berman 1990,1991 argues that sentences such as those in (1a-b) exemplify a fundamental bifurcation among interrogative clauses (the 'quantificational variability effect' (QVE)). His claim is that whereas in (1a) an adverb of quantification can only be interpreted as quantifying over cases/events/situations (henceforth the *cases* reading), (1b) displays an additional reading, (the *qv* reading), paraphrasable as (1c):

(1) a. Jill to some extent/usually/for the most part wonders which students cheat on the exam.

b. Jill to some extent/ usually/for the most part knows which students cheat on the exam.

c. For some/most students x that cheat on the exam, Jill knows that x cheats on the exam.

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Subsequent accounts of the QVE, Lahiri 1991 and Groenendijk and Stokhof 1993, differ from Berman and from each other in a number of important ways. The only empirical point of relevance in what follows is Lahiri's demonstration that adverbs of frequency ('often', 'seldom') show no QVE effect: there is no question/answer bifurcation for these adverbs, no reading distinct from the cases reading. It is only adverbs of quantity that bring out an additional reading.

All three accounts are united in assuming:

- **Assumption 1**: (1c) is a correct paraphrase/entailment of the qv reading;
- **Assumption 2**: there is a class of interrogative-clause embedding predicates that do not display qv readings. This includes 'question predicates' such as 'wonder', 'ask', 'investigate', and 'discuss'.

In this paper I make the following points:

- Contra **Assumption 1**: I propose alternative truth conditions for sentences such as (1b); I argue that these provide constraints on the notion of answerhood needed for the semantics of interrogatives.
- Contra **Assumption 2**: I suggest that once one moves away from a view of qv readings as involving quantificational variability, one notices that question predicates also trigger a cases/qv ambiguity.
- I show that the qv reading is independent of the nature of the embedded complement and arises equally with declaratives and NP's.
- I sketch an account of the phenomenon, one that ties qv readings to adverbial modification of the embedding *predicate*.

The paper is based on Ginzburg 1994 in which a more detailed account and theory comparison can be found.

1 Problems with the Truth Conditions of Assumption 1

According to **Assumption 1**, sentences such as those in (2) involve the logical forms in (3) respectively:

(2) a. Bill for the most part knows who came to the party.

b. Bill remembers to some extent which students failed the exam.

(3) a. For most x, x a human that came to the party Bill knows that x came to the party.

b. For some students x that failed the exam, Bill remembers that x failed the exam.

My claim is that once a broader perspective on answerhood is adopted, both in terms of the contexts where questions are used and the types of questions considered, such a paraphrase proves to be incorrect.

1.1 Quantified Answers

(4) would appear to license (5a,b):

(4) Celia: All I know is that some rather unruly linguists showed up, though I don't know who.

(5) a. Celia could tell (only) to some extent/ to a limited extent who showed up last night.

b. Celia knew (only) to some extent/to a limited extent who showed up last night.

Now if **Assumption 1** were correct, (5) should entail (6).

(6) For some x who showed up last night Celia told me/knew that x showed up last night.

However, given the context of (4), it is clear that the *de re* nature of the paraphrase in (6) is not warranted.

1.2 Pragmatic Relativisation

Now consider the following dialogue:

(7) a. [Context: Jill is about to step out of a taxi in Helsinki.] Driver: Do you know where you are?

b. Jill: South West Helsinki.

In many contexts, i.e. unless Jill's purpose is to locate a specific destination, Jill's response in (7b) licenses the statement in (8):

(8) Jill knows pretty much/to a large extent where she is.

If we identify the quantificational force of 'pretty much'/'to a large extent' with 'most/many', a paraphrase of (8) as per **assumption A** seems clearly incorrect:

(9) For most/many places x where Jill is, Jill knows that she is in x.

1.3 Partial y/n Answers

Similarly, unexpected for a view of qv readings based on **Assumption 1** is that partial answers for y/n–interrogatives, exemplified in (10) also give rise to qv readings:

(10) a. Jill: If there's a likelihood that Millie will come, I'll bake a cake. Could you tell me: is Millie coming tomorrow?

Bill: She's not overworked, so I'd say she might come.

b. Bill's response indicated to a certain extent whether Millie would be coming tomorrow.

These data are especially tricky for accounts such as Berman's and Groenendijk and Stokhof's where the adverb is assumed to be effecting a quantification over the role associated with the wh-phrase. It is also problematic for an approach like Lahiri's given that the Hamblin semantics for interrogatives on which his account is based does *not* accommodate partial answers for y/n interrogatives.

2 QV Readings as Predicate Modification

I offer now some arguments for developing an account that ties qv readings to adverbial modification of the embedding *predicate* rather than of the embedded complement. I attempt to refute **Assumption 2** concerning the putative lack of qv readings for questions predicates and then show that the qv reading is independent of the nature of the embedded complement and arises equally with declaratives and NP's.

2.1 QV Readings with Question Predicates

It is certainly the case that question predicates do *not* display a *reading* such as that paraphrased in (1c). My claim above has been that neither do factive/resolutive predicates.[1] Nonetheless, question predicates *do* allow for readings distinct from the cases reading, readings which for both question and resolutive predicates can be paraphrased as follows:

(11) a. Jill adverb V q = Jill had adverb-many Nom(V) of q.

b. Jill for the most part/hardly/to some extent knows q = Jill had almost complete/very partial/partial knowledge of q.

c. Jill and Bill for the most part/hardly/to some extent discussed q = Jill and Bill had almost complete/very partial/partial discussion of q.

[1]The class of predicates that behaves 'factively' with interrogatives is somewhat wider than with declaratives. I dub such predicates 'resolutive' since they carry a presupposition that the embedded question is *resolved*. See below section 3.1 for exemplification.

Let us consider some examples:

- **discuss**

(12) a. This issue, who to hire for the position, is highly complex. We have managed sofar to discuss it only to a very limited extent/partially.

b. Hence, what has taken place is: a limited/partial discussion of who to hire for the job ensued.

- **investigate**

(13) a. There have been many issues for us to investigate, far far too many for us to do a thorough job. We have to some extent investigated who committed the crime, we have fully investigated who was at the scene of the crime, but only to a limited extent when the suspects were in town.

b. Hence, what has taken place is: partial investigation of the first issue, complete investigation of the second issue, limited investigation of the third issue.

- **depend**

(14) a. Who comes here in the morning depends to some extent on how many terminals are free.

b. That is, there is a partial dependency between the resolution of the question who comes here and the resolution of the question how many terminals are free.)

- **wonder**

(15) a. I was really perplexed by his attack. Of course, your explanation of his behaviour seems reasonable, but I still wonder to some extent at least why anyone would adopt such an attitude.

b. That is, I still have a partial desire for an explanation that could resolve that issue.

The conclusion these data point to is that adverbs of extent can trigger qv readings for question predicates. The basic criterion for availability of such a reading seems to be: to what extent can the argument of the predicate be "partially consumed". Partial knowledge or recollection is more easily conceivable than partial wonderment or asking.

2.2 QV Readings for Non-Interrogative Complements

We will now see that qv readings also arise with non-interrogative complements. (16b) demonstrates that adverbs of extent can modify the (semi) factivity of an embedded declarative as well. In both (16a) and (16b) what has been *established* is a *weaker* fact than the one potentially described by the complement:

(16) a. The scientist has to some extent established which person committed the crime. (The scientist has established a fact that goes some way towards resolving the question of which person committed the crime.)

b. The scientist has to some extent established that unpasteurised milk causes botulism in rats. (The scientist has established a fact that goes some way towards proving the claim that unpasteurised milk causes botulism in rats.)

(17) exemplifies a class of predicates where both the (declarative) factivity and the (interrogative) resolutivity are *unmodified*:

(17) a. It to some extent amazed/disgusted Jill who chose to show up to the party. (Jill was somewhat amazed/disgusted by a fact that resolves the question of who chose to show up to the party.)

b. It to some extent amazed/disgusted Jill that unpasteurised milk causes botulism in rats. (Jill was somewhat amazed/disgusted by the fact that (proves the claim that) unpasteurised milk causes botulism in rats.)

Moreover, this split is correlated with the behaviour of fact nominals:

(18) a. This fact to some extent amazes Jill.

b. Jill has to some extent managed to establish [this fact]$_1$. (What Jill has actually established is a "weaker" fact than fact$_1$.)

More generally, the partial answer/evidence readings arise for precisely those predicates which manifest a "weaker" fact reading in (19a):

(19) a. Bill to some extent knows/discovered/revealed [this fact]$_1$.
(What Jill actually knows/discovered/revealed is a "weaker" fact than fact$_1$.)

b. Bill to some extent knows/discovered/revealed who showed up.
(What Bill knows/discovered/revealed is a fact that
goes some way towards resolving the question who showed up.)

c. Bill to some extent knows/discovered/revealed that Mary showed up. (What Bill knows/discovered/revealed is a fact that
goes some way towards proving the claim that Mary showed up.)

2.3 Two Sources for QV Readings

The data in sections 2.1 and 2.2 suggest two, independent sources for qv readings. The first is that such readings result from the modification of the *embedding* predicate.[2] This is because

1. qv readings arise for all interrogative complement predicates *including* question predicates.

2. qv readings arise for declarative and NP complements as well in such a way that presupposition projection is constant for a given predicate: predicates such as 'be-amazed' or 'disgust' are holes both for factivity and resolutivity when extent-modified, whereas 'establish' or 'reveal' filter them away.

As a special case, this view can be extended to account for a related "hedging" reading, one in which the asserter to Q-extent commits herself to a statement, as in (20). For reasons of space I ignore such readings in the remainder of the paper:[3]

(20) a. To some extent/for the most part, (I'm willing to say that) this book is convincing.

b. To some extent/for the most part, (I'm willing to say that) Jill knows who was there.

c. To some extent/for the most part, (I'm willing to say that) Jill knows Mary was there.

3 An Account of QV Readings for Factive/Resolutive Predicates

The remainder of the paper is devoted to sketching an account of the "partial answer/proof" reading that characterizes qv readings for semi-resolutive/factive predicates e.g. in (19). In order to do this, I will spell out certain assumptions about declarative and interrogative semantics, motivate an enrichment of the notion of an *answer*, and sketch a theory of questions wherein such a notion can be accommodated. Certain of the formal details are provided in the appendix, though for fuller motivation and treatment see Ginzburg 1994, (forthcoming).

3.1 Interrogative/Declarative Semantics

Table 1 lists four class of interrogative/declarative embedding predicates.

[2]The predicates 'give an X idea' or 'have an X idea' where X varies over 'some', 'reasonable', or 'very good' are perhaps prototypical examples of such a process of modification.

[3]Obviously one cannot subsume all verb-modification readings to be instances of the "hedging" reading: this would not account for multiply embedded qv readings as in (i)

(i) Jill told me that Bill knows to some extent who came.

Nor would it account for the fact that presupposition projection is constant for a given predicate.

Resolutives	Factives	QI	TF
report	reveal	ask	claim
tell	know	wonder	believe
announce	forget	investigate	assume
guess	determine	discuss	assert
predict	discover	ponder	allege
state	remember	about	deny
	show		prove

Table 1: Resolutive, Factive, Question, TF predicates

Factive predicates satisfy the following schemas:

(21) a. The claim is that p.
Bill V's/has V'ed (knows/discovered) that p.
So, the claim is true.

b. A certain fact is/has been V'ed (known/discovered)
Which fact? One that proves the claim that p.
So, it is V'ed that p.

Resolutive and factive predicates satisfy the following schemas:

(22) The question is: who left.
Bill V's/has V'ed (knows/discovered/told me/reported/managed to guess) who left.
So, the question is resolved/the question is no longer open.

(23) A certain fact is/has been V'ed
(known/discovered/told me/reported/guessed).
Which fact? A fact that resolves the question of who left.
So, it is/has been V'ed (known/discovered/told me/reported/guessed) who left.

TF predicates are *inapplicable* to interrogative contents, while, conversely, QI predicates are inapplicable to declarative contents:

(24) a. # Xiaokang asked/wondered/investigated/weighed-in-his-mind that Jill likes Bongo drumming.

(25) a. # Bill believes/ hopes who came yesterday.

b. # Basil supposes/ assumes which pitcher will do what tomorrow.

c. # Bill claimed/ alleged whether Millie came yesterday.

There are also data that show that neither question nor propositions are "genuine" arguments of factive/resolutive predicates. More precisely, the data show that factive/resolutive predicates do not embed question nominals (e.g. 'the question/issue') *purely referentially* in the sense of Quine 1953, whereas factives do not embed proposition nominals ('the claim/forecast/belief' etc), ones which denote entities of which one can predicate truth or falsity, purely referentially. This is exemplified for the latter in (26, 27):

(26) a. The Fed's forecast was that gold reserves will be depleted by the year 2000.

b. Bill believes/accepts the Fed's forecast. Hence, Bill believes/accepts that gold reserves will be depleted by the year 2000.

c. Bill discovered/was aware of the Fed's forecast. It does *not follow* that: Bill discovered/was aware that gold reserves will be depleted by the year 2000.

(27) a. Bill believes that gold reserves will be depleted by the year 2000. Hence, there is a claim/hypothesis/prediction that Bill believes.

b. Bill discovered/knows that gold reserves will be depleted by the year 2000. *It does not follow* that there is a claim/hypothesis that Bill discovered/knows.

Motivated by such data, that builds on the insights of Vendler 1972, Ginzburg 1994 proposes a situation semantics for interrogatives and declaratives within a framework that distinguishes between *questions, propositions* and *facts*. In this system:

- Interrogatives have basic denotation as questions. This is what QI predicates embed.
- Declaratives have basic denotation as propositions. This is what TF predicates embed.
- An interrogative I can coerce to denote *a fact that resolves the question denoted by I*. This is what resolutive and factive predicates embed. (cf. Pustejovsky 1992 for relevant notion of 'coercion'.)
- A declarative D can coerce to denote *a fact that proves the proposition denoted by D*. This is what factive predicates embed.

3.2 Enriching Answerhood

The data we saw in section 1 suggest that a sufficient condition for disquoting an item of information τ by means of an adverbially modified interrogative can be described informally as follows: **τ is a partial answer to the question denoted by the embedded interrogative.**
Consider the standard notions of answerhood associated with questions:

(28) a. Answer-Set('whether p') = $\{p, \neg p\}$

b. Answer-Set('who left') = { left(j), left(m), left(b), ...}

c. Exhaustive-Answer(q) = $\bigwedge\{p|$ True(p) $\wedge$ p $\in$ Answer-Set(q) } [e.g. Hamblin 1973/Karttunen 1977]

The notions of answerhood in (28) do not jibe well with the data in section 1. This suggest that we need enriched notions of answerhood. Ones that

- accommodate quantified answers for wh-questions ('knowing that several linguists showed up' can constitute 'knowing to some extent who showed up')
- are pragmatically relativised (whether 'knowing that you are in Southwest Helsinki' constitutes 'knowing to a large extent where you are' depends on your goals and inferential capabilities.)
- accommodate non-polar answers for yes/no-questions ('indicating that Millie might come' can constitute 'indicating to a certain extent whether Millie will come'.

3.3 A Theory of Questions with Enriched Answerhood

These desiderata concerning answerhood motivate the theory of questions in Ginzburg 1994, (forthcoming). This theory is based on formalisation of two notions:

- **Being a fact τ that *resolves* a question q relative to mental state ms**

(29) RESOLVES(τ, q, ms) iff

a. semantic condition: τ is a *potentially* resolving fact of q: Pot-Resolves(τ, q) if either:

- τ POSITIVELY-RESOLVES q (for 'whether p': any information that entails p; for a wh-question: any information that entails that the extension of the queried predicate is non-empty.)
- τ NEGATIVELY-RESOLVES q (for 'whether p': any information that entails $\neg p$; for a wh-question: any information that entails that the extension of the queried predicate is empty ('who came? No one came'.))

b. pragmatic relativisation: τ entails the current goal (in ms) relative to the available inferential resources (of ms): $\tau \Rightarrow_{ms} goal - SOA(ms)$

- **Being a fact that is about question q** (Intuitively, being in the range of information associated with a question independently of factuality or level of detail.)

(30) a. Jill: Is Millie leaving tomorrow? Bill: Possibly/It's unlikely/Yes/No.

b. Bill provided information about whether Millie is leaving tomorrow. (We have no indication whether this information is reliable.)

(31) a. Jill: Who is coming tonight? Bill: Millie and Chuck/Several friends of mine./Few people I know.

b. Bill provided information about who was coming that night. (We have no indication whether this information is reliable.)

Consequently, it is possible to define (cf. Lahiri's notion 'Q-extent exhaustive answer'):

(32) **Being a fact τ that** *to Q-extent resolves* **a question q relative to mental state** ms holds iff $\exists\chi$ such that:

χ resolves q relative to ms

And,

τ subsumes Q-extent of the information of χ

A consequence of this is that:

(33) if τ is factual information ABOUT the question q, and if the question is resolved, then τ (at least) to some extent resolves the question.

3.4 Partial Answer/Proof Readings

We can now offer an account of how the adverb uniformly modifies the fact argument of semi-factive/resolutive predicates such as 'establish', 'know' or 'discover'. The adverb of extent is treated as a verb modifier. The modified verb triggers coercion:

- question-to-fact in the interrogative case,
- proposition-to-fact in the declarative case,
- no coercion needed in the fact nominal case.

The following constraint is imposed relating the adverbially modified predicate to its unmodified counterpart. It is assumed to hold for predicates such as those in (19):

(34) $\langle$ V-TO-Q-EXTENT, exp-role:x, content-role: f, cog-role: ms $\rangle$
$\rightarrow \exists f_1 \langle$ V, exp-role:x, content-role: f_1, cog-role: ms $\rangle$,
where f_1 is a fact that satisfies the following:
('f_1 subsumes Q-extent of the information of f, relative to the mental state ms'.)

In particular, it is straightforward to verify that if f_1 subsumes Q-extent of the information of f, where f resolves a question q, then f_1 to Q-extent resolves q, in the sense of definition (32).

4 Appendix

4.1 SOA Algebras, Subsumption

- The semantic framework utilized here is situation theory (e.g. Barwise and Etchemendy 1990, Barwise and Cooper 1991). The view of questions utilized here is the framework described in Ginzburg 1994, (forthcoming). I survey the notions from that paper needed here.

- Basic entities in ontology: a set of situations, SOA's and n-ary abstracts.

- Algebraic structure: a *SOA algebra*, SOA-ALG$_0$ = $< Sit_0, SOA_0, \rightarrow, \models, 0, 1 >$: a non-empty collection of objects Sit_0 called situations, together with a Heyting algebra of SOA's $< SOA_0, \rightarrow >$ with distinguished members **0, 1**, and a relation $\models$ on Sit_0 x SOA_0. (Barwise and Etchemendy 1990)

- In general, a partial ordering $\Rightarrow$ such as the one used for modelling informational subsumption, which is transitive and reflexive, satisfies:

  (35) $\tau \Rightarrow \sigma$ if and only if for any ψ if $\sigma \Rightarrow \psi$, then $\tau \Rightarrow \psi$

- Consequently: $\Rightarrow^{Q-extent}$ intended to capture the notion of 'contains Q-extent of the information' defined as:

  (36) $\tau \Rightarrow^{Q-extent} \sigma$ iff For Q *many* ψ such that $\sigma \Rightarrow \psi$, it holds that $\tau \Rightarrow \psi$.

4.2 Propositions and Questions

- A proposition $(s!\sigma)$ is constructed from a pair of s a situation, σ a SOA

- A question $(s?\mu)$ is constructed from a pair of s a situation, μ an n-ary infon abstract.

  (37) a. A use of 'Did Bill leave' gets as content the question $(s?\langle LEFT, b; + \rangle)$,

  b. A use of 'who left' gets as content the question $(s?\lambda x \langle LEFT, x \rangle)$

- APPL-INST is the set of application instances of μ:
  APPL-INST$(\mu) =_{def} \{\sigma | \exists f[\sigma = \mu[f]]\}$

  (38) a. $\{\langle$ R,a;+ $\rangle\}$ = APPL-INST($\langle$ R,a;+ $\rangle$) (A SOA is a 0-ary abstract; the APPL-INST set is a singleton.)

  b. Any $\langle\langle$ R,a;+ $\rangle\rangle$ that is in SOA_0
  will be $\in$ APPL-INST($\lambda X \langle$ R,X;+ $\rangle$)

- (39) $(s!\sigma)$ is TRUE iff $s \models \sigma$. In such a case σ is a *fact*.

  (40) PROVE$(\tau, (s!\sigma), ms)$ iff

a. $\tau \Rightarrow_{ms} \sigma$

b. $s \models \tau$

Here $\Rightarrow_{ms}$ is taken to be a sound notion of consequence available to the mental state ms of an agent a. Minimally, it could be identified as the transitive closure of the conditionals represented in ms.

(41) $\exists \tau, ms PROVE(\tau, (s!\sigma), ms)$ iff TRUE$[(s!\sigma)]$

- (42) RESOLVES$(\tau, (s?\mu), ms)$ holds iff

a. $s \models \tau$

b. Pot-Resolves(τ, μ):

- $\tau \rightarrow \bigvee$APPL-INST(μ)

Or

- $\tau \rightarrow \overline{\bigvee}$APPL-INST$(\mu)$

And either:

c. $\tau \Rightarrow_{ms}$ Fact-$\bigwedge(g_0)$, if goal-content(ms) is a question $(s_1?g_0)$.

Or: $\tau \Rightarrow_{ms} g_0$, if if goal-content(ms) is a proposition $(s_1!g_0)$.

Fact-$\bigwedge_{Sit_0}$ represents the most exhaustive application-instance determined by the n-ary abstract component of a question *relative to the given set of situations* Sit_0:

(43) Fact-$\bigwedge_{Sit_0}(\mu) =_{def}$

Either

$\bigwedge(\{\tau \in SOA_0 | \tau \in$ APPL-INST$(\mu) \wedge \exists s_0(s_0 \in Sit_0 \wedge s_0 \models \tau]\})$ **if this set** $\neq \emptyset$

Or

$\bigwedge(\{\tau \in SOA_0 | \exists \sigma(\sigma \in$ APPL-INST$(\mu) \wedge \tau = \overline{\sigma} \wedge \exists s_0(s_0 \in Sit_0 \wedge s_0 \models \tau))\})$

Otherwise

- (44) Given a SOA τ and a SOA-abstract μ, About(τ, μ) holds iff

whenever $s \models \tau$, it is the case that

$s \models \bigvee$APPL-INST$(\mu) \vee \overline{\bigvee}$APPL-INST$(\mu)$

Strong use of partiality: whereas on a traditional model-theoretic conception this defining condition is vacuous, given that in the SOA algebra $\sigma \vee \overline{\sigma} \neq 1$ ('1' represents trivial information), the condition is restrictive.

4.3 Coercion–based Account of Resolutive and Factive Content

Question to Fact Coercion

(45) $f \in$ RESOLVING-FACTS$[q, ms]$ iff RESOLVES(f, q, ms)

Here ms is a parameter for the the mental situation that has to be contextually supplied whenever an attitude predicate embeds a content (see Cooper and Ginzburg 1994).

(46) a. An interrogative I can be coerced to denote $\bigvee$(RESOLVING-FACTS[CONT(I),ms])

Hence, we achieve the effect that ⌜ V S[+Int] ⌝ denotes
$\lambda x \exists f \langle$ CONT(V), x, f,ms $\rangle$ where
$f \in$ RESOLVING-FACTS[CONT(S[+Int]),ms]

Proposition to Fact Coercion

(47) $f \in$ PROVE-FACTS$[p, ms]$ iff PROVES(f, p, ms)

a. A declarative D can be coerced to denote $\bigvee$(PROVE-FACTS[CONT(D),ms])

Hence, we achieve the effect that ⌜ V S[+DECL] ⌝ denotes
$\lambda x \langle$ CONT(V), x, σ,ms $\rangle$ where [CONT(S[+DECL])] = $(s!\sigma)$

- The coercion process will be well-defined if and only if the embedded proposition (question) is true (resolved).
- Thus, the factivity/resolvedness presuppositions emerge without further stipulation.

References

Barwise, J. and R. Cooper 1991 'Simple Situation Theory and its graphical representation.' In: J. Seligman (ed.) DYANA Report R2.1.C.

Barwise, J. and J. Etchemendy 1990. 'Information, Infons and Inference.' In: Cooper et al. (eds.) *Situation Theory and its applications, volume 1.* CSLI Lecture notes 22, CSLI, Stanford, Ca.

Berman, S. 1990. 'Towards the Semantics of Open Sentences: Wh-phrases and Indefinites'. In: Proc. of 7th Amsterdam Colloquium.

Berman, S. 1991. *On the Semantics and Logical Form of wh-clauses.* PhD thesis, University of Massachusetts at Amherst.

Boër, S. and W. Lycan 1985. *Knowing Who*, MIT Press, Cambridge.

Cooper, R. and J. Ginzburg 1994. 'A Compositional Situation Semantics for Attitude Reports'. To appear in: J. Seligman (ed.) *Language, Logic and Computation: The 1994 Moraga Proceedings.* CSLI Lecture notes, CSLI: Stanford.

Ginzburg, J. 1992 *Questions, Queries and Facts: a Semantics and Pragmatics for Interrogatives.* Stanford University PhD dissertation.

Ginzburg, J. 1994. 'Resolving Questions', HCRC, University of Edinburgh Ms.

Ginzburg, J. (forthcoming). 'The Semantics of Interrogatives'. To appear in: S. Lappin (ed.) *Handbook of Contemporary Semantic Theory*, Blackwell: Oxford.

Groenendijk, J. and M. Stokhof. 1993. 'Interrogatives and Adverbs of Quantification'. In: K. Bimbo and A. Mate (eds) *Proceedings of the 4th Symposium on Logic and Language*, Budapest.

Hamblin, C.L. 1973. 'Questions in Montague English.' Foundations of Language 10: 41-53.

Karttunen, L. 1977. 'The Syntax and Semantics of Questions'. Linguistics and Philosophy 1: 1-44.

Lahiri, U. 1991 *Embedded Interrogatives and Predicates That Embed Them.* MIT PhD Dissertation.

Pollard, C. and Sag, I.A. 1994.*Head Driven Phrase Structure Grammar*, Jointly published by: U. of Chicago Press, Chicago and CSLI, Stanford.

Pustejovsky, J. 1992 'Linguistic Constraints on Type Coercion'. Brandeis University Ms.

Stalnaker, R. 1974. 'Pragmatic Presuppositions'. In: Munitz and Unger (eds.) *Semantics and Philosophy.* NYU Press, New York.

Vendler, Z. 1972. *Res Cogitans.* Cornell UP, Ithaca, NY.

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