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KIM STERELNY AND FIONA COWIE

## Names and Natural Kinds

Since the late 1960s, philosophical debate over names and natural-kind terms has generated influential arguments against the assumption that intentional features of language and thought derive only from “internal” psychological features of the individual speaker or thinker. The arguments turn on a recognition of the importance, for the lexical semantics of natural language, of causal relations between a speaker and his or her physical and social environment.

The targeted assumption is typified by the view, derived from John Locke's notion of nominal essence, that the understanding of a (non-primitive) term and the grasp of a (non-primitive) concept consist in the thinker's possession of a set of severally necessary and jointly sufficient descriptive conditions for the application of the term or concept. John Stuart Mill held a Lockean view of general terms, though he argued that proper names have denotation but no connotation: one can use a proper name to denote some entity without thereby attributing any descriptive property to the named entity.

Gottlob Frege postulated a Platonic ontology of “senses” to account for the informativeness of identity statements, e.g., *Hesperus is Phosphorus*. The sense, together with the state of the world, determines the term's referent or extension. The sense of a proper name is the sense of a definite description which the speaker associates with the name; thus the sense of *Aristotle* might be, for a speaker, that of “the pupil of Plato and teacher of Alexander the Great.”

Bertrand Russell dispensed with Fregean senses in favor of *direct reference*: the entire semantic contribution of a genuinely referring term is nothing more than the entity to which it refers. But ordinary proper names do not genuinely refer; they abbreviate definite descriptions, which disappear under logical analysis. Thus *Aristotle was bald* abbreviates, for a speaker, something like *The pupil of Plato and teacher of Alexander the Great was bald*, which has the logical form:

$$\exists x [\forall y (y \text{ was a pupil of Plato and a teacher of Alexander the Great} \leftrightarrow y=x) \ \& \ x \text{ was bald}].$$

The analysis is iterated to eliminate all remaining ordinary names, such as *Plato*. Ultimately, the constituents of thinkable and expressible propositions are revealed to be things (such as our own sensory states) with which we are “acquainted,” where acquaintance is a kind of

unmediated and infallible epistemic access. The contemporary work reported in this article, though frequently espousing Russellian direct reference, reverses Russell at precisely this point: instead of analyzing intentional features of thought and discourse in terms of internal psychological states, it characterizes psychological states partly by reference to states of the thinker's environment.

Wittgenstein 1953 was concerned to discredit the possibility of a language founded on reference to private mental events, without public criteria for correctness of application and public checks on constancy of meaning. However, description theories of names held sway until the sustained attacks of Kripke 1972 and Donnellan 1972.

Kripke gives a modal argument for the conclusion that *Aristotle* is not synonymous with any cluster *F* of descriptions that speakers associate with it. The synonymy view entails that the proposition expressed by *Aristotle had some of the properties F* is true in every possible world at which *Aristotle* designates. But surely this is false: Aristotle might not have gone into pedagogy, nor have done any of the things for which he is known. A proper name is a "rigid designator": it designates the *same entity* with respect to every possible world where it designates at all. A cluster of descriptions, by contrast, might be satisfied by different entities in different possible worlds.

It might be thought that descriptions, while not yielding synonymies for names, nevertheless fix the referent of the name in the actual world. Often, however, the associated descriptions (even those across the community) are too impoverished to pick out anything uniquely; yet reference succeeds. When a speaker does associate a uniquely identifying description with a name, an object's satisfaction of the description is neither a necessary nor a sufficient condition for its being the referent of the name. If an unknown man named Schmidt proved the incompleteness of arithmetic, and Gödel took credit for Schmidt's work, speakers who associate with *Gödel* just the description "prover of the incompleteness of arithmetic" nevertheless refer to Gödel, not to Schmidt, when they use the name.

Kripke proposes instead that names achieve their reference by means of a *causal historical chain*. A proper name is grounded in a set of initial uses in connection with causal, perceptual interaction with the entity named. Later uses are accompanied by an intention to preserve the referent of earlier uses. The picture recalls J. S. Mill, in that it does not require any associated descriptive content (but see Evans 1982). Statements containing empty names—the meaningfulness of which was pointed

out by Russell as a difficulty for Mill—are accounted for in terms of the chain: *Zeus does not exist* is true in virtue of the fact that the causal chain for *Zeus* is not grounded in any existing thing.

If a proper name is directly referential in Russell's sense, its sole semantic function is to import its referent into the proposition expressed or believed (Kaplan 1989). But then anyone who believes the proposition expressed by *Cicero is Cicero* also believes the proposition expressed by *Cicero is Tully*, since the two sentences express the same proposition. This seems false; a rational person who knows that Cicero is Cicero might believe that Cicero is distinct from Tully. Kripke 1979 defends the direct-reference view against this Fregean objection by describing cases in which we are inclined, quite independently of considerations of direct reference, to say that perfectly rational people believe inconsistent propositions.

If the semantic value of an ordinary proper name is just its referent, then it would seem to follow that substitution of co-referring names in attitude ascriptions must preserve truth. An apparent counterexample is that *Sal believes that Cicero is Tully* might be false, despite the truth of both *Cicero = Tully* and *Sal believes that Cicero is Cicero*. So the theory of reference must either motivate restrictions on substitutivity of co-referring names, or explain away the apparent counterexamples. Several authors have pursued the first strategy; e.g., in Richard 1990, substitutivity is restricted in virtue of the embedded sentence's expressing a linguistically enhanced proposition—an amalgam of a Russellian proposition with the words of the sentence itself. An example of the second strategy, and thus a pure form of direct reference theory, is Soames 2002, in which the apparent counterexamples are explained away as resulting from our failure to distinguish the proposition that the attitude ascription semantically encodes, from other propositions that the ascription would ordinarily be used to convey or even to assert.

Kripke 1972 and Putnam 1975 extend the causal picture of reference to natural-kind terms. Against the deeply entrenched Lockean view they adduce arguments from linguistic competence: we frequently employ natural-kind terms without knowing scientifically correct necessary and sufficient conditions for their application. A term like *gold* is grounded in a set of perceptually based applications to existing samples which, by and large (there may be impurities), share an underlying nature. Other uses of the term are accompanied by an intent to

preserve the extension of previous uses. *Gold* correctly applies to all and only those instances that share the underlying nature of the sample. It is not part of normal linguistic competence to know that this consists in being the element with atomic number 79.

In the famous “twin-earth” thought-experiment of Putnam 1975, we imagine that earth and twin earth are alike in every respect, except that the clear, colorless liquid that flows in the rivers and plumbing of twin earth has the chemical composition XYZ instead of H<sub>2</sub>O. Oscar<sub>1</sub> on earth and Oscar<sub>2</sub> on twin earth are doppelgängers, identical in all “inner” psychological respects and in all relevant physiological respects. Each is ignorant of the chemistry of what he calls *water*. Surely, Putnam urges, XYZ is not water. Water is H<sub>2</sub>O in every possible world. Moreover, Oscar<sub>1</sub>’s term *water* and Oscar<sub>2</sub>’s term *water* have different meanings: the former is true of H<sub>2</sub>O in every possible world, but the latter is true of XYZ in every possible world. “Meanings,” Putnam concludes (1975:227), “just ain’t in the head!”

Natural-kind terms exhibit what Putnam calls a “sociolinguistic division of labor.” Competent speakers need not have identifying knowledge of the kind in order for their use of a natural-kind term to have its usual extension. It is enough that experts can discriminate instances. Normal linguistic competence seems rather to consist in possession of a “stereotype” roughly characterizing the kind. For example, in teaching the term *tiger*, it seems obligatory to include the information that tigers have stripes.

To exhibit a different sort of environmental dependency, Burge 1979 imagines someone who has a large number of beliefs about arthritis—and who says, and thinks, that he has arthritis in his thigh. What he thinks is false, since only ailments of the joints can be arthritis. Now imagine his doppelgänger living in a community that standardly includes certain rheumatoid ailments of the thigh in the extension of its term *arthritis*. The doppelgänger’s utterance *I have arthritis in my thigh* is taken by experts in his community to express a simple truth. The twins, though identical at an individualistic level of description, have different concepts. The thought-experiment exhibits a purely social component in the identification of intentional content; and it draws the anti-individualistic moral for mental as well as linguistic content.

Putnam 1975 sometimes expresses the moral of his thought-experiment by claiming that natural-kind terms have an indexical component: necessarily, *x* is water if and only if *x* bears the relation “same substance” to THIS,

to what’s called *water* around HERE. But this claim requires careful interpretation (Salmon 1981:99–106). Natural-kind terms, on Putnam’s overall view, express a constant content, independent of the context of use within a language. (One must, of course, hold the language to be fixed; otherwise, all terms are trivially indexical in virtue of the very conventionality of language.) Semantic content varies in the thought-experiments not intralinguistically with the context of utterance, but between languages and broad, stable features of the physical and social environment (Burge 1982).

“Two-dimensional” semantics is a proposed gloss on the Kripke-Putnam results that has attracted attention (e.g., see chap. 2 of Jackson 1998, and references therein). This view attempts to carve out a semantic role for descriptive properties that may be revealed by conceptual analysis, all the while agreeing that a term like *water* has an intension that assigns to the actual world, as well as to each other possible world, considered as non-actual, the set of all instances of H<sub>2</sub>O in the relevant world. Two-dimensional semantics postulates a second “diagonal” intension for *water*, which assigns to each possible world *w*, considered as actual, the set of all instances of whatever stuff plays, in *w*, the watery role that conceptual analysis reveals as assigned to *water* (where this role may include such features as *lying at the end of a certain causal-historical chain*). However, there remain unclarities in the application of these formal ideas to particular semantic constructions. For example, two-dimensionalism provides no clear method for distinguishing cases in which a pair of homophonic expressions across contexts are simply lexically distinct, from cases in which they share a diagonal intension.

Soames 2002 deepens and refines the Kripke-Putnam results regarding natural kind terms, but, contrary to Kripke, he finds no distinctive and explanatory sense in which such terms are rigid designators. Substance predicates, for example, resemble proper names in being non-descriptive, but they carry the semantic presupposition that nearly all members of an ostended sample share an underlying physical constitution. If the presupposition succeeds, then the semantic value of a natural kind predicate like *water* is nothing more than the kind itself—a function from worlds to sets of instances, as it might be—and this is analogous to direct reference. The semantic value of the compound expression *H<sub>2</sub>O*, on the other hand, is not the kind itself but a complex and partly descriptive property that determines the kind. The proposition *water is H<sub>2</sub>O* is thus linguistically guaranteed to

be necessary if true, but it is not a priori knowable, and so it is epistemically disanalogous to propositions like *Cicero is Tully*.

The new theories of reference raise large methodological issues for psychology and linguistics. Stich 1983 argues that the environmental dependencies render everyday intentional discourse unsuitable for cognitive-scientific explanation. Some philosophers have suggested that the distinction of Kaplan 1989 between character and content may be pressed into the service of an individualistic, and hence scientifically respectable, variety of intentionality. But Burge 1986 argues that explanations in cognitive science routinely attribute non-individualistic mental states, and that revisionary proposals are not well motivated. Such disagreements about methodology in cognitive science are played out against the backdrop of a near consensus against individualism in recent mainstream philosophy of language. Taken full strength, anti-individualism holds that semantic claims describe, in the first instance, not (even appropriately idealized) individual psychologies, but communal conventions and norms for representing the world. No such near consensus exists among linguists, however; see, for example, Chomsky 2000.

[See also Semantics and Pragmatics and Contextual Semantics.]

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#### Propositions

The traditional philosophical conception of proposition is a conception of something which is a bearer of truth-conditions, and is the object of belief, assertion, denial, and judgment. According to this conception, the meaning of a sentence is identified with a function from times and contexts of use to the propositions expressed by the sentence with respect to these times and contexts (see Cartwright 1962). It is a fundamental task of a semantic theory to characterize the propositions expressed by the sentences of a language. This characterization is required for the semantic evaluation of propositional attitude constructions; it determines the cognitive contents of the sentences of the language; and it helps to identify the beliefs, judgments, and assertions of its speakers.

Three principal conceptions of proposition emerged in the 20th century: the *Fregean* conception (see Frege 1960), the *truth-conditional* conception, and the *Russellian* conception (see Russell 1956). Each accepts the following principles:

- (1a) Attitudes such as belief, assertion, judgment, and denial are relations to propositions.