

October 2005

Count Me In

This newsletter goes out to all of the schools that participated in the Count Me In study in 2004 and 2005. We want to share what we are learning.

This year, a school in Ottawa joined those in Winnipeg and Peterborough. Almost 400 children counted, added and thought their way through Count Me In school research sessions.

Parents Count Too!

Count Me In's objective is to find predictors of mathematical achievement in young children. As with literacy, home activities may play a role. Many parents of children in the study filled out extensive questionnaires on home activities - some of you for the second year! Thank you so much for your input.

One of the groups of activities described in the questionnaire was math-related games, including board games, games with cards, and activities involving timing. Our analysis shows that more frequent game playing is related to how quickly and accurately children can count and, for older children, their skill at solving addition facts. We can't say that playing games causes children to count more efficiently, but it certainly doesn't hurt!

Counting - the how & the why

Researchers have suggested that faster counters memorize math facts sooner than slower counters (David Geary, 1993). When children learn addition and subtraction in Grades 1 and 2, they start out using counting to solve problems like $3 + 4$ or $9 + 6$, so it makes sense that skilled counting is a prerequisite for learning about arithmetic.

In the Count Me In study, all of the children count circles displayed on the computer screen. Groups of 1 to 6 circles appear 18 times, 3 times for each size of group. The children are asked to answer 'as fast as you can'. Most children find this fun and pay close attention, speeding from one display to the next.

At the *Society for Research in Child Development* this year, we presented results showing that, as expected, children get faster at counting every year. However, we also showed that children with lower math scores tend to count more slowly, even when there are only 2 or 3 circles on the screen. Thus, counting speed may be a predictor of children's acquisition of arithmetic skills.

We are also studying what children understand about counting. Adults know that counting is a flexible procedure. You can count from left to right, or you can count every second object, or in a collection of toys, you can count all the blue toys first. As



long as you assign one number word to each object, you will come up with a correct answer for 'how many'.

In our study, children watch an animated frog (Hoppy), count a set of red and blue squares. Sometimes, Hoppy counts the squares from left to right (the standard procedure). Other times, Hoppy makes a counting mistake (e.g., he misses one of the squares, or counts one twice). We ask the children to watch Hoppy count and then to tell us if Hoppy has made a mistake. By Grade 2, most of the children can reliably identify mistakes.

Sometimes Hoppy is flexible about how he counts, for example, from right to left, or he counts the blue squares first and then counts the red squares. Even though Hoppy counts correctly on these unusual trials (he states the correct number





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of squares), many of the children tell us that Hoppy has made a mistake. These results suggest that the children don't understand how the counting procedure can be used in flexible ways.

Children with lower to average math scores were still learning about the counting procedure in Grade 2 - they were most likely to say that Hoppy had made a mistake on these unusual trials.

Children with higher math scores were a bit more flexible - they were more likely to accept unusual counts. Overall, however, children at this age are not very flexible about 'how to count'.

Flexibility in choosing and applying arithmetic procedures takes a long time to develop. Parents can help by encouraging children to use a variety of methods to solve counting and arithmetic problems.

Board Games - Counting & Flexibility

What kind of fun math-related activities can you do at home with your children? The Count Me In team recommends board games, card games, and other activities where math happens naturally. Board games with dice provide lots of counting practice and some practice with simple addition to twelve. Counting the dots on dice and then confirming the count by tapping the squares on the board as the player moves all help the child develop ease with small numbers.

Games that involve alternative routes (like Sorry or Chinese Checkers) also may help your child develop the counting flexibility we were discussing earlier. You can help by demonstrating unusual counts - starting from either end, or the beginning, or counting opposite colors. Older children will enjoy learning checkers and chess, which reinforce spatial skills, memory, and encourage the development of strategies.

Card games that involve matching numbers or making pairs such as Crazy Eights help children practice a variety of number skills. The presence of a parent or caregiver is a big part of the value of board games and card games. Adults help to guide the children's skill development by tactfully correcting mistakes (or facilitating the process so mistakes are avoided), applauding success, and modeling the skills.

The bottom line is that activities in which parents and children are using their math skills together are fun and likely to enhance children's development in math. Parents have an important role to play in encouraging children's applied math knowledge and showing them how math is important for everyday activities.