A Structuralist Theory of Reference

Ioannis Votsis (Heinrich-Heine Universitaet Duesseldorf)

votsis@phil.uni-duesseldorf.de

www.votsis.org

The aim of this talk is to lay the foundations for a theory of reference that is capable, if called upon, to do justice to a realist view of science. The talk is divided into three parts. The first part concerns the clash between existing conceptions of reference. It is argued that although in conflict there is a sense in which these conceptions are legitimate in different contexts. Even so, some contexts are more demanding than others and, as a consequence, put constraints on the appropriateness of the concept of reference. In the context of the scientific realism debate, one important constraint is the ability to provide an adequate account of the phenomena surrounding the reference of scientific terms in cases of theory change or of full-blown scientific revolution. The second part reflects on what happens to concepts of reference when specific versions of realism and anti-realism are endorsed. The emphasis here is on the most promising such versions of late, namely structural realism and empiricist structuralism. In spite of their differences, both of these views put forth a structuralist epistemology that, as it turns out, forces our conceptions of reference to take into account the relations that the objects we wish to refer to stand in with respect to other objects. Finally, the third part considers the ways in which our attempts to refer to things in the world appear to fall short or indeed do so. The focus here is on puzzles relating to the indeterminacy of reference. Two such puzzles are discussed and dismissed. At the end of the talk it is conceded that reference is in a sense indeterminate but that this indeterminacy springs from structuralist limitations on knowledge and is not to be feared.

There are various competing theories of reference out there. The first part of the talk begins with a consideration of what motivates these theories, at least in so far as these concern reference in a natural language setting. It is argued that each theory is motivated by different sets of practices that competent language users appeal to in order to fix reference. Since these sets are typically in conflict and there is often no way to adjudicate between them it is unreasonable to rule out one theory in favour of another. Modulo some qualifications, different sets of practices are thus taken to underwrite different concepts of reference. In the current context, this means that there are various legitimate concepts of reference (see Votsis 2011). So long as we are aware which concepts are used under what circumstances, we can solve and even dissolve various disputes.

The plurality of reference concepts does not imply that successful reference-making is a purely conventional matter. This can be clearly seen in intricate reference scenarios where the semantic content of a term is a *sine qua non* in determining its reference. More generally, acknowledging a plurality of concepts does not mean that certain concepts are not more natural or better suited than others for particular tasks. In the context of the scientific realism debate this task includes accounting for what happens in cases of theory change or of full-blow scientific revolution. Several issues demand our attention here. Among others, we need to know whether a scientific term α that appears in both a predecessor and a successor scientific theory refers to the same object, property or relation. On the one hand, a holistic conception of meaning and reference tells us that differences in the semantic content of the theories imply differences in the semantic content of their terms. And if the semantic content of a term determines its reference then it seems that α cannot be referring to the same object. On the other hand, even terms that strictly speaking deviate in their semantic content overlap enough for there to be a robust sense of referential continuity. The challenge then is to find a principled way to resolve this tension.

Are there additional constraints on the appropriateness of the concept of reference in the context of the scientific realism debate? The short answer is yes. Specific versions of realism and anti-realism often have a say in the way the reference of scientific terms is to be achieved. This brings us to the second part of the paper. In recent years, the most promising realist and anti-realist views are structural realism (e.g. see Worrall 2007) and empiricist structuralism (e.g. see van Fraassen 2006) respectively. Although the two views are at odds concerning where exactly to draw the line of what is knowable, they both share a structuralist conception of epistemology. That is, according to both, at best we can know the structure of the world – the unobservable world in the case of structural realism, the observable one in the case of empiricist structuralism. This convergence has significant implications on our understanding of reference. If the knowledge of an object afforded to us by a scientific theory is dependent on the relations that object stands in with respect to other objects, then it may very well be that the reference of the corresponding term in the given scientific theory will likewise be dependent on those relations.

This last suggestion has been developed in recent years by structural realists. Worrall (2007), for example, claims that we must reject term-by-term reference and opt instead for the view that the structure of our theory globally reflects and refers to the structure of the unobservable reality. I find the global reflection and reference claim nebulous at best. Contrary to it, I argue that incorporating a relational element in reference can be seen as an elaboration of term-by-term reference. A reply to

an epistemological objection that has been raised against structural realism is instructive here. Psillos (2001) argues that the structural realist claim that we cannot know individual objects, first-order properties and their relations leads to absurdities. In reply (see Votsis 2005), I have argued that his objection trades on a misconception of what the structural realists claim. Their claim is not that we cannot know them at all but that we can only know them through the relations they instantiate, or, in more technical terms, up-to-isomorphism. In a similar move, it can be argued that scientific terms are able to refer to individual objects, i.e. in a term-by-term fashion, but that to fix this reference requires taking into account the relations these objects instantiate.

No discussion of reference would be complete without a discussion of the ways in which our attempts to refer to things in the world fall short, whether that be in practice or in principle. This brings us to the third and final part of the talk. The main way in which reference is supposed to fall short is through the so-called 'indeterminacy of reference'. Several distinct puzzles fall under this category. Two of them are discussed and dismissed as not presenting a real (or at least not an insurmountable) challenge to successful reference-making, namely gavagai-type cases and grue-type cases.[1] In both cases the presumed indeterminacy can be eliminated by taking into consideration the ad-hocness of their suppositions. The intention here is not to assert that reference can always be uniquely fixed. Indeed, if the structuralist story presented above is correct, reference (at least with respect to unobservable objects) has a natural limit: It can be fixed only up-to-isomorphism. Even so, this limit has no genuine impact on the way we go about making contact with the world and therefore should not be feared.

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[1] The latter was originally formulated not as a challenge to reference but to natural classification schemes (see Goodman 1983). I formulate a variant that directly challenges the determinacy of reference.