The Semantics of Implicitly Relational Predicates

Dan McCloy
Department of Linguistics, University of Washington
drmccloy@uw.edu

1. Introduction

In this paper I address the interpretation of a certain type of predicate that I have termed *implicitly relational predicates* (IRPs). These predicates are notable for their unusual interaction with locative expressions. Specifically, locatives in sentences with IRPs differ from locatives in other sentences with respect to what they locate. Consider the interpretation of the locative *in Texas* in sentences (1) and (2):

1) George died in Texas

2) George is popular in Texas

In 1), we can say that *in Texas* locates the event of George's death.[1] This can be formalized quite naturally by treating *die* as a stage-level predicate that introduces an event variable into the computation (following Kratzer, 1995). In this way, the truth conditions for (1) could be expressed, in slightly simplified form, as in 3):

3) $\exists e$ [DIE(George, e) & LOC(IN(Texas, e))]

At first glance, it would seem that a similar analysis would work for (2). But intuitively, it is hard to see how the event comprising George's popularity can be located anywhere, at least not in the same way that we tend to think of events like *George dying*, *Stella buying a car* or *Carl winning the race* being located somewhere (cf. the fact that George can be popular in Texas and in Montana at the same time). Put more concretely, if we adopt event-based analyses for both (1) and (2), we must be willing to accept an ontology in which Davidsonian events can be nonlocally distributed; that is, they could occur in multiple spatial locations simultaneously. I take this interpretation to contradict the standard view of Davidsonian events, and in this paper I will assume as much and will not argue for any particular ontology. Rather, the question I will address is this: if an event-based analysis is unavailable for sentences like (2), how else can we formalize such sentences? After discussing the problems with event-based analyses, I will present one alternative account present in the literature (Maienborn, 2001), in which an adaptation of topic-comment structure and a special version of the predicate modification rule are used to represent sentences like (2). I will then present my own alternative: that predicates like *popular* have an implicit argument that is either filled covertly by contextual information, or by an overt locative or other PP.

2. Event types and the SLP/ILP distinction

In the introduction of this paper, Kratzer's (1995) analysis (cited above and seen in (3)) was called into question for being conceptually ill-fitting for certain predicates, on the grounds that these predicates, if they can be said to describe events at all, seem to describe events that can occur in multiple non-contiguous locations at one time. In addition to this conceptual issue, recent work on Davidsonian eventualities casts further doubt on an event-based analysis. In this section I will briefly summarize the reasoning in Kratzer (1995), then present work from Maienborn (2003) that calls its assumptions into question.

Kratzer (1995) makes use of the stage-level/individual-level predicate (SLP/ILP) distinction to explain which predicates have an eventuality argument slot (and thus introduce event variables into the computation), and which do not.[2] Three assumptions that are relevant here underlie her analysis:

[1] We could also say (perhaps naïvely so) that *in Texas* locates the subject *George* in sentence (1). Even if that might work for some sentences like (1), it will clearly not work for 2): George need not be in Texas (or ever have been) in order to be popular there.

[2] It is well known that Kratzer's analysis is a reformulation of the original SLP/ILP distinction due to Carlson (1977) and Milsark (1974), which were important foundationally but not directly relevant here.

4) i. SLPs readily combine with locatives whereas ILPs do not,
ii. locatives serve to spatiotemporally locate an action,
iii. such spatiotemporal location is accomplished by a (locative) modifier combining with an event variable

(Kratzer, 1995, p. 128)

Since *popular* quite readily combines with locatives, then following Kratzer we would assume it to be an SLP that introduces an event variable, and that the locative takes the event variable as its argument, as seen in (5):

5) ⟦George is popular in Texas⟧ = 1 iff: ∃*e* [POPULAR(George, *e*) & LOC(IN(Texas, *e*))]

One problem with this analysis, noted in Maienborn (2003), is that the traditional diagnostics for the presence of Davidsonian events do not reliably distinguish SLPs from ILPs: in most cases, neither SLPs nor ILPs can serve as infinitival complements of perception verbs (cf. iii through vi of Table 1, below). However, given the appropriate context, both ILPs and SLPs can occur in this way (cf. the exchanges in vii and viii of Table 1).

Table 1 First diagnostic for event arguments: infinitival complements of perception verbs

i.	I saw Carol lift 120 kilos	(action verb)
ii.	* I saw Carol weigh 120 kilos	(stative verb)
iii.	* I saw Carol be blonde / intelligent / French	(copula+ILP)
iv.	* I saw Carol be happy / tired / hungry	(copula+SLP)
v.	* I saw the radio be digital	(copula+ILP)
vi.	* I heard the radio be loud	(copula+SLP)
vii.	A: Carol is so foolish, she never acts intelligently.	
	B: I've seen Carol be intelligent.	(copula+ILP)
viii.	A: Maria is always energetic.	
	B: I saw Maria be tired (once).	(copula+SLP)

(data adapted and expanded from Maienborn, 2003)

One conclusion we might draw from this is that copular predicates are sometimes eventive (as in vii and viii) and sometimes not (as in iii through vi); indeed, this is the position taken by Maienborn (cf. Maienborn, 2001, 2003, 2004). Another possible conclusion is that something about the exchanges in vii and viii invalidates the diagnostic (though it is not clear why this would be so). What seems clear is that whatever it is that distinguishes ILPs from SLPs, it does not seem to be the presence or absence of an event variable (or if an event variable does account for the difference between iii and vii, then it does not seem to be the predicates themselves that are responsible for its presence or absence).[3]

A further problem with event-based analyses like Kratzer's is the question of what exactly it means for a predicate to "readily combine" with a locative (a problem that also arises in another of the standard diagnostics for event arguments: their ability to be spatiotemporally located by locative modifiers). Maienborn (2001) argued that there are at least three ways in which locatives can relate to the predicate (based on a variety of syntactic and semantic criteria). Briefly, *external* locative modifiers locate the overall event (by combining with the eventuality argument of the verb) and are generated within the VP, whereas

[3] Maienborn accounts for the distributional difference of SLPs/ILPs with locatives by appealing to the availability (or lack) of a temporal reading for the locative modifier. For example:

Maria was blond in the car.

A sentence like this is normally unacceptable with the locative, which under Kratzer's theory would be taken as evidence that no event variable was available for the locative to bind, and thus *blond* was an ILP. But Maienborn shows that *Maria was blonde in the car* is perfectly acceptable given a context in which Maria was described as blond at one time (i.e., in the car) and as brunette at a later time; in such contexts *in the car* receives a temporal interpretation and the sentence as a whole receives an epistemic reading. This analysis is supported by extensive work on the variety of types of locatives (cf. Maienborn, 2001).

internal locative modifiers describe a relevant part of the event (which may be one of the verb's grammatical arguments or other entities inferred on the basis of conceptual knowledge), are generated at the edge of the VP, and can receive instrumental interpretations. Finally, *frame-setting* modifiers restrict the conditions under which the speaker makes their claim, do not relate to the eventuality argument of the verb but rather to the proposition of the sentence, and can receive temporal interpretations. See Maienborn's article for full details.

If we take this typology of locatives into account, it presents challenges for event-based accounts like Kratzer's, since it is no longer clear that readily combining with locatives is a unified, easily describable diagnostic for SLPs; nor is it a sufficient condition for establishing the presence of an event argument on traditional views of Davidsonian events (Maienborn does not ultimately reject the diagnostic, but her results demonstrate the need for careful scrutiny whenever it is applied). It bears noting that Maienborn is not the only scholar to conclude that eventuality arguments cannot distinguish ILPs from SLPs; Glasbey (2006) proposes a predicate typology (drawing in part from Levin, 1993) in which all copular predicates lack eventuality arguments, based on how the presence or absence of event arguments affects the interpretation of bare plural objects.

3. Maienborn's alternative proposal

If a traditional event-based analysis is not possible for sentences like (2), how are we to analyse them? Maienborn offers an alternative analysis in which locatives that are frame-setting modifiers "constrain a semantically underspecified referent that relates to the sentence topic" (2001, p. 231). This is formalized as an entity v^x that is "anchored w.r.t. the conceptual structure accessible through x" (p. 220). The v^x variable enters the computation through a special variant of the predicate modification rule, called MOD^V:

6) MOD^V: $\lambda Q\, \lambda P \ldots \lambda x\, [P(\ldots)(x) \,\&\, Q(v^x)]$ (Maienborn, 2001, pp. 220, 231)

On this view, *in Texas* in (2) merges with the head of the topic phrase (formalized as $\lambda P\, \lambda x\, [\langle P, x\rangle]$ where $\langle P, x\rangle$ is an ordered pair $\langle$COMMENT,TOPIC$\rangle$, constrained such that the topic is of a semantic type that could be taken as the argument of the comment). The merger occurs via the MOD^V rule in (6), so that after the merger, *in Texas* is formalized as in (7) below (note that in this analysis P represents the comment (*is popular*) and *x* represents the topic *George*).

7) $\lambda P\, \lambda x\, [\langle P, x\rangle \,\&\, \text{LOC}(\text{IN}(\text{Texas}, v^x))]$

While this analysis works formally, it is subject to the perennial criticism that it requires "extra machinery" to get the job done (in this case, a specialized version of the predicate modification rule, and a topic-comment analysis for sentences that seem to be simple predicative declaratives). A more concrete reason to question this analysis is that traditionally in topic-comment structures the comment is a complete sentence in itself (cf. this classic example from Li & Thompson, 1981):

8) Zhè kē shù, yèzi hěn dà (MANDARIN)
this CL tree leaf very big
"This tree, (its) leaves are very big."

In fact, if simple sentences like *George is popular* are to be treated formally as topic-comment structures, one wonders what force is left in that notion to describe a sentence's information structure. This is not to be taken as a wholesale indictment of Maienborn's work; indeed, she acknowledges that her proposed formalism is but one among many possibilities. But the specialized PM rule and the odd use of topic-comment structure are reason enough to explore alternatives. In the next section I present my own proposal for formalizing sentences like (2).

4. A proposed formal structure for implicitly relational predicates

I will now offer a new formal structure for implicitly relational predicates. Taking *popular* as an example, I propose the structure seen in (9):

9) *popular*: λP λ*x* [*x* is popular among those characterized by P]

What I am claiming is that implicitly relational predicates like *popular* have an implicit argument (of type ‹e,t›) and that when locatives or other PPs are present, they are arguments of the predicate rather than adjuncts to it; when overt locatives are not present, the argument is supplied contextually.

To understand the motivation for this structure, consider the fact that sentences like *George is popular in Texas* do not preserve truth under simplification, which we would expect if the locative were simply locating the event:

10) George is popular in Texas ↛ George is popular

I grant that the antecedent of (10) does entail that George is popular *somewhere*, but, crucially, that is not what the consequent of (10) means. Rather, when no locative (or other modifier) is overt, the sentence *George is popular* will be interpreted with respect to some specific (i.e., definite) group of individuals. The composition of that group is quite sensitive to context, and in some cases incorporates both overt and contextual information. For example, consider the difference betweeen (11) and (12):

11) George is popular in Texas

12) George Bush is popular in Texas

Here I claim that the natural interpretation of (12) is that George Bush is popular among voters in Texas (not just among Texans generally). Indeed, it is hard to imagine a context in which no reference group is contextually salient and in which *George is popular* can be uttered felicitously (*sans* locative or other PP). Put simply, if such a reference group is unknown, how would we know if George is in fact popular? Recanati (2007) gives a nice diagnostic for situations like this in a paper addressing definite and indefinite interpretations of implicit arguments (specifically in reference to meteorological predicates). The diagnostic is shown in the difference in felicity of A's response in (13) and (14) below:

13) A: John has arrived
B: Where has he arrived?
A: # I have no idea.

14) A: John has danced.
B: Where has he danced?
A: I have no idea.

The diagnostic is meant to distinguish predicates with implicit location arguments (*arrive* in (13)) from predicates whose location argument is optional and therefore adjoined (*dance* in (14)). In either case the argument may be overt or contextually determined. I claim that *popular* patterns with the *arrive*-type predicates, as demonstrated in (15):

15) A: George is popular.
B: Where? / Among whom?
A: # I have no idea.

I take this to be evidence for the presence of an implicit argument, and thus for the plausibility of a "λP λ*x*"–type structure as seen in (9). This analysis has the advantage of simplicity in that it does not require a specialized version of the predicate modification rule; nor does it employ an unusual usage of topic-comment structure. An interesting consequence of this analysis is that in sentences like (12) it seems necessary that the overt (locative) expression and the covert contextual information (the knowledge that George Bush is a politician and thus voters are relevant) must combine with each other before combining with *popular*. This could presumably happen via ordinary predicate modification, though I will not make any strong claims on this issue here.

5. Conclusion and Future Directions

I have argued that certain predicates previously analyzed as one-place properties are better understood as taking two arguments: one property and one individual. The "λP λ*x*[…]" structure proposed above for *popular*-type sentences also works well for other adjectival predicates, e.g., *accepted, reflected, rivaled, rare, widespread, non-existent*, etc. As one example:

16) *rare*: λP λ*x* [there are few *x*'s among those things characterized by P]

17) Jeeps are rare in Seattle.

This example shows the same feature seen in the difference between (11) and (12) above: namely that both contextual and overt information combine to characterize the reference set. In (17), those "things characterized by P" are compared against other *automobiles* (contextual) *that are in Seattle* (overt). The role of contextual information (i.e., the fact that they must be automobiles) is important in assessing the truth of the sentence: if the utterance context were one in which the topic of discussion were the differences between construction workers in Seattle versus other cities, then (17) might be false even if "generally speaking" (17) were true, because the contextual information changes from *automobiles* to *things possessed by construction workers*. A precise formalization of the integration of contextual information is left as an area for future work.

References

Carlson, G. N. (1977). *Reference to kinds in English.* Unpublished PhD dissertation, University of Massachusetts, Amherst.

Glasbey, S. (2006). Bare plurals in object position: which verbs fail to give existential readings, and why? In S. Vogeleer & L. Tasmowski (Eds.), *Non-definiteness and plurality* (pp. 133-157). Amsterdam; Philadelphia: J. Benjamins.

Kratzer, A. (1995). Stage-Level and Individual-Level Predicates. In G. Carlson & F. Pelletier (Eds.), *The Generic Book* (pp. 125-175). Chicago: University of Chicago Press.

Levin, B. (1993). *English verb classes and alternations : a preliminary investigation*. Chicago: University of Chicago Press.

Li, C. N., & Thompson, S. A. (1981). *Mandarin Chinese: a functional reference grammar*. Berkeley: University of California Press.

Maienborn, C. (2001). On the Position and Interpretation of Locative Modifiers. *Natural Language Semantics, 9*(2), 191-240.

Maienborn, C. (2003). Against a Davidsonian Analysis of Copula Sentences. *Proceedings of the North East Linguistic Society, 33*, 167-186.

Maienborn, C. (2004). A pragmatic explanation of the stage level/individual level contrast in combination with locatives. In B. Agbayani, V. Samiian & B. Tucker (Eds.), *Proceedings of the Western Conference on Linguistics (WECOL)* (Vol. 15, pp. 158-170). Fresno: CSU.

Milsark, G. L. (1974). *Existential sentences in English.* Unpublished PhD dissertation, MIT, Cambridge.

Recanati, F. (2007). It is raining (somewhere). *Linguistics and Philosophy, 30*(1), 123-146.