Perspectives on Concealed Questions

This paper makes two contributions to the understanding of *concealed questions* (CQs). First, it points out that current theories which do at least provide a natural explanation of Heim's ambiguity[1] (see example (9) below) differ along two fundamental dimensions.

(1) Some analyze CQs as individual concepts, while others analyze them as identity questions. We will call this the QUESTION dimension and classify theories as [±Q].

(2) Some take the semantics of attitude verbs and questions to be relative to a certain way of individuating the individuals in the domain of discourse, while others do not. We will call this the PERSPECTIVE dimension and classify theories as [±P].

We argue that many well-known empirical problems in this area are direct and inescapable consequences of theories being either [-Q] or [-P]. [-P] theories (Romero, L&P-05, DirComp-07) cannot deal with functional CQs such as (3) (Harris, Ms-07), with quiz CQs such as (4) (Frana, 2006) and with quantified CQs such as (5) (the analysis of such CQs involves quantification over individual concepts which is notoriously problematic if not relativized to a certain way of individuating the individuals in the domain of discourse). Finally, [-P] theories require type inflation of CQ embedding verbs (Schwager, SuB-07).

(3) Ann: I need a good plumber.
Bob: I know the right guy. Mary says her brother is the best plumber in town.

(4) John only knew the shoes. (Frana, 2006)

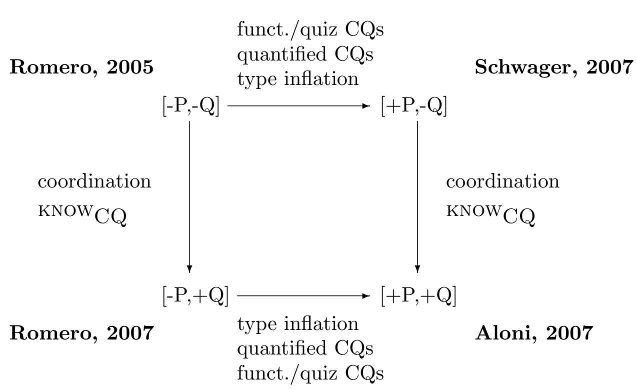
(5) John knows every European capital.

[-Q] theories (Romero, 2005; Schwager, 2007) don't account for the (un)grammaticality of coordinated constructions such as (6) and (7), and are forced to postulate a special purpose lexical item KNOW$_{CQ}$ besides KNOW$_{WH}$ and acquaintance KNOW.

(6) *The price of milk fell last week and is known to John. (Nathan, 2006)

(7) John knows the capital of the Byzantine Empire
before 324 AD and who won the World Series in 1981.

The situation is summarized in the diagram below and leads to the conclusion that, to have any serious potential, a theory of CQs must be [+P,+Q]. The only such theory proposed so far is that of Aloni (Ms-07). The second contribution of this paper, then, is to point out three problems for Aloni's theory, and possible ways to deal with them.



[1] This qualification excludes the theories of Nathan (PHD-06) and Frana (SALT-06) .

Quantified CQs. Aloni's theory analyzes quantified CQs like (5) as (8), where x_1 ranges over the conceptual cover {the capital of Italy, the capital of Germany,...}, $\uparrow_n$ transforms a noun phrase α into the identity question $?x_n.\ x_n = \alpha$ (in this case yielding $?x_2.\ x_2 = x_1$), x_2 ranges over the cover {Rome, Berlin,...}, and KNOW$_{\text{WH}}$ is analyzed a la Groenendijk and Stokhof (1984). Notice that the analysis crucially involves a *de re* representation.

(8) $\forall x_1(EC(x_1) \to K_j(\uparrow_2 x_1))$

The ambiguity in (9), noted by Heim (1979), is analyzed as a *de re* / *de dicto* ambiguity.

(9) John knows the capital that Fred knows.

a. Reading A: John and Fred know the same capital.
$\exists x_1(x_1 = \iota x_1(C(x_1) \wedge K_f(\uparrow_2 x_1)) \wedge K_j(\uparrow_2 x_1))$ (*de re*)

b. Reading B: John knows which capital Fred knows.
$K_j(\uparrow_1 \iota x_1(C(x_1) \wedge K_f(\uparrow_2 x_1)))$ (*de dicto*)

But a problem arises in versions of Heim's example which contain quantified CQs:

(10) John knows every capital that Fred knows.

Reading B cannot be derived because the quantified CQ requires a *de re* representation.

The general problem is that Aloni's $\uparrow_n$ type shift only applies to nominals of type e. We propose a modified type shift which applies to generalized quantifiers more generally. This allows for a *de dicto* representation of (5) and a derivation of Reading B in (10):

(11) $\uparrow_n Q = ?x_n(Q \subseteq \lambda P.P(x_n))$

Indefinite CQs. An independent problem arises with indefinite CQs:

(12) John knows a capital that Fred knows.

Analyzing the indefinite as a generalized quantifier and transforming it using (11) clearly yields the wrong result. The right result is obtained, however, if we adopt a choice function interpretation of indefinites (Reinhart, L&P-97; Winter, L&P-97) (type lifting of CQ nominals to generalized quantifiers has been left implicit in (13)).

(13) $\exists f_{\langle s\langle\langle e,t\rangle,e\rangle\rangle}(K_j(\uparrow_1 f(\lambda x_1(C(x_1) \wedge K_f(\uparrow_2 x_1)))))$

Derived Covers. A third problem is that Aloni's approach crucially relies on the existence of conceptual covers such as {the price of milk, the price of juice,...}. As noted by Schwager (SALT-07), this requires that the price of milk and the price of juice denote different price-individuals in every possible world, which is clearly unrealistic. We propose that variables may not only range over proper conceptual covers, but also over *derived conceptual covers*. Given a conceptual cover C and a relation $R_{\langle s\langle e\langle e,t\rangle\rangle\rangle}$, we define the derived conceptual cover based on C and R as follows:

(14) $\{x \mid \exists c \in C.\forall w.R(w)(x(w))(c(w))\}$

In particular, {the price of milk, the price of juice,...} is the derived conceptual cover based on {milk, juice,...} and the relation $\lambda w.\lambda x.\lambda y.x$ *is the price of* y *in* w.

We thus resolve three pressing problems for Aloni's theory. The resulting system accounts for a wide variety of data in a natural way, and the proposed solutions have general repercussions for the theory of quantification under conceptual cover.