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REMARKS ON GRIMSHAW'S CLAUSAL TYPOLOGY*

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1 Background

This paper discusses two generalizations (see Grimshaw 1979) concerning question embedding predicates. The examples in (1) reveal that predicates expressing surprise (*surprise*-predicates hereafter) do not take polar interrogatives as complements ((1b)) although other types of interrogatives are allowed. The examples also show that predicates like *wonder* (*wonder*-predicates hereafter) do embed polar interrogatives but are incompatible with *wh*-interrogatives where the *wh*-phrase is intensified ((1d-e)). For ease of reference, the generalizations are given as (2) and (3).

(1) a. Ian {✓knows |✓is surprised |*is wondering} that Pam likes parties.
b. Ian {✓knows |*is surprised |✓is wondering} whether Pam likes parties.
c. Peter {✓knows | ✓is surprised | ✓is wondering} who likes parties.
d. Peter {✓knows | ✓is surprised | *is wondering} what a great success the party was.
e. Peter {✓knows | ✓is surprised | *is wondering} how enormously wide the Ganges river is.

(2) <u>Generalization I:</u>
Surprise-predicates do not embed polar interrogatives.

(3) <u>Generalization II:</u>
Wonder-predicates do not embed questions with intensified *wh*-phrases.

Grimshaw introduces the features exclamative ([E]), proposition ([P]), and question ([Q]) to describe (1) and (4)-(6). In her system the complements in (1d-e) are unambiguously [E] because root interrogatives with intensified *wh*-phrases cannot function as questions ((4), (5)). The polar interrogative (1b) by contrast is unambiguously [Q] because root polar interrogatives are never exclamative ((6)).

(4) a. How (*enormously) wide is the Ganges river?
b. ✓How (enormously) wide the Ganges river is!

(5) a. *What a (great) success was the party?

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b. ✓What a (great) success the party was!

(6) a. ✓Was Erna at the party?
b. ✓Was Erna at the party!

If the complement in (1c) is ambiguous between [E] and [Q], we can describe the facts in (1) using selection: *wonder* selects [Q], *surprise* [P] and [E], *know* all three.

This approach has often been criticized and the necessity of the clausal type feature ([E]) been questioned (see e.g. d'Avis 2001, 2002; Lahiri 2000; Zanuttini and Portner 2000, 2003). I agree with the thrust of this line of criticism (see Abels 2004 for review). If we reject Grimshaw's system, we must derive Generalization I and II from independent considerations. Generalization I is the topic of the first part of this paper (I develop key ideas from d'Avis 2001, 2002, for an earlier version see Abels 2004). Generalization II is discussed in the second part (see also d'Avis 2001, 2002; Haida 2003).

Matrix exclamatives raise a number of further issues that I would like to sidestep here: What is the relation of sentence meaning and illocution? Which role does intonation play in constituting illocution (see e.g. Altmann 1993; Batliner 1988a, b, c; Oppenrieder 1988, 1989 for French Alter 1994)? How does intonation interact with the syntax? Etc.

2 Polar interrogatives under *surprise*-predicates

In section 2.1 I lay out my assumptions about interrogative semantics. The main point is the claim that polar interrogatives are singleton sets of propositions. Section 2.2 reviews and formalizes a number of presuppositions that *surprise*-predicates give rise to. In section 2.3 I show how the claims from 2.1 and 2.2 together entail that embedding a polar interrogative under a *surprise*-predicate leads to a presupposition failure in any context. This is the reason why polar interrogatives are not embeddable under *surprise*-predicates. In section 2.4 I address a potential counterargument from alternative questions.

2.1 Assumptions about questions and answers

I assume that both *wh*- and polar interrogatives denote (functions from possible worlds to) sets of propositions. The idea is Hamblin's (1973). While following Hamblin in the treatment of *wh*-interogatives ((7a))[1], I depart from him for polar interrogatives. Hamblin treats polar interrogatives as two-membered sets of propositions, I treat them as singletons as in (7b) (see also d'Avis 2001; Roberts 1998).

7 a. $Q = [\![\text{What did Frank buy}]\!] = \{p \mid \exists x\ \text{thing'}(x)\ \&\ p = \{w' \mid \text{bought}(x)(f')(w')\}\}$
b. $Q = [\![\text{Did Frank buy milk}]\!] = \{p \mid p = \{w' \mid \text{bought}(m')(f')(w')\}\}$

[1] I am assuming that *wh*-words range over (possibly plural) individuals (not quantifiers as the infelicity of many answers with quantifiers to questions shows). Furthermore, I assume that questions with simplex *wh*-words do not presuppose that there is a p in Q such that p is true in the evaluation world – *which*-interrogatives, on the other hand, are probably presuppositional.

There is a large body of research indicating that a number of different notions of answerhood to a question are needed (e.g. Beck and Rullmann 1999; Groenendijk and Stokhof 1982, 1984; Heim 1994). We need to distinguish at least between *mention-some* answers and strongly exhaustive answers. I will also use the more debatable notion of weakly exhaustive answer (Heim 1994), but in a non-essential way. The present approach to interrogative semantics claims that, while none of the kinds of answer is treated directly as the denotation of the question, all kinds of answers can be derived from the question denotation. In other words, the question denotation used here is the generator set for all kinds of answers. It is important to note that, while the Hamblin denotation for questions can easily generate the mention some, weakly exhaustive and strongly exhaustive answers, the opposite is not true (see Heim 1994). In that sense the Hamblin semantics is the most basic denotation we can give to a question.

If the question denotation is construed as the generator set for the answers, then it is natural to construe polar interrogatives as singleton sets. The singleton Q={p}, trivially generates the answer p, but it also generates the answer ¬p: ¬p is the strongly exhaustive answer to Q={p} in those worlds where p is false (see d'Avis 2001 and below).

(8) $Q = [\![\text{Did Frank buy milk}]\!] = \{p \mid \quad p = \{w' \mid \text{bought}(m')(f')(w')\} \vee \neg p = \{w' \mid \text{bought}(m')(f')(w')\}\}$

Consider the derivation of various answers from the Hamblin denotation Q_H. The weakest one is the *mention-some* answer. Some proposition p is a *mention-some* answer to Q iff p is the conjunction of some subset of members of Q_H (see (9)) and it is a true *mention-some* answer in w if it is a mention some answer and it is true ((10)) in w.

(9) $p \in \{ q_{<s,t>} \mid \exists S\ S \subseteq \{q' \mid q' \in Q_H\} \wedge q = \bigcap S\}$

(10) $p \in \{ q_{<s,t>} \mid \exists S\ S \subseteq \{q' \mid q' \in Q_H\} \wedge q = \bigcap S \wedge w \in q\}$

Given their construction, the set of *mention-some* answers with the subset relation form a lattice with the true *mention-some* answers as a sub-lattice. The latter contains as the most informative (smallest) member Heim's (1994) *weakly exhaustive* answer (henceforth answ_1^w). answ_1^w is the conjunction of all true answers in the evaluation world.

11) $\text{answ}_1^w = \bigcap\{p \mid p \in Q_H \,\&\, p(w)\}$

Later on in the paper I discuss in several places the special case where the Hamblin denotation does not contain any true members. In this case the set of true members of Q_H is empty and the weakly exhaustive answer, technically still a *mention-some* answer, is the intersection of the empty set of propositions. Given the definition of intersection ((12)), the intersection of ∅ is the domain ((13)). The intersection of the empty set of propositions is therefore the set of all worlds, the tautology. The definitions thus entail that the question (7a) and (7b) have as answ_1^w the tautology iff Frank didn't buy anything and Frank in fact didn't buy milk respectively.

12) $\bigcap S =_{def} \{x \in D \mid \forall M \in S \dashrightarrow x \in M\}$

13) $\bigcap \varnothing = D$

From the weakly exhaustive answer we can derive the strongly exhaustive answer ($answ_2^w$). $answ_2^w$ can be defined in two equivalent ways: either as the intersection of the weakly exhaustive answer with the negations of all the false members in the Hamblin set or more elegantly as in (14) (see Heim 1994).

14) $answ_2^w(Q) = \{w' \mid answ_1^{w'} = answ_1^w\}$

In the limiting case above, where no member of Q_H is true in the evaluation world and $answ_1^w$ is the tautology, $answ_2^w$ turns out to be the *nothing*- and the *no*-answer respectively; thus, if in (7a) there is no true member in Q_H, then $answ_2^w$ is the proposition that Frank bought nothing in w, and if in (7b) Frank didn't buy milk in w, then $answ_2^w$ is the proposition that Frank didn't buy milk.

As a final note on the denotation of questions note that for any questions and any world $answ_2^w$ entails $answ_1^w$ and that $answ_1^w$ entails all *mention-some* answers.

2.2 The presuppositions of *surprise*-predicates

With this as background, we are ready to consider the semantics of *surprise*-predicates (see d'Avis 2001, 2002; Heim 1994). In this paper I mainly discuss their presuppositions, not their assertive content. To be sure, they have assertive content, but it is irrelevant for what follows.[2] I will use example (15a) for illustration in my discussion.

(15) a. Heinz is surprised (at) who Mary invited.
     b. Heinz is surprised (at) Q.

to be surprised expresses a relation between two propositions and an individual: One of the propositions describes a state of affairs that the individual, the referent of the subject of the *surprise*-predicate, knows. The other proposition contradicts the first one and the referent of the subject of the *surprise*-predicate would have deemed more likely. When a *surprise*-predicate embeds a question both propositions stand in particular relations to that question. It always has to be possible to construct two appropriate propositions from the question – this fails in the case of polar interrogatives.

Let's call the relevant proposition that Heinz knows (p_2) and the proposition that expresses his expectations (p_1). If the question does not allow the construction of two contradictory propositions in the way described below, the *surprise* relation cannot hold. We therefore start with an existence presupposition for two propositions ((16)).

[2] See Sharvit 2002 and references cited there for discussion of the assertive content of *surprise*.

(16) $\exists p_1, p_2 \in D_{<s, t>}\ p_1 \cap p_2 = \varnothing$ Condition I

p_1 must also be compatible with some member of the Hamblin set ((17)).

(17) Q contains members which are compatible with p_1 (with Heinz' expectation).
$\exists p_1, p_2 \in D_{<s, t>}, q \in Q\ [p_1 \cap p_2 = \varnothing \wedge q \cap p_1 \neq \varnothing]$ Condition II

To see this, consider a scenario in which Mary has invited people and in which Heinz' expectation violates Condition II. Heinz must have expected that Mary wouldn't invite anybody. In this a scenario (15a) is neither true nor false. It is infelicitous. Instead something like (15a') would have to be said (see d'Avis 2001, 2002; Heim 1994).

(15) a'. ✓Heinz is surprised that Mary invited somebody.

Let's turn to p_2 now. Example (15a) presupposes that Heinz knows a *mention-some* answer to Q ((18)). If he were totally oblivious about the invitees, he could not be surprised about it or, for that matter, fail to be surprised. (Heim 1994 assumes a much stronger condition here, but without empirical support, I believe.)

(18) p_2 is the most informative *mention-some* answer to Q known by the referent of the subject of *be surprised.*[3] Condition III

p_2 is not Heinz' total knowledge. Rather, it is the most informative *mention-some* answer entailed by Heinz' total knowledge.[4]

We can never posit a proposition for p_2 which is not a *mention-some* answer. Suppose we tried. Suppose for example that Mary invited nobody and that Heinz knows this. No matter what Heinz' expectation might have been (15a) is infelicitous in this situation – it is neither true nor false. Instead we have to describe this situation with (19a) or (19b).

19) a. Heinz is surprised that Mary didn't invite anybody.
b. Heinz is not surprised that Mary didn't invite anybody.

Condition III captures this fact since 'that Mary invited nobody' is not a *mention-some* answer to Q. Technically, the only available *mention-some* answer in this case is the tautology. But if p_2 is the tautology, then there is no p_1 which both contradicts p_2 and is

[3] It is cumbersome but straightforward to cast this condition formally. p_2 is the single member in the set of *mention-some* answers that is (i) true, (ii) known by the referent of the subject, and (iii) entails all other members of the set of *mention-some* answers that fulfill (i) and (ii). In the limiting case, Heinz will know Heim's weakly exhaustive answer (see 23).

[4] Under certain circumstances it might be necessary to take recourse to disjunctions of *mention-some* answers (e.g. Heinz knows that Mary invited Harry or Sally but not which one of the two but both invitations would occasion surprise). Here disjunctions of *mention-some* answers seem to be required for p_2. I will ignore this complication since it is irrelevant to the point of this paper as far as I can see.

compatible with some member of Q_H. To fulfill the first requirement, p_1 must be the empty set (the contradiction) and to fulfill the second one p_1 must not be the empty set.

Since p_2 represents something that the referent of the subject of *surprise* knows, it follows that p_2 contains the evaluation world, which, in turn, entails that p_2 is not empty. From this and the discussion immediately above we derive Corollary I ((20)).

20) $\varnothing \neq p_2 \neq W$ Corollary I

The point that p_2 must be a *mention-some* answer, can be shown in a number of additional ways. Consider a scenario where Heinz expected Mary to invite Peter and Frank, but in reality she invited only Peter, and Heinz knows this. In such a situation, (15a) is false. Instead (15a'') might be uttered (this example goes back to Heim 1994).

(15) a. Heinz is surprised (at) who Mary invited.
(15) a.'' Heinz is surprised (at) who Mary didn't invite.

Heinz' total knowledge is that Mary invited only Peter, which contradicts his expectation that she would invite both Peter and Frank. However, the most informative *mention-some* answer entailed by Heinz' knowledge, i.e. p_2, is the proposition that Mary invited Peter. This proposition is compatible with Heinz' expectation, hence (15a) is false.

A final illustration comes from scalar predicates. Consider a scenario where Heinz expected Mary to be 6ft tall, but really she is just under 4.5ft tall, and Heinz knows this. While (21b) can be truthfully uttered in this situation, (21a) cannot.

(21) a. Heinz is surprised (at) how tall Mary is.
b. Heinz is surprised (at) how short Mary is.

The explanation for this is straightforward if we assume that *tall* is scalar and *short* means 'not tall' (see Heim 2000). Consider (21a) first. Assuming scalarity for *tall*, Heinz' expectations entail that Mary is 4.5ft tall, i.e., he expects what he knows. This is true whether we describe Heinz' expectations by (a) *that Mary is tall to degree* δ*=6ft* or (b) *that the maximal degree* δ *to which Mary is tall is equal to 6ft* or (c) *that the maximal degree* δ *to which Mary is tall is at least 6ft.* No matter which one we choose, the expectation does not contradict the knowledge; hence, the example is false.[5] This only works because the maximality operators in (a), (b), and (c) apply to Heinz' expectation not to his knowledge. If Heinz' knowledge lost scalarity (as they would if we used $answ_2$) (21a) would become true.[6]

Consider now (21b). The most informative *mention-some* answer to Q that Heinz knows is that Mary is not tall to degree δ, δ=4.5ft. Heinz' expectation can again be coded in

[5] Only the proposition *that Mary is tall at least to degree* δ*,* δ*=6ft* would contradict what Heinz knows, but, given the assumed scalarity of the predicate *tall*, this proposition is the contradiction.

[6] The present analysis is unavailable if exhaustivity is built into the denotation of questions as in e.g. Groenendijk and Stokhof 1982, 1984.

various forms: (a) *that Mary is not tall to degree* δ*=6ft* or (b) *that the minimal degree to which Mary is not tall is equal to 6ft* or *(c) that the minimal degree to which Mary is not tall is at least 6ft*. These correspond to the options given above for (21a). Under the first option Heinz' expectation does not contradict his knowledge. The two other options however lead to a contradiction as desired – one of them must be what is actually used by speakers. The asymmetry between (21a) and (21b) can thus easily be accounted for by crucially assuming that p_2 is a *mention-some* answer.

Briefly consider what conclusions we can draw from the above about the status of p_1. It is probably uncontroversial to assume that Heinz can only be surprised if the expectation he was harboring was contingent ((22)). Condition (22) follows already without further stipulation. $p_1 \neq W$, because otherwise p_1 could not contradict p_2 (p_2 is not empty by Corollary I above (20)!). $p_1 \neq \varnothing$, because otherwise p_1 would not be compatible with any member of Q_H. Thus (22) is derived.

22) $\varnothing \neq p_1 \neq W$ Corollary II

It further follows from (17) that Heinz expectation must be compatible with the presuppositions of some member of the question.

I summarize the presuppositions of *surprise*-predicates as (23). It says that there must exist two propositions that contradict each other. One of them is the most informative *mention-some* answer known by Heinz, the other one is consistent with some member of Q_H. Given that the actual knowledge (p_2) is the most informative *mention-some* answer known by the referent of the subject of the *surprise*-predicate and given that the weakly exhaustive answer is the most informative *mention-some* answer, period, we can conclude the second line of (23): *surprise*-predicates presuppose that it must be possible to construct p_1 in such a way as to be incompatible with the weakly exhaustive answer while being compatible with some member of Q_H.

(23) $\exists p_1, p_2 \in D_{<s,t>}$ [$p_1 \cap p_2 = \varnothing \wedge \exists q \in Q\ q \cap p_1 \neq \varnothing \wedge p_2$ is the maximally informative *mention-some* answer to Q known by the referent of the subject of *surprise*]

$\Rightarrow$ $\exists p_1 \in D_{<s,t>} [p_1 \cap \bigcap\{q \mid q \in Q \wedge q(@)=1\} = \varnothing \wedge \exists q \in Q\ q \cap p_1 \neq \varnothing]$

2.3 Why *surprise*-predicates do not embed polar interrogatives

In this short section I demonstrate that Generalization I, follows from (23) together with the assumption that polar interrogatives are singleton sets. The idea is that example (24) is excluded because of contradictory presuppositions.

(24) *Heinz is surprised (at) whether Mary invited Fritz.
(25) $Q^{(24)} = \{q \mid q = \{w' \mid invited(f')(m')(w')\}\}$.

Given our assumptions, the embedded interrogative is interpreted as (25). There are two possibilities to consider now: either (i) Mary did invite Fritz in the evaluation world (@) or (ii) Mary didn't invite Fritz in the evaluation world (@).

Suppose the former is true, i.e., $q(@)=1$. There are only two *mention-some* answers to the question: the tautology (W) and the proposition q, that Mary invited Fritz. p_2 is not the tautology by Corollary I (20); thus, $p_2 = q$. Since p_2 must be incompatible with p_1 by Condition I ((16)), $p_1 \cap q = \emptyset$. However, Condition II ((17)) demands that p_1 be compatible with some member of Q_H. Q_H being a singleton set with the single member q, $p_1 \cap q \neq \emptyset$. Obviously, there is no p_1 that fulfills both requirements.

Suppose now that q is false in the evaluation world, i.e. $q(@)=0$. Since Q_H is a singleton and q is, by assumption, false, the only true *mention-some* answer to Q in this case is W (see the discussion above (12)). It follows that $p_2 = W$. By assumption there must be a p_1 such that $p_1 \cap p_2 = \emptyset$, but if $p_2=W$, then $p_1=\emptyset$. This contradicts the demand of Condition II ((17)), according to which there is member q in Q_H such that $p_1 \cap q \neq \emptyset$. Clearly there is no p_1 that can fulfill the requirements and the presupposition comes out false again. The fact that $p_2=W$ also contradicts Corollary I ((20)) of course.

The presupposition of *surprise* cannot be satisfied just in case Q_H is a singleton. This explains Generalization I: the presupposition is necessarily false; there is no context in which the presuppositions of (24) are fulfilled. Example (24) is unusable because it has unsatisfiable presuppositions. This type of account is not novel. The idea that necessarily contradictory presupposition render a sentence unusable has previously been pursued successfully, in the study of negative polarity items (see Krifka 1995; Lahiri 1998).

It is crucial for my proposal that polar interrogatives are singleton sets. If they were two-membered sets as in Hamblin's original proposal ($Q_{polar} = \{p, \neg p\}$), the above reasoning would not go through any more because the relevant contradictory presuppositions could no longer be derived. It is therefore instructive to look at *wh*-questions that plausibly have a two-membered Hamblin set. An example is given in (26).

(26) ✓I am surprised (at) which of the two teams won the finals.

If we are talking about, say, the European soccer championship, then (26) is in relevant ways like the Hamblin denotation for a polar interrogative. There are two possible answers, the answers exclude each other, and the answers exhaust the space of possibilities. Yet (26) is acceptable unlike (32). This distinction is unexpected if polar interrogatives are two-membered sets, but is expected under the present approach.

(27) *I am surprised (at) whether Greece won the finals.

The last two examples thus strengthen the argument for the present theory. If polar interrogatives are treated as singletons, Generalization I follows directly from the presuppositions of *surprise*-predicates without recourse to the clause type feature [E].

2.4 Remarks on Alternative Questions

The approach developed so far runs into difficulties with alternative questions (see (28)). *Surprise*-predicates do not embed alternative questions although they can plausibly be analyzed as two- (or more-) membered sets of propositions. We expect alternative questions to behave like example (26) and be acceptable counter to fact.

(28) a. *Ian was surprised whether Amy drinks tea or whether she drinks coffee.
b. *Ian was surprised whether Amy drinks tea or coffee.[7]

To understand the problem, consider the following simplistic theory of alternative questions. The disjunction takes two sets and forms their union[8]. In example (28b) disjunction can take scope in various positions. First, *or* could disjoin *tea* and *coffee*. This leads to the polar interrogative reading of (28b) ((29a)). This reading is ungrammatical as we saw. Second, *or* could take scope above the question forming operator (which outputs a set of propositions: $[\![?]\!] = \lambda p \lambda q$: p=q) and below *surprise*. The disjunction of two polar interrogatives is a two-membered set of propositions.[9] This is the problematic case (29b). Third, *or* could scope above *surprise* (29c). In this case *surprise* would have to embed polar interrogatives, which is ruled out as we saw.

(29)

	Scope	Prediction	Comment
a.	surprise > Q_{OP} > or	*	Q_{OP} returns a singleton
b.	surprise > or > Q_{OP}	✓	*Or* forms the union of two singleton sets. This situation is expected to be admissible counter to fact.
c.	or > surprise > Q_{OP}	*	The disjuncts are ill-formed individually

To pursue the present theory, we would need to find out why disjunction cannot scope between the question forming operator and *surprise.* I do not have an answer to this, but I would like to point out that the observed restriction on the scope of disjunction is part of a larger generalization that extends to *wh*-questions. Consider example (30).

(30) John was surprised who stayed long or who left early.

Again there are three logical possibilities for the scope of *or.* First, *or* could take scope below the question forming operator. This scope is syntactically unavailable for obvious reasons here (31a). Second, *or* could take scope between *surprise* and the question forming operator. This is the configuration that must be disallowed for alternative questions. Allowing it for *wh*-questions would make the following wrong prediction. Disjunction forms the union of both *wh*-questions. The result is the set of propositions *that Andrew stayed long, that Barbara stayed long, that Chris stayed long, … that Andrew left early, that Barbara left early, that Chris left early,…* . Suppose John knows p_2 = *that Andrew stayed long and that Barbara left early*. Clearly, p_2 is a *mention-some*

[7] The strings of words in (28) actually have an acceptable but irrelevant reading: with a long pause after *surprised* and the interpretation *John was surprised regardless whether Mary drinks tea of coffee*. Clearly, the clause introduced by *whether* is not the complement of *be surprised* in this case.

[8] The conjunctive interpretation of alternative questions (see Boërs 1978) is presumably an effect of the strong contexts in which they often appear.

[9] This suggestion incidentally invalidates one of Krifka's (2001:302-303)) objections to the proposition set approach to questions.

answer to the disjoined question. Suppose furthermore that John expected p_1=*that Andrew would stay long or that Barbara would leave early but not both*. Under this scenario p_1 is incompatible with p_2 and p_1 is compatible with some member(s) of the combined Q_H. Thus (30) is predicted to be true in this situation. However, surprisingly, it is not.[10] Example (30) cannot be used in this situation. Finally, *or* could scope above *surprise*. In this case the sentence means that John was surprised who stayed long or that John was surprised who left early. The sentence, in fact, has only this meaning ((31)).

(31)

	Scope	Prediction	Comment
a.	surprise > Q_{OP} > or	*	Syntactically unavailable for (30)
b.	surprise > or > Q_{OP}	✓	***or* forms the union of two sets. This situation is expected to be admissible counter to fact.**
c.	or > surprise > Q_{OP}	✓	This reading (matrix disjunction) is possible.

It follows from this discussion that intermediate scope for disjunction is apparently impossible both in *wh*-questions and in alternative questions. The problem thus reduces to a more general question concerning the scope of disjunction.

3 Questions with intensifiers under *wonder*-predicates

Lets turn to questions with intensifiers. They occur under *surprise*-predicates but not under *wonder*-predicates. This was illustrated in example (1) above. Below I concentrate on German. English is subtly different in ways that I do not quite understand.

The basic facts for German parallel the English facts above. It is usually impossible to use an intensified *wh*-phrase in a root question (32-33a) or as the complement of a *wonder*-predicate (32-33b), but as an exclamative (32-33c), as the complement of a *surprise*-predicate (32-33d), and under a verb like *know* (32-33e) they can occur. The examples show that adjectival and nominal intensifications show parallel behvavior.[11, 12]

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[10] This is plausible if Andrew usually stays long and Barbara usually leaves early and additionally, Barbara is in love with Andrew which gives rise to the expectation that she will stay unusually late if Andrew stays late, too. The sketched scenario is parallel to the case where (i) is uttered truthfully in a situation where John knows p_2 = *that Mary invited Frank and Sue* and he expected p_1= *that Mary invites Frank or Mary invites Sue but not both*. But (i) is true in this case while (30) is not in the case described.

(i) John is surprised (at) who Mary invited.

[11] The unacceptable examples improve if the *wh*-word is heavily stressed (see d'Avis 2001, 2002).

[12] The occasional suggestion in the literature (Rosengren 1992) that these intensified questions are really free relatives has little plausibility. For example, intensified *wh*-question occur in the scope marking construction, which is impossible with all kinds of relative clauses, and they must be extraposed from the middlefield, which is obligatory with finite complements but optional with free relatives (see Abels in preparation). For additional arguments to the same effect see d'Avis 2001, 2002.

(32) a. *Wie enorm groß ist Maria?
how enormously tall is Maria
b. *Heinz fragt sich, wie enorm groß Maria ist.
Heinz asks self how enormously tall Maria is
c. ✓Wie enorm groß Maria ist!
How enormously tall Maria is!
d. ✓Heinz ist überrascht, wie enorm groß Maria ist.
Heinz is surprised how enormously tall Maria is
e. ✓Ich weiß, wie enorm groß Maria ist.
I know how enormously tall Maria is

(33) a. *Welche Bullenhitze herrscht im Kino?
Which bull's heat reigns in.the cinema
b. *Heinz möchte wissen, welche Bullenhitze im Kino herrscht.
Heimz wants to know which bull's heat in.the cinema reigns
c. ✓Welche Bullenhitze im Kino herrscht!
which bull's heat in.the cinema reigns
d. ✓Es ist erstaunlich, welche Bullenhitze im Kino herrscht.
It is surprising which bull's heat in.the cinema reigns
e. ✓Ich habe erfahren, welche Bullenhitze im Kino geherrscht hat.
I have found out which bull's heat in.the cinema reigned has

3.1 Deficient questions?!

Once we treat intensified *wh*-questions as questions, it is a natural move to treat them as somehow deficient. d'Avis 2001 makes a concrete proposal along these lines. For him they are semantically interrogatives (type <<s,t>, t>) which are deficient in the sense that they presuppose their own answer. d'Avis further assumes restriction (34), which is fairly natural, given that questioning requires indeterminacy, an open choice.[13]

(34) Restriction:
Wh-clauses that presuppose their own answer cannot occur in question context.
(d'Avis 2001:67)

Although I agree with d'Avis' intuitions, his implementation contradicts both the results from section 2 of this paper and, in fact, d'Avis' own assumption. He treats intenstified *wh*-questions as singleton sets of propositions (he calls this the 'one-proposition-interpretation' d'Avis 2001:66). There are two main problems with this. First of all, we have seen that independently motivated presuppositions on predicates like *be surprised* bar

[13] d'Avis' independent justification for (34) rests on examples contrasts like (i) and (ii) that go back to Grimshaw's work.

(i) ✓I wonder who went to the movies – John or Mary.

(ii) *I wonder who went to the movies – (namely) John and Mary.

such predicates from taking interrogatives denoting singletons as their complement. This should then rule out (32d) and (33d). Another way to put it is that for d'Avis intensified *wh*-questions come out as (a special kind of) polar questions, but since he himself treats polar questions as singletons, it is unclear how they could ever comply with the rationale given for (34), namely, that questioning requires choice. What is needed is a different way of stating the deficiency of intensified *wh*-questions.

Before attempting to do so, consider a few more examples ((35) and (36)). The former show that intensified *wh*-questions can actually be used as real questions and the latter show that intensified *wh*-questions can be embedded under *wonder*-predicates after all. The question is thus, what distinguishes these examples from unacceptable ones?

(35) a. In the theater:
✓Wenn's hier im Parkett schon so heiß ist, welche Bullenhitze herrscht dann (wohl/erst/wohl erst) oben auf dem Rang?
‚If it is already this hot down here on the main floor, what unbearable heat must there be up on the balcony?'

b. *A river 10m deep and 20m wide that flows at 0.3km/h transports about 16m^3 water per second.*
✓Wie enorm breit müsste ein Fluss gleicher Tiefe und Fliessgeschwindigkeit sein, um 100 000 m^3 Wasser pro Sekunde zu führen? – 6km.
‚How enormously wide would a river of the same depth and speed have to be to transport 100 000 m^3 of water/second? – 6km.

(36) *Embedded Questions:*

a. ✓Wenn die Temperaturen in Gujarat schon im Winter 30° übersteigen, fragen sich unsere Hörer natürlich, was für eine Bullenhitze dort im Sommer herrscht.
‚If the temperature in Gujarat is above 30° C even in winter, our listeners of course wonder what unbearable heat there is there during the summer.'

b. ✓Mein Physiklehrer hat mich heute gefragt, wie enorm breit ein Fluss sein müsste, um bei einer Tiefe von 10m und einer Fliessgeschwindigkeit von 0,3km/h 1 000 000 m^3 Wasser pro Sekunde zu führen.
‚My physics-teacher asked me today how enormously wide a river would have to be in order to carry 1 000 000 m^3 water/second at 0.3km/h and a width or 10m.'

Andreas Haida (p.c.) suggests the following generalization: *wh*-questions with intensifiers can appear under *wonder*-predicates and as matrix questions if they occur with a filter for presuppositions (for the concept of 'filter' see Heim 1983; Karttunen and Peters 1979).[14] *If*-clauses and *in order to* clauses filter presuppositions ((37)). In (37a) o

[14] Examples like (i) seem to be a different class of exceptions to generalization (3) since *dass* clauses do not seem to plug presuppositions. I do not currently have an analysis for these cases.

(continued)

the existence presupposition of the definite description is not fulfilled. This presupposition is filtered in (37b-c), which makes them acceptable (if tedious without the epithet).

(37) a. #You have to lure the alien into the trap.
b. If you want to catch an alien, you have to lure the alien/sucker into the trap.
c. In order to catch an alien, you have to lure the alien/sucker into the trap.

The fact that presupposition plugs allow intensified *wh*-questions to appear under *wonder*-predicates indicates that d'Avis' basic intuition is correct. Intensified *wh*-questions have presuppositions that make them incompatible with questioning. They are filtered in (35) and (36), which explains their felicity. However, unlike d'Avis we cannot treat this as a presupposition of the members of the Hamblin set. If we did so, the Hamblin set would shrink to a singleton with the consequences noted. Instead we neet to treat the presuppositions of the question as an object separate from the presuppositions of the members of the Hamblin set. Once these types of presuppositions are properly distinguished, the contradiction that d'Avis proposal gave rise to can be avoided. At the moment I do not have a concrete implementation of this proposal, however.

4 Conclusion

In this paper the question is raised whether Grimshaw's clause type feature [E] is necessary to capture Generalizations I and II. Generalization I follows directly from independently motivated presuppositions of *surprise*-predicates once the (nonstandard) assumption is made that polar interrogatives are singleton sets of proposition. The first part of this paper thus constitutes an argument for this approach to polar interrogatives. In fn. 9 we noted that this approach to polar interrogatives also solves one of Krifka's objections to the proposition set approach to questions – which constitutes a second argument.

Generalization II also seems to be analyzable in terms of presuppositions, those of *wonder*-predicates and intensified questions. D'Avis' intuition that intensified questions are defective appears to lead to a workable result once d'Avis specific implementation is abandoned. A new argument for this view came from the fact that filters for presuppositions interact in the expected way with acceptability judgments. A compositional analysis of the facts in Generalization II is yet to be provided, though.

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(i) ✓Mit welchem Affenzahn rast du denn/eigentlich durch die Stadt, dass du jetzt schon hier bist?
‚At what breakneck speed do you blow through town that you are here already?'

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