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Human Brain Made for Counting

Randolph Schmid, Associated Press

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The tests:

- Sharing. Almost all the children were able to distribute six and nine pieces of play dough among three [toy bears](#). When 7 or 10 pieces were to be shared, the idea of dividing up the extra piece was only figured out by a few of them, and those were older, non-English speakers.
- Memory. Various numbers of tokens were placed on a mat and then covered. Children were asked to place the same amount of tokens on their mats. No differences were found in the three groups.
- Nonverbal addition. Some counters were placed on a mat and covered. A few seconds later more were

placed down and then slid under the mat. The children were asked to match the total number of counters. Several combinations were used including 2+1, 1+4, 4+3 and 4+2. The English speakers got fewer right, but the difference was not considered significant.

- Cross-modal matching. A block of wood was tapped with a stick and some counters were placed on a mat. Sometimes the number of taps matched the number of counters, sometimes not. The children were asked if the numbers were the same. No language differences were found.

"Perhaps the most striking result comes from the cross-modal matching task, where the child has to put out the number of counters corresponding to a sequence of auditory events," Butterworth said. "This cannot be done using visual memory, but requires the child to generate a mental representation that is abstract enough to serve to represent both auditory and visual enumeration."

But Gibson said, "In order to demonstrate their desired conclusion, the authors would need to evaluate an age group across languages with and without number words, where the participants in the language with number words can succeed in getting close to 100 percent accuracy on the tasks. Then the effects of the absence of number words can be evaluated in the population speaking the language that lacks number words," they said.

In these tests, however, while all groups of children had more or less similar results, none had 100 percent.

It looks like all the children in the study are using approximate matching to solve the tasks at hand, a strategy which does not rely on the use of number words, he said.

Gibson and other researchers have also studied South American natives whose languages don't have number words.

"In our recent work, we have demonstrated that Piraha speakers achieve high accuracy on matching tasks, despite having no count words whatsoever, not even a word for one," Gibson said.

Butterworth's research was supported by the Leverhulme Trust.

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