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Uncovering the concealed question (and some shifty types).

Contra a number of recent analyses, this paper defends the view that the DP in English "concealed question" constructions like (1) denotes a question -- in this specific case, the question 'What price does milk have?' ((2)) Through a detailed examination of these and related sentences, it motivates a small group of type-shifting rules that operate on N and NP denotations, as well as a kind of hidden structure within propositional complements. In the end, the analysis fits with a constrained view of type-shifting on which type-shifting rules are for the most part "meaning-preserving" -- that is, with some minor exceptions, in changing the interpretation of an element, they do not add to its informational contribution, but simply reorganize it in a certain precise sense. The investigation is inspired by Nathan 2006, but the conclusions are rather different.

The basic argument relies on examples like (1a) with verbs like *ask* or *debate*.   On the basis of examples that do not involve embedded DPs, these verbs have to be analyzed as combining with question meanings ((3)). When they combine with a DP like *the price of milk*, they behave just as though they combine with the question meaning (2), so the null hypothesis is obviously that the DP yields that meaning. (Other expressions with irreducibly question-selecting meanings can be used to make the same point.) To arrive at this question meaning, we argue, a type shift applies to *price*. This type shift produces a function that takes an object x and yields the singleton set containing the question 'What price does x have?' ((4b)). Importantly, this type shift is also involved in generating another meaning for *price* that is a predicate of questions: *price* in (5) is interpreted as "question of the form 'What price does x have?'" and this meaning is obtained by applying a second type shift on top of the first ((4c)). The idea that (1a) and (5) involve the same type shift explains why the relational nouns that can appear in the two constructions are subject to the same restrictions. The fact is that the two constructions only allow nouns that, roughly speaking, are presupposed to be functional, and not even all of those. (*Price* works; *flavor* and *father* do not.) This similarity can be understood if the initial type shift imposes these restrictions. (These are not the only type shifts that play a role in examples with question-selecting verbs. An additional type shift "relationizes" non-relational nouns like *year* in *He asked me the year Mary was born* in such a way that they come to select for a relative-clause-like meaning. Recognizing this, we show, leads naturally to an account for "Heim-style" ambiguities like the ambiguity in *John asked Mary the price Fred asked her.*)

When it comes to examples like (1b) with a proposition-selecting verb like *know*, we argue that the question-denoting expression is embedded within the complement of *know*. A sentence like (1b) has a structure whose ingredients essentially spell out "John knows the proposition truly answering the question 'What price does milk have?'." The higher *the* here is the one that is pronounced -- (6) sketches the idea. Assuming such structures, with a higher pronounced determiner that ranges over propositions and a lower unpronounced determiner *a* or *the*, allows us to account in a simple and especially transparent way for a variety of quantified "concealed question" and related constructions. For example, the reading of (7a) that expresses that John knows every proposition truly answering a question of the form 'What is the price of x?' arises out of a structure like (7c), which contains essentially the same ingredients as our paraphrase. (*Price* is interpreted here in the same way it is in (5).) Interestingly, NPs under *know* seem able to undergo a type-shift that is not available under *ask* ((8)-(9)). This is responsible for the fact that the relational nouns that appear under *know* are not restricted in the way they are under *ask*, as well as for the marginal "set readings" that have been discussed in the literature (Roelofsen and Aloni 2008, Schwager 2008).

The idea that "concealed question" constructions contain questions has not gone unchallenged in the literature, but the facts that have been brought up do not seem to us to pose devastating problems. A quick hand-waving summary: Possibly, the fact that certain question-selecting verbs, like *wonder*, do not combine with DPs like *the price of milk* is related to the more general fact that they can't combine with DPs headed by *question* (*I wondered the same thing* vs. **I wondered the same question*). Possibly, the fact that certain proposition-selecting verbs like *regret* don't either is related to the more general fact they don't combine with "syntactic questions" like *what the price of milk is*.

(1) a. John asked Mary <u>the price of milk</u>.
     b. John knows <u>the price of milk</u>.

(2) { λw_s. milk has price p in w | p a possible price }

(3) a. [[ask]] = λx_e. $\lambda Q_{<st,t>}$. λy_e. λw_s. in w, y asks x to convey to him the (str. exh.) answer to Q.
     b. [[debate]] = λX_e. $\lambda Q_{<st,t>}$. λw_s. in w, the members of X compare the likelihood of different
                    conjunctions of propositions in Q

(4) a. [[price]] = λx_e. λp_p. λw_s. x has price p in w
     b. **S1**([[price]]) = λx_e. $\lambda Q_{<st,t>}$. Q = { λw_s. [[price]](x)(p)(w) | p $\in$ dom([[price]](x)) for some x }
     c. **S2**(**S1**([[price]])) = $\lambda Q_{<st,t>}$. for some x, S1([[price]])(x)(Q) = 1.

(5) John asked Mary one price.

(6) a. John knows the price of milk.

    b. "John knows the proposition that truly answers the question 'What price does milk have?'"

    c. <u>interpretation</u>:   "John" "knows" "the" "prop"   "answers" "the" "S1-price" "milk"

       <u>structure</u>: 1 w_1 John knows [$_{DP}$ the n [Op 2 [w_1 t_2 answers [$_{DP}$ the price of milk]]]]

       <u>pronunciation</u>:   John knows   the   price of milk

(7) a. John knows every price.

    b. "John knows every prop. that truly answers a question of the form 'What price does x have?'"

    c. <u>interpretation</u>:   "every" "prop"   "a" "S2-[S1-price]"   "answers"

       <u>str. below *knows*</u>* : [$_{DP}$ every n [Op 2 [a   price   3 [w_1 t_2 answers t_3]]]]

                *Note that *a price* undergoes QR.

(8) **S3**([[flavor of ice cream]]) = $\lambda Q_{<st,t>}$. Q = { λw_s. [[f. of i.c.]](x)(w) | x $\in$ dom([[f. of i.c.]]) }

    (I.e., **S3**([[flavor of ice cream]]) gives us the singleton set containing the question 'What is a flavor
     of ice cream?')

(9) a. John knows every flavor of ice cream.

    b. "John knows every prop. that truly answers the question 'What is a flavor of ice cream?' "

    c. <u>interpretation</u>:   "every" "prop"   "answers" "the" "S3-[flavor of ice cream]"

       <u>str. below *knows*</u> : [$_{DP}$ every n [Op 2 [w_1 t_2 answers [$_{DP}$ the   flavor of ice cream]]]]

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