

# Is the radical multiverse view coherent?

Neil Barton and Daniel Waxman

## Abstract

Hamkins has argued for a very radical version of set-theoretic multiversism, on which every model of first-order ZFC is on an ontological par with every other. Moreover, his responses to the categoricity arguments and attitude towards the natural number structure indicate that he is committed to a principle we call Bridging: Only those structures and statements that are agreed upon by all models of first-order ZFC are determinate. In this paper, following arguments of Barton and Koellner, we suggest that this view is not coherent since the notion of a model of first-order ZFC is itself not determinate within the ZFC-multiverse. We consider a response given by Barton—that the multiverse view should be regarded as proposing an algebraic framework for set-theoretic practice—and argue that it is unworkable in the details in virtue of its dependence on another indeterminate notion, namely truth. We consider two responses available to the radical multiversist: (1.) Accept that the natural numbers are determinate, but otherwise hold on to the framework, or (2.) Plump for a further radicalisation of the view to only considering ‘feasible’ fragments of ZFC. Whilst both are coherent, we argue that each gives up a substantial part of the view. (1.) gives up Bridging, whereas (2.) gives up the naturalism that is often seen as a virtue of the position.