Copular asymmetries in belief reports

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The naïve view of copular sentences.

[[*A is B*]] = [[*B is A*]], when *A* and *B* are expressions of the same type.

(1) [[Sam is Jessica]] = [[Jessica is Sam]]

The coherence of (2), emphasized by Cumming (2008), suggests that the naïve view is wrong.

(2) a. Mary thinks that Jessica is Sam, but she doesn't think that Sam is Jessica.
b. Mary thinks that you are me, but she doesn't think that I am you.

Moreover, as Cumming's discussion makes clear, "reversed counterparts" of (2) are not always true in the same scenarios. (This result is not actually derived by Cumming's analysis.)

(2') b. Mary thinks that I am you, but she doesn't think that you are me.

The proposal box.

Copular sentences involve a semantic asymmetry.

Copular sentences may involve a relational element PRED that relates an individual and an individual concept.

(3) $[\![\text{PRED}]\!]^{c,i} = \lambda k_{<s,e>}. \lambda x_e. x = k(i)$

An individual can be **COERCED** to a concept, and thus an inherently individual-denoting expression can appear in the concept-argument position of PRED.

(4) $[\![\text{PRED Z}]\!]^{c,i} = \lambda x_e. x = f([\![Z]\!]^{c,i})(i)$

While the precise nature of the coercion – the precise identity of *f* in (4) – depends on the context, there is a constraint: our choice of *f* on a given occasion will make it the case that, for any individual *x* in its domain, the value of *f*(x) at an index i has properties at i that we presuppose *x* to have uniquely. (This means in particular that, for any i in the common ground, *f*(x)(i) = x.)

We imagine "PREDPs" like those in (5) as small clauses generated below *be* (cf. Moro, …):

(5) a. [[… be [Jessica [PRED ^the violinist]]]]^{c,i} = 1 iff *j* is the violinist in i
b. [[… be [Jessica [PRED Sam]]]]^{c,i} = 1 iff $j = f(s)(i)$ (where *f*(s)(i) is the individual in i who has certain properties that we presuppose *s* to have uniquely)

Old facts involving questions.

As observed in Percus 2003, in a context like (C1) it would make sense for me to whisper (6a) to you but not (7a) (see Heller and Wolter 2013 for similar contrasts):

(C1) *The role dilemma scenario*. Having just been introduced to the members of a piano trio (*j*,*s*,*b*), we know their names but are not sure who plays which instrument. They are still standing in front of us.

(6) a. Who do you think Jessica is _ ? (The violinist?)
b. … [Jessica [PRED t_1]]
c. { λi_s. For all i'$\in$ $\text{Dox}_{\text{you(C)},i,}$ $j = k(i')$ | $k \in D_{<s,e>}$ } ← Intuitively: {VIOLINIST(*j*), CELLIST(*j*), …}

(7) a. Who do you think _ is Jessica ?
b. … [t_1 [PRED Jessica]]
c. { λi_s. For all i'$\in$ $\text{Dox}_{\text{you(C)},i,}$ $x = f(j)(i')$ | $x \in D_e$ } ← Intuitively: {**JESSICA**(*j*), **JESSICA**(*s*), …}

This is explained on the assumption that extraction occurs from argument positions of PRED: (7a) then poses a choice among propositions in (7c), and it could not serve to ask about roles in the trio, which is intuitively what (6a) is used to ask about.

Indeed, given our assumptions about *f* (plus natural ones about the common ground), (7a), in posing a choice among propositions in (7c), could only be used to ask something already settled in the context.

New facts involving questions.

In context (C2) – a context in which we can take (2a) to be true – it would make sense for me to whisper (8a) to you but not (9a).

(C2) *The mistaken identity scenario.* Bill is throwing a party in honor of his cousin Sam who has just been awarded his PhD. All the guests know that, but they don't all know Sam (and some of them, like Mary, don't even know his name). When Jessica arrives, Mary, who is already completely toasted, walks up to her with a big smile. "You must be proud to be a doctor now," she says, "Is your wife coming too?" I am in the room (next to Sam) and can see that Mary is very confused, but haven't caught on yet as to the precise nature of her confusion.

(8) a. Who does Mary think Jessica is _ ?
b. … [Jessica [PRED t_1]] (cf. (6b))
c. { λi_s. For all i'$\in$ $\text{Dox}_{m,i,}$ $j = k(i')$ | $k \in D_{<s,e>}$ } ←
Intuitively: {'Mary thinks GUEST-OF-HONOR(*j*)', 'Mary thinks HOST(*j*)', …}
A.k.a.: {'Mary thinks **SAM**(*j*)', 'Mary thinks **BILL**(*j*)', …})

(9) a. Who does Mary think _ is Jessica ?
b. … [t_1 [PRED Jessica]] (cf. (7b))
c. { λi_s. For all i'$\in$ $\text{Dox}_{m,i,}$ $x = f(j)(i')$ | $x \in D_e$ } ←
Intuitively: {'Mary thinks **JESSICA**(*s*)', 'Mary thinks **JESSICA**(*b*)', ….}

This is now explained too. It makes sense to ask (8a), because, given the context, it makes sense to pose a choice among propositions in (8c). (9a) cannot be used to pose the same choice: to pose a choice among propositions in (9c) would rather be to ask to which individual Mary attributes properties that Jessica has uniquely -- which does not seem to be an issue here.

Indeed, given our assumptions, (9a) in this scenario could only be used to ask something already settled in the context.

A deceptive twist: inversion.

Even though we can take (2a) to be true in (C2), Bill, watching the scene with amusement, could also felicitously and truly say (10) (with a particular kind of intonation on *Jessica* and on *Sam*.)

(10) Look! Mary thinks that SAM is JESSICA!

Following a well trodden path, we claim that this is due to an additional structure in which the *predicate part* of PREDP has *moved up* from its base position. Some consequences appear to the right. (The connection we suggest: *A doctor you might consult is John*, cf. Mikkelsen 2004.)

Copular sentences may contain an additional projection above PRED's projection, to which non-focused predicates may move (permitting them to move thereafter to the clausal subject position);
This additional projection constitutes a focus domain.

(11) a. Possible initial structure of the sister of *be* (this is what gets interpreted)
$[_{\text{FocP}}$ ~C $[_{\text{PREDP}}$ Jessica_F [PRED Sam]]]
b. The sister of *be* after movement
$[_{\text{FocP}}$ [PRED Sam] [~C $[_{\text{PREDP}}$ Jessica_F ---]]]
c. Pronunciation after movement of [PRED Sam] to subject of *be*:
"Sam is Jessica."

(The use of the structure in (11a) requires there to be a salient question that poses a choice among propositions in the set { **SAM**(*j*), **SAM**(*f*), … }, the focus value of PREDP.)

The assumption box.

Ontology.

Individuals exist across worlds.

In cases where *a* is obviously perceptually salient to interlocutors *b* and *c*, *a* is literally present in all the worlds that make up the common ground; in cases where *b* perceives *a*, *a* is literally present (and perceived by *b*) in all of *b*'s doxastic alternatives.

Semantic values.

Constituents are evaluated with respect to a "context" and an "index". (For simplicity, we will identify indices with possible worlds.)

Names are rigid (with respect to indices) and yield individuals.
Declarative sentences, evaluated at a context and an index, yield truth values.
Questions, evaluated at a context and an index, yield sets of propositions.

Use.

A sentence S can only be used when, for all c_1, c_2 among the interlocutors' candidates for the context of utterance, $\lambda i. [\![S]\!]^{c1,i} = \lambda i. [\![S]\!]^{c2,i}$.

In the case of a declarative sentence, the result is a proposition.
In the case of a question, the result is a function from indices to sets of propositions -- but in all cases below a constant function, we assume. The set of propositions that this function yields – the question's "value set" -- amounts to the set of possible answers.

A question can only be used as such when it is presupposed that it has a true answer – i.e., every world in the common ground must make true some proposition in the question's value set.

Back to (2).

That we take (2a) to be true in Context (C2) follows given that the pre-copular DPs correspond to external arguments of PRED and the post-copular DPs to internal arguments.

(C2) makes salient the fact that Mary thinks that *j* -- the individual she is talking to -- has certain properties that *s* has uniquely in actual fact (the property of being the cousin of Bill's who has just been awarded his PhD, the property of being the guest of honor at Bill's party,...).

At the same time, on the (C2) scenario, there are a lot of properties that *j* has uniquely in actual fact -- like the very salient property of being the individual that Mary is talking to – that do not belong to *s* -- the individual next to me -- in Mary's doxastic alternatives.

- *An apparent interaction with agreement*. We don't find analogous sentences like (12) with a 1st or 2nd person pronoun. This is because the additional structure requires the whole predicate – which triggers default 3rd person agreement -- to raise.
(12) a. Look! Mary thinks that you are me! (Sam to Jessica)
b. #Look! Mary thinks that I am YOU!
(12') a. Look! Mary thinks that I am you! (Jessica to Sam)
b. #Look! Mary thinks that YOU are ME!
- *Extraction possibilities remain unchanged*. While in principle we could now generate for (9a) a structure that poses a choice *among the propositions in (8c)* -- by extracting from the position that *Sam* occupies in the inverted structure -- this is excluded by syntactic considerations. We would be extracting a subpart of a constituent triggering agreement (CED).
- *The special intonation contour* of (10) used in the context of (C2) (hopefully).
- *Constraints on question-answer pairs*. Even though an inverted structure for (15) would express exactly what (14) expresses, it is not a suitable answer to (8a) (= (13b)) in our scenario. This is due to the focus pattern of the inverted structure.

Answer *Question asked in (C2)* *Answer*

(13) a. Who does Mary think is Sam?
{ λi_s. For all i'$\in$ $\text{Dox}_{m,i,}$ $x = f(s)(i')$ | $x \in D_e$ }
OK {'Mary thinks **SAM**(*j*)', 'Mary thinks **SAM**(*a*)', ….} OK

(14) Mary thinks Jessica is Sam.

(15) **Mary thinks Sam is Jessica.**

b. **Who does Mary think Jessica is ? (= (8a))**
{ λi_s. For all i'$\in$ $\text{Dox}_{m,i,}$ $j = k(i')$ | $k \in D_{<s,e>}$ }
OK **BAD**

Postscript: an important detail we ignored. The literature has also considered *appropriate* uses of sentences like (7a) (e.g. Percus 2003). Additional assumptions are needed to account for these. We suggest that they involve "diagonalization" operators, but explaining this would involve (a.o.) adjusting our assumptions about indices.

(16) $[\![\Delta \text{ Jessica}]\!]^{c,i} = \lambda i. [\![\text{Jessica}]\!]^{i,i}$