Crossworld Predication and Crossworld Quantification: a 2D approach

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Cross-world comparatives

"X might have been greater than it is"

+

"John believes that P"

"John believes that X might have been greater than it is"

- There have been many attempts to conceptualize such comparisons – e.g., "numeric", "objectual" and "mentalist" interpretation, discussed in detail in a series of articles 2013-2015 by Valery Surovtsev [Surovtsev 2013] and Evgeny Borisov [Borisov 2013, 2015]

X is compared to itself

X is compared to itself in a different world

X is compared to itself in a different centered world

Russell's joke

I have heard of a touchy owner of yacht to whom

a guest, on first seeing it, remarked,

- "I thought your yacht was larger than it is";

and the owner replied,

- "No, my yacht is not larger than it is".

[Russell, 1905, p. 52].

Russell's joke

(1) I thought your yacht was larger than it is.

(2) The size that I thought your yacht was is greater than the size of your yacht is.

(3) I thought that the size of your yacht was greater than the size of your yacht.

Russell's analysis

(2') $\exists x(B(x{=}s(y)) \ \& \ x{>}s(y))$

(3') $B\exists x(x{=}s(y) \ \& \ x{>}s(y))$

- According to Russell, (2') is what the guest actually meant, whereas (3') is the meaning attributed to him by the yachtsman. Kripke notes that Russell is right in general: "scope does matter in intensional contexts" [Kripke, 2005, p.1005]

- At the same time he alleges that (2') fails adequately to formalize (2), because it attributes an overly specific view to the guest, namely the view of the form $B(x = s(y))$, which implies existence of a unique size the guest thought the yacht was [Kripke, 2005, p.1021]

Problems with Russell's approach

- *Apriority*. Russell supposes that the guest previously had some idea of the size of the yacht, but that need not be true. He doesn't have to have such a priori knowledge and he still can be surprised and say "I thought your yacht was larger than it is" [Kripke, 2005, p.1022].

Problems with Russell's approach

- *Vagueness*. The Russellian approach require an appeal to the degrees to which an individual might possess the positive. However, even if the guest had some idea of the size of the yacht, it need not be exact [Borisov, 2013, p. 222]. The presence of degrees seems to be epistemically inessential: "Why should we need to factor our reasoning through other objects first in order to understand the relation that x and w stand in to y and v? Why not just reason about this relationship directly?" [Button, 2012, p. 246; Kocurek, 2016, p. 19]. The structure of yachts joke allows the predicates for which a quantitative expression is "difficult or impossible due to subjective preferences", such as "more beautiful" [Surovtsev, 2013, p. 228-229].

Problems with Russell's approach

- *Platonism about degrees and numbers*. Perhaps the main philosophical problem with this approach is its "ontological commitment" to certain abstract objects [Kocurek, 2016, p. 17]. In his analysis Russell apparently makes use of reference to degrees and cardinal numbers, whereas the existence of these abstract entities is the question logic should remain neutral on.

Cross-world predication

- QML fails to capture some patterns of expression typical in many natural languages. Consider the following example:

(4) Some people could have been richer than they really are

Cross-world predication

(4') $\exists x \Diamond R(x,x)$

doesn't work. This says that for someone there is a possible world where she is richer than herself (in that world)

(4'') $\Diamond \exists x R(x,x)$

is also incorrect, because this says that in some possible world, someone (in that world) is richer than herself (in that world)

Cross-world predication

- The most important feature of (4) is that it makes *cross-world comparisons*

- This sentence relates objects in one world to *the same* objects *in another world*

- Thus, QML fails to formalize some simple examples of cross-world predication

- This is not just a syntax problem, because the core idea of PWS is largely the idea that all cross-world relations between individuals must be logically reducible to intra-world properties and relations

Cross-world subjunctive modal logic

- Wehmeier [Wehmeier, 2012] proposes a deliberated approach, based on cross-world subjunctive modal logic (CSML)

- Instead of inventing new operators, Wehmeier starts with distinguishing grammatical moods in the syntax (*i* for "indicative", *s* for "subjunctive")

- The mood markers applied to predicates indicate the worlds relative to which we calculate their extensions

For instance, $R^{i,s}$ should be interpreted as a relation between an object in the actual world and (perhaps the same) object in counterfactual world
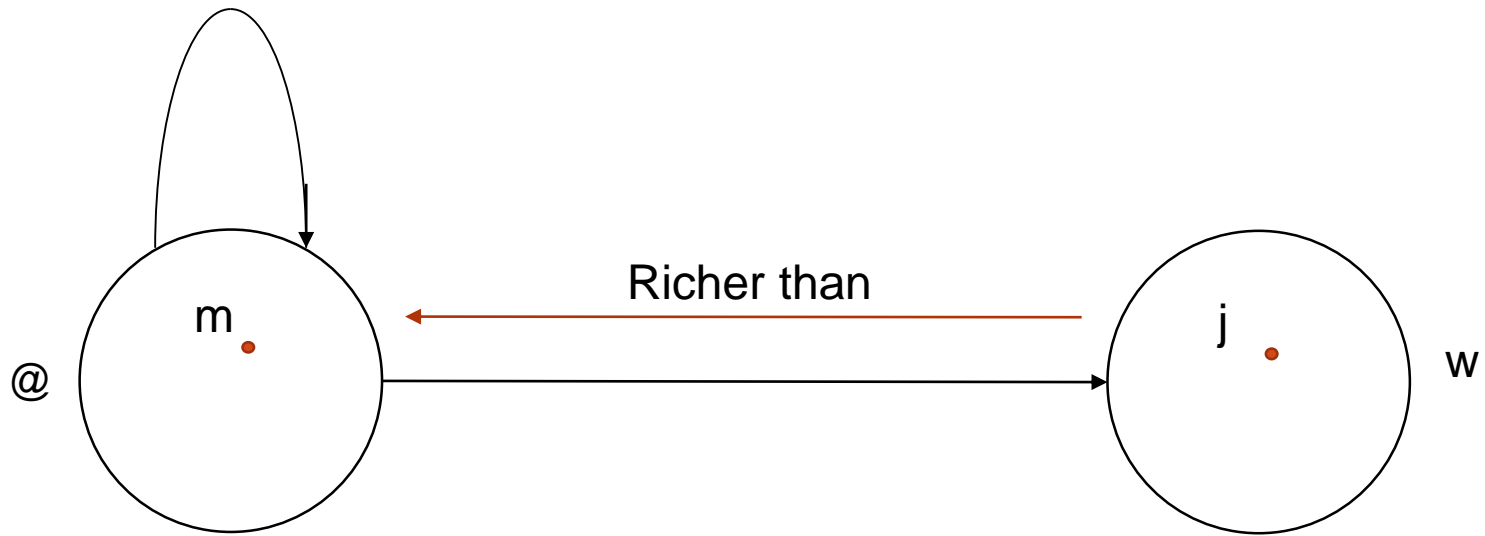
(5) John could be richer than Mary is

should be the formalized as follows:

(5') $\lozenge R^{s,i}(j,m)$

- $\Diamond R(j,m)$

@ $\neg R(j,m)$

Richer than

j   m   w

$R(j,m)$

- $\Diamond R^{s,i}\,(j,m)$

Problem with belief reports

- Alethic modal operators are generally considered as indicating metaphysical possibility in terms of possible worlds

- However, in Russell's joke about yachts we have an example of epistemic (doxastic) modality, which reflects states of belief in terms of possible worlds

- Although metaphysical and epistemic modalities have a lot formal features in common, they substantially differ in some philosophical aspects

Centered worlds

- A metaphysically possible world is "a way the world might have been", whereas an epistemically possible world (scenario) is rather "a complete description of what the world might be like together with the speaker's location within that world"

- Sometimes epistemically possible world are understood as *centered* worlds (a metaphysically possible worlds with a designated agent and time)

Epistemic two-dimensionalism

- In this framework, the truth values of statements are relativized to possible worlds in two different ways: they depend both on what the facts in a "world of evaluation" are and on what the sentences mean in a (perhaps the same) "world of reference"

Epistemic two-dimensionalism

- The key idea is that possible worlds can play two distinct roles: they serve as contexts of use (W_A: worlds considered as *actual*), and as circumstances of evaluation (W_C: worlds considered as *counterfactual*)

Epistemic two-dimensionalism

- Every expression has at least two intensions:

  (1) *primary intension* is a function f: $W_A \rightarrow E$ from actual worlds to extensions;

  (2) *secondary intension* is a function f: $W_C \rightarrow E$ from counterfactuals worlds to extensions

Modal rationalism

- In addition to this general semantic framework, Chalmers proposes a special account of modal epistemology, widely known as modal rationalism (MR). This account establishes a secure link between *a priori* conceivability and metaphysical possibility:

  (MR) Every epistemically possible scenario – a complete description of what the world might be like together with the speaker's location within that world – describes a genuine metaphysically possible (centered) world.

A Two-Dimensional Interpretation of Russell's Joke

- Given MR, two-dimensionalism becomes a fruitful approach to the analysis of Russell's joke
- Taking primary intension as epistemic intension one could explain the ambiguity of (1) in terms of centered worlds
- What is required for a term to have an epistemic intension for a speaker is for that speaker to have the ability to identify extensions for a term given various hypotheses about the actual world
- Therefore, the yachtsman's mistake is not an evaluation of his guest's sentence in a wrong world, but setting a wrong center in the right world

A Two-Dimensional Interpretation of Russell's Joke

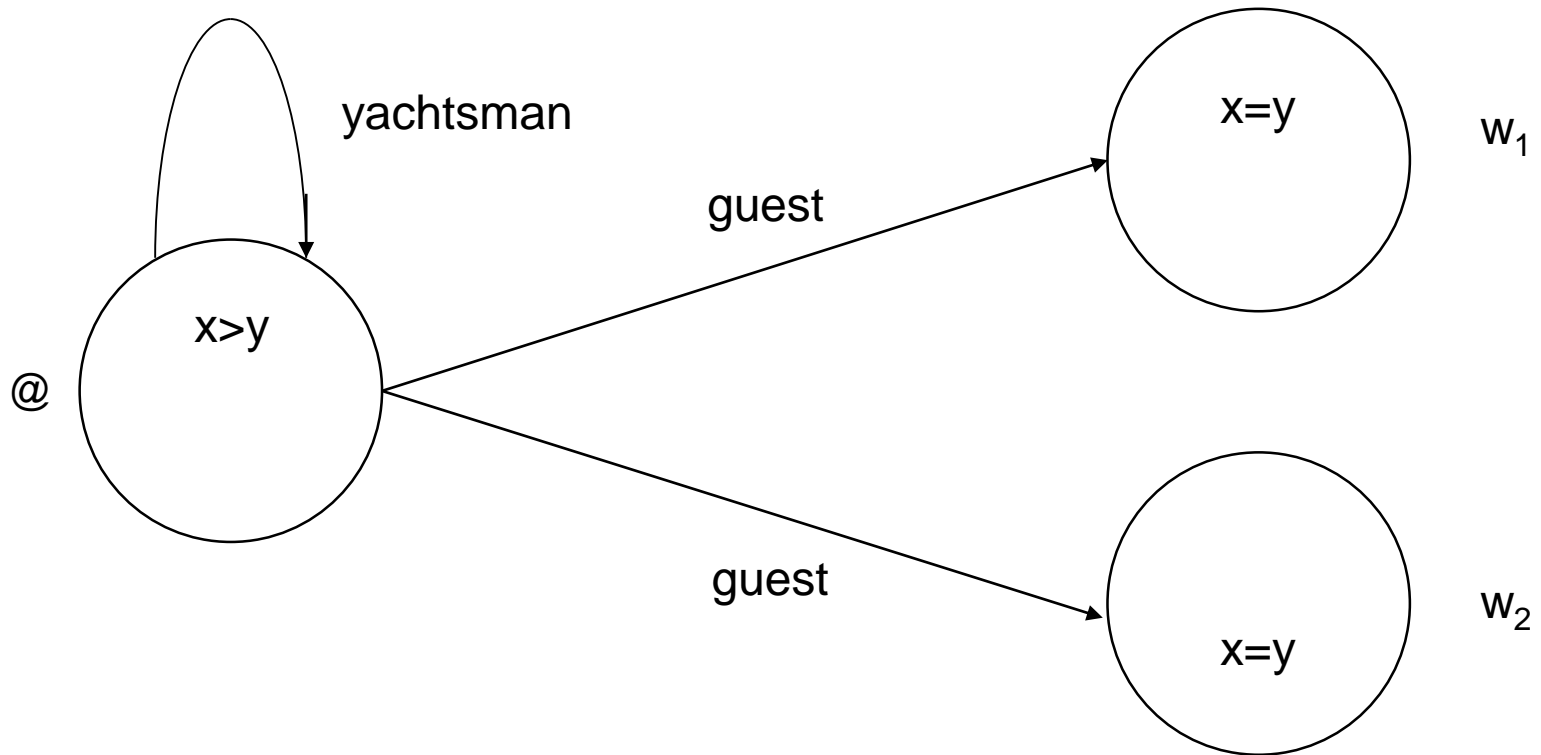- It is rather the primary intension of "the yacht" that creates a problem, not the secondary one

  Let us consider

  (2'') $\exists x(B(x^s=^iy)$ & $x^i>^iy)$

  as a formalization of (2)

  This says that there is an object x in the domain of all possible worlds $w_1, \ldots, w_n$ accessible to the actual world @, such that in every w_i it is true that x (in w_i) equals to y (in @), whereas in @ it is true that x (in @) is larger than y (in @)

- (2") $\exists x(B(x^s{=}^i y) \ \& \ x^i{>}^i y)$

yachtsman

x>y

@
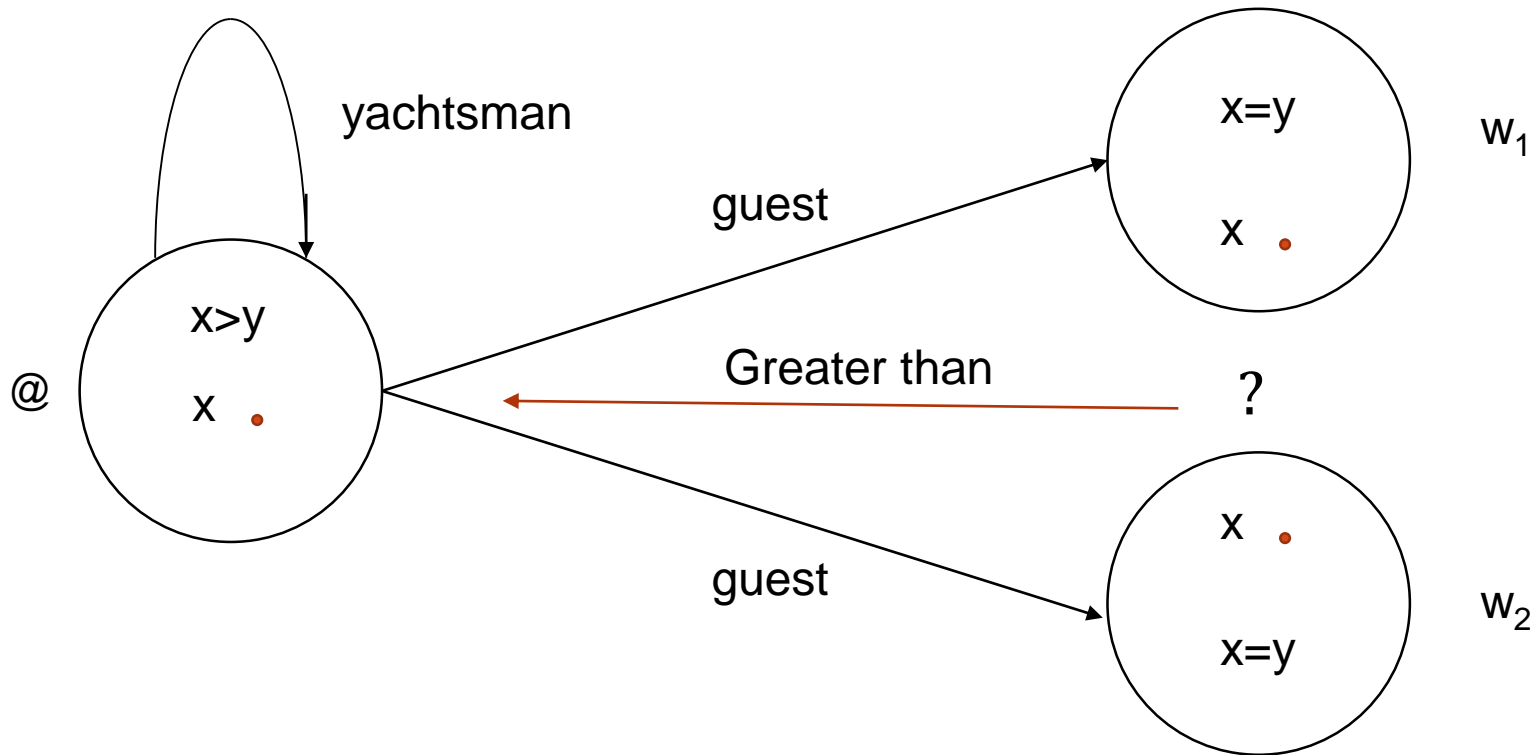
guest

x=y

w_1

guest

x=y

w_2

Counteridentity

- The Epistemic two-dimensionalism is philosophically more relevant here than subjunctive markers approach, because the centered worlds framework can be applied both to linguistic expressions and to thought contents
- The difference between identity (=) and counteridentity ($^s=^i$) is not clear within Wehmeier's framework
- One could think that these two relations are basically of one kind, both stating the metaphysical identity of secondary (i.e. standard) intensions
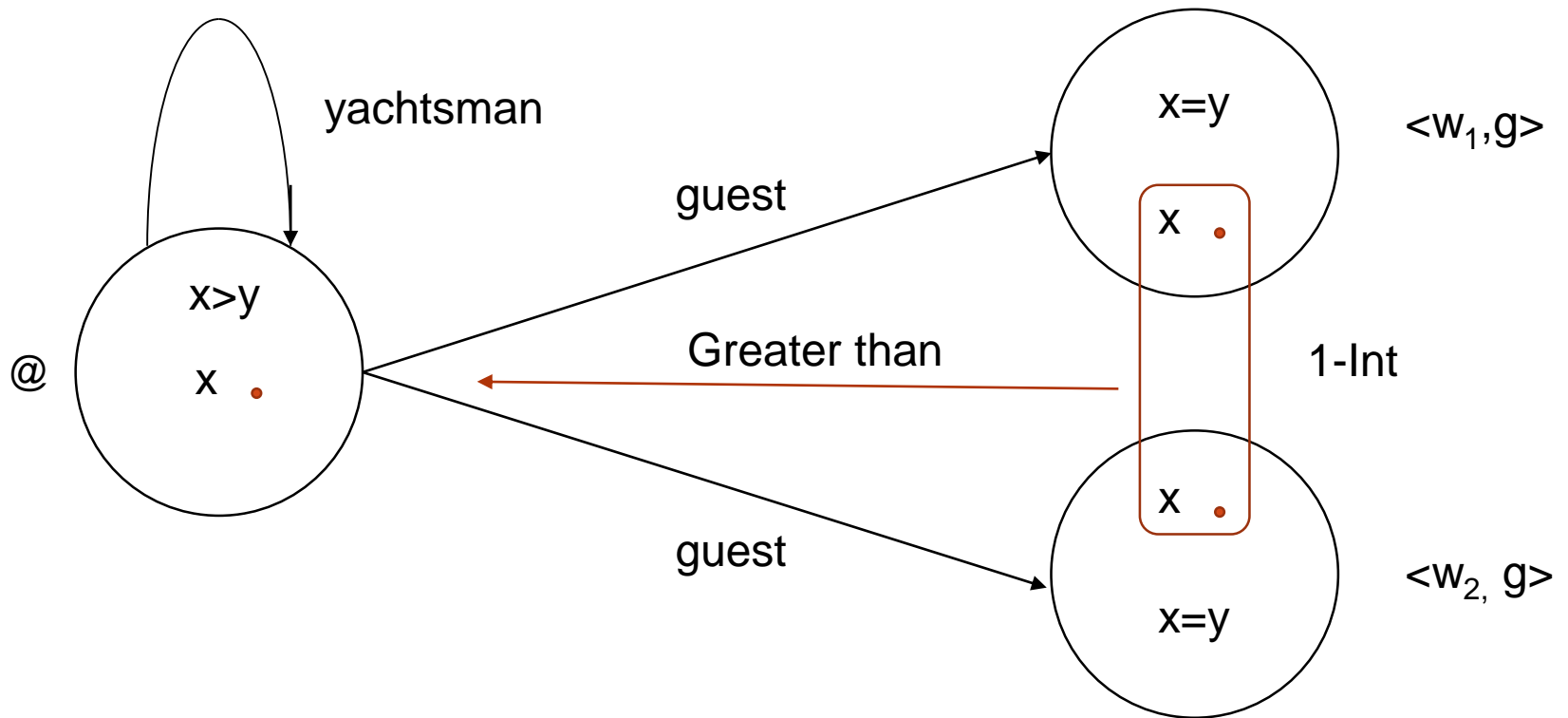
Counteridentity

- The point is that sentence $x^s=^iy$ state the identity of different intensions, namely the primary intension of x in $<w,g,t>$ (centered world w with a designated agent g "guest" and time t of his belief) and the secondary intension of y in @

- It should be clear, that metaphysical identity (=) is public, whereas counteridentity ($^s=^i$) is perspectival, determined by a specific agent's point of view inside the world

- (2'') $\exists x(B(x^s=^iy) \& x^i>^iy)$

- (2'') $\exists x(B(x^s=^i y) \ \& \ x^i>^i y)$

Summary

- (2'') formalizes (2) more accurately than (2') does
- Epistemic two-dimensionalism provides a better interpretation of (2'') than CSML semantics does
- Because it takes into account the cross-world nature of "=" within the clause expressing belief of the guest
- It is sensitive to perspectival aspects of comparison

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