Questions

1 The meaning of questions

We have been developing a truth-conditional semantics where sentences are either *true* or *false*, given a particular model. Questions, on the other hand, cannot be treated in the same way:

(1) How many moons does Jupiter have?

The most widely adopted solution goes back to Hamblin (1958):

(2) **The meaning of a question:**
To know the meaning of a question is to know what counts as an answer to the question.

1.1 Question embedding

One way to study the meaning of a question is by embedding it. Question-embedders are normally classified into two classes, the *know* class and the *ask* class. *Know*-type predicates but not *ask*-type predicates can take a declarative clause.

(3) a. John *asked* who came.
b. * John *asked* that Mary came.

(4) a. John *knows* who came.
b. ✓ John *knows* that Mary came.

Context: Mary came and Sue didn't come.

(5) John knows who came.
⇒ John knows that Mary came.
⇒ John knows that Sue didn't come.

(6) John was surprised (by) who came.
⇒ John was surprised that Mary came.
⇏ John was surprised that Sue didn't come.

Know and *surprise* receive different interpretations, which can be defined as the *strongly exhaustive* and the *weakly exhaustive* interpretation of questions.

(7) **Strong exhaustivity**: {Mary came and nobody else came, Bill came and nobody else came, Sue came and nobody else came...}

(8) **Weak exhaustivity**: {Mary came, Bill came, Sue came,...}.

For both types of predicates, to describe the truth conditions of a question-embedding, we need reference the (true) possible answers of the question.

1.2 Question-answer congruence

We can check for what counts as an answer by testing question-answer discourses. Suppose that Alex took the turtle to school and nothing else.

(9) What did Alex take to school?

  a. Alex took the TURTLE to school. *true answer*
  b. Alex took the PIG to school. *false answer*
  c. # ALEX took the turtle to school. *invalid answer*
  d. # Alex took the turtle to SCHOOL. *invalid answer*
  e. # Yes. *invalid answer*

Note that (9a,c,d) differ only in the placement of focus. Their (prejacent) truth-conditions are the same, but their *alternatives* are different.

(10) Alex took the TURTLE to school.
Prejacent proposition: Alex took the turtle to school.
Focused constituent: turtle
Alternatives to "turtle": frog, pig...
Alternative propositions: Alex took the *frog* to school, Alex took the *pig* to school...

Idea: A question and an answer are congruent when the answer's alternative propositions are the same as the possible answers to the question (Rooth, 1992).

(11) **Evaluating question-answer congruence with focus:**

  a. question: What did Alex take to school?
    i. ✓ Alex took the TURTLE to school.
    ii. # ALEX took the turtle to school.
  b. question: Who took the turtle to school?
    i. # Alex took the TURTLE to school.
    ii. ✓ ALEX took the turtle to school.

Core idea: The meaning of a question *is* the set of possible answers.

2 In-situ questions through Rooth-Hamblin alternatives

Hamblin (1973) proposed that computing *alternatives* (using $[\![\cdot]\!]^f$) can be used to compute sets of possible answers.[1] *Wh*-phrases denote sets of individuals:

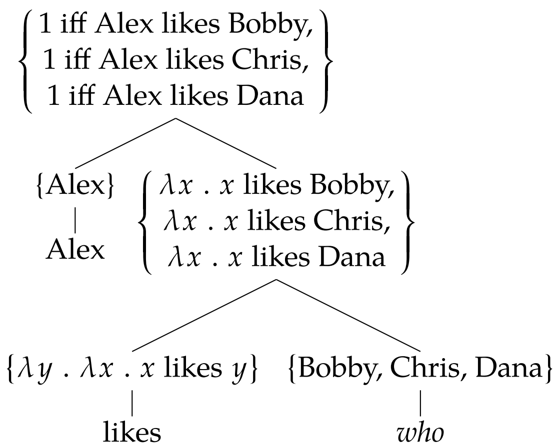
(12) **The semantics of *who*:**

Ordinary semantic value: $[\![\textit{who}]\!]^o$ is undefined

Focus-semantic value: $[\![\textit{who}]\!]^f = \{x_e : x \text{ is human}\}$

> "Although standard English word-order places the interrogative word or phrase (or the main one, if there is more than one), first, with inversion of the verb, there is no real need for an order difference from that appropriate to indicatives. So let us assume no special rules about word-order are needed." Hamblin (1973, p. 48)

(13) **A toy LF of question interpretation via Rooth-Hamblin alternative computation:**



(14) **Principle of Interpretability (Beck, 2006, p. 16):**

An LF must have an ordinary semantic value.

We want $[\![\text{S}]\!]^o$ to be the question (a set of answers), not $[\![\text{S}]\!]^f$. So we need an operator that will convert this focus-semantic value into the ordinary semantic value.

(15) **AltShift (Kotek, to appear):**

$[\![[\textsc{AltShift}\ \alpha]]\!]^o = [\![\alpha]\!]^f$

$[\![[\textsc{AltShift}\ \alpha]]\!]^f = \left\{[\![[\textsc{AltShift}\ \alpha]]\!]^o\right\} = \left\{[\![\alpha]\!]^f\right\}$

AltShift takes a sister that has a set of alternatives (and no ordinary semantic value) and returns the focus-semantic value of its sister as the ordinary semantic value. This gives us a set of propositions—the possible answers to the questions—as the denotation of the question.

(16) **Condition on question-answer congruence (Rooth, 1992):**

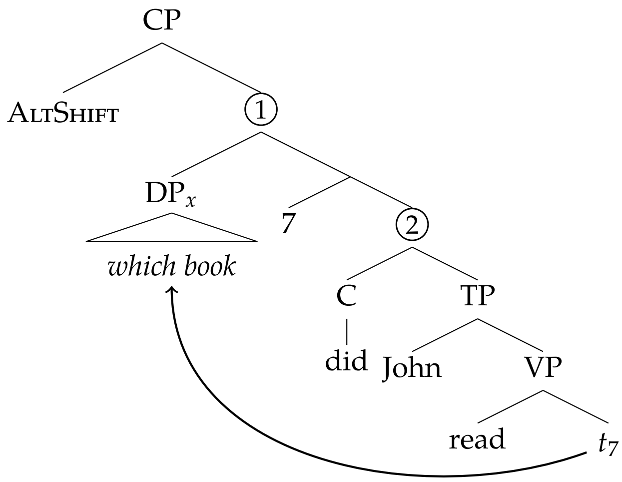
$[\![\text{question}]\!]^o \subseteq [\![\text{answer}]\!]^f$

[1]Historical note: Hamblin (1973) and Rooth (1985) independently arrived at this method of computing "alternatives." See fn 7 of Rooth (1992).

3 Questions with movement

The proposal above is compatible with questions with *wh*-movement:

(17) **A (simplified) LF for a simplex *wh*-question with movement:**



(18) **Key parts of the derivation of (17):**[2]

a. $[\![\textcircled{2}]\!]^{o,g}$ = 1 iff John read $g(7)$

b. $[\![\textcircled{1}]\!]^{f}$ = {1 iff John read x in w : x is a book}

c. $[\![\textcircled{1}]\!]^{o}$ is undefined

d. $[\![\text{CP}]\!]^{o}$ = $[\![\textcircled{1}]\!]^{f}$ = {1 iff John read x in w : x is a book}

Syntactically, movement is subject to island constraints (Ross, 1967).

(19) **The Sentential Subject Constraint:**

No NP can be extracted from within a subject.

* *Who* did [[that John spoke to ___] surprise you]?

(20) **The Complex NP Constraint:**

No extraction out of a clause embedded under a noun (RCs and CP complements of N).

a. * *How many cities* does John have brothers [who live in ___]?

b. *How many cities* does John have brothers [living in ___]?

c. * *What* does John believe [the report [that Mary bought ___]]?

d. *What* does John believe [(that) Mary bought ___]?

English *wh*-questions involve overt movement. If we have an in-situ question, a natural approach would be to propose that the *wh*-word moves overtly.

[2]Formally, Kotek (to appear) presents intensionalized (type $\langle s, t\rangle$) values instead of type t conditional truth values as the denotation of each possible answer.

4 Alternative questions in Mandarin Chinese

Let's look now at a real-world example of an in-situ question:

(21) **Mandarin *haishi* alternative question:**

ni xiang he kafei haishi hongcha (ne)?
you want drink coffee HAISHI tea NE

Alternative question: 'Do you want to drink coffee or tea?'

Possible answers: ✓(I want) coffee; ✓(I want) tea; #Yes; #No

What is the LF of this question? An earlier proposal:

(22) **LF movement analysis of (21) (Huang, 1982):**

[kafei haishi hongcha]$_i$ [ni xiang he t_i]
coffee HAISHI tea you want drink

The movement approach predicts that *haishi* disjunction will be island-sensitive, but it is not, as noted by Huang (1991):

(23) **Sentential subjects (Huang, 1991, 313–314):**

[$_{island}$ wo qu [meiguo] haishi [yingguo]] bijiao hao
I go America HAISHI England comparatively good

Matrix alternative question: 'Is it better for me to go to America or to England?'

(24) **Relative clauses (Huang, 1991, 314):**

ni xihuan [$_{island}$ renshi ni haishi bu renshi ni] de ren
you like know you HAISHI NEG know you DE person

Matrix alternative question: 'Do you like people who know you or people who don't know you?'

Erlewine (2014) provides additional evidence from intervention effects and the position of *shi*.

(25) **Proposal (Erlewine, 2014):** (cf 12)

Ordinary semantic value: $[\![\text{A HAISHI B}]\!]^o$ is undefined

Focus-semantic value: $[\![\text{A HAISHI B}]\!]^f = [\![\text{A}]\!]^f \cup [\![\text{B}]\!]^f$

5 More on AltShift and multiple questions

(26) **Two readings of multiple questions:**

Which student read *which* book?

a. Single-pair: *John read Moby Dick.*

b. Pair-list: *John read Moby Dick, Mary read War & Peace, and Bill read Oliver Twist.*

(27) **A single-pair reading is modeled as a set of propositions:**

$$\left\{\begin{array}{l}\text{John read MD, John read WP, John read OT, Mary read MD,}\\ \text{Mary read WP, Mary read OT, Bill read MD, Bill read WP, Bill read OT}\end{array}\right\}$$

Things are more complicated with the pair-list question. Intuitively, this reading is like asking a series of questions:

(28) **A set of *which book* questions ranging over students:**

Which student read *which* book?

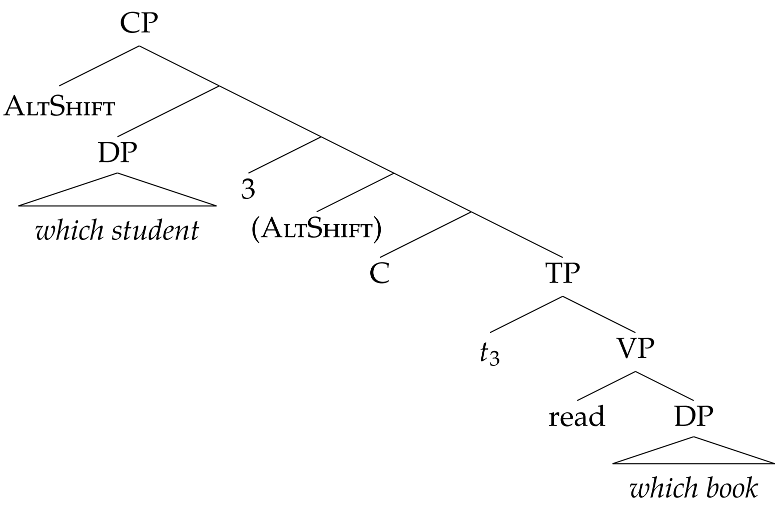
$$\left\{\begin{array}{l}\text{Which book did John read?}\\ \text{Which book did Mary read?}\\ \text{Which book did Bill read?}\end{array}\right\}$$

Unpacking each question, we get:

(29) **A family of questions denotation for (26/28):**

$$\left\{\left\{\begin{array}{c}\text{John read MD}\\ \text{John read WP}\\ \text{John read OT}\end{array}\right\},\left\{\begin{array}{c}\text{Mary read MD}\\ \text{Mary read WP}\\ \text{Mary read OT}\end{array}\right\},\left\{\begin{array}{c}\text{Bill read MD}\\ \text{Bill read WP}\\ \text{Bill read OT}\end{array}\right\}\right\}$$

(30) **Two LFs for the multiple question (28):**[3]



[3]Kotek (to appear) illustrates this type of LF with covert movement of the in-situ *wh*, but this is not crucial.

References

Beck, Sigrid. 2006. Intervention effects follow from focus interpretation. *Natural Language Semantics* 14:1–56.

Erlewine, Michael Yoshitaka. 2014. Alternative questions through focus alternatives in Mandarin Chinese. In *Proceedings of the 48th Meeting of the Chicago Linguistic Society (CLS 48)*, ed. Andrea Beltrama, Tasos Chatzikonstantinou, Jackson L. Lee, Mike Pham, and Diane Rak, 221–234.

Hamblin, Charles. 1958. Questions. *Australian Journal of Philosophy* 36:159–168.

Hamblin, Charles. 1973. Questions in Montague English. *Foundations of Language* 10:41–53.

Huang, Cheng-Teh James. 1982. Logical relations in Chinese and the theory of grammar. Doctoral Dissertation, Massachusetts Institute of Technology.

Huang, Cheng-Teh James. 1991. Modularity and Chinese A-not-A questions. In *Interdisciplinary approaches to linguistics: essays in honor of Yuki Kuroda*. Kluwer Academic Publishers.

Kotek, Hadas. to appear. On the semantics of *wh*-questions. In *Proceedings of Sinn und Bedeutung 20*.

Rooth, Mats. 1985. Association with focus. Doctoral Dissertation, University of Massachusetts, Amherst.

Rooth, Mats. 1992. A theory of focus interpretation. *Natural Language Semantics* 1:75–116.

Ross, John Robert. 1967. Constraints on variables in syntax. Doctoral Dissertation, Massachusetts Institute of Technology.