

What does it mean for something to be an *object*, in the broad sense in which numbers, persons, physical substances, and reasons all play the role of objects in our language and thought? My dissertation argues that objects are simply *answers to questions*: they are things we search for and specify during investigation or inquiry. They share this epistemological role, but need not belong to any common ontological category.

I argue for this conclusion by developing the concept of an *investigation*. An investigation is an activity structured by a question. For example, consider an elementary algebra problem: what is the number x such that $x^2 - 6x + 9 = 0$? Beginning from this question, one carries out an investigation by searching for and giving its answer: $x = 3$. I use this notion of investigation as the foundation for a new semantic program which explains what ‘number’ and similar nouns mean. On the view I develop, nouns like ‘number’ express the *kind* of question an investigation addresses. ‘Number’ corresponds to a ‘how many?’ question; ‘person’ corresponds to ‘who?’; ‘reason’ to one sense of ‘why?’; and so on.

I make use of this idea, which has its roots in Aristotle’s *Categories*, to solve a puzzle about these nouns. As Frege pointed out in the *Foundations of Arithmetic*, it seems to be impossible for

(1) The number of Jupiter’s moons is four.

to be true while

(2) Jupiter has four moons.

is false, or vice versa. These sentences are just two different ways of expressing the same thought. But on a standard analysis, it is puzzling how that can be so. Except for ‘number’, every expression in (1) has a correlate in (2). If the thought is the same whether or not it is expressed using ‘number’, what does that noun contribute? Is the concept it expresses wholly empty? That can’t be right: ‘number’ is a meaningful expression, and its presence in (1) seems to make that sentence *about* numbers, in addition to Jupiter and its moons. So why doesn’t it make a difference to the sentence’s truth conditions?

These two sentences are a famous example, but the pattern they exhibit is hardly unique. To say that Galileo discovered Jupiter’s moons is just to say that the *person* who discovered them was Galileo. Likewise, to say that Jupiter spins rapidly because it is gaseous is just to say that the *reason* it spins rapidly is that it is gaseous. So the same puzzle that arises for ‘number’ also arises for ‘person’, ‘reason’, and other nouns of philosophical interest. If they are significant, what contribution do they make?

Because the problem is general, I pursue a general solution. I argue that sentences like (1), which are known as *specificational* sentences, should be analyzed as question-answer pairs. Semantically, (1) is analogous to a short dialogue: “How many moons does Jupiter have? Four.” This analysis is linguistically well supported, and it solves the puzzle. According to this analysis, (1) asserts no more or less than the answer it gives, which could also be given by (2); that is why they have the same truth conditions. But (1) differs from (2) by explicitly marking this assertion as answering the ‘how many?’ question expressed by ‘the number of Jupiter’s moons’. That is why the two sentences have different subject matters and uses.

I formulate this analysis of specificational sentences using a game-theoretical semantics. In the semantic games which determine the truth conditions of a specificational sentence, players carry out investigations in which they seek to answer the question expressed in the first part of the sentence. When they can give the answer expressed in the second part, the sentence is true. In this setting, objects are characterized by their epistemological role: objects are whatever can be specified as the values sought in such investigations for bound variables. The semantics thus captures the sense in which objects are answers to questions.

This account offers a new interpretation of Frege’s claim that numbers are objects. Frege’s claim concerns the epistemological role of numbers, which is why he appeals to (1) to support it: sentences like (1) show us that numbers are the sort of thing we can search for and specify in scientific investigations. In Frege’s view, it is that role, rather than the ontology of numbers, which grounds the objectivity of arithmetic.