

# Study: Preschoolers integrate audio, video

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Children may have a raw ability to quickly add large sums even before they have been taught arithmetic, researchers reported Monday.

Scientists previously demonstrated infants, children, and non-human primates have limited abilities to manipulate numerical quantities.

In the most recent study, Elizabeth Spelke and colleagues at Harvard University's Laboratory for Developmental Studies explored the extent of those skills in preschoolers, including how well they integrated audio and visual information about abstract numbers.

The children participated in several experiments to test comparison and addition. For example, in the "cross-modal addition" version, children watched computer animations that briefly flashed two successive groups of dots, ranging in size from 10 to 58 dots.

The children then heard a quick series of tones and reported whether there were more combined dots or more tones. Across all experiments, the children answered correctly about two-thirds of the time, which was significantly better than chance.

The results suggest an abstract knowledge of number and addition precedes language-based mathematics instruction and might help create strategies that harness children's pre-existing arithmetic intuitions.

The research appears in this week's online, early edition of the Proceedings of the National Academy of Sciences.

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