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To infinity and beyond: children generalize the successor function to all possible numbers years after learning to count.

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Summary: Recent accounts of number word learning posit that when children learn to accurately count sets (i.e., become “cardinal principle” or “CP” knowers), they have a conceptual insight about how the count list implements the successor function – i.e., that every natural number n has a successor defined as $n + 1$. However, recent studies suggest that knowledge of the successor function emerges sometime after children learn to accurately count, though it remains unknown when this occurs, and what causes this developmental transition. We tested knowledge of the successor function in 100 children aged 4 through 7 and asked how age and counting ability are related to: (1) children’s ability to infer the successors of all numbers in their count list and (2) knowledge that *all* numbers have a successor. We found that children do not acquire these two facets of the successor function until they are about $5\frac{1}{2}$ or 6 years of age – roughly 2 years after they learn to accurately count sets and become CP-knowers. These findings show that acquisition of the successor function is highly protracted, providing the strongest evidence yet that it cannot drive the cardinal principle induction. We suggest that counting experience, as well as knowledge of recursive counting structures, may instead drive the learning of the successor function.

Classification: F21 F22

Keywords: cardinal principle; successor function; infinity; count list; conceptual change; natural number concepts

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