

From degrees of belief to binary beliefs: Lessons from judgment-aggregation theory*

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Abstract

What is the relationship between degrees of belief and binary beliefs? Can the latter be expressed as a function of the former – a so-called “belief-binarization rule” – without running into difficulties such as the lottery paradox? We show that this problem can be usefully analyzed from the perspective of judgment-aggregation theory. Although some formal similarities between belief binarization and judgment aggregation have been noted before, the connection between the two problems has not yet been studied in full generality. We seek to fill this gap. This paper is organized around a baseline impossibility theorem, which we use to map out the space of possible solutions to the belief-binarization problem. Our theorem shows that, except in limiting cases, there exists no belief-binarization rule satisfying four initially plausible desiderata. Surprisingly, this result is a direct corollary of the judgment-aggregation variant of Arrow’s classic impossibility theorem in social choice theory.

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