How to deal with Janus'face of natural numbers?

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Abstract

This paper addresses a dilemma arising from the linguistic behaviour of arithmetical expressions in two basic ways: they occur, either as singular terms in identity statements or as predicates of concepts in adjectival statements. However, those forms of syntactical behaviour give rise to opposite accounts of the ontological status of natural numbers. The substantival use of arithmetical expressions is associated with the interpretation of natural numbers as abstract particulars while the adjectival use of arithmetical expressions ordinarily supports the interpretation of natural numbers either as properties of physical collections or as properties of sortal concepts, i.e. as second-order properties.

Both types of interpretation are taken under consideration and the special difficulties of each position are sketched, in view of recently discussed aspects of the 'arithmetical platonism' issue. The interpretation of numbers as abstract particulars by the neo-Fregean program presupposes the discrimination of singular terms from other categories of expressions. However, to achieve the alleged syntactical distinction by means of an appropriate set of criteria is considered as a very ambitious task which has not yet been met in an adequate way. On the other hand, interpretations of natural numbers as (1st or 2nd-order) properties face difficulties which, to a large extent, are taken to arise from the fact that those interpretations do not offer a satisfactory account of arithmetical identities. In particular, the paper takes in account Maddy's approach according to which natural numbers are properties of sets. Then it investigates the reasons why interpretations of numbers as properties often result in an extensional treatment of those properties.

Then the paper tries out a reduction strategy to investigate the relationship between the substantival form ' ' and the adjectival form ' ' and determine, if possible, the most fundamental of the two accounts. Hence, it presents three options. The first option is to examine whether the substantival form is reducible to the adjectival form, by an attempt to undermine the semantic role of arithmetical terms as genuine singular terms. The second option is to apply the converse reduction strategy. The third option is to take the substantival form to be equivalent to the adjectival form.

In particular, the paper focuses its attention on the third option. To articulate the proposal about the alleged equivalence between the two forms of syntactical behaviour of numbers, it embarks on a discussion of Ramsey's argument that no essential difference between particulars and universals can be asserted at least on syntactical grounds. Then the paper moves on to present the reasons why the third option appears to be the most prevalent of the three. To highlight this claim, it presents an account of how an equivalence principle can actually be settled among the two forms of arithmetical syntactical behaviour. The paper concludes with suggestions about possible ways by which we can construe the alleged equivalence, considering the substantival and the adjectival account as the two sides of the same coin.

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