Naturalized facts for counterfactuals

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This paper is a response to Kratzer (2002), in which propositional facts are characterized naturally within a possible worlds semantics as the relevant notion for the semantics of counterfactuals and epistemic attitudes. While agreeing that facts must serve an important role in causal explanations, attitudes and the semantics of counterfactuals, a situation-theoretic account is proposed in which facts are special parametric constraints, constitutive of the common ground (Stalnaker (1999)). These constraints have come to be shared by a community in a causally privileged way, which immunizes them against revision, unless background conditions change. In addition to the basic concepts of Situation Semantics, the notion of a bisimulation between epistemic states and the stability of background conditions, first analyzed in Barwise (1986), are regarded core concepts in a dynamic naturalized semantics of counterfactuals.

Taking from Kratzer (2002) the English clause (1)

(1) Thomas is picking roses

as core example for our discussion, in the terminology of Situation Semantics an utterance of (1) describes a real situation s, in which Thomas is in the process of picking roses at the space-time location l, referred to by the speaker’s using the present tense, including the utterance space-time l_u, and a positive polarity, as in (2)

(2) in s: at l: picking, Thomas, roses; +

The interpretation or the propositional content of (1) is a type of situation S, the set of situations that contain the same constituents, described by different utterances of (1). The meaning of (1) is a constraint between the type of situation S in which (1) is used to assert something and the type of situation S’ described: S => S’ (cf. Barwise (1986), p. 37-9). Such constraints make it possible for one situation to carry information about another one. In determining the interpretation of a conditional from its meaning, context and background conditions greatly affect their interpretation. Indexicals, including the causal anchoring of proper names, are but one linguistic way to exploit environmental constants, but conditional information may contain any number of parameters, some ‘unarticulated’, yet bindable in the sense of Recanati (2002). For instance, the conditional in (3) exploits a chain of constraints, one biological about thorns naturally growing on roses, another about thorns causing cuts in human fingers, using the Xerox principle.

(3) If Thomas is picking roses, he cuts his fingers on their thorns.

But any number of implicit background assumptions, themselves conditional in nature, guarantee the stable truth of (3). For instance, Thomas never wears protective gloves when picking roses, or his choice of roses to pick don’t include the thornless varieties, or the way he picks roses is not sufficiently attentive and careful to avoid their thorns. Such features of conditionals that exploit systematic parametric variation constitute background constraints in the common ground, which serve to account for the persistence of conditionals and counterfactuals, making them suitable objects of epistemic attitudes, giving them explanatory force and rendering them relatively immune to epistemic revision.
In Kratzer (2002) the notion of propositional fact is construed for (1) in three steps: (i) a situation $s$ is a fact $f$ exemplifying (1) ($s$ is a specific minimal ‘uncluttered’ situation in which Thomas is picking roses, p. 660), (ii) the smallest persistent extension $p$ of \{f\} (the set of all actual situations in which Thomas is picking roses, p. 660) and (iii) its natural extension, i.e. the transitive closure of under maximal similarity relations (adding all counterparts of Thomas, roses and ways of picking, p. 668). A proposition $p$ is a propositional fact of a world $w$ iff there is an $s \leq w$ such that $p$ is the natural extension of $s$ (p. 668).

Truth, belief and reliability of method are required to characterize knowledge, as in (4):

$$(4) S \text{ knows } p \text{ iff}
\begin{align*}
& (i) \text{ there is a fact } f \text{ that exemplifies } p \\
& (ii) S \text{ believes } p \text{ de re of } f \text{ and}
& (iii) S \text{ can rule out relevant possible alternatives of } f \text{ that do not exemplify } p
\end{align*}$$

(Kratzer (2002), p. 664)

In interpreting a conditional we must determine which parameters in both its meaning as well as its background constraints may vary. This parametric variation fixes their subject matter, and serves to preserve background in applications of the Xerox Principle, cf. Barwise (1986), p. 25. For instance, the counterfactual (5a) differs in subject matter from (5b), even though both are true in the situations, large and small, that support (1) and (3).

(5) a. *If you would have been picking dandelions, your finger would not be bleeding.*

b. *If you would have been picking roses carefully, your finger would not be bleeding.*

Given (1) and (3), in uttering (5a) to Thomas the articulated constituent of the kind of flowers he picked is parametrized in the context and counterfactually assigned to dandelions, preserving the way Thomas picks flowers, including roses, as a constraint in the background. The biological constraint that dandelions have no thorns serves to explain to Thomas, supposedly attuned to this, that neither his finger, the one that is actually bleeding from his picking roses, nor any one of his other fingers would have been bleeding in any such situation. In (5b) the unarticulated background constraint describing the way in which Thomas has actually been picking roses is parametrized to explain to him how he could have prevented his finger from bleeding, had he picked roses differently. In this interpretation the parametric cause of Thomas’ bleeding finger is a bound unarticulated constituent of what Thomas comes to understand, but his other fingers play no role in updating his epistemic state.

To account for this important difference in the information Thomas may obtain from utterances of (5a) and (5b) in updating his epistemic state and guiding his future behavior, a demonstrative link must first be preserved to bind Thomas’ actually bleeding finger, anchored or ‘loaded’ in the utterance situation as resource situation. It is HIS finger that is bleeding, that would not have been bleeding, had he been picking dandelions or had he been more careful. None of Thomas’ other fingers that are not bleeding, even though they could have been bleeding too, play a role in evaluating the truth of either (5a) or (5b). Neither is any of the fingers of dandelion picking counterpart Thomas, although those counterpart fingers are presumably not bleeding either. Thomas’ actually bleeding finger must be preserved as a constituent of the parametric propositions expressed in uttering either (5a and b), just as Thomas himself must be, cf. Perry (1993).

Given Kratzer’s dynamic semantics of *would*-counterfactuals, as stated in (6),
(6) “A would counterfactual is true in a world w iff every way of adding as many facts of w to the antecedent as consistency allows reaches a point where the resulting set logically implies the consequent.” Kratzer (2002), p. 665.

her notion of propositional fact does not seem to be sufficiently fine grained to discriminate that anyone uttering (5a) attributes Thomas’ bleeding finger to the fact that he picked roses, whereas anyone uttering (5b) attributes it to the way he picked the roses. In adding Kratzer’s propositional facts to the antecedents of (5a) and (5b), the same maximally consistent set of facts is eventually obtained, if consistency is all that is required. The notion of ‘relevant’ facts in the modal clause 4(iii) may well be understood to strengthen similarity relations on minimal situations in some epistemically significant way. But this condition does not seem to be connected in any systematic way to partitioning the subject matter of the conditional from its backgrounded constraints. From (5a) Thomas gets to understand that the speaker suggests he better avoid roses, if he wants to pick flowers again. But in uttering (5b) the speaker tells him to be more careful next time in picking roses. In accounting for this difference in what Thomas gets to learn from the experience of cutting his finger and the way he comes to understand how he may guide his future actions, what is added to the antecedent needs to preserve background constraints. The Xerox principle depends on the specific causal fact, called a demonstration (ter Meulen (1994)), of the actual situation of Thomas picking roses in such a way that made one of his finger bleed. Such demonstrations are required to give conditionals and counterfactuals the force of an indication, from which guidelines for actions may be derived and epistemic states are updated. Adding parametrized propositions, alias facts, to the utterance situation of the antecedent of (5a) would in addition background the way Thomas picks flowers. Hence Thomas derives from it an indication to avoid picking roses in the future. Adding parametrized propositions to the utterance situation of the antecedent of (5b) would background his picking roses and parametrize different ways of picking them. Thomas derives from this interpretation the indication that he better be more careful in picking roses next time, if they are thorny. These two ways of strengthening the antecedent by adding facts, as parametrized propositions, are hence not invariant under bisimulation (Seligman and Moss (1997), p. 252), the key semantic invariance for a modal language describing labeled transition systems, since ways of adding information should also preserve subject matter.

References.
A. ter Meulen, 1994, Demonstrations, Indications and Experiments, the Monist 77:2, special issue on Facts and Situations, 239-256.