# Severing uniqueness from answerhood

Bernhard Schwarz (McGill University)

reporting on joint work with

Aron Hirsch (HUJI) and
Michaela Socolof (McGill)

## 1 Introduction

**Wh-questions: answerhood and presuppositions.** How do they relate?

- **Answerhood patterns:** What does it take to resolve a question?
  - **Mention-all.** Only one intuitively complete true answer:

    (1) What is missing?
    conveys: "Tell me everything that is missing."

    (2) *f_ _m*
    a. *o* and *r* are missing.
    b. #*o* is missing.
    c. #*r* is missing.

  - **Mention-some.** Multiple intuitively complete true answers:

    (3) Where can we get coffee?
    can convey: "Tell me some place where we can get coffee."

    (4) a. We can get coffee at Aroma.
    b. We can get coffee at Névé.

- **Uniqueness presupposition.** Carried by singular wh-questions:

  (5) Which letter is missing?
  presupposes: $\exists!x[\text{letter}(x) \wedge \text{miss}(x)]$

  (6) *f_ _m*
  #Which letter is missing?

  - Constraining answerhood: $\exists!x[\text{letter}(x) \wedge \text{miss}(x)]$ entails mention-all.

**Influential idea** (Dayal 1996): Mention-all and uniqueness from the same source.

- Mention-all: Encoded in an answer operator, $\text{ANS}_\text{D}$.

(7) $\text{ANS}_\text{D}$ $[_\text{CP} \ldots]$

- Uniqueness: Triggered by $\text{ANS}_\text{D}$; a side-effect of mention-all as encoded in $\text{ANS}_\text{D}$.

**Today:**

- **Main claim.** (As in Hirsch & Schwarz 2019.) Uniqueness:
  - Severed: Trigger not tied to constraints on answerhood.
  - Local triggering: Triggered not by ANS, but locally, by operator in CP (and carried by each answer, as proposed in Uegaki 2018, 2020).

    (8) (ANS) $[_\text{CP} \ldots \text{TRIG} \ldots]$
- **Evidence presented.** Related findings about uniqueness:
  - **Scope:** Can be triggered under an operator scoping inside CP.

    (9) (ANS) $[_\text{CP} \ldots \text{OP} [\ldots \text{TRIG} \ldots] \ldots]$
  - **Distribution:** Can co-occur with mention-some, hence not tied to mention-all.

- **Data studied:** Singular wh-questions with disjunction (extending Haida & Repp 2013, Hirsch 2018, Ciardelli et al. 2019), OP = *or*.

(10) (ANS) $[_\text{CP} \ldots [\ldots \text{TRIG} \ldots]\ \boxed{\text{or}}\ [\ldots \text{TRIG} \ldots] \ldots]$

- **Consequences explored.** Uniqueness, answerhood:
  - **Local triggering:** Triggering by a CP internal element. Possibility considered: TRIG = wh (as in Hirsch & Schwarz 2019, Uegaki 2020).

    (11) (ANS) $[_\text{CP} \ldots \text{OP} [\ldots \boxed{\text{wh}} \ldots] \ldots]$
  - **Answer operator:** A weakened operator considered in Fox (2013) is shown to interact with independently triggered uniqueness to derive observed answering patterns.

    (12) $\boxed{\text{ANS}_\text{F}}$ $[_\text{CP} \ldots]$

**Outline:**

1. Review: uniqueness from answerhood (Section 2)
2. Scope of uniqueness and local triggering:
   a. A problem of scope (Section 3)
   b. Triggering uniqueness locally (Sections 4)
3. Distribution of uniqueness and mention-some
   a. A problem of distribution (Section 5)
   b. Reconciling uniqueness with mention-some (Section 6)

## 2 Review: uniqueness from answerhood

**This section:** Outline of Dayal's classic proposal (developed in Xiang 2016 and Fox 2013, 2018)

- **Dayal (1996):** both mention-all and uniqueness from $\text{ANS}_\text{D}$, given the logical profiles of answer sets.

**Assumptions:**

- **Syntax.** Every question CP combines with $\text{ANS}_\text{D}$:

  (13) $\text{ANS}_\text{D}$ $[_{\text{CP}}$ wh ...$]$

- **Semantics of CP.** Determines a classic Hamblin set:
  - Non-singular wh (including mono-morphemic wh): Hamblin answers based on both atoms and pluralities.

    (14) a. What is missing?
    b. $\{\text{miss}(a), \text{miss}(b), \text{miss}(a+b), \ldots\}$

  - Singular wh: Hamblin answers based on atomic individuals.

    (15) a. Which letter is missing?
    b. $\{\text{miss}(a), \text{miss}(b), \ldots\}$

- **Semantics of $\text{ANS}_\text{D}$.** Maps a Hamblin set to a proposition, picking out its unique strongest (= maximally informative) true member, presupposing there is one:

  (16) a. $[\![ \text{ANS}_\text{D} ]\!]^\text{w} = \lambda\text{Q}\text{: max}_{\text{inf}}(\{\text{p: p}\in\text{Q} \wedge \text{p(w)}\}) \neq \emptyset$
  $.\ \iota\text{p}[\text{p}\in\text{max}_{\text{inf}}(\{\text{p: p}\in\text{Q} \wedge \text{p(w)}\})]$
  b. $\text{max}_{\text{inf}}(\text{P}) := \{\text{p: p}\in\text{P} \wedge \forall\text{q}[\text{q}\in\text{P} \rightarrow \text{p}\subseteq\text{q}]\}$

  - **Maximality notion:** $\text{max}_{\text{inf}}(\text{P})$ cannot have more than one element.

**Mention-all and uniqueness from $\mathbf{ANS_D}$:** $ANS_D$ captures both mention-all where observed (with non-singular wh) and uniqueness (with basic cases of singular wh):

- **Non-singular wh, mention-all:** Unique complete true answer.

  (17) What is missing?
  conveys: "Tell me everything that is missing."

  - Hamblin set: The Hamblin answers are based on atoms and pluralities.

    (18) $\{\text{miss}(a), \text{miss}(b), \text{miss}(a{+}b), \ldots\} =$
    $\{\text{miss}(a), \text{miss}(b), \text{miss}(a) \wedge \text{miss}(b), \ldots\}$

  - Logical profile: The Hamblin set is closed under conjunction.
  - Fact: For any set of propositions S closed under conjunction, $\text{max}_{\text{inf}}(\text{S}) = \{\bigcap \text{S}\}$.
  - So: $ANS_D$ outputs the conjunction of all true Hamblin answers, hence mention-all:

    (19) if defined
    $$[\![ \text{ANS}_\text{D} ]\!]^\text{w}((18)) = \iota\text{p}[\text{p}{\in}\text{max}_{\text{inf}}(\{\text{p: p}{\in}(18) \wedge \text{p(w)}\})]$$
    $$= \bigcap\{\text{p: p}{\in}(18) \wedge \text{p(w)}\}$$

- **Singular wh, uniqueness presupposition:** Unique true answer (hence mention-all).

  (20) Which letter is missing?
  presupposes: $\exists!\text{x}[\text{letter(x)} \wedge \text{miss(x)}]$

  - Hamblin set: The Hamblin answers are based on atoms only.

    (21) $\{\text{miss}(a), \text{miss}(b), \ldots\}$

  - Logical profile: The Hamblin set is not ordered by entailment.
  - Fact: For any unordered set of propositions S, $\text{max}_{\text{inf}}(\text{S}) \neq \emptyset$ iff $\exists!\text{p}[\text{p}{\in}\text{S}]$.
  - So: $ANS_D$ can apply only if there is a single true Hamblin answer, hence uniqueness:

    (22) $[\![ \text{ANS}_\text{D} ]\!]^\text{w}((21))$ defined only if $\text{max}_{\text{inf}}(\{\text{p: p}{\in}(21) \wedge \text{p(w)}\}) \neq \emptyset$
    iff $\exists!\text{p}[\text{p}{\in}(21) \wedge \text{p(w)}]$

**Salient limitation:** Remains silent about mention-some (Fox 2013, 2018). See Sections 5 and 6.

# 3 A problem of scope

**This section:** A problem for Dayal's proposal.

- **Claim targeted:** The uniqueness trigger applies globally, to the interrogative as a whole.

## 3.1 A puzzle from disjunction

**Data investigated:** Disjunctive wh-questions, with singular wh-phrase (extending observations in Haida & Repp 2013, Hirsch 2018, Ciardelli et al. 2019).

(23) a. In which town was Shakespeare born or did Bach die?
b. Which letter is missing in *fa_m* or was replaced with a dollar sign in *t$st*?

- Surface syntactic profile: *or* flanked by two C' constituents:

  (24) a. In which town $[_{C'}$ $[_{C}$ was] Shakespeare born] or $[_{C'}$ $[_{C}$ did] Bach die]?
  b. Which letter $[_{C'}$ $[_{C}$ is] missing in *fa_m*] or $[_{C'}$ $[_{C}$ was] replaced in *t$st*]?

- Terminology: *C'-disjunctive* questions. (Leaving open whether *or* merges with C' constituents.)

**Confirming acceptability.** Possible contexts and responses:

(25) Person A is doing a crossword and needs to answer one of two clues next.
A: In which town was Shakespeare born or did Bach die?
B: i. Shakespeare was born in Stratford.
ii. Bach died in Leipzig.

(26) Person A is playing a word game and must complete one of two words next.
A: Which letter is missing in *fa_m* or was replaced with a dollar sign in *t$st*?
B: i. *r* is missing in *fa_m.*
ii. *e* was replaced in *t$st.*

**Determining the predicted presupposition:**

- **Transparent CP syntax.** C' disjunction, across-the-board wh-movement:

  (27) $[_{CP}$ [in which town] [ $[_{C'}$ was Shakespeare born t ] or $[_{C'}$ did Bach die t]]

- **Background on composition in CP.** Karttunen (1977) (as updated in Heim 1994, Fox 2013):

  – Logical form for CP (TP = question *nucleus*):

  (28) a. Which letter is missing?
  b. $[_{CP}$ λp [ [which letter] λx $[_{C'}$ $[_{C}$ ? p] $[_{TP}$ x missing]]]]

– Entries for functional elements:

(29) a. $[\![\,?\,]\!] = \lambda p_{st}.\ \lambda q_{st}.\ p = q$
b. $[\![\,\text{which}\,]\!] = \lambda f_{et}.\ \lambda g_{et}.\ \exists x[f(x) \wedge g(x)]$

– Resulting CP denotation (in world w), corresponding Hamblin set:

(30) a. $\lambda p.\ \exists x[\text{letter}(x)(w) \wedge p = \text{miss}(x)]$
b. $\{\text{miss}(a), \text{miss}(b), \ldots\}$

- **Applied to C'-disjunctives:**

– Logical form for CP:

(31) $[_{CP}\ \lambda p[\ [\text{which town}]\ \lambda x[\quad [_{C'}\ [_{C}\ ?\ p]\ [_{TP}\ \text{Shakespeare was born in x}]]$
$\text{or}\ [_{C'}\ [_{C}\ ?\ p]\ [_{TP}\ \text{Bach did die in x}]]]]]$

– Classic semantics for disjunction:

(32) $[\![\,\text{or}\,]\!] = \lambda p_t.\lambda q_t.\ p \vee q$

– Resulting CP denotation (in world w), corresponding Hamblin set:

(33) a. $\lambda p.\ \exists x[\ \text{town}(x)(w) \wedge [\quad p = \text{born}_s(x)$
$\vee\ p = \text{died}_b(x)\ ]]$

b. $\{\text{born}_s(\text{Stratford}), \text{born}_s(\text{Leipzig}), \ldots\}$
$\cup\ \{\text{died}_b(\text{Stratford}), \text{died}_b(\text{Leipzig}), \ldots\}$

- **Condition on applying $\text{ANS}_D$:**

– Logical profile: The Hamblin set (33b) is not ordered by entailment.

– Fact: For any unordered set of propositions S, $\max_{inf}(S) \neq \emptyset$ iff $\exists! p[p \in S]$.

– Hence: $\text{ANS}_D$ can apply only if there is a single true Hamblin answer.

(34) $[\![\,\text{ANS}_D\,]\!]^w((33b))$ defined only if $\max_{inf}(\{p\!: p \in (33b) \wedge p(w)\}) \neq \emptyset$
iff $\exists! p[p \in (33b) \wedge p(w)]$

- **Hence, the presupposition predicted:**

(35) $[\ \exists! x[\text{town}(x) \wedge \text{born}_s(x)] \wedge \neg\exists y[\text{town}(y) \wedge \text{died}_b(y)]]$
$\vee\ [\ \neg\exists x[\text{town}(x) \wedge \text{born}_s(x)] \wedge \exists! y[\text{town}(y) \wedge \text{died}_b(y)]]$

**Verdict: inadequate.** The questions can be felicitous even if—or even though—the presuppositions predicted are incompatible with common knowledge. Specifically:

- Entailed by presupposition predicted:

(36) $\neg\exists x[\text{town}(x) \wedge \text{born}_{\text{s}}(x)] \vee \neg\exists y[\text{town}(y) \wedge \text{died}_{\text{b}}(y)]$

- Given by common knowledge:

(37) $\exists x[\text{town}(x) \wedge \text{born}_{\text{s}}(x)] \wedge \exists y[\text{town}(y) \wedge \text{died}_{\text{b}}(y)]$

### 3.2 A matter of scope

**Diagnosis of the problem:** Due to the relative scope of the uniqueness trigger and *or*.

- **Analysis above:** The uniqueness trigger (TRIG = $\text{ANS}_{\text{D}}$) scopes over disjunction:

(38) TRIG [. . . or . . . ]

  – Notation: Schema equates *or*'s semantic scope with its syntactic disjuncts (even though disjunct size may not actually fix *or*'s scope (e.g., Larson 1985, Schlenker 2006)).

- **Proposed remedy:** The trigger can (or must) scope below *or*, internal to the disjuncts:

(39) [. . . TRIG . . . ] or [. . . TRIG . . . ]

**Expected effect of the proposed remedy:**

- **Presupposition triggered:** Uniqueness triggered internal to each disjunct.

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

(41) left: $\exists!x[\text{town}(x) \wedge \text{born}_{\text{s}}(x)]$
right: $\exists!y[\text{town}(y) \wedge \text{died}_{\text{b}}(y)]$

- **Assuming universal projection.** Suppose every triggered presupposition is true, ∀Ps:

(42) $\exists!x[\text{town}(x) \wedge \text{born}_{\text{s}}(x)] \wedge \exists!y[\text{town}(y) \wedge \text{died}_{\text{b}}(y)]$

**Verdict: adequate.** C'-disjunctive questions elicit judgments expected under ∀Ps:

- Detecting the presupposition: Infelicity when ∀Ps is incompatible with common knowledge.

(43) a. #Which letter is missing in *f_ _m* or was replaced with a dollar sign in *t$st*?
b. #Which letter is missing in *fa_m* or was replaced with a dollar sign in *$$st*?

– Presupposition derived (∀Ps):

(44) a. $\exists!x[\text{letter}(x) \wedge \text{miss}_{\text{f\_\_m}}(x)] \wedge \exists!y[\text{letter}(y) \wedge \text{replaced}_{\text{t\$st}}]$
b. $\exists!x[\text{letter}(x) \wedge \text{miss}_{\text{fa\_m}}(x)] \wedge \exists!y[\text{letter}(y) \wedge \text{replaced}_{\text{\$\$st}}]$

– Entailed by common knowledge:

(45) a. $\neg\exists!x[\text{letter}(x) \wedge \text{miss}_{\text{f\_\_m}}(x)]$
b. $\neg\exists!y[\text{letter}(y) \wedge \text{replaced}_{\text{\$\$st}}]$

**Next, developing the remedy:** How does [. . . TRIG . . . ] or [. . . TRIG . . . ] arise?

- Two options:

  – **High disjunction:** *Or* scopes above $\text{ANS}_\text{D}$ (= TRIG).

  (46) $[_\text{X}$ . . . ANS $[_\text{CP}$ . . . ] . . . ] or $[_\text{X}$ . . . ANS $[_\text{CP}$ . . . ] . . . ]

  – **Low triggering:** TRIG (≠ ANS) scopes within C', below *or*.

  (47) $[_\text{C'}$ . . . TRIG . . . ] or $[_\text{C'}$ . . . TRIG . . . ]

- Next step: A case against high disjunction.

### 3.3 A case against high disjunction

**Scope above ANS:** Above $\text{ANS}_\text{D}$, the lone scope site for disjunction that seems viable would be in a covert performative layer.

- **Two covert performative predicates** (Sauerland 2009, Sauerland & Yatsushiro 2017): Imperative force from covert structure above ANS.

(48) a. Which letter is missing?
b. OUGHT [MAKE-KNOWN [$\text{ANS}_\text{D}$ $[_\text{CP}$ which letter is missing]]]

- **A scope site for disjunction**: Between the two performative predicates (entertained as an option for CP-disjunctives in Hirsch 2018):

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

  – Scope taking: For example, via big coordinates whose size is in part obscured by ellipsis:

  (50) OUGHT [ [MAKE-KNOWN [$\text{ANS}_\text{D}$ $[_\text{CP}$ in which town $[_\text{C'}$ was S. born ]]]]
  or [MAKE-KNOWN [$\text{ANS}_\text{D}$ $[_\text{CP}$ ~~in which town~~ $[_\text{C'}$ did B. die ]]]]]

- **Determining the presupposition predicted:**

  – Hamblin sets. In each disjunct, a separate CP denotation is composed; the Hamblin sets are not unioned:

(51) a. left: {$\text{born}_s$(Stratford), $\text{born}_s$(Leipzig), ...}
b. right: {$\text{died}_b$(Stratford), $\text{died}_b$(Leipzig), ...}

– Logical profiles: Neither Hamblin set is ordered by entailment.

– Consequence: In each disjunct, $\text{ANS}_D$ can apply only if there is a single true proposition in the Hamblin set.

(52) a. left: $[\![\text{ANS}_D]\!]^w$((51a)) defined only if $\max_{inf}(\{p: p\in(51a) \wedge p(w)\}) \neq \emptyset$ iff $\exists!p[p\in(51a) \wedge p(w)]$
b. right: $[\![\text{ANS}_D]\!]^w$((51b)) defined only if $\max_{inf}(\{p: p\in(51b) \wedge p(w)\}) \neq \emptyset$ iff $\exists!p[p\in(51b) \wedge p(w)]$

– Presuppositions triggered:

(53) a. left: $\exists!x[\text{town}(x) \wedge \text{born}_s(x)]$
b. right: $\exists!y[\text{town}(y) \wedge \text{died}_b(y)]$

– Projection: Universal projection derives the intended target, ∀Ps.

(54) $\exists!x[\text{town}(x) \wedge \text{born}_s(x)] \wedge \exists!y[\text{town}(y) \wedge \text{died}_b(y)]$

### 3.3.1 Problems with high disjunction

**Two commitments.** The high disjunction proposal is committed to two assumptions:

**A. Scope extension.** A C'-disjunctive question allows for *or* to scope higher than C'.

(55) OUGHT [ [MAKE-KNOWN [$\text{ANS}_D$ [$_{CP}$ in which town [$_{C'}$ was Shakespeare born ] ]]]
or [MAKE-KNOWN [$\text{ANS}_D$ [$_{CP}$ ~~in which town~~ [$_{C'}$ did Bach die ] ]]]]]

**B. Two questions.** A C'-disjunctive question introduces two separate question denotations (Hamblin sets).

(56) OUGHT [ [MAKE-KNOWN [$\text{ANS}_D$ [$_{CP}$ in which town [$_{C'}$ was Shakespeare born ]] ]]
or [MAKE-KNOWN [$\text{ANS}_D$ [$_{CP}$ ~~in which town~~ [$_{C'}$ did Bach die ]] ]]]]

**To be argued:** Neither commitment is viable.

**A. No scope extension:** In C'-disjunctives, *or* cannot take scope higher than C'.

- **Part 1: No high disjunction from ellipsis**

  Data: Consider C'-<u>con</u>junctives—wh questions with C' constituents flanking *and*.

  (57) In which town was Shakespeare born and did Bach die?

  – Ellipsis parse: With *and* scoping in the performative layer:

  (58) OUGHT [ [MAKE-KNOWN [$\text{ANS}_\text{D}$ [$_\text{CP}$ in which town was S born]]]
  and [MAKE-KNOWN [$\text{ANS}_\text{D}$ [$_\text{CP}$ ~~in which town~~ did B die]]]]]

  – Prediction. Should felicitously elicit answers such as:

  (59) Shakespeare was born in Stratford and Bach died in Leipzig.

  – Judgment: Cannot normally be so answered. (Sentence seems to imply that Bach died where Shakespeare was born.)

  – Hence: The C'-conjunctive does not permit a high conjunction ellipsis parse.

  – Assumption: Conditions on ellipsis apply equally to coordinations with *and* and *or*.

  – **Consequence:** High disjunction in C'-disjunctives, if available, cannot be due to ellipsis.

- **Part 2: no high disjunction from any source**

  – Other potential paths to high scope: e.g., choice functional analyses (Schlenker 2006) or Hamblin semantics (Simons 2005, Alonso-Ovalle 2006).

  – Problem: Independent evidence against possible disjunction scope over an embedding predicate in C'-disjunctives.

  – Baseline: *Or* can scope over an embedding predicate in embedded CP-disjunctives.

  (60) Al is wondering [$_\text{CP}$ in which town Shakespeare was born] or [$_\text{CP}$ in which town Bach died].

  (61) a. . . . either fact will do. (*wonder* > *or*)
  b. . . . but I'm not sure which. (*or* > *wonder*)

  – Frozen scope: In embedded C'-disjunctives, *or* cannot scope over the overt embedding predicate.

  (62) Al is wondering in which town [$_\text{C'}$ Shakespeare was born] or [$_\text{C'}$ Bach died].

  (63) a. . . . either fact will do. (*wonder* > *or*)
  b. #. . . but I'm not sure which. (*or* > *wonder*)

  – Assumption: Constraints on scope do not discriminate between overt and covert embedding predicates.

– **So, scope extension commitment:** Not viable. In C'-disjunctives, the scope of *or* is frozen at C', hence cannot extend into the covert performative layer.

**B. One question, not two:** The meaning of a C'-disjunctive question does not introduce two separate question denotations (Hamblin sets).

- **Evidence from explicit reference to questions:**

  – Reference to questions: The demonstrative *this question* can be understood as getting its referent from a preceding matrix interrogative.

  (64) a. In which town was Shakespeare born?
  b. Sorry, I cannot answer this question.

  – Assumption: Anaphoric reference of *this question* is to a question denotation.

  – Prediction: High disjunction then predicts that C'-disjunctives should not be good antecedents, as they introduce two equally salient question denotations. Compare:

  (65) Either Jane or Maud will sing. #She will stand on that platform. (Simons 1996)

  – Observation: The prediction is incorrect; C'-disjunctives can antecede *this question*:

  (66) a. In which town was Shakespeare born or did Bach die?
  b. Sorry, I cannot answer this question.

  – Questioning the premise: Perhaps *this question* can also pick up the unique speech act a C'-disjunctive expresses? Test with overt approximations of high disjunction structure:

  (67) a. i. Tell me in which town Shakespeare was born or tell me in which town Bach died.
  ii. You should tell me in which town Shakespeare was born or tell me in which town Bach died.
  iii. I want you to tell me in which town Shakespeare was born or tell me in which town Bach died.
  b. #Sorry, I cannot answer this question.

  – Observation: These overt approximations do not serve as good antecedents for *this question*. (Cf.: *Sorry, I cannot respond to this request.*)

  **So, two-questions commitment:** Not viable. In the interpretation of a C'-disjunctive question, only one question denotation (Hamblin set) is composed.

**Recall, the two options:** How does [...TRIG...] or [...TRIG...] arise in C'-disjunctive questions?

- **High disjunction:** Rejected.

  (68) $[_{X} \ldots \text{ANS} \; [_{CP} \ldots] \ldots]$ or $[_{X} \ldots \text{ANS} \; [_{CP} \ldots] \ldots]$

- **Low triggering:** Adopt this.

  (69) $[_{C'} \ldots \text{TRIG} \ldots]$ or $[_{C'} \ldots \text{TRIG} \ldots]$

**Answer operator:** Operating on Hamblin set, applies to CP:

(70) $\boxed{\text{ANS}} \; [_{CP} \ldots [_{C'} \ldots \text{TRIG} \ldots]$ or $[_{C'} \ldots \text{TRIG} \ldots] \ldots]$

**Consequence:** Uniqueness:

- TRIG $\neq$ ANS: Uniqueness not triggered globally by $\text{ANS}_{D}$ or any answer operator.
- Local triggering: Instead triggered within the interrogative CP.

**Questions this raises:** With TRIG $\neq$ ANS:

- Answerhood: What are the consequences for answerhood? (Sections 5 & 6)
- Uniqueness: What triggers uniqueness? (Next.)

# 4 Triggering uniqueness locally

**This section:** The wh-item as a conceivable local trigger, TRIG = wh.

- Uniqueness could be triggered by the wh-item after reconstruction into the question nucleus. (Versions considered in Hirsch & Schwarz 2019, Uegaki 2020; see Xiang 2020 for problems).

**Revised logical form and denotations:**

- **Revised logical form:**
  - Overt wh: The overt wh-phrase reconstructs (as in Rullmann & Beck 1998).
  - Covert wh: A silent operator $\exists_{wh}$ takes the overt wh-phrase's place at the periphery, binding a variable within the reconstructed overt wh-phrase.

    (71) a. Which letter is missing?
    b. $[_{CP}\ \lambda p\ [\exists_{wh}\ \lambda x\ [_{C'}\ [_{C}\ ?\ p]\ [_{TP}\ [_{DP}\ [\text{which x}]\ \text{letter}]\ [_{VP}\ \text{is missing}]]]]]$

- **New denotations:**
  - Covert wh: existential quantification, removed from the overt wh, is reassigned to $\exists_{\text{wh}}$:

    (72) $[\![ \exists_{\text{wh}} ]\!] = \lambda f_{et}.\ \exists x[f(x)]$

  - Overt wh: *which* is a "parameterized determiner" that triggers a mereology-based maximality presupposition (Sharvy 1980, Link 1983).

    (73) a. $[\![ \text{which} ]\!] = \lambda x_e.\ \lambda f_{et}.\ \lambda g_{et} : \max_{part}(\{z\text{: } f(z) \wedge g(z)\}) \neq \emptyset\ .\ f(x) \wedge g(x)$

    b. $\max_{part}(P) := \{x\text{: } x{\in}P \wedge \forall y[y{\in}P \rightarrow y{\sqsubseteq}x]\}$

**Uniqueness triggered locally, in the nucleus:**

- Presupposition triggered locally: Maximality presupposition is triggered in the question nucleus.

  (74) $\max_{part}(\{z\text{: letter}(z) \wedge \text{miss}(z)\}) \neq \emptyset$

- Uniqueness from maximality: As a condition on a set of atoms, maximality yields uniqueness.

  (75) $\max_{part}(\{z\text{: letter}(z) \wedge \text{miss}(z)\}) \neq \emptyset$ iff
  $\exists!z[\text{letter}(z) \wedge \text{miss}(z)]$

- Presuppositional answers: each Hamblin answer carries the uniqueness presupposition.

  (76) a. $\lambda p.\ \exists x[p = \lambda w\text{: } \exists!y[\text{letter}(y)(w) \wedge \text{miss}(y)(w)].\ \text{letter}(x)(w) \wedge \text{miss}(x)(w)]$

  b. $\left\{ \begin{array}{c} \lambda w\text{: } \exists!y[\text{letter}(y)(w) \wedge \text{miss}(y)(w)].\ \text{letter}(a)(w) \wedge \text{miss}(a)(w), \\ \lambda w\text{: } \exists!y[\text{letter}(y)(w) \wedge \text{miss}(y)(w)].\ \text{letter}(b)(w) \wedge \text{miss}(b)(w), \\ \ldots \end{array} \right\}$

- Projection: Projection from the Hamblin answers (existential or universal) yields the question's intended presupposition (cf. *Who invited the king of France?*).

  (77) $\exists!x[\text{letter}(x) \wedge \text{miss}(x)]$

**Low triggering under disjunction**

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

- Logical form: The overt wh-phrase reconstructs to in intermediate position in each disjunct:

  (79) $[_{CP}\ \lambda p\ [\exists_{wh}\ \lambda x[\ \ [_{C'}\ [_{C}\ ?\ p]\ [_{TP}\ [\ [\text{which } x]\ \text{town}]\ \lambda y[_{TP}\ \text{Shakespeare was born in } y]]]$
  $[\text{or } [_{C'}\ [_{C}\ ?\ p]\ [_{TP}\ [\ [\text{which } x]\ \text{town}]\ \lambda z[_{TP}\ \text{Bach died in } z]]]]]]]$

- Presuppositions triggered, locally and low: A presupposition of maximality, hence uniqueness, is triggered in the nucleus, internal to each disjunct:

(80) a. left: $\max_{part}\{z\colon \text{town}(z) \wedge \text{born}_s(z)\} \neq \emptyset$ iff
$\exists!z[\text{town}(z) \wedge \text{born}_s(z)]$

b. right: $\max_{part}\{z\colon \text{town}(z) \wedge \text{died}_b(z)\} \neq \emptyset$ iff
$\exists!z[\text{town}(z) \wedge \text{died}_b(z)]$

- Presuppositional answers: The Hamblin set consists of two families of Hamblin answers, which differ in the uniqueness presupposition they carry:

(81) a. $\lambda p.\ \exists x[\ \ [p = \lambda w\colon \exists!y[\text{town}(y)(w) \wedge \text{born}_s(y)(w)].\ \text{town}(x)(w) \wedge \text{born}_s(x)(w)] \vee [p = \lambda w\colon \exists!y[\text{town}(y)(w) \wedge \text{died}_b(y)(w)].\ \text{town}(x)(w) \wedge \text{died}_b(x)(w)]]$

b.
$$\left\{\begin{array}{l} \lambda w\colon \exists!y[\text{tn}(y)(w) \wedge \text{born}_s(y)(w)].\ \text{tn}(\text{Stratford})(w) \wedge \text{born}_s(\text{Stratford})(w), \\ \lambda w\colon \exists!y[\text{tn}(y)(w) \wedge \text{born}_s(y)(w)].\ \text{tn}(\text{Leipzig})(w) \wedge \text{born}_s(\text{Leipzig})(w), \\ \qquad \dots \end{array}\right\}$$
$$\cup \left\{\begin{array}{l} \lambda w\colon \exists!y[\text{tn}(y)(w) \wedge \text{died}_b(y)(w)].\ \text{tn}(\text{Stratford})(w) \wedge \text{died}_b(\text{Stratford})(w), \\ \lambda w\colon \exists!y[\text{tn}(y)(w) \wedge \text{died}_b(y)(w)].\ \text{tn}(\text{Leipzig})(w) \wedge \text{died}_b(\text{Leipzig})(w), \\ \qquad \dots \end{array}\right\}$$

- Presupposition projected: Universal projection from the Hamblin set yields the target ∀Ps (e.g., Abrusán 2014):

(82) $\exists!x[\text{town}(x) \wedge \text{born}_s(x)] \wedge \exists!y[\text{town}(y) \wedge \text{died}_b(y)]$

**Summary.** Uniqueness must be locally triggered within the question nucleus. The wh-item is a possible trigger.

(83) (ANS) $[_{CP} \dots \text{TRIG} \dots] = $ (ANS) $[_{CP} \dots \boxed{\text{wh}} \dots]$

# 5 A problem of distribution

**This section:** Another way of seeing that uniqueness must be severed from answerhood. Now focusing on answerhood:

- **Claim targeted:** Uniqueness is tied to $\text{ANS}_D$, hence to mention-all.
- **Observed:** A kind of uniqueness can co-occur with mention-some.

**C'-disjunctives as mention-some questions.** Consider again a C'-disjunctive with singular wh:

(84) Which letter is missing in *fa__m* or was replaced with a dollar sign in *t$st*?

- **Expected classic Hamblin set** (see Section 3):

(85) $\{\text{miss}_{\text{fa\_m}}(a), \text{miss}_{\text{fa\_m}}(b), \ldots\}$
$\cup \{\text{replaced}_{\text{t\$st}}(a), \text{replaced}_{\text{t\$st}}(b), \ldots\}$

  – Logical profile: Hamblin set not ordered by entailment.

- **Assessing answerhood:**

  – Answerhood predicted from $\text{ANS}_\text{D}$: Uniqueness and mention-all.

(86) $\text{ANS}_\text{D}$ [which letter is missing in *fa_m* or was replaced in *t$st*]

  – Actually observed: C'-disjunctives are mention-some, judged to permit two intuitively complete answers.

(87) Which letter is missing in *fa_m* or was replaced with a dollar sign in *t$st*?
conveys: "Tell me one of those two things."

(88) a. *r* is missing in *fa_m*.
b. *e* was replaced in *t$st*.

  – Already dismissed: High disjunction, two applications of $\text{ANS}_\text{D}$.

(89) OUGHT [ [MAKE-KNOWN [$\text{ANS}_\text{D}$ [$_\text{CP}$ which letter [$_\text{C'}$ missing in *fa_m*]]]]
or [MAKE-KNOWN [$\text{ANS}_\text{D}$ [$_\text{CP}$ ~~which letter~~ [$_\text{C'}$ replaced in *t$st*]]]]]]

**Therefore:** C'-disjunctives do not compose with $\text{ANS}_\text{D}$.

**And yet, uniqueness.** C'-disjunctives still carry a sort of uniqueness presupposition (Section 3):[1]

(90) a. #Which letter is missing in *f_ _m* or was replaced with a dollar sign in *t$st*?
b. #Which letter is missing in *fa_m* or was replaced with a dollar sign in *$$st*?

**Conclusion:** Uniqueness cannot be derived from $\text{ANS}_\text{D}$ or tied to mention-all.

**Next step:** A weaker theory of answerhood which does not derive uniqueness from ANS, but interacts with independently triggered uniqueness to permit mention-some.

[1] For a related observation, due to Roger Schwarzschild, see Dayal (2016, p. 75, fn. 19).

## 6 Reconciling uniqueness with mention-some

**This section:** A weak ANS defined in Fox (2013) applies to our data correctly: for unordered Hamblin sets, it derives mention-some unless masked by independently triggered uniqueness.

$\mathbf{ANS_D}$ (Dayal 1996). Recap:

(91) a. $[\![\text{ANS}_\text{D}]\!]^\text{w} = \lambda\text{Q}\text{: max}_{\text{inf,strong}}(\{\text{p: p}\in\text{Q} \wedge \text{p(w)}\}) \neq \emptyset$
$\quad . \ \iota\text{p}[\text{p}\in\text{max}_{\text{inf,strong}}(\{\text{p: p}\in\text{Q} \wedge \text{p(w)}\})]$

b. $\text{max}_{\text{inf,strong}}(\text{P}) := \{\text{p: p}\in\text{P} \wedge \forall\text{q}[\text{q}\in\text{P} \rightarrow \text{p}\subseteq\text{q}]\}$

- Strong maximality: $\text{max}_{\text{inf,strong}}(\text{P})$ cannot have more than one element.

**Salient limitation:** Remains silent about mention-some (Fox 2013, 2018). So, Fox's suggestion:

- $\mathbf{ANS_F}$ (Fox 2013). Appealing to a weaker notion of maximality, which permits multiple maximal members:

(92) a. $[\![\text{ANS}_\text{F}]\!]^\text{w} = \lambda\text{Q}\text{: max}_{\text{inf,weak}}(\{\text{p: p}\in\text{Q} \wedge \text{p(w)}\}) \neq \emptyset$
$\quad . \ \text{max}_{\text{inf,weak}}(\{\text{p: p}\in\text{Q} \wedge \text{p(w)}\})$

b. $\text{max}_{\text{inf,weak}}(\text{P}) := \{\text{p: p}\in\text{P} \wedge \forall\text{q}[\text{q}\in\text{P} \rightarrow \text{q}\not\subset\text{p}]\}$

  - Weak maximality: $\text{max}_{\text{inf,weak}}(\text{P})$ can have multiple elements.

  In particular: $\mathbf{max_{inf,weak}(P) = P}$ **if P not ordered by entailment.**

**Fox's assessment of** $\mathbf{ANS_F}$**.** Accommodates mention-some at expense of losing uniqueness:

- **Singular wh.** Where $\text{ANS}_\text{D}$ correctly derives uniqueness, $\text{ANS}_\text{F}$ incorrectly derives mention-some.

(93) Which letter is missing?
presupposes: $\exists!\text{x}[\text{letter(x)} \wedge \text{miss(x)}]$

  - Classic Hamblin set: Not ordered by entailment.

(94) $\{\text{miss}(a), \text{miss}(b), \ldots\}$

  - Consequence: $\text{ANS}_\text{F}$ can incorrectly output a set of multiple true Hamblin answers.

(95) w: $o$ and $r$ are the missing letters
$[\![\text{ANS}_\text{F}]\!]^\text{w}((94)) = \{\text{miss}(o), \text{miss}(r)\}$

**But, reassessment, given local triggering:**

- **Singular wh.** Availability of mention-some correctly regulated by locally triggered presupposition:
  - **High trigger.** Triggered highest in wh's scope, presupposition preempts mention-some.

    (96) Which letter is missing?

    (97)
    $$\left\{\begin{array}{l} \lambda \text{w: } \exists!\text{y}[\text{letter}(\text{y})(\text{w}) \wedge \text{miss}(\text{y})(\text{w})].\ \text{letter}(a)(\text{w}) \wedge \text{miss}(a)(\text{w}), \\ \lambda \text{w: } \exists!\text{y}[\text{letter}(\text{y})(\text{w}) \wedge \text{miss}(\text{y})(\text{w})].\ \text{letter}(b)(\text{w}) \wedge \text{miss}(b)(\text{w}), \\ \qquad \ldots \end{array}\right\}$$

    - Logical profile: Hamblin answers are pairwise incompatible; only one can be true.
    - Projection: In fact, the projected presupposition entails that exactly one Hamblin answer is true.

      (98) $\exists!\text{y}[\text{letter}(\text{y}) \wedge \text{miss}(\text{y})]$

    - So, answerhood: potential mention-some correctly masked, mention-all (uniqueness) correctly guaranteed.

  - **Low trigger.** An operator OP intervening between wh and the trigger can change the logical profile, unmasking mention-some from $\text{ANS}_\text{F}$. Example: OP = *or*.

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

    (100)
    $$\left\{\begin{array}{l} \lambda \text{w: } \exists!\text{y}[\text{tn}(\text{y})(\text{w}) \wedge \text{born}_\text{s}(\text{y})(\text{w})].\ \text{tn}(\text{Strtf})(\text{w}) \wedge \text{born}_\text{s}(\text{Strtf})(\text{w}), \\ \lambda \text{w: } \exists!\text{y}[\text{tn}(\text{y})(\text{w}) \wedge \text{born}_\text{s}(\text{y})(\text{w})].\ \text{tn}(\text{Lpz})(\text{w}) \wedge \text{born}_\text{s}(\text{Lpz})(\text{w}), \\ \qquad \ldots \end{array}\right\}$$
    $$\cup \left\{\begin{array}{l} \lambda \text{w: } \exists!\text{y}[\text{tn}(\text{y})(\text{w}) \wedge \text{died}_\text{b}(\text{y})(\text{w})].\ \text{tn}(\text{Strtf})(\text{w}) \wedge \text{died}_\text{b}(\text{Strtf})(\text{w}), \\ \lambda \text{w: } \exists!\text{y}[\text{tn}(\text{y})(\text{w}) \wedge \text{died}_\text{b}(\text{y})(\text{w})].\ \text{tn}(\text{Lpz})(\text{w}) \wedge \text{died}_\text{b}(\text{Lpz})(\text{w}), \\ \qquad \ldots \end{array}\right\}$$

    - Logical profile: There are pairs of mutually compatible Hamblin answers; more than one Hamblin answer can be true.
    - Projection: In fact, the (universally) projected presupposition entails that exactly two Hamblin answers are true.

      (101) $\exists!\text{x}[\text{town}(\text{x}) \wedge \text{born}_\text{s}(\text{x})] \wedge \exists!\text{y}[\text{town}(\text{y}) \wedge \text{died}_\text{b}(\text{y})]$

- So, answerhood (extending Hirsch 2018): mention-some correctly unmasked.

(102) w: Shakespeare born (only) in Stratford, Bach died (only) in Leipzig

$[\![ \text{ANS}_\text{F} ]\!]^\text{w}((100)) =$

$$\left\{\begin{array}{l}\lambda\text{w: } \exists!\text{y}[\text{tn(y)(w)} \wedge \text{born}_\text{s}\text{(y)(w)}].\ \text{tn(Strtf)(w)} \wedge \text{born}_\text{s}\text{(Strtf)(w)},\\ \lambda\text{w: } \exists!\text{y}[\text{tn(y)(w)} \wedge \text{died}_\text{b}\text{(y)(w)}].\ \text{tn(Lpz)(w)} \wedge \text{died}_\text{b}\text{(Lpz)(w)}\end{array}\right\}$$

(103) a. Shakespeare was born in Stratford.
b. Bach died in Leipzig.

**Conclusion:** For Hamblin sets of singular wh-questions, $\text{ANS}_\text{F}$ enables mention-some, which is often, but not always, masked by locally triggered presupposition:

- Triggered high: Mention-some correctly masked—as only one Hamblin answer can be true
- Triggered low: Mention-some correctly enabled—as multiple Hamblin answers can be true.

# 7 Conclusions

**Wh-questions: answerhood and presuppositions.** How do they relate?

- **Dayal (1996):** Uniqueness and mention-all have the same source. Triggering arises in virtue of how mention-all is encoded in an answer operator, $\text{ANS}_\text{D}$.
- **Today:** Uniqueness triggering severed from answerhood. Evidence from C'-disjunctives:
  - Scope of uniqueness: Content of the uniqueness presupposition reveals possible low triggering site, inside the question nucleus.
  - Distribution of uniqueness: Compatible with mention-some, unless masked by uniqueness' content from high triggering site in the nucleus.

**Open questions include:** What are possible low triggering sites? What is the trigger? (Hirsch & Schwarz 2019, Xiang 2020, Kobayashi & Rouillard 2020)

(104) (ANS) $[_\text{CP} \ldots \text{OP} [\ldots \text{TRIG} \ldots] \ \ldots]$

- **Triggering sites.** Today: OP = or. Hirsch & Schwarz (2019): OP = $\Diamond$.

(105) Which letter could be missing in *fo _ m*?

(106) a. *a* could be missing.
b. *r* could be missing.

- Low uniqueness: Presupposes $\Diamond[\exists!\text{x}[\text{letter(x)} \wedge \text{miss(x)}]]$, not $\exists!\text{x}[\Diamond[\text{letter(x)} \wedge \text{miss(x)}]]$.

(107) #Which letter could be missing in $f\_\_ m$?

– Mention-some: (i) and (ii) in (b) could each resolve the question.

- **The trigger.** Considered above: TRIG = wh.
  – Problem: Multiple wh ≠ multiple uniqueness triggering (Hirsch & Schwarz 2019, Xiang 2020).
  – Dayal (1996): Multiple singular wh yields "exhaustivity and uniqueness":

(108) Which student read which book?
presupposes: $\forall$x[student(x) $\rightarrow$ $\exists$!y[book(y) $\wedge$ read(x,y)]]

  – Possibility (Kobayashi & Rouillard 2020): TRIG ≈ an exhaustivity operator.

## References

Abrusán, Marta. 2014. *Weak Island Semantics*. Oxford University Press.
Alonso-Ovalle, Luis. 2006. Disjunction in alternative semantics. Doctoral Dissertation, University of Massachusetts Amherst.
Ciardelli, Ivano, Jeroen Groenendijk, & Floris Roelofsen. 2019. *Inquisitive semantics*. Oxford University Press.
Dayal, Veneeta. 1996. *Locality in Wh Quantification*. Dordrecht: Kluwer.
Dayal, Veneeta. 2016. *Questions*. Oxford: Oxford University Press.
Fox, Danny. 2013. Mention some readings. Lecture notes, Massachusetts Institute of Technology, February 2013.
Fox, Danny. 2018. Partition by exhaustification: Comments on Dayal 1996. In *Proceedings of Sinn und Bedeutung 22*, ed. Uli Sauerland & Stephanie Solt, volume 2 of *ZASPiL 61*, 403–434. Berlin: Leibniz-Centre General Linguistics.
Haida, Andreas, & Sophie Repp. 2013. Disjunction in wh-questions. In *Proceedings of NELS 40*, ed. Seda Kan, Claire Moore-Cantwell, & Robert Staubs, 259–272. Amherst: GLSA.
Heim, Irene. 1994. Questions. Class handout, Massachusetts Institute of Technology.
Hirsch, Aron. 2018. Disjoining questions. manuscript, McGill University, Montreal.
Hirsch, Aron, & Bernhard Schwarz. 2019. Singular *which*, mention-some, and variable scope uniqueness. In *Proceedings of Semantics and Linguistic Theory (SALT) 29*, ed. Katherine Blake, Forrest Davis, Kaelyn Lamp, & Joseph Rhyne, 748–767. Linguistic Society of America.
Karttunen, Lauri. 1977. Syntax and semantics of questions. *Linguistics and Philosophy* 1:3–44.
Kobayashi, Filipe Hisao, & Vincent Rouillard. 2020. High and low exhaustification in singular *which*-questions. Poster at SALT 30.
Larson, Richard K. 1985. On the syntax of disjunction scope. *Natural Language & Linguistic Theory* 3:217–264.
Link, Godehard. 1983. The logical analysis of plurals and mass terms: A lattice-theoretical approach. In *Meaning, Use, and the Interpretation of Language*, ed. Reiner Bäuerle, Christoph Schwarze, & Arnim von Stechow, 302—323. Berlin: de Gruyter.
Rullmann, Hotze, & Sigrid Beck. 1998. Presupposition projection and the interpretation of 'which'-questions. In *Proceedings of Semantics and Linguistic Theory (SALT) 8*, ed. Devon Strolovitch & Aaron Lawson, 215–232. Ithaca, NY: Cornell University.

Sauerland, Uli. 2009. Decomposing questions acts. *Snippets* 62–63.

Sauerland, Uli, & Kazuko Yatsushiro. 2017. Remind-me presuppositions and speech-act decomposition: Evidence from particles in questions. *Linguistic Inquiry* 48:651–678.

Schlenker, Philippe. 2006. Scopal independence: A note on branching and wide scope readings of indefinites and disjunctions. *Journal of Semantics* 23:281–314.

Sharvy, Richard. 1980. A more general theory of definite descriptions. *The Philosophical Review* 89:607–624.

Simons, Mandy. 1996. Disjunction and anaphora. In *Proceedings of Semantics and Linguistic Theory (SALT) 6*, ed. Teresa Galloway & Justin Spence, 245–260. Ithaca, NY: Cornell University.

Simons, Mandy. 2005. Dividing things up: The semantics of or and the modal/or interaction. *Natural Language Semantics* 13:271–316.

Uegaki, Wataru. 2018. The problem of presupposition projection in question-embedding. talk at Semantics and Linguistic Theory (SALT) 28.

Uegaki, Wataru. 2020. The existential/uniqueness presupposition of *wh*-complements projects from the answers. ms. University of Edinburgh (to appear in *Linguistics and Philosophy*).

Xiang, Yimei. 2016. Interpreting questions with non-exhaustive answers. Doctoral Dissertation, Harvard University, Cambride, MA.

Xiang, Yimei. 2020. Relativized exhaustivity: Mention-some and uniqueness. Manuscript, Rutgers University, July 2020.