Sources of knowledge in children's acquisition of the successor function

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Abstract

The successor function a recursive function S which states that for every natural number n, S(n) = n+1 underlies our understanding of the natural numbers as an infinite class. Recent work has found that acquisition of this logical property is surprisingly protracted, completed several years after children master the counting procedure. While such work links successor knowledge with counting mastery, the exact processes underlying this developmental transition remain unclear. Here, we examined two possible mechanisms: (1) recursive counting knowledge, and (2) formal training with the +1 rule in arithmetic. We find that while both recursive counting and arithmetic mastery predict successor knowledge, arithmetic performance is significantly lower than measures of recursive counting for all children. This dissociation suggests children do not generalize the successor function from trained mathematics; rather, we find evidence consistent with the hypothesis that successor knowledge is supported by the extraction of recursive counting rules.