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Bringing Order to the Cognitive Fallacy Zoo

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Abstract

Investigations into human decision-making have led to the discovery of numerous cognitive biases and fallacies, with new ones continually emerging, leading to a state of affairs which can fairly be characterized as the cognitive fallacy zoo! In this work, we formally present a principled way to bring order to this zoo. We introduce the idea of establishing implication relationships (IRs) between cognitive fallacies, formally characterizing how one fallacy implies another. IR is analogous to, and partly inspired by, the concept of reduction in computational complexity theory. We present several examples of IRs involving experimentally well-documented fallacies: base-rate neglect, availability bias, conjunction fallacy, decoy effect, framing effect, and Allais paradox. We conclude by discussing how our work: (i) allows for identifying those pivotal cognitive fallacies whose investigation would be the most rewarding research agenda, and (ii) permits a systematized, guided research program on cognitive fallacies, motivating influential theoretical as well as experimental avenues of future research.