Keeping Prices Low: An Answer to a Concealed Question

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1 Introduction: Concealed Questions

- DPs that have the same truth-conditional meaning as embedded interrogative clauses (cf. Baker 1968; Heim 1979)

(1) a. *Cécile knows the capital of Norway.*
≈ Cécile knows what the capital of Norway is.
b. *Uli told me the time of the meeting.*
≈ Uli told me what the time of the meeting is.

(2) a. *John knows a doctor that can treat your illness.*
b. *John knows most prices in this supermarket.*

CQ-DPs *the capital of Norway, a doctor that can treat your illness,...*

CQ-embedding predicates *know, tell* (others: *reveal, forget, ...*)

- different from acquaintance-*know*:
  - substituting coextensional DPs:

(3) *Cécile knows the capital of Norway.*
The capital of Norway is the largest town in Norway.
Acquaintance: $\Rightarrow$, CQ: $\not\Rightarrow$
Cécile knows the largest town in Norway.

(4) *John knows a doctor that can treat your illness.*
Every doctor that can treat your illness is also a golf instructor.
Acquaintance: $\Rightarrow$, CQ: $\not\Rightarrow$
John knows a golf instructor. Frana (2006)

  - different truth conditions:

(5) a. *Cécile knows what the capital of Norway is, but she has never been there.*
b. #*Cécile knows Oslo but she has never been there.*

  - languages with different lexical items (+DP) (Heim 1979; Frana 2006)
Italian: *sapere* (only CQ) vs. *conoscere* (no CQ)
German: *kennen* (%CQ) vs. *wissen + DP* (only CQ)

- to be explained:
  1. how does the DP get turned into a question?
  2. why only identity questions?
  3. which predicates are CQ-embedding?
  4. which NPs can occur in CQ-DP?
  5. particular ambiguities ("Reading A/Reading B")
- this talk:
  - factivity (*de re*) is crucial (cf. Frana 2006)
  - intuition: *CQ get better when reporting a quiz (cf. Frana 2006)
  - refined theory of *de re*-belief (cf. Aloni 2000; Aloni 2005)
  - simple solution for crucial ambiguity
  - promising starting point for restrictions on CQ-DPs
  - technically: combination of pragmatic theory and individual concept-theory

2 Three Types of CQ-Analyses

depending on the (semantic) argument(s) of $know_{CQ}$ (cf. Romero 2006 for detailed evaluation):

individual u_e and property $\mathbf{P}_{\langle s,et\rangle}$ *know* combines with a DP that denotes an individual u and says that the subject knows that u has property P (type $\langle s,et\rangle$)

- P is provided by the context, with strong default bias for the property mentioned in the DP (discussed Heim 1979, `pragmatic theory`)
- DP picks out individual and provides P at the same time (cf. Frana 2006, *`de re`*`-theory`)

individual concept x_{se} (discussed Heim 1979; Janssen 1984; Romero 2005)

function from indices to individuals (e.g. for each index w: the capital of Norway in w)

subject knows the correct value of the individual concept (all doxastic alternatives agree with the real world on x)

proposition p_{st} (Romero 2007, Romero 2006, Nathan 2006)

the capital of Norway

$$\mapsto \text{the set of (true) propositions } Q = \{x \text{ is the capital of Norway} |\ x \in D_e\}$$

one/the/every/most/... elements of Q are true of the subject's doxastic alternatives

3 A Problem with Belief *de re*

3.1 Getting Hold of a Doctor who can Help You

- apart from Frana 2006: factivity/*de re* is not central in CQ-theorizing
- all approaches so far involve belief about individuals simpliciter, but...

(6) scenario: John gives you name and address of Dr. Maria Bloom (the individual DMB) who is indeed a doctor who can help you. That same night, John and DMB happen to be at the same party and she is introduced to him as "Mary". They start chatting and, since she is a sparetime semanticist, she starts explaining to him some classical puzzles of mistaken identity. John is very fascinated and ends up thinking she must be some sort of philosopher (or maybe, philologist?), but certainly not a doctor.

intuitively, both (7a) and (7b) can be understood as true in the given scenario:

(7) a. *John knows a doctor who can help you.*
b. *John thinks his interloctur is not a doctor.*

- DMB is the only individual that could make true (7a)
- John's interlocutor is DMB

$\Rightarrow$: belief can not be about individuals simpliciter, but only about indiviudals in a certain guise

- not taken into account by the existing approaches

(8) Frana (2006) for (7a):
$\exists u_e[\text{doctor}(w)(u) \wedge \text{can-help-you}(w)(u) \wedge \forall w' \in Dox_{john}[\text{doctor}(w')(u) \wedge \text{can-help-you}(w')(u)]]$
There is an individual u which is actually a doctor who can help you, and John believes of that individual that he/she is a doctor who can help you. ($\Rightarrow$ John excludes that u is not a doctor)

(9) Nathan (2006) for (7a):
$\exists p_{st} \exists u_e[p = \lambda w_1.[\text{doctor}(w_1)(u) \wedge \text{can-help-you}(w_1)(u)] \wedge p(w) \wedge (\forall w' \in Dox_{john}(w))[p(w')]]$
There is a true proposition that, for some individual u, is of the form "u is a doctor who can help you", and John believes that proposition
($\Rightarrow$ John excludes that u is not a doctor)

- an instance of `Quine's puzzle`: belief cannot target individuals simpliciter

Tully = Cicero. Assume, x is a variable mapped to an individual, (10a) is true, and (10b) is false:

(10) a. Philip is unaware that Tully denounced Catiline.
b. Philip is unaware that Cicero denounced Catiline.
c. Philip is unaware that x denounced Catiline.

then, if the assignment maps x to the individual which is Cicero and Tully, what is the truth-value of (10c)?

- cross-identification would be trivial, if the variables ran over individuals:

(11) Who is who?
a. The person right next to you is Hans-Christian, the person closest to the window is Monika,. . . .

- solution: questioning, belief attribution and quantification do not target individuals simpliciter, but under certain guises

  variables range over individual concepts (contingent identity theories)

  Kaplan (1969): we cannot quantify over all individual concepts, but over suitable sets of individual concepts (`the shortest spy`-problem)

- implementation: Aloni (2000, 2005)

3.2 Conceptual Covers

- Aloni (2000, 2005): suitable sets of individual concepts correspond to a contextual perspective taken on the (relevant) individuals: a `conceptual cover`

(12) Given a set of possible worlds W and a universe of individuals D, a `conceptual cover CC` based on (W,D) is a set of functions $W \rightarrow D$ such that:
$(\forall w \in W)(\forall d \in D)(\exists! c \in CC)[c(w) = d]$

a set of individual concepts that fulfills

i. at each index, all individuals are picked out (`existence`)
ii. at each index, each individual is picked out by only one individual concept (`uniqueness`)

- which cover is salient (= what is a good answer) depends on the contextual perspective:

(13) *Who is the president of Mali?*
a. *Amadou Toumani Touré.* — at a history exam
b. *Him!* (pointing at someone) — at a cocktail reception

- partitioning induced by a question (cf. Groenendijk and Stokhof 1984) is sensitive to the salient conceptual cover.

  so: (13a) resolves the question if the naming cover (14a) is salient, and (13b) does if a rigid cover is (14b) (K is the set of proper names)

(14) a. NC = $\{\lambda w.\iota x[x \text{ is called } a \text{ in } w] | a \in K\}$ `naming cover`
b. RC = $\{\lambda w.d \mid d \in D\}$ `rigid cover`, used in pointing

- if John believes *de re* of DMB that she is a doctor, there has to be an individual concept x_{se} that

  1. picks out DMB in the actual world, and
  2. at each of John's doxastic alternatives picks out an individual that is a doctor

  crucially, not any individual concept would do (if John does not know anything about Mary, but she happens to be the richest doctor of Germany, (15a) is felt to be false, although John most likely believes that the richest doctor in Germany is a doctor).

  this is captured by requiring that the quantifier runs over a particular set of individual concepts

(15) a. *John believes that Mary is a doctor.*
b. $\exists^F x[x(w) = \text{DMB} \wedge \forall w' \in Dox_{john}(w)[\text{doctor}(x(w'))]]$

F is the contextually salient conceptual cover over which $\exists$ runs

- Aloni (2005): principles of RELEVANCE, INFORMATIVITY, CONSISTENCY, and PARSIMONY govern which conceputal cover that is (implemented in bi-directional OT, cf. Section 5 for some details)

  PARSIMONY (violable constraint) predicts that the naming cover (NC) always comes for free; any other covers is costly unless an expression corresponding to the identifier that shall be used is present overtly

- e.g., INFORMATIVITY rules out a value for F that contains *the richest doctor in Germany*, CONSISTENCY rules out *the person John has just been introduced to*

4 CQs under Conceptual Covers

4.1 The Basic Idea

- internal argument of $know_{CQ}$ is an individual concept:

(16) $[\![know]\!] = \lambda x_{se}\lambda u_e.\exists^F y[y(w) = x(w) \wedge \forall w' \in Dox_u(w)[x(w') = y(w')]]$

subject u *CQ*-knows individual concept x iff

- u has an `identifier` (another individual concept y) for the actual referent of x and
- u knows that x and y pick out the same individual (whichever that is)
- there are pragmatic constraints on what are possible identifiers

- *the capital of Italy* is interpreted as a definite description of type e, we take its intension to avoid a type-mismatch (cf. Lasersohn 2005)

(17) a. *John knows the capital of Italy.*
b. $\lambda w.[\![\textit{the capital of Italy}]\!]^w = \lambda w.\iota u_e[\text{capital}(w)(\text{Italy})(u)]$
c. $[\![(17a)]\!]^w = \exists^F x[x(w) = \iota u_e[\text{capital})(w)(\text{Italy})]$
$\wedge \forall w' \in Dox_{john}(w)[x(w') = \iota u_e[\text{capital}(w')(\text{Italy})]]$

most likely (PARSIMONY): $F = NC$ and x = "the unique object called Rome"

- type-shifts (cf. Nathan 2006)

(18) relational nouns like *capital* (type $\langle s, \langle e, \langle e,t\rangle\rangle\rangle$) can shift:
a. to a set of individuals $\langle s, et\rangle$:
$\lambda R\lambda w\lambda u_e.\exists v_e[R(w)(v)(u)]$ `Shift1`
b. to a set of individual concepts $\langle se,t\rangle$:
$\lambda R\lambda x_{se}.\exists u_e[\forall w[R(w)(u)(x(w))]$ `Shift2`

(<u>note</u>: The result of `Shift2` is not world dependent, this avoids Gupta's problem, cf. Dowty, Wall, and Peters 1981.)

- quantifiers are QRed and leave a trace of type $\langle s,e\rangle$:

(19) a. *John knows most European capitals.*
b. [[*most European capitals*]$_i$ *John knows* t_i]
c. [[`Shift2`(*capitals*)]]= $\lambda x_{se}.\exists u_e[\forall w[\text{capital}(w)(u)(x(w))]$
d. $\text{MOST}(\lambda x_{se}.\text{capital}_{\langle se,t\rangle}(x) \wedge \text{European}(x))$
$(\lambda x_{se}.\exists^F y[y(w) = x(w) \wedge \forall w' \in Dox_{john}(w)[y(w') = x(w')]])$

- if we prefer to treat *the* as a quantifier, we have to adopt another type-shift:

(20) relational nouns like *capital* (type $\langle s, \langle e, \langle e,t\rangle\rangle\rangle$) can also shift
(21) to $\langle e, \langle se,t\rangle\rangle$: $\lambda R\lambda u_e\lambda x_{se}.\forall w[R(w)(u)(x(w))]$ `Shift2b`

modulo uniqueness presupposition: same prediction for relational nouns, but non-relational nouns are excluded as definite description CQs (= Nathan 2006). (I'd rather exclude them on pragmatic grounds, cf. 5)

4.2 Reading A and B

- the famous ambiguity (Heim 1979)

(22) *John knows the capital Fred knows.*
a. **Reading A**: For exactly one country x Fred can tell you what x's capital is, and John can also tell you what x's capital is.
(John need not know anything about Fred.)

b. **Reading B**: For exactly one country x, Fred can tell you what x's capital is, and John can tell you what country x that is
(John knows something about Fred; John need not know what the capital of x is).

a situation for Reading B:

- The capital of Italy is Rome.
- Fred believes with good reason (=knows): The capital of Italy is Rome.
- John holds possible:
  The capital of Italy is Rome and Fred knows: The capital of Italy is Rome.
  The capital of Italy is Paris and Fred knows: The capital of Italy is Paris.
  The capital of Italy is Frankfurt and Fred knows: The capital of Italy is Frankfurt.
  ...

- crucially, I assume no structural ambiguity and no difference in types:

(23) a. *John knows the capital Fred knows.*

b. [*John knows* [*the* [[`Shift2`(*capital*) *Fred knows*]]]]

c. [[*the capital Fred knows*]]= $\iota x_{se}[\text{capital}_{\langle se,t\rangle}(x) \wedge \exists^F y[y(w) = x(w) \wedge \forall w' \in Dox_{fred}(w)[y(w') = x(w')]]$

d. [[(23a)]]=
$$\exists^K z_{se}[z(w) = \iota x_{se}[\text{capital}_{\langle se,t\rangle}(x) \wedge \exists^F y[y(w) = x(w) \wedge \forall w' \in Dox_{fred}(w)[y(w') = x(w')]]]](w) \wedge \forall w' \in Dox_{john}(w)[z(w') = \iota x_{se}[\text{capital}_{\langle se,t\rangle}(w)(x) \wedge \exists y[y(w) = x(w) \wedge \forall w' \in Dox_{fred}(w)[y(w') = x(w')]]]](w')]]$$

assume that Fred can identify the capital of Italy as the city called Rome: so y = "the city called Rome" (=$\lambda w.\iota u_e.$called-Rome$(w)(u)$)

now, either (Reading A) John has the same knowledge, $z = y$ = "the city called Rome"; or (Reading B) John knows something about Fred, namely, that Fred can answer the question what the capital of Italy is (in that case, z is the individual concept that maps every index to the city that at w' is the city-individual u which is the capital of some country v and Fred knows at w' that capital$(w')(v)(u)$)

(24) Reading A: $z = y = \lambda w.\iota u[\text{called-Rome}(w)(u)]$

Reading B: z = "the capital Fred knows"
$$z = \lambda w.\iota u[\exists v[\text{capital}(w)(v)(u) \wedge \forall w' \in Dox_{fred}(w)[\text{capital}(w')(v)(u)]]]$$
(z = the individual concept that maps every index w' to the city that at w' is the city-individual u which is the capital of some country v and Fred knows at w' that u is the capital of v)

note: $\iota x.\text{capital}_{\langle se,t\rangle}(x) \wedge \exists y[y(w) = x(w) \wedge \forall w' \in Dox_{fred}(w)[y(w) = x(w)]$ (the interpretation of the relative clause) is $\lambda w.\iota u_e.\text{capital}(w)(\text{Italy})(u)$. Hence, pragmatically, it is no possible value for z, because it attributes trivial knowledge to John. The identifier used at the pragmatic level can be described as "the capital Fred knows". Yet it is different from how this definite description (that is responsible for the identifier to be available!) is interpreted in the course of the semantic computation. This certainly requires closer investigation. As a working hypothesis, I assume that a definite description renders salient as an identifier the intension of its type e-denotation (in the sense of Lasersohn 2005) (even if the noun is shifted to a set of individual concepts in the computation of the semantic meaning).

4.3 Indefinites

- as it stands, simple indefinites require a different $know_{CQ}$

(25) a. John knows a doctor who can help you.
b. John knows a European capital.

we could treat them as $\langle s,e\rangle$-quantifiers

but: it seems somehow unintuitive to shift *doctors who can help you* to a set of individual concepts

intuitively, (25a) says that John has a means to identify for you a person who (actually and to him) is a doctor who can help you (the semantics Frana 2006 aims at):

(26) $\exists^F x[x(w) \in \text{doctor-who-can-help-you}(w) \wedge \forall w' \in Dox_{john}(w)[x(w') \in \text{doctor-who-can-help-you}(w')]$

this requires a different lexical entry for *know* (type $\langle\langle s,et\rangle,et\rangle$):

(27) $[\![know]\!] = \lambda P_{\langle s,et\rangle}\lambda u_e.\exists^F x[x(w) \in P(w) \wedge \forall w' \in Dox_u(w)[x(w') \in P(w')]]$

if indefinites can be interpreted as properties (cf. Zimmermann 1993), we obtain (26) for (25a)

- if we allow for a typeshift from $\langle s,e\rangle$ to $\langle s,et\rangle$ (`Shift 3`), we can use (27) for definite descriptions and quantifiers as well (give up (16))

(28) $\lambda x_{se}\lambda w\lambda u_e.u = x(w)$ `Shift 3`

(29) $[\![$*John knows the capital of Italy.*$]\!] =$
$\exists^F x[x(w) \in (\lambda u_e.u = \iota v[\text{capital}(w)(\text{Italy})(v)]) \wedge \forall w' \in Dox_{john}(w)[x(w') \in (\lambda u_e.u = \iota v[\text{capital}(w')(\text{Italy})(v)])]]$

of course, for any u_e, x_{se}, w: $[u \in (\lambda v.v = x(w))]$ is equivalent to $[u = x(w))]$

- if indefinites can be both quantifiers and properties, the framework offers two possibilities of dealing with indefinite CQs:

  doctor (who can help you) does not normally shift to a set of individual concepts, hence, (25a) is interpreted with the indefinite in situ denoting a property (cf. (26))

  but *capital* can undergo both `Shift1` (to a set of cities that are capital of some country or other) and `Shift2` (to a set of individual concepts each recording the capital for a given country); thereby, we predict two construals for (25b):

(30) a. [*John knows* [*a Euorpean* `Shift1`(*capital*)]]
b. $\exists^F x[x(w) \in \text{European-capital}_{\langle s,et\rangle}(w) \wedge$
$\forall w' \in Dox_{john}(w)[x(w') \in \text{European-capital}_{\langle s,et\rangle}(w')]$

(31) a. [[*a European*-`Shift2`(*capital*)]$_i$ *John knows* t_i]
b. $\text{A}(\lambda x_{se}.\text{European-capital}_{\langle se,t\rangle}(x))$
$(\lambda x_{se}.\exists^F y[y(w) = x(w) \wedge \forall w' \in Dox_{john}(w)[y(w') = x(w')]]])$

maybe this is what we need after all:

certainly, (25b) can be interpreted as saying e.g. that John can name one city of which he knows that this is a Euorpean capital (without knowing which country's capital that is) (then (30) is true, but (31) is false)

can also be understood as saying that John could answer only one question out of "What is the capital of the European country x?" (with x ranging over a contextually relevant set of European countries)

(maybe) only reading available for abstract relational nouns (cf. Frana 2006, who suggests pair-objects)[1]

(32) *John knows a price (in this supermarket).*
e.g. John knows that the butter costs 1.30.
$\neq$ John knows that 1.30 is a price (of some object or other).

[1]Heim (1979:60) describes a scenario in which a noun *phone number*, usually also associated with the stronger knowledge "knowing a phone number as someone's phone number", is just known to fall under the existentially closed predicate `Shift1`(*phone number*). She considers (i) in the scenario described below.

(i) *John knows every phone number.*

Suppose, John's task is to assign to a new phone a number which is not yet taken by any other phone. Then he needs to "know every phone number", not in the sense of knowing which number is whose, however, but merely in the sense of knowing which numbers are somebody's at all. This reading seems to involve quantification over phone numbers as individuals and should come out roughly as in (ii).

(ii) $\text{EVERY}(\lambda u.\text{phone-number}_{\langle s,et\rangle}(w)(u))$
$(\lambda u.\exists^F x[x(w) = u \wedge \forall w' \in Dox_j(w)[x(w') \in \text{phone-number}_{\langle s,et\rangle}(w')]]])$

It remains to be worked out how this reading can be generated. In any case, I take its availability to demonstrate that set-membership knowledge in the sense of (30) is available for a larger class of nouns than one might assume at first glance.

Do we need (31) as an independent reading or just a stronger interpretation of (30)?

evidence (31) is a true reading:

(33) Peter takes part in a quiz and has to answer questions i-iv about American capitals and v-viii about European capitals.

(i) What is the capital of Massachusetts?
(ii) What is the capital of Vermont?
(iii) What is the capital of Texas?
(iv) What is the capital of California?

(v) What is the capital of Norway?
(vi) What is the capital of Italy?
(vii) What is the capital of Austria?
(viii) What is the capital of Germany?

Peter answers most questions correctly. After the quiz, John (the quizmaster), has to report which questions each candidate could answer. John himself has no clue what the correct answers are, and he isn't even very good at remembering which questions the candidates could answer. In the end, John remembers at least that Peter got the capital of Austria right, so he knows a European capital.

I think that scenario makes (25b) true on a non-trivial reading, that is not captured by (30).

The construal in (30) is true in the scenario, if we interpret (25b) as saying that (without thinking of Peter), John managed to remember that Austria was a European country (hence, "the capital of Austria" (whatever it is), would be some European capital).

But in the given scenario, this is not the reading we are after: we report John as knowing something about Peter's performance, namely, which European capital-question he could answer. This is obtained from (25b) if y is "the capital Peter identified correctly" (John himself neither has to know that this is Vienna nor that Austria is a European country):

(34) there is an x which gives the capital of some European country (namely, $\lambda w.\iota u_e[\text{capital}(w)(\text{Austria})(u)]$), such that John can identify it (by y = "the capital Peter identified correctly")

This is reminiscent of Reading B as discussed for sentences containing relative clauses (cf. (23a)).

5 Evaluating the analysis

- avoids unwanted predictions of belief about individuals simpliciter (vs. e-theories, se-theory, and propositional theories as put forth so far)

- Reading A/B come out without cross-categorial entries and special shifters (cf. Romero 2006 for comparison of Romero 2007 and Nathan 2006)
- **coordination** predictions:

(35) a. #John told me, and Mary visited, the capital of Norway. *e*-failure
b. #The price of milk fell last week and is known to John. *se*-failure
c. #John saw, and Mary told me, the capital of Norway. $\langle s,t\rangle$

still to be dested in detail $\langle s,et\rangle$:

(36) a. ???John seeks on the map, and Mary told me, the capital of Norway.
b. ???John seeks, and Mary knows, a doctor that can help her.

- **pronominalization**: fine because of property type (cf. Romero 2005)

(37) John knows the winner of the race and Peter knows it/^{*CQ}her, too.

- **not everything is a good CQ-DP** (*se*-theory: failure, Nathan (2006): any lexically relational/functional DP, *e*-theories: in "appropriate" context, observation: quiz-contexts are appropriate contexts)

  here: *CQ*-knowledge requires:

  - a relevant set of individuals to be covered
  - a salient conceptual cover which may not contain the interpretation of the CQ-DP (INFORMATIVITY)

- following Aloni 2005: restrictions on what CC is salient: INFORMATIVITY, RELEVANCE, CONSISTENCY are inviolable; PARSIMONY is violable

  PARSIMONY ("Avoid Accommodation"): the naming cover is always available for free, other covers have to be accommodated, unless the variable is introduced by a DP belonging to it

- first approximation: **functional nouns** (lexically) fix the domain of objects to be covered (better if argument position is filled overtly - information structure?)

  a functional noun F interpreted as F renders salient its own conceptual cover (over $D'' \subseteq D$, corresponding to some $D' \subseteq D$)

(38) $\{\lambda w.\iota u_e.\mathrm{F}(w)(x)(u) \mid x \in D'\}$

naming comes for free and provides the source for the identifier needed

(39) a. #*John knows the pope.*
b. *John knows the head of the Catholic Church.*

but: capitals are not necessarily capitals - strictily speaking, not a conceptual cover as defined by Aloni (2000)

- predicted: functional nouns that pick out "nameless" objects are bad as CQ-DPs

(40) *John knows the carburetor (of the car).*

carburetor: functional, still bad. But: what could be a possible identifier???

hard to think of an identifier apart from pointing (targets individual simpliciter)

(41) $RC = \{\lambda w.d \mid d \in D\}$

back to knowledge about individuals (conflict with acquaintance-*know*?)

- quiz context saves CQs: (i) set of objects to be identified is fixed, (ii) pointing (= capacity to identify the pure individual) is required only for that particular occasion

  past tense - anaphoricity triggers presence of identification event (capacity to identify the individual takes narrow scope)

(42) *John knew the shoes.* Frana (2006)
when asked to point out the shoes, John correctly pointed out the shoes

- "modifiers help"
  - some modifiers introduce relationality/functionality (Nathan 2006 lets them introduce mapping to propositions)

    (43) a. John knows the person responsible.
    b. #John knows the responsible person.

  - some modifiers help to set the domain that has to be covered (plays a role for indefinites, too)

    (44) *Hans weiß einen* ??(*guten*) *Arzt.*
    Hans knows a good doctor
    'Hans knows a good doctor.'

    we require a conceptual cover not for all individuals, but only for doctors

6 Conclusions

- CQs involve a property embedding variant of *know* that takes into account *de re*-belief
- "higher order readings" without higher order types (Reading A/B)
- ^{ok}pronominalization; to be checked (not hopeless): coordination
- pragmatic constraints on CQ-DPs look promising

- explore: embedding predicates, specificational subjects

Appendix

Irene Heim (p.c.) points out a possible problem with disambiguated variants of (22):

(45) a. *John knows the same price Fred knows.*
b. *John knows the price Fred knows, too.*

In both cases, only Reading A survives. For the moment, my reply would be that the identifier needed for Reading B (*the price Fred knows*) is no longer expressed overtly (hence, via PARSIMONY), we are stuck with Reading A.

But let us consider the following variant of her examples:

(46) a. *Frank also knows the price Fred knows.*
b. *Auch Frank kennt den Preis, den Fred kennt.*
Also F. knows the price that R. knows
'Frank also knows the price Fred knows.'

In these cases, the identifier is expressed explicitly. And indeed, the sentence is ambiguous again. The additive particle *also/auch* requires some other individual than Frank to have an identifier for "the price Fred knows". Now, both the German and the English example can mean that, in addition to someone else (let us say, Mark), Frank has an identifier for "the price Fred knows". In that case, the presupposition of the additive particle is satisfied either by type A or type B-knowledge of an individual not mentioned in the sentence.

But (46) also allows that the presupposition of the additive particle is satisfied by Fred's price knowledge as mentioned in the relative clause. In that case, only reading A seems available. The same preference for the instance of knowledge that satisfies the presupposition of the additive particle to involve the same identifier as the assertion thus modified is observed in the above case. The following sequence does not seem to verify (46):

(47) Fred: "The capital of Italy is Rome", Frank: "Fred knows what the capital of Italy is", Mark: "The capital of Italy is Rome".

As it stands, my analysis does not account for this observation. The problem should be considered together with the one of overt multiple embeddings like (48) and what are possible readings/identifiers for the respective levels (cf. Heim 1979; Romero 2005):

(48) John knows the price known to Fred that Bill knows.

References

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