

Child's 'mental number line' affects memory for numbers

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As children in Western cultures grow, they learn to place numbers on a mental number line, with smaller numbers to the left and spaced further apart than the larger numbers on the right. Then the number line changes to become more linear, with small and large numbers the same distance apart. Children whose number line has made this change are better at remembering numbers, according to a new study published in *Psychological Science*, a journal of the Association for Psychological Science.

Remembering numbers is an important skill—in life, which is full of [social security numbers](#), temperatures, locker combinations, and [passwords](#), as well as in school. For this study, Clarissa A. Thompson of the University of Oklahoma and Robert S. Siegler of Carnegie Mellon University looked at how children's memory for numbers relates to the way they represent numbers in their heads.

"Young children's knowledge sometimes seems impressive, because they can count, 'one two three four five six seven eight nine ten,' but often they just learn by rote. Their counting doesn't have much to do with their understanding of how big the numbers are," says Thompson. But eventually these words get associated with the size of the numbers. Children normally start out with a logarithmic [number](#) line, which has more space between smaller numbers and crunches the larger numbers together at the top. Eventually they progress to a linear number line.

In one experiment, each child was given a stack of blank number lines,

with "0" written below the left end and "20" written below the right end. Then the child heard a series of numbers from 1 through 19 and had to mark on each number line where they thought that number belonged. Then the experimenter told a story that included a few numbers. The child was asked to name four cartoon characters, to throw off their memory a bit. (Thomas the Tank Engine and Dora the Explorer were favorites.) After that, the experimenter asked questions about the story, like "How many forks did Colleen wash?" Children with a more linear number line were better at remembering the numbers in the story.

In three experiments, Thompson and Siegler found that the more linear a child's number line, the better the child was at remembering numbers. This was true for preschoolers for numbers from 1-20 and for elementary school [children](#) for numbers from 1-1000. "We really do live in a world of numbers," says Thompson. "Some we only need to approximate, and others we need to remember exactly. Ability to estimate the sizes of numbers influences the ability to remember the numbers exactly."

Provided by Association for Psychological Science

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