

DOMAIN OF QUANTIFICATION

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When we utter sentences containing quantifiers, typically we are not to be taken to speak about absolutely everything there is. Suppose Mary has invited her friend John to a party to which she is going. If, upon entering the party, Mary turns to Jack and utters (1), it would be rather odd of Jack to object by pointing out that John in fact knows several people who are not present.

(1) John doesn't know anybody.

The people not at the party are not *exceptions* to Mary's claim — in the context of her utterance they simply *don't count*. They are not in the domain of quantification. But suppose Jack nevertheless does make this odd comment. Then it would be natural for Mary to clear things up by saying that she meant to speak only of the people at the party, except for herself, John and Jack. And it would *not* be natural to reject the objection by uttering (1) again. After this second utterance John's faraway acquaintances *would* count as exceptions to Mary's claim. *Now* the domain of quantification includes them.

The phenomenon of quantifier domain restriction is a special case of context-dependence. It is an extreme case: if Mary repeats herself in the above situation, then by uttering the same words she manages to convey different propositions despite the fact that the external circumstances do not seem to have relevantly changed. The problem is how to account for this rather striking context-sensitivity. To address this problem, we need to answer the following three questions: (I) What exactly is a domain of quantification? (II) How should domains of quantification be incorporated into a theory

of linguistic interpretation? (III) How is it determined within a context what the domain of quantification is?

Let us start with question (I). Given that we speak of various objects being *in* the domain of quantification, it is natural to assume that domains are sets. This is a common view expressed in many textbooks. (A prominent exception is Quine; cf. Quine 1951: 69) A model for a first-order language includes a set, called the *universe* of the model, and the clauses of a truth-conditional semantics interpret quantified sentences with respect to this set. (E.g. Hodges 1983:562 – 6) Semantic theories for natural languages typically follow suit: they specify the semantic value of sentences relative to a model, which includes a set serving as domain of quantification. (E.g. Chierchia & McConnell-Ginet 2000: 158 – 68) But despite its popularity, this standard view faces at least two serious difficulties.

The first one concerns *unrestricted quantification*. (Whether unrestricted quantification is even coherent is a matter of some controversy among philosophers. For arguments against, see Dummett 1973: 530 – 1, 567 – 9 and Dummett 1991: 232 – 5, 313 – 9. For a response to Dummett, see Cartwright 1994.) The problem is often put as follows: “Even if we don’t do it often, we *can* quantify over absolutely everything. For example, when we assert that everything is identical to itself, we do just this. But if all quantification is restricted to a certain set then — given the well-known fact that there is no set containing all sets, and hence, no set containing absolutely everything — we couldn’t do this.” This way of stating the problem is suggestive, but not exactly right: the defender of the view that domains of quantification are sets could agree that we can quantify over absolutely everything, as long as the domain of quantification in *this* claim is also restricted to some set. We must be more careful in articulating the problem: “Let *u* be a particular utterance of (2) and let us assume that the domain of quantification associated with this utterance is *D*.

(2) Every set is a set.

We know from Russell’s paradox that if *D* is a set then there is some set *S*, which is not a member of *D*. So, we can conclude:

(3) The claim made by u does not entail that S is a set.

That is, for an arbitrary utterance of (2) there is a set such that the claim made by that utterance is not about that set.” This is in a profound conflict with our intuitions. If unrestricted quantification is coherent, domains of quantification cannot be sets.

Perhaps the simplest way to respond to this difficulty would be say that in certain cases domains of quantification are proper classes. But this move would still not solve the second problem with the standard view, which concerns *modality*. Suppose you utter (1) upon entering a room full of people. Let’s assume that the proposition you convey is true and it quantifies over the people in the room. Now, consider a counterfactual situation, which differs from the actual one only insofar that the room contains one additional person, who is in fact known by John. Relative to this situation, the proposition considered above is intuitively false. But proponents of the standard view must disagree. According to them, the domain of quantification is the set of people in the room in the actual situation, and relative to the counterfactual situation, John still does not know anyone in *that* set. The source of the modal difficulty is that sets (as well as proper classes) have their members essentially: if $x \in S$, then necessarily $x \in S$. Domains of quantification, however could contain objects they don’t actually contain.

A natural way to solve the second problem would be to say that domains of quantification are not sets or classes, they are *properties* (cf. Soames 1986: 356, Stanley & Szabó 2000: 252). To say that an object is in a domain of quantification (relative to a possible world) should be then construed as saying that it belongs to the extension of the property (relative to that world). In order to be immune to the first difficulty, we also need to insist that the extension of a property need not be a set. (I.e. we must reject the idea that properties are functions from possible worlds to sets of individuals.) But since we have properties like the property of being a set or the property of being a property, we already know that.

There is an alternative to this line: domains of quantification might be taken to be contextually determined *situations*, akin to miniature possible worlds. (E.g. Barwise & Perry 1983, Barwise & Perry 1985, Cooper 1993, Reçanati 1996.) How much this

diverges from the approach that identifies domains with properties depends on the details of the semantics of quantification and on the metaphysics of situations. In order to solve the modal problem mentioned above, the standard notion of a situation must be modified, and it is unclear whether the modified situation-based approach is substantially different from the more traditional property-based one (cf. Soames 1986: 367).

Let us turn now to question (II). How should domains be incorporated into a theoretical account of our understanding of quantified sentences? Here are three basic options. First, one might think that these properties are expressed by unpronounced predicates in the syntactic structure of quantified sentences. Secondly, one might think that these properties are introduced into the semantic interpretation of quantified sentences, without being expressed by unpronounced predicates. Finally, one might think that these properties do not affect the semantic interpretation of quantified sentences, but do nevertheless affect what is pragmatically conveyed by the utterance of such sentences.

According to the first option, in a context in which an utterance of (1) conveys the proposition that John doesn't know anyone who has ever been on television, it is because the 'real' syntactic structure of the sentence uttered is as in:

(4) John doesn't know anybody who has ever been on television.

However, the phrase 'who has ever been on television', while syntactically present, is phonologically unrealized. This option has not proven popular (for critical discussion, cf. Bach 1994:130ff, Reçanati 1996:448, and Stanley & Szabó 2000:236-9).

According to the second option, the semantic interpretation expressed by (1), relative to the context under consideration, is the same as would have been expressed by (4), relative to this context. However, this is not because the property that is the quantifier domain is expressed by some unpronounced English expression, but for some other reason. It might be (a) that in the syntactic structure of quantified sentences, there are variables whose values, relative to a context, are quantifier domains (e.g. Westerståhl 1985, Stanley & Szabó 2000; for an approach involving operators rather than variables, cf. Cresswell 1996). Alternatively, it might be (b) that quantifier domains are introduced directly into semantic interpretation, without any syntactic mediation.

Option (b) can be combined with two competing views about the nature of semantic interpretations. One can say, as e.g. Barwise & Perry 1983 does, (b1) that the semantic interpretation of sentences does not yield a proposition, only a *propositional radical* that is true or false relative to a domain. Alternatively, one could maintain, as e.g. Barwise & Perry 1985 does, (b2) that semantic interpretation assigns propositions to sentences, which contain domains as *unarticulated constituents*, that is, propositional constituents that are not the semantic values of any sentential constituents. It is of particular significance for the debate between views (a) and (b) that sometimes domains of quantifiers behave as if they were *bound* by some other quantifier; the phenomenon is noted by Cooper 1993, von Stechow 1994, section 2.2.2, Farkas 1997; for its bearing on the evaluation of view (b), cf. Stanley & Szabó 2000: 250.

According to the final option, the semantic interpretation of a sentence containing a quantifier expression, even relative to a context, is not sensitive to intuitively felt domains of quantification. On this view, even relative to the context involving Mary described above, what is expressed by (1) is the obviously false proposition that John doesn't know anybody at all. However, what is conveyed by her act of uttering (1) is 'enriched' via pragmatic mechanisms into the (presumably true) proposition that John doesn't know anybody who is at the party other than Mary, Jack and himself (for defenses of this position, see, for example, Bach 1994, Carston 1988, and Sperber & Wilson 1986; for criticism, cf. Stanley & Szabó 2000:239 – 45).

Whichever of the above options turns out to be correct is relatively independent of question (III): How is it determined within a context which particular property is the domain of a quantifier? There is some reason to think that, when a quantificational expression occurs embedded inside a discourse, its domain may partly be a function of the domains of quantified expressions that occur previously in the discourse (cf. Gawron 1996). But a prior question concerns how the domain of a quantified expression is resolved when it occurs discourse-initially. The two main options here are the intentions of the speaker and certain objective features of the environment. The first view is often taken for granted in discussions (for arguments against it, see Gauker 1997, 1998).

A disagreement between defenders of these two options is in many ways similar to the disagreement between those who believe that the referent of a demonstrative is

fixed by speaker's referential intentions and those who think it is fixed by the demonstration accompanying the use of the demonstrative; cf. Kaplan 1978, McGinn 1981, Wettstein 1981, Reimer 1991, and Bach 1992. But the situation is somewhat more complicated in the case of domains of quantification. We have *two* reasonably clear alternative views on how the reference of a demonstrative is fixed, but we have *no* convincing account of the mechanism of domain selection. It is plausible that when using demonstratives, speakers typically intend to pick out a particular object. It is not equally clear that in using a quantifier, they have the requisite intention to determinately single out a property. It is also plausible that typical uses of demonstratives are accompanied by explicit or implicit demonstrations. But should we say that when using a quantifier, speakers actually demonstrate a property? At present, there is no convincing answer to question (III).

References

- Bach, Kent. 1992. Intentions and demonstrations. *Analysis* 52.140 – 6.
- Bach, Kent. 1994. Conversational implicature. *Mind and Language* 9.124 – 62.
- Barwise, Jon and John Perry. 1983. *Situations and Attitudes*. Cambridge, MA: MIT Press.
- Barwise, Jon and John Perry. 1985. Shifting situations and shaken attitudes. *Linguistics and Philosophy* 8.105 – 61.
- Carston, Robyn. Implicature, explicature, and truth-theoretic semantics. In *Mental Representations: The Interface between Language and Reality*, edited by R. M. Kempson, 155 – 81. Cambridge: Cambridge University Press.
- Cartwright, Richard. 1994. Speaking of Everything. *Nous* 28.1 – 20.
- Chierchia, Gennaro and Sally McConnell-Ginet. 2000. *Meaning and Grammar: An Introduction to Semantics*. 2nd edition. Cambridge, MA: MIT Press.
- Cooper, Robin. 1993. Generalized quantifiers and resource situations. In *Situation Theory and its Applications*, edited by P. Aczel, et al., 191 – 211. Stanford: Stanford University Press.
- Cresswell, Max. 1996. *Semantic Indexicality*. Dordrecht: Kluwer.
- Dummett, Michael. 1973. *Frege: Philosophy of Language*. Cambridge, MA: Harvard University Press.
- Dummett, Michael. 1991. *Frege: Philosophy of Mathematics*. Cambridge, MA: Harvard University Press.
- Farkas, Donka. 1997. Evaluation indices and scope, In *Ways of Scope Taking*, edited by Anna Szabolcsi, 183 – 215. Dordrecht: Kluwer Press.
- Gawron, Jean Mark. 1996. Quantification, quantificational domains, and dynamic logic. In *The Handbook of Contemporary Semantic Theory*, edited by Shalom Lappin, 247 – 67. Oxford: Blackwell Press.
- Hodges, Wilfried. 1983. Elementary predicate logic. In *Handbook of Philosophical Logic*, edited by D. Gabbay and F. Guenther. Vol. 1.1-131. Dordrecht: Kluwer.
- Kaplan, David. 1978. Dthat. In *Syntax and Semantics*, edited by P. Cole, New York: Academic Press. Vol. 9.221 – 43.

- McGinn, Colin. 1981. The mechanism of reference. *Synthese* 49.157 – 86.
- Quine, Willard Van Orman. 1951. *Mathematical Logic*. Cambridge, MA: Harvard University Press.
- Reçanati, François. 1996. Domains of discourse. *Linguistics and Philosophy* 19:445 – 75.
- Reimer, Marga. 1991. Demonstratives, demonstrations, and demonstrata. *Philosophical Studies* 63.187 – 202.
- Soames, Scott. 1986. Incomplete definite descriptions. *Notre Dame Journal of Formal Logic* 349 – 75.
- Sperber, Dan and Deirde Wilson. 1986. *Relevance: Communication and Cognition*. Cambridge, MA: Harvard University Press.
- Stanley, Jason and Zoltán Gendler Szabó. 2000. On quantifier domain restriction. *Mind and Language* 15:219 – 61.
- Van Fintel, Kai. 1994. *Restrictions on Quantifier Domains*. PhD thesis. University of Massachusetts, Amherst.
- Westerståhl, Dag. 1985. Determiners and context sets. In *Generalized Quantifiers in Natural Language*, edited by J. van Benthem and A. ter Meulen, 45 – 71. Dordrecht: Foris.
- Wettstein, Howard. 1981, Demonstrative reference and definite descriptions. *Philosophical Studies* 40.241 – 57.