***Which*-questions, uniqueness, and answerhood: evidence from disjunction**

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1. Introduction. Singular *which*-questions presuppose existence and uniqueness (∃!), e.g. *Which boy ate?* presupposes that exactly one boy ate. Dayal (1996) proposed that an operator *ANS* triggers ∃! globally, as a condition on the question's Hamblin set. We present a novel argument that ∃! is instead carried by individual answers (as in Uegaki 2018), triggered locally within the question nucleus, and that *which* itself is the source of ∃! (as in Champollion et al. 2017, Hirsch & Schwarz 2019). Our argument refers to cases like (1) (conceivably used, e.g., in the context of crossword solving, with clues asking for Shakespeare's place of birth and Bach's place of death).

(1) In which town was Shakespeare born or did Bach die?

2. Gobal triggering. On Dayal's account, ∃! is triggered by ANS_D in (2): applying to a question's Hamblin set, ANS_D triggers the presupposition that the set of true Hamblin answers contains a (unique) most informative member, which is then output as *the* complete true answer, yielding mention-all. Where Hamblin answers are not related by entailment, the presupposition demands that exactly one of them be true. For *Which boy ate?* and the classic Hamblin set $\{p \mid \exists x[\textsc{boy}(x)(w) \wedge p = \textsc{ate}(x)]\}$, the result is the intended presupposition that exactly one boy ate. (A revision of ANS_D proposed in Fox 2018 has the same effect for the examples discussed here.)

(2) $[\![\mathrm{ANS_D}]\!]^w = \lambda Q_{(st)t}\colon \exists p{\in}Q[p(w) \wedge \forall q{\in}Q[q(w) \rightarrow p{\subseteq}q]].\ \iota p{\in}Q[p(w) \wedge \forall q{\in}Q[q(w) \rightarrow p{\subseteq}q]]$

3. The disjunction puzzle. In a modern rendition of Karttunen's (1977) analysis (and omitting *ANS*), *Which boy ate?* has a logical form like *λp[[which boy] λx[[? p_{st}] [x_e ate]]]*. With $[\![?]\!] = [\lambda q.\ [\lambda p.\ p{=}q]]$, and the wh-phrase denoting an existential quantifier, this derives the intended classic Hamblin set above. By the same token, and assuming that the two instances of subject-aux inversion in (1) signal the inclusion of *?* in each disjunct, (1) will have the logical form in (3a).

(3) a. λp[[which town] λx[[[? p_{st}] [Shakespeare was born in x]] or [[? p_{st}] [Bach did die in x]]]
b. $\{p \mid \exists x[\textsc{town}(x)(w) \wedge [p = \textsc{born}(s)(x) \vee p = \textsc{died}(b)(x)]]\}$

(3a) gives rise to the Hamblin set in (3b). The members of (3b) are semantically independent. So the global presupposition from ANS_D will amount to the presupposition that exactly one Hamblin answer is true, which in turn amounts to the proposition stated in (4).

(4) $\lambda w.[\exists!x[\textsc{town}(x)(w) \wedge \textsc{born}(s)(x)(w)] \wedge \neg\exists y[\textsc{town}(y)(w) \wedge \textsc{died}(b)(y)(w)]] \vee$
$[\exists!x[\textsc{town}(x)(w) \wedge \textsc{died}(b)(x)(w)] \wedge \neg\exists y[\textsc{town}(y)(w) \wedge \textsc{born}(s)(y)(w)]]$

In virtue of entailing that either Shakespeare was not born in a town or Bach did not die in a town, this presupposition is in conflict with common knowledge. It is clear, however, that (1) is not in fact judged to introduce such a conflict, hence does not actually presuppose (4).

It will not help to merely allow for disjunction to scope below *?*, permitting the logical form in (5a). (5a) gives rise to the Hamblin set in (5b), whose members are again independent, so that the global presupposition from ANS_D is again that only one of them is true. This amounts to the proposition (6). In virtue of excluding that Bach died in a town where Shakespeare wasn't born, this presupposition is also in conflict with common knowledge and not actually attested.

(5) a. λp[[which town] λx [[? p_{st}] [[Shakespeare was born in x] or [Bach did die in x]]]
b. $\{p \mid \exists x[\textsc{town}(x)(w) \wedge p = \lambda w'.\ \textsc{born}(s)(x)(w') \vee \textsc{died}(b)(x)(w')]\}$

(6) $\lambda w.\exists!x[\textsc{town}(x)(w) \wedge [\textsc{born}(s)(x)(w) \vee \textsc{died}(b)(x)(w)]]$

We conclude that, for cases like (1), the global presupposition that ANS_D triggers is inadequate.

4. Local triggering. On the analysis of Hirsch & Schwarz (2019), *Which boy ate?* has a logical form *λp[∃ λx[[? p_{st}] [[[which x_e] boy] ate]]]]*, with reconstruction of the *which*-phrase into the question nucleus (as in Rullmann and Beck 1998), its previous position now occupied by ∃, an unrestricted existential quantifier over individuals. Confining attention to singular *which*-phrases, the denotation of *which* is in (7).

(7) $[\![\text{which}]\!] = \lambda x_e.\ \lambda f_{et}.\ \lambda g_{et}\text{: } \exists! y[f(y) \wedge g(y)].\ f(x) \wedge g(x)$

So *which* locally triggers ∃!, which is then carried by each member of the resulting Hamblin set: $\{p \mid \exists x[p = \lambda w\text{: } \exists! y[\textsc{boy}(y)(w) \wedge \textsc{ate}(y)(w)].\ \textsc{boy}(x)(w) \wedge \textsc{ate}(x)(w)]\}$. Suppose presuppositions project from Hamblin sets existentially, i.e. the question as a whole presupposes that the presupposition of at least one Hamblin answer is met. This winds up deriving the intended ∃!, hence replicating, for basic cases, the effect of the globalist analysis employing ANS_D.

5. The puzzle solved. Under the localist analysis, our disjunctive question (1) allows for a logical form like (8a), with disjuncts that each include *?*.

(8) a. $\lambda p[\exists\ \lambda x[\ [\ [?\ p_{st}]\ [\ [\text{which x}]\ \text{town}\ \lambda y[\text{S born } y_e]]]\ \text{or}\ [\ [?\ p_{st}]\ [\ [\text{which x}]\ \text{town}\ \lambda y[\text{B die } y_e]]]]$

b. $\{p \mid \exists x[\ [p = \lambda w\text{: } \exists! y[\textsc{town}(y)(w) \wedge \textsc{born}(s)(y)(w)].\ \textsc{town}(x)(w) \wedge \textsc{born}(s)(x)(w)] \vee$
$[p = \lambda w\text{: } \exists! y[\textsc{town}(y)(w) \wedge \textsc{died}(d)(y)(w)].\ \textsc{town}(x)(w) \wedge \textsc{died}(b)(x)(w)]\ ]\}$

This derives the Hamblin set in (8b), which for each town x contains two propositions: that x is the town where Shakespeare was born (presupposing that Shakespeare was born in a unique town); and that x is the town where Bach died (presupposing that Bach died in a unique town). Existential projection derives the question presupposition in (9): Shakespeare was born in a unique town or Bach died in a unique town. Weak enough to be entailed by common knowledge, this presupposition is innocuous, solving the puzzle from (1) under the globalist account.

(9) $\lambda w.\exists! x[\textsc{town}(x)(w) \wedge \textsc{born}(s)(x)(w)] \vee \exists! x[\textsc{town}(x)(w) \wedge \textsc{died}(b)(x)(w)]$

6. Answerhood captured, too. Letting *which* trigger ∃! paves the way for weakening ANS_D in (2) to ANS_F in (10), as put forward in Fox (2013). Accommodating mention-some, ANS_F outputs a *set of* propositions each deemed a complete true answer. For Hamblin answers not related by entailment, ANS_F outputs the set of all true answers. So in the actual world, ANS_F maps (8b) to (11). Extending findings in Hirsch (2018), this predicts, correctly, that (1) is judged to permit multiple mention-some answers such as *Shakespeare was born in Stratford* and *Bach died in Leipzig.*

(10) $[\![\text{ANS}_\text{F}]\!]^{w} = \lambda Q_{(st)t}\text{: } \exists p{\in}Q[p(w) \wedge \neg\exists q{\in}Q[q(w) \wedge q{\subset}p]].\ \{p{\in}Q \mid p(w) \wedge \neg\exists q{\in}Q[q(w) \wedge q{\subset}p]\}$

(11) $\left\{ \begin{array}{l} \lambda w\text{: } \exists! y[\textsc{town}(y)(w) \wedge \textsc{born}(s)(y)(w)].\ \textsc{town}(\text{Stratford})(w) \wedge \textsc{born}(s)(\text{Stratford})(w), \\ \lambda w\text{: } \exists! y[\textsc{town}(y)(w) \wedge \textsc{died}(b)(y)(w)].\ \textsc{town}(\text{Leipzig})(w) \wedge \textsc{died}(b)(\text{Leipzig})(w) \end{array} \right\}$

7. A closer look at the presupposition. The disjunctive ∃! derived under the localist account, illustrated by (9), seems justifiable in general. It captures the deviance of (12a), given that each disjunct shows more than one letter to be missing or covered. (12b) is deviant even though there the disjunctive ∃! is met. Does this show that the ∃! is actually conjunctive, rather than disjunctive? We think not, since (12b) is plausibly deviant in virtue of being blocked by a less complex competitor with the same felicitous Hamblin answers, viz. *Which letter is missing in "f _ n"?*.

(12) a. #Which letter is missing in "f _ _ n" or has been covered in "r ■ ■ d"?

b. #Which letter is missing in "f _ n" or has been covered in "r ■ ■ d"?

8. Conclusion. Disjunctive singular *which*-questions provide novel evidence for a localist analysis of uniqueness presuppositions, and for Fox's (2013) notion of answerhood that this analysis enables.

References. Champollion et al. 2017. On questions and presuppositions in typed inquisitive semantics. Handout for InqBnB. ∘ Dayal 1996. Locality in Wh Quantification. ∘ Fox 2013. Mention some readings. Lecture notes, MIT. ∘ Fox 2018. Partition by exhaustification: Comments on Dayal 1996, SuB 22. ∘ Hirsch 2018. Disjoining questions. ms, McGill. ∘ Hirsch & Schwarz 2019. Singular *which*, mention-some, and variable scope uniqueness. poster at SALT 29. ∘ Karttunen 1977. Syntax and semantics of questions. L&P ∘ Rullmann & Beck 1998. Presupposition projection and the interpretation of *which*-questions. SALT 8 ∘ Uegaki 2018. On the projection of the presupposition of embedded questions, SALT 28.