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Numerical estimation in preschoolers.

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Summary: Children's sense of numbers before formal education is thought to rely on an approximate number system based on logarithmically compressed analog magnitudes that increases in resolution throughout childhood. School-age children performing a numerical estimation task have been shown to increasingly rely on a formally appropriate, linear representation and decrease their use of an intuitive, logarithmic one. We investigated the development of numerical estimation in a younger population (3.5- to 6.5-year-olds) using 0–100 and 2 novel sets of 1–10 and 1–20 number lines. Children's estimates shifted from logarithmic to linear in the small number range, whereas they became more accurate but increasingly logarithmic on the larger interval. Estimation accuracy was correlated with knowledge of Arabic numerals and numerical order. These results suggest that the development of numerical estimation is built on a logarithmic coding of numbers – the hallmark of the approximate number system – and is subsequently shaped by the acquisition of cultural practices with numbers.

Classification: F21 F22 C61 C62

Keywords: number concepts; numeracy; computation; preschool children; numbers; cultural influences; age differences; child development; foreign countries; kindergarten

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