

# Abstract Representations and Confirmation

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## Abstract

Many philosophers would concede that mathematics contributes to the abstractness of some of our most successful scientific representations. Still, it is hard to know what this abstractness really comes to or how to make a link between abstractness and success. I start by explaining how mathematics can increase the abstractness of our representations by distinguishing two kinds of abstractness. First, there is an abstract representation that eschews causal content. Second, there are families of representations with a common mathematical core that is variously interpreted. The second part of the paper makes a connection between both kinds of abstractness and success by emphasizing confirmation. That is, I will argue that the mathematics contributes to the confirmation of these abstract scientific representations. This can happen in two ways which I label "direct" and "indirect". The contribution is direct when the mathematics facilitates the confirmation of an accurate representation, while the contribution is indirect when it helps the process of disconfirming an inaccurate representation. Establishing this conclusion helps to explain why mathematics is prevalent in some of our successful scientific theories, but I should emphasize that this is just one piece of a fairly daunting puzzle.

**Keywords:** applications of mathematics; abstraction; confirmation

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