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Conceptualization, individuation and quantification

The topic of this paper is the interaction between how things are conceptualized, how they are individuated and how they are counted. I will present a formal, compositional theory of individuation and show how it derives truth conditions for certain kinds of quantified sentences that have proven problematic to analyse using more conventional methods, based on a theory of conceptualization that can also be applied to issues such as semantic anomaly.

Quantification has long been a topic of central interest in referentially-oriented approaches to meaning, so much so that Barbara Partee has talked of 'the starring role of quantifiers in formal semantics'.[1] It remains an extremely productive topic in which the mathematical and logical techniques that have been developed over the past few decades for semantic analysis have produced impressive empirical results.

Quantification, however, presupposes a well-defined domain of objects to be quantified over, divisible along the lines that natural language provides. Geach (1962, 38f.) famously argued that only certain natural language expressions (those that are 'substantival') from among the relevant grammatical categories make this possible:

> a general term can occur as a name only if it makes sense to prefix the words "the same" to it. By no means all general terms satisfy this condition; and only in connection with such as do satisfy it can the question be asked how many so-and-so's there are. [...]
>
> I maintain that it makes no sense to judge whether x and y are 'the same', or whether x remains 'the same', unless we add or understand some general term—"the same F". That in accordance with which we thus judge as to the identity, I call a *criterion* of identity [...] "The same F" does not express a possible way of judging as to identity for all interpretations of "F".

Geach's point can be taken further: in some cases, an expression that he (presumably) would have recognised as substantival provides *more than one* potential criterion of identity. For example, consider the word 'book'. If there are two copies of *War and Peace* in a situation, are there two books, or one? Is one copy the same book as the other, or not? I will argue that these questions arise because the word 'book' provides, in Geach's terminology, two criteria of identity. According to what we might call the physical criterion of identity there are two books, and one copy is not the same book as the other, whereas according to what we might call the informational criterion of identity there is one book, and one copy *is* the same book as the other.

Furthermore, which criterion of identity applies in any given sentence can be shown to be determined compositionally. For example, consider (1-a)–(1-c).

(1) a. Two books are heavy.

[1] In the Baggett Lectures at the University of Maryland, 7–9 November 2012: `http://ling.umd.edu/events/archive/346/`.

b. Two books are informative.
c. Two books are heavy and informative.

(1-a) requires a physical criterion of identity; it would not, for example, be true in a situation in which there is a single physical volume in which two books are printed. Conversely, (1-b) requires an informational criterion of identity; it could not be true in a situation involving (only) two copies of the same book. Particularly interestingly, (1-c) requires a third kind of criterion, one requiring that there are two books according to *both* the physical *and* the informational criteria of identity. In each case, the criterion of identity that applies can be seen to be determined by the selectional properties of the predicates used—for example, 'heavy' somehow requires or expects its argument to denote something physical.

Asher (2011) and Cooper (2011) have both approached the concept of criteria of identity in cases like (1-a)–(1-c) in a way that connects it with the idea of there being different ways of conceptualizing an object. I will present an analysis along these lines, based on the formalization of criteria of identity as equivalence relations on the domain of discourse, plus an enhanced lexical semantics for nouns like 'book' that allow for more than one criterion of identity. I will show that the truth conditions my account predicts for cases like (1-c) are more accurate than those predicted by other accounts. I will also extend my analysis to address the ambiguity, noted by, Krifka (1990), of sentences like (2).

(2) 4000 ships passed through the lock last year.

On the standard reading of (2), there were 4000 ships such that each of them passed through the lock last year. On another reading, however, there need not have ever been as many as 4000 ships in existence, provided that 4000 times last year a ship passed through the lock. In one analysis of this phenomenon, Barker (1999, 688) connects this second reading with the idea of a 'stage' as developed by Carlson (1982):

> In both cases there must be 4000 ship entities present in the model—but several of those discourse entities (stages, if you prefer) may correspond to the same ship in the world of experience.

This idea of a possible discrepancy between 'ship entities [...] in the model' and 'ship[s] in the world of experience' indicates that one approach to the ambiguity of (2) would be to locate the necessary distinction in different criteria of identity for ships, based on different ways of conceptualizing a ship. For example, ship s at time t_1 could be conceptualized as distinct from ship s at time t_2. I will present an analysis like this of the ambiguity of sentences like (2), and connect it both with the analysis of sentences like (1-a)–(1-c) and with a theory of semantic anomaly that makes use of the same notion of conceptualization.

References

Asher, Nicholas (2011) *Lexical Meaning in Context* (Cambridge: Cambridge University Press).

Barker, Chris (1999) 'Individuation and quantification,' *Linguistic Inquiry* 30:683–691.

Carlson, Greg N. (1982) 'Generic terms and generic sentences,' *Journal of Philosophical Logic* 11(2):145–181.

Cooper, Robin (2011) 'Copredication, quantification and frames,' in Sylvain Pogodalla and Jean-Philippe Prost (eds.), *Logical Aspects of Computational Linguistics*, number 6736 in Lecture Notes in Computer Science (Berlin/Heidelberg: Springer), 64–79.

Geach, Peter Thomas (1962) *Reference and Generality*, Contemporary Philosophy (Ithaca, NY: Cornell University Press).

Krifka, Manfred (1990) 'Four thousand ships passed through the lock: object-induced measure functions on events,' *Linguistics and Philosophy* 13:487–520.