Varieties of situation semantics

Chris Potts, Ling 236/Psych 236c: Representations of meaning, Spring 2013

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Overview

1 Initial motivation

This section presented evidence that worlds are too big and coarse-grained. Sec. 5 discusses additional motivating phenomena.

1.1 Claims about specific situations

(1) Claire has the three of clubs.

Barwise & Etchemendy (1987:122), cited by Kratzer (2009):

> We might imagine, for example, that there are two card games going on, one across town from the other: Max is playing cards with Emily and Sophie, and Claire is playing cards with Dana. Suppose someone watching the former game mistakes Emily for Claire, and claims that Claire has the three of clubs. She would be wrong on the Austinian account, even if Claire had the three of clubs across town.

1.2 Quantification and domain restriction

(2) a. [Sitting in the kitchen] There is no more coffee.
b. We had to leave the village. There was no more coffee. (Francez 2010)

Situations need not be spatio-temporally connected:

(3) Everyone did the homework.

Individual sentences can be evaluated with respect to multiple situations:

(4) Everyone is asleep and is being monitored by a research assistant.

1.3 Direct perception reports

After Barwise & Perry (1983) and Kratzer (2009):

(5) a. Beryl saw Meryl sprinkle the white powder on Cheryl's dinner.
  b. The white powder was the deadly poison.
  c. $\Rightarrow$ Beryl saw Meryl sprinkle the deadly poison on Cheryl's dinner.

(6) a. Beryl saw that Meryl sprinkled the white powder on Cheryl's dinner.
  b. The white powder was the deadly poison.
  c. $\not\Rightarrow$ Beryl saw that Meryl sprinkled the deadly poison on Cheryl's dinner.

1.4 Definite reference

Barwise & Perry (1983:159), cited by Kratzer (2009):

> Suppose my wife and I collaborate on cooking for a party. And suppose that at a certain point in the party I say, "I am the cook," referring to l. Is what I said true or not? The answer is, "It depends on which situation I am describing." First, suppose someone comes up to me and says, "The food at this party is delicious! Who is the cook?" If I say "I am the cook," I have clearly not described things accurately. I have claimed to be the person who did the cooking for the party. But suppose instead someone comes up to me eating a piece of my famous cheesecake pastry and says, "Who made this?" Then I may truly say that I am the cook.

Examples modified from the 'small world' paradigm of Evans (2005) and Frazier (2008):

(7) In-class rating experiment (1-5 scale, $N = 48$, between subjects design)

  a. At the coffee shop, Joan was reading near the back. (mean rating: 4.09)
  The table was a bit tippy.
  b. At the coffee shop, Joan looked around for a place to sit. (mean rating: 2.04)
  The table was a bit tippy.

(8) a. Sam brought his bicycle to the campus bicycle shop. (mean rating: 4.92)
  The front wheel was misaligned.
  b. Sam was browsing around the campus bicycle shop. (mean rating: 2.58)
  The front wheel was misaligned.

1.5 Tense

(9) a. There was a book on the table. It was in Russian. (Klein 1994)
  b. There was a book on the table. It is in Russian.

2 Possibilistic situation semantics

2.1 Models

Definition 1 (Possibilistic situation structures; Kratzer 1989:§3.2; Kratzer 2002:§3)**.**

i. S is the set of situations

ii. A is the set of thin particulars

iii. $\leqslant$ is a partial ordering on $S \cup A$ such that

  a. For no $s \in S$ is there an $a \in A$ such that $s \leqslant a$
  b. For all $s \in S \cup A$ there is a unique $s' \in S$ such that $s \leqslant s'$ and for all $s'' \in S$, if $s' \leqslant s''$, then $s'' = s'$.

iv. $\wp(S)$, the powerset of S, is the set of propositions.

v. $W \subseteq S$ is the set of maximal elements with respect to $\leqslant$.

vi. For all $s \in S$, w_s is the maximal element s is related to by $\leqslant$.

Notes:

i. Free fusion: any two situations smoosh together (mereological sum) to create a third:

   Lewis (1991:79–81), cited by von Fintel (2004:542):

   > It is no problem to describe an unheard-of fusion. It is nothing over and above its parts, so to describe it you need only describe the parts. Describe the character of the parts, describe their interrelation, and you have *ipso facto* described their fusion. The trout–turkey in no way defines description. It is neither fish nor fowl, but it is nothing else: it is part fish and part fowl. It is neither here nor there, so where is it? — Partly here, partly there. That much we can say, and that's enough. Its character is exhausted by the character and relations of its parts.

ii. Worlds should be taken as primitives to avoid collapse into a single world (Dekker 2004:387; von Fintel 2004:542–543).

iii. *Thin particulars* are individuals with none of their properties. Angelika has a picture of one, but unfortunately I don't have a copy.

iv. *Thick particulars* are individuals with all of their properties.

v. *States-of-affairs* are situations containing thick particulars.

vi. Individuals are parts of worlds, so we require counterpart theory to reason about entities across different worlds (Lewis 1968, 1973).

vii. See also Bach 1986; Seligman & Moss 1997.

2.2 Identity and equality

Kratzer (2002:659):

> The members of *S* are particulars. Consider this shirt. It is striped in a very particular way. This very particular way of being striped is an actual state of my shirt. It is a state so particular that it is a state that only my shirt can be in. Its particular way of being striped is just one of the states of my shirt. There are others. Its very particular way of being cotton, its very particular way of being as long as it is, [. . .]

Kratzer (1989:612):

> Situations cannot be identified with space–time chunks. The following example shows why: As a matter of fact, I am hungry and tired right now. Let us consider that slice of our world history which comprises just this present moment. Is every part of this slice in which I am hungry a part in which I am tired? And likewise, is every part in which I am tired a part in which I am hungry? If situations were simply space–time chunks, the answer would probably be 'yes'. [. . .] They would be one and the same fact. But they are not.

Maienborn (2011):

> Lemmon (1967) suggests that two events are identical just in case they occupy the same portion of space and time. This notion of events seems much too coarse-grained, at least for linguistic purposes, since any two events that just happen to coincide in space and time would, on this account, be identical. To take Davidson's (1969/1980: 178) example, we wouldn't be able to distinguish the event of a metal ball rotating around its own axis during a certain time from an event of the metal ball becoming warmer during the very same time span. Note that we could say that the metal ball is slowly becoming warmer while it is rotating quickly, without expressing a contradiction. This indicates that we are dealing with two separate events that coincide in space and time.

Maienborn (2011):

> [T]he search for ontological criteria for identifying events will probably continue for some time. In the meantime, linguistic research will have to build on a working definition that is up to the demands of natural language analysis.

Maienborn (2011):

> What might also be crucial for our notion of events (besides their spatial and temporal dimensions) is their inherently relational character. [. . .] In fact, the ability of Davidsonian analyses to make explicit the relationship between events and their participants, either via thematic roles or by some kind of decomposition (see sections 3.2 and 3.3 below), is certainly one of the major reasons among linguists for the continuing popularity of such analyses.

2.3 Persistence and quantification

Definitions adapted from Kratzer 1989:§3.

Definition 2 (Assignment functions). $Var \mapsto A$

Definition 3 (Persistence). A proposition $p \in \wp(S)$ is persistent iff for all $s, s' \in S$, if $s \leqslant s'$ and $s \in p$, then $s' \in p$.

Definition 4 (Modified assignments). If g is an assignment function, then $g[x \mapsto d]$ is the assignment function that is just like g except that it maps x to d (which g might already have done).

Definition 5 (Non-persistent universal quantification).

$$s \in [\![\forall_{\mathbf{np}} x\ (P(x) \rightarrow Q(x))]\!]^g \text{ iff for all } d \in A, \text{ if } s \in [\![P(x)]\!]^{g[x \mapsto d]}, \text{ then } s \in [\![Q(x)]\!]^{g[x \mapsto d]}$$

Definition 6 (Generic universal quantification).

$$s \in [\![\forall x\ (P(x) \rightarrow Q(x))]\!]^g \text{ iff for all } s' \in S \text{ such that } s \leqslant s', \text{ if } s' \in [\![P(x)]\!]^{g[x \mapsto d]}, \text{ then there is an } s'' \text{ such that } s' \leqslant s'' \text{ and } s'' \in [\![Q(x)]\!]^{g[x \mapsto d]}$$

(10) a. s is a situation containing exactly three mugs, m_1, m_2, m_3, all blue.
b. s' extends s (that is, $s \leqslant s'$) by adding a red mug, m_r

(11) a. $s \in [\![\forall_{\mathbf{np}} x\ (\mathbf{mug}(x) \rightarrow \mathbf{blue}(x))]\!]^g$ but $s' \notin [\![\forall_{\mathbf{np}} x\ (\mathbf{mug}(x) \rightarrow \mathbf{blue}(x))]\!]^g$
b. $s \notin [\![\forall_{\mathbf{np}} x\ (\mathbf{mug}(x) \rightarrow \mathbf{blue}(x))]\!]$ because $s' \in [\![\mathbf{mug}(x)]\!]^{g[x \mapsto m_r]}$ and for all extensions s'' of s', $s'' \notin [\![\mathbf{blue}(x)]\!]^{g[x \mapsto m_r]}$ (because we never get rid of the red mug)

2.4 Exemplification

Definition 7 (Exemplification; Kratzer 2002, 2009). A situation $s \in p$ exemplifies p iff

i. for all $s' < s$, $s' \in p$; or

ii. there there is no s' such that $s' < s$ and $s' \in p$

(12) a. MUD is a situation that consists of mud and only mud.
b. MUD exemplifies $[\![\exists x\ \mathbf{mud}(x)]\!]^g$ because of def. 7, clause (i)

(13) a. MUD+MOSS is a situation that consists of some mud and some moss and nothing else.
b. MUD+MOSS does not exemplify $[\![\exists x\ \mathbf{mud}(x)]\!]^g$:
i. any $s' <$ MUD+MOSS consisting of only moss is such that $s' \notin [\![\exists x\ \mathbf{mud}(x)]\!]^g$
ii. any $s' <$ MUD+MOSS consisting of only mud is such that $s' \in [\![\exists x\ \mathbf{mud}(x)]\!]^g$

(14) a. TEAPOTS is a situation that has three teapots and nothing else in it.
b. TEAPOTS exemplifies $[\![$**there are exactly 3 teapots**$]\!]^g$
c. TEAPOTS does not exemplify $[\![$**there are exactly 2 teapots**$]\!]^g$

3 Relation to information-based situation semantics

3.1 Some references

- Barwise & Perry 1983 is the book-length treatment synthesizing, expanding, and modifying the authors' earlier work (e.g., Barwise 1981).
- Barwise & Perry (1985) is a "self-interview" written responding to the peer critiques in that issue of the journal.
- Barwise & Etchemendy (1987) use situations to analyze paradoxes involving self-reference.
- Cooper (1996) shows how to do quantification in situation semantics
- Seligman & Moss (1997) describe an axiomatic situation theory. Devlin (2006) is a more accessible overview.
- Ginzburg (1995a,b) and Ginzburg & Sag (2001) develop a situation semantics for many kinds of interrogatives (see also Ginzburg 1996).

3.2 Hyper-intensionality again (themes from class 1)

Kratzer (2009):

> The solution that situation semantics offered for the puzzle of logically equivalents in attitude ascriptions encountered competition from the very start: state-of-affairs and infons looked suspiciously like structured propositions [. . .] The structured meanings of Carnap, Lewis, and Cresswell & von Stechow are tree structures whose end nodes are intensions, rather than lexical items. They are thus objects that are independent of the vocabularies of particular languages, but are nevertheless hierarchically structured in the way sentences are. Differences between structured propositions in various frameworks and the state-of-affairs or infons of situation theory seem to largely boil down to foundational matters regarding the status of possibilia [. . .]

Chierchia & Turner (1988:272):

> On the present approach, it appears to be quite straightforward to construe information units as "structured meanings". In one of the models that the theory admits (being constructed out of models for the λ-calculus) information units are interpreted as the formulae themselves. Structured meanings appear to be simple variants of the latter models, obtained by replacing symbols with their semantic values.

4 Relation to event semantics

Kratzer (2009):

> This suggests that the exemplification relation can be used to actually define basic Davidsonian event predications within a situation semantics. The exemplification relation relates possibly very complex sentences to their exemplifying situations. Davidsonian event predications emerge as those special cases where the sentences that are related to exemplifying situations are atomic.

(15) $\lambda e\ P(a)(e)$ abbreviates $\lambda s\ (P(a)(s) \wedge \mathbf{exemplify}(P(a), s))$
where $[\![\mathbf{exemplify}(p, s)]\!] = \mathrm{T}$ iff p exemplifies s (def. 7)

5 Some advanced topics

Quantification Berman 1987 and von Fintel 1994 study quantification in situation semantics.

Donkey sentences Heim (1990) proposes to abandon the dynamic account of donkey anaphora from Heim (1982, 1983) in favor of a situation-theoretic account in which pronouns are disguised definite descriptions. Elbourne (2001, 2005, 2008) further develops this idea and addresses some of the problems Heim herself identified. See also Büring 2001; Schwarz 2009.

Stage-level and individual-level Kratzer (1995) analyzes stage-level predicates like *tired* as having an event argument and individual-level predicates like *brown-eyed* as lacking such arguments (as making claims only at the world level).

Knowledge ascriptions Kratzer (2002) seeks to solve a wide range of cases like those of Gettier (1963) using exemplification.

Scalar implicature Exemplifying situations impose upper bounds on scalar terms, whereas truth in a situation does not. More generally, talk of situations imposes no upper-bound, whereas talk of worlds does (Kratzer 2003).

6 Looking ahead

- Situation semantics seems well-connected to grounded language understanding.
- Situations more naturally support reasoning in terms of particular (experimental) situations, perspectives, and occurrences.
- It seems hard to connect this approach with distributional ones.

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