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Testing object-based models of number perception in early development

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Abstract

Nativist and empiricist theories of number perception dispute the content of early quantitative representations. We adapt a numerical comparison task using the “connectedness illusion” for young children (3-6 years) to test the theorized developmental transition from feature- to object-based enumeration predicted by some empiricist accounts. Children as young as three reliably underestimated connected dot displays, despite instruction to ignore connecting lines, replicating previous findings in adults (Franconeri et al., 2009; He et al., 2009). These results indicate that children’s numerical judgments recruit discrete object representations, even before significant number-specific experience. Our findings constrain empiricist accounts which propose a prolonged feature-based stage of number perception and highlight the value of theoretically diagnostic stimuli to probe the origins of numerical cognition.