**Abstract**

We test the hypothesis that children acquire the successor function — a foundational principle stating that every natural number *n* has a successor *n*+1 — by learning the productive linguistic rules that govern verbal counting. Previous studies report that speakers of languages with less complex count list morphology have greater counting and mathematical knowledge at earlier ages in comparison to speakers of more complex languages (e.g., Miller & Stigler, 1987). Here, we tested whether differences in count list transparency affected children’s acquisition of the successor function in three languages with relatively transparent count lists (Cantonese, Slovenian, and English) and two languages with relatively opaque count lists (Hindi and Gujarati). We measured 3.5- to 6.5-year-old children’s mastery of their count list’s recursive structure with two tasks assessing productive counting, which we then related to a measure of successor function knowledge. While the more opaque languages were associated with lower counting proficiency and successor function task performance in comparison to the more transparent languages, a unique within-language analytic approach revealed a robust relationship between measures of productive counting and successor knowledge in almost every language. We conclude that learning productive rules of counting is a critical step in acquiring knowledge of recursive successor function across languages, and that the timeline for this learning varies as a function of counting transparency.

Keywords: Cross-linguistic; Count list; Successor function; Natural number concepts; Number acquisition; Conceptual development