A hierarchical model of metacognition

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Abstract

I present a novel method of conceptualizing metacognition in a computational hierarchy. Metacognition is commonly described as cognition acting on itself, and correlates with enhanced performance in memory, reasoning, emotional regulation, and motor skills. Understanding metacognition requires surmounting two barriers: its high-level abstraction and disputed terminology. To overcome these barriers I employ a computational cognitive architecture to first define the base units of cognition and how they come to act on themselves. Well-defined computational units are built up into a hierarchy of cognitive processes. These forms of cognition are then connected back to clarify the research literature. Each form is built into working models within ACT-R to support this hierarchical systems viability. The intention of this hierarchical model is to help clarify the nature of metacognition by supplementing verbal cognitive definition with rigorous computational terminology.