Sortal vs. relational nouns in concealed questions: A pragmatic solution

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Building on the treatment of concealed questions developed in Aloni & Roelofsen [1], this paper presents a novel account of why the availability of concealed question readings of determiner phrases tends to vary with the type of the DP head noun.

Concealed questions (CQ:s) are determiner phrases that are naturally interpreted as embedded questions: 'I know *Bill's age*' ≈ 'I know *what age Bill is*'. It is often observed [2, 3, 6] that the availability of CQ-readings of determiner phrases in English tends to vary with certain properties of the DP head noun. For definite DP:s, CQ-readings are only widely available when the head noun is *relational*, i.e. denotes a two-place relation (like *age, capital, phone number*). Constructions with *sortal*, or one-place, head nouns, e.g. ?? 'I know *Bill's brick*', are generally difficult to interpret, let alone as containing CQ:s. Quantified DP:s headed by relational nouns typically yield ambiguous CQ:s. 'John knows *every capital*' can be read as meaning that John knows which cities are capitals (the *set* reading), or that John knows for each country, what its capital city is (the *pair-list* reading) [5]. When the head noun is sortal, as in 'John knows every card', only the set reading is normally available [4].

Previous approaches [2, 3] aim to derive these constraints on CQ-readings from the difference in *semantic type* of sortal and relational nouns. However, purely semantic explanations are contradicted by the observation that CQ-readings can systematically be made available also for DP:s with sortal nouns. Making salient a *relation* between individuals and bricks, together with a *method of identification* of bricks, will license a CQ-reading of the possessive DP in (1):

<u>*Context 1.*</u> A number of bricks lie in front of John (method of identification: *ostension*), one of which is owned by Bill (relation: *ownership*) .

(1) John knows Bill's brick. ≈ John knows which of the bricks he sees (e.g., the leftmost one) is owned by Bill.

Conversely, not all definite DP:s headed by relational nouns make for good CQ:s. Kinship terms are archetypal relational nouns; still, constructions like 'John knows Bill's mother' are difficult to interpret as CQ:s. While the noun provides a two-place relation, interpretation still requires a contextual specification of the method of identification of mothers (available to John):

<u>*Context 2.*</u> John is given a list of names, and asked to select the names of his friends' mothers (method of identification: *naming*).

(2) John knows Bill's mother. ≈ John knows which name is the name of Bill's mother.

Analogous examples show a parallel variability of pair-list readings of quantified CQ:s: these readings can systematically be made available also when the head noun is sortal, and may fail to appear even if the head noun is relational (compare 'John knows every mother' *out of the blue* vs. in Context 2). Hence, a relational DP head nominal is neither necessary nor sufficient for licensing the relevant CQ-readings. In this paper, it is instead shown that the availability of CQ-readings can be predicted by the contextual salience of relevant *methods of identification*, formalized through *conceptual covers* [1].

Conceptual covers are formalizations of methods of identification, like identification by naming, ostension, or definite description. Formally, a *basic* conceptual cover CC based on a domain D and set of worlds W is a set of *individual concepts* (functions from worlds to entities), such that each individual in D is identified by exactly one concept in each world:

$$\forall w \in W : \forall d \in D : \exists! c \in CC : c(w) = d$$

Complex covers can be obtained applying the intension of a salient function (provided by an unsaturated functional relational noun, or the extralinguistic context) to a basic cover. For instance, the functional noun *age* expresses a function *age-of*, whose intension can be used to derive the cover {the age of Ann, the age of Bill...} from the basic naming cover {Ann, Bill...}.

Deriving CQ-readings. We follow [1] in deriving CQ-readings by type-shifting entity-denoting expressions occurring under proposition-embedding verbs (like *know*) into questions. Following Groenendijk & Stokhof [4], questions are analysed as having the form $?x.\phi$, and as expressing, at a world w, the proposition corresponding to the true exhaustive answer to $?x.\phi$ in w. Unlike in [4], expressions are evaluated relative a *cover resolution function* $\mathcal{R}$:

$$[\![?x.\phi]\!]_{M,w,g_{\mathcal{R}}} = \{v \mid \forall c \in \mathcal{R}(x) : [\![\phi]\!]_{M,w,g_{\mathcal{R}}[x/c]} = [\![\phi]\!]_{M,v,g_{\mathcal{R}}[x/c]}\}$$

$\mathcal{R}$ maps every variable x to some salient conceptual cover, and g_R maps each x to some concept in $\mathcal{R}(x)$. Variables still denote entities, but only via an individual concept: $[\![x]\!]_{M,w,g_{\mathcal{R}}} = g_{\mathcal{R}}(x)(w)$.

Unlike [1], we treat relational nouns as lexically $\langle e, \langle e, t\rangle\rangle$-type expressions, obtaining one-place $\langle e, t\rangle$-type readings by explicit saturation or existential closure of the noun's internal argument. Possessive DP:s are analysed following Partee [7]: where N is a relational noun, 'Bill's N' is analysed as $\iota x.N(b)(x)$; when N is sortal, the construction is analysed as $\iota x.N(x) \wedge \pi(b)(x)$, where π is a free relation that needs to be pragmatically specified.

Felicitous relational nouns. The account derives the following representations for the CQ-reading of (3) and the pair-list reading of (4) (where $\mathcal{K}$ is a standard knowledge-operator):

(3) John knows Bill's age. $\rightsquigarrow \mathcal{K}_J(?z.z = \iota x.\textsc{age}(b)(x))$

(4) John knows every capital. $\rightsquigarrow \forall x(\exists y.\textsc{capital}(y)(x) \rightarrow \mathcal{K}_J(?z.z = x))$

The naming cover $\{1, 2, 3...\}$ over ages is commonly known, hence available by default in the out-of-the-blue interpretation of (3). Resolving the range of z and x to this cover yields the desired interpretation of (3) as meaning that John knows what age Bill is, in the sense of knowing which element of $\{1, 2...\}$ picks out the age of Bill. The pair-list reading of (4) outlined earlier is obtained by using the commonly known basic naming cover over countries for y, and the corresponding cover over cities for z. To derive a non-trivial question meaning, we apply the intension of the function expressed by *capital* to the elements of the naming cover over countries, and obtain the cover {the capital of Germany, the capital of France...} for the range of x.

Sortal nouns. When there is no commonly known conceptual cover over the elements in the denotation of an (unmodified) sortal noun, a definite DP built from it lacks a CQ-reading out of the blue. Unlike the case with relational possessive DPs, the interpretation of a sortal possessive DP additionally requires contextual specification of π:

(5) John knows Bill's brick. $\rightsquigarrow \mathcal{K}_J(?z.z = \iota x.\textsc{brick}(x) \wedge \pi(b)(x))$

Out of the blue. $x \mapsto *, \pi \mapsto *$

Context 1. $x \mapsto$ {the leftmost brick, the rightmost brick...}, $\pi \mapsto$ OWNED-BY

Sortal nouns do not express any function via which derived covers can be generated. For quantified DP:s built from sortals, the additional cover needed to derive a pair-list reading then always needs to be contextually supplied, and this reading is therefore absent out of the blue.

Infelicitous relational nouns. A relational noun like *mother* can be used to derive a conceptual cover, but does not provide a commonly known cover (eg. naming) over the elements in its denotation. Without such a cover being salient in the context, the pair-list reading of quantified CQ:s will at best have a trivial interpretation. Likewise, a possessive DP containing such a noun fails to yield a CQ-reading without the appropriate context:

(6) John knows Bill's mother. $\rightsquigarrow \mathcal{K}_J(?z.z = \iota x.\textsc{mother}(b)(x))$

Out of the blue. $x, z \mapsto *$

Context 2. $x, z \mapsto$ {Ann, Mary, Sue...}

The full account extends this basic treatment to constructions with other quantifiers and CQ-embedding verbs, as well as to embedded CQs. The improved treatment of relational nouns is also shown to resolve issues with non-functional and many-to-one relational nouns present in [1].

References. [1] Aloni, M., & Roelofsen, F. (2011). Interpreting concealed questions. *Linguistics and Philosophy* 5: 443. • [2] Barker, C. (2016). Why relational nominals make good concealed questions. *Lingua* 182: 12. • [3] Frana, I. (2017). *Concealed questions.* Oxford: Oxford University Press. • [4] Groenendijk, J. & Stokhof, M. (1984). *Studies on the semantics of questions and the pragmatics of answers.* PhD thesis, University of Amsterdam. • [5] Heim, I. (1979). Concealed questions. In *Semantics from different points of view,* ed. R. BAEuerle, U. Egli, and A. von Stechov, 51. Berlin: Springer. • [6] Nathan, L. (2006). *On the interpretation of concealed questions.* PhD thesis, MIT. • [7] Partee, B. (1983/1997). Uniformity vs. versatility: the genitive, a case study. In van Benthem & ter Meulen (eds.) *The Handbook of Logic and Language*, Elsevier, 464.