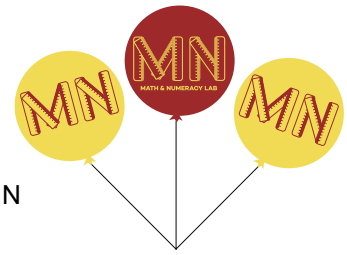


## Why “number” matters in early childhood

Children benefit from having a good understanding of what numbers *are* and what number words *mean*. This knowledge provides a foundation for their later mathematics achievement. This means that children benefit from opportunities to learn about numbers before they enter school. At the Math and Numeracy Lab (MN Lab) at UMN, we study what contributes to early math learning opportunities.



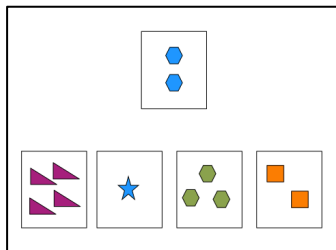
Math learning opportunities may involve activities like counting, creating sets, adding or subtracting items in everyday situations during play, mealtime, or walks to and from home. In order to engage in these sorts of number activities, children need to be aware of numbers in the first place! Studies show that children’s spontaneous focus on number predicts math achievement a year or two later. In our study, we asked whether it is possible to prompt children to notice “number” in materials with which they interact.

## Noticing number in everyday activities

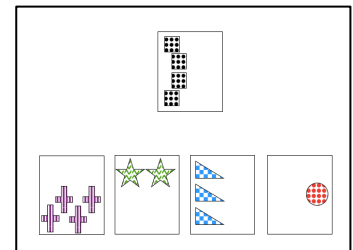
Imagine reading a book to a preschooler. On one page, there is text accompanying a picture of four balloons. As you read the text, how does the child know that “four” balloons refers to *how many* balloons there are, instead of the size, shape, color, or even the location of the balloons (such as if they appear high on the page or in the middle). What determines if a child even notices the number to begin with?

## Noticing number in our research activity

We hypothesized that competing demands may either facilitate or interfere with children’s attention to number. To test this hypothesis, we created a matching game using pictures like those shown in the examples below. Each page had a target picture at the top and four pictures at the bottom. On each page, we asked children (and adults) to choose “the best match” for the target. On some pages, we asked them to show us all the matches.



There were three possible matches per page, and one picture that did not match the target at all (like the first option in the page shown on the left, and the second option in the page shown on the right). We varied the types of possible matches. On some pages, pictures matched the target on color, shape, or number (like on the left); on other pages, pictures could match the target on number, location, or pattern (like on the right).



We found that children rarely attended to number when finding either a *best match* or *any possible match*. (Adults were more likely to attend to number than were children, but were more still likely to match on other features). Children (and adults) were less likely to find a match based on number if the other possible matches were color or shape (which we considered “salient,” or highly noticeable, features) compared to when the other matches were less salient (e.g., pattern or location). You might notice this effect in the pictures above: the two number-matching sets of 4 items in the picture on the right are more evident than the two number-matching sets of 2 items in the picture on the left.

## Implications

One interpretation of these findings is that materials and activities can be designed to help children notice number, and that ***we can make “number” stand out by avoiding salient competing features***. This may help support more opportunities for children to learn about numbers. [This principle might generalize to other features, such as shape or size]. In other words, materials themselves affect the opportunities for children to notice mathematical features and to therefore practice and develop their mathematical thinking.

## For further reading

Chan, J. Y.C., & Mazzocco, M.M.M. (2017). Competing features influence children’s attention to number. *Journal of Experimental Child Psychology*, 156, 62–81. <https://doi.org/10.1016/j.jecp.2016.11.008>.

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