Iterated *de re*
A new puzzle for the relational report semantics
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De re belief reports are sentences that ascribe to someone a belief about some external entity or *res*. If the content of the ascribed belief is itself a *de re* report we have an iterated *de re* report. For instance:

(1) John thinks that Mary thinks I'm a hero

I'll show that the doubly embedded *I* in (1) is problematic in a context where John *thinks* there is a *de re* belief between Mary and me, while *in fact* Mary's belief was about someone else, say my twin. I reconcile the intuitive truth of (1) in such a scenario with the fact that *I* picks out the current speaker, me.

Iterated *de re* and mistaken identity

Consider the following scenario:

(2) John and Mary are friends. John heard Mary say: "That girl is a hero". He thought she was pointing to me. In fact, he confuses me with my twin sister. Mary's really pointing to my sister, I have never met Mary and she doesn't even know I exist.

From Mary's utterance it follows that she has a *de re* belief, not about me, but about my twin sister. I would be entitled to report her belief as (3a), but not (3b):

(3) a. Mary thinks my sister is a hero
     b.#Mary thinks I'm a hero

John also has a *de re* belief, about Mary. Since he is confused about the object of her belief he would disagree with our judgments in (3). Because he thinks Mary's belief is about me, we intuititively judge (4a) false, but (4b) true:

(4) a.#John thinks Mary thinks my sister is a hero
     b. John thinks Mary thinks I'm a hero $\big[$=(1)$\big]$

The puzzling observation is that we use a first person pronoun in (4b) even though it seems that neither John's nor Mary's belief is *de re* about me. More in particular, I will show that the intuitive, relational paraphrase *John believes of Mary that she believes of me that I am a hero* fails to capture the correct truth conditions.

The relational analysis of *de re*

The so-called relational analysis of *de re* is based on Kaplan's (1969) 'vivid names'. The idea is that x believes *de re* of y that it has property P iff there is an actual acquaintance relation between x and y, and x believes that the individual she herself is so acquainted with has P. Two refinements: (i) The reformulation of *believes that …* in terms of *believes of* res *that …* requires a separation of *res* from ascribed content, i.e. a non-compositional '*res* movement' somewhere in the syntax/semantics interface (more below). We'll assume that syntax parses belief complements into structured representations of the form ⟨*res*, predicate⟩. (ii) To avoid problems with *de se* attitudes, the 'believes' in the definiens is further explicated as a property self-ascription, following Lewis (1979)

With (i) and (ii) we get the following general semantics for a belief about a single *res*. (Think of the structured representation as a shorthand for the longer existential statement with property self-ascription BEL^*):

(5) x believes (of y) that $P(y)$
   a. $\text{BEL}_\text{x}\langle\text{y}, \text{P}\rangle$
      $\equiv \exists\text{R}[\text{R}(\text{x}, \text{y}) \wedge \text{BEL}_\text{x}^*\lambda\text{u}[\text{P}(\imath\text{v}[\text{R}(\text{u}, \text{v})])]]$
   b. $[\![(5a)]\!] = 1$ iff there is an R with $R(x, y)$ and x self-ascribes property $\lambda u[P(\imath v[R(u, v)])]$

Concretely, the simple report in (3a) would be analyzed as:

(6) $\text{BEL}_\text{m}\langle\texttt{sister\_of(i)}, \lambda\texttt{z}[\texttt{hero(z)}]\rangle$

Following (5a), this means there is an acquaintance relation R between Mary and my sister such that Mary believes whoever she is R-acquainted with is a hero. The sentence is correctly predicted to be true because there is an appropriate R, viz. the perceptual relation between Mary and the person she is pointing at in (2). Similarly, (3b) is false because (2) provides no such acquaintance relation between Mary and me.

The puzzle

The most natural parse of our iterated report (1) would be that John believes *de re* of Mary that she believes *de re* of me that I am a hero:

(7) $\text{BEL}_{\text{j}}\langle \text{m}, \lambda\text{x}[\text{BEL}_{\text{x}}\langle \text{i}, \lambda\text{z}[\text{hero}(\text{z})]\rangle]\rangle$

Surprisingly, with the relational semantics specified above this does not give the right reading. Expanding the structured beliefs as specified by (5a) we get:

(8) $\exists \text{R}[\text{R}(\text{j},\text{m}) \wedge \text{BEL}_{\text{j}}^{*}\lambda\text{u}[$
$\quad \exists \text{R}'[\text{R}'(\imath\text{v}[\text{R}(\text{u},\text{v})], \text{i}) \wedge \text{BEL}_{\imath\text{v}[\text{R}(\text{u},\text{v})]}^{*}\lambda\text{u}'[$
$\quad\quad \text{hero}(\imath\text{v}'[\text{R}'(\text{u}',\text{v}')])]]]]]$

The problem with (8) is the indexical, i, occurring inside a belief operator, functioning like a rigid designator, creating a singular proposition. This means we can create an 'Ortcutt scenario' (Quine 1956) to disqualify it. Just continue our scenario with:

(9) Turning to me, Mary adds: "You're a coward"

John might report this with (10a), which I in turn could report with (10b):

(10) a. John to me: "Mary thinks you're a coward"
b. John thinks that Mary thinks I'm a coward

So, we find that in the extended scenario (2)+(9), both (1) and (10b) are true. Combining the relational logical forms of the two sentences however yields a contradiction (on the natural, but so far implicit, assumption that John believes there to be only one relevant acquaintance relation R' between Mary and me). This is as expected: one cannot belief two contradictory things about a single actual individual, me (i), without taking the different 'guises', given by acquaintance relations, of that individual into account.

Solution

Having pinpointed the problem thus, a solution within the relational framework presents itself. What we must do is 'move' the doubly embedded *res*, i, one step further, leaving behind a descriptive guise in John's belief as well as in Mary's:

(11) $\text{BEL}_{\text{j}}\langle \text{m}, \text{i}, \lambda\text{x}\lambda\text{y}[\text{BEL}_{\text{x}}\langle \text{y}, \lambda\text{z}[\text{hero}(\text{z})]\rangle]\rangle$
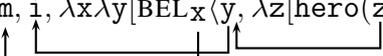
Paraphrase: John believes of Mary$_i$ and of me$_j$ that i believes of j_k that k is a hero. The first person pronoun is moved outside both belief embeddings, so the relational interpretation should be Ortcutt-proof.

To make sure, let's apply (5a) (trivially extended to cover beliefs about multiple *res*):

(12) $\exists \text{R}[\text{R}(\text{j},\text{m}) \wedge \text{R}'(\text{j},\text{i}) \wedge \text{BEL}_{\text{j}}^{*}\lambda\text{u}[$
$\quad \exists \text{R}''[\text{R}''(\imath\text{v}[\text{R}(\text{u},\text{v})], \imath\text{w}[\text{R}'(\text{u},\text{w})]) \wedge \ldots$

The only difference between (12) and (8) is that John no longer has to believe his representation of Mary ($\imath\text{v}[\text{R}(\text{u},\text{v})]$) to be acquainted with the *actual me* (i), but rather with *his representation of* the actual me ($\imath\text{w}[\text{R}'(\text{u},\text{w})]$). John's mistaking me and my sister in the scenario exploits precisely this distinction between whom one is acquainted with and whom one believes to be acquainted with.

Acquaintance and compositionality

The present solution does an interesting novel prediction: (1) can only be true if John is vividly acquainted with me. This is indeed implicit in the first scenario already: in order for John to think Mary is pointing to me, he must have some prior acquaintance with me. What would it mean to mistake someone for someone you have never been in contact with?

A final observation concerns the non-compositionality of our solution. von Stechow and Zimmermann (2004:15) criticize the relational account for requiring '*res* movement', the essentially non-compositional separation between *res* and ascribed predicate. Note that the current proposal requires twice the *res* movement for iterated *de re*. However, as von Stechow and Zimmermann also show that the truly compositional alternative based on Kaplan's (1989) characterial modes of presentations fails for independent reasons, I submit that the non-compositionality of *de re* is real, and even worse than hypothesized earlier. It remains to be seen though if we can't integrate the as yet purely syntactic movement into a more semantic or pragmatic mechanism.

Selected references

von Stechow, A. and T. E. Zimmermann (2004). A problem for a compositional account of *de re* attitudes.