

Insights into Very Young Children's Mathematical Thinking from Psychological Research

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Very young and preverbal children can engage in mathematical thinking. Often their opportunities to use, show, or develop mathematical thinking is dependent on their environment—and this is impacted by the attitudes and beliefs of early childhood educators who work with them (MacDonald & McGrath, 2022). Early childhood educators also need to be able to recognise the mathematical understandings that the children have and then use what they have observed in creating additional opportunities for further developing the children's mathematical understandings (Cohrssen & Tayler, 2016). Research from the field of psychology could help early childhood educators refine their beliefs about very young and preverbal children's capacity to engage with mathematics. Due to the work with very young and preverbal children not being able to ask the children for their thinking, psychological research often uses the violation-of-expectation method to identify the thinking of these children—as Stahl and Kibbe (2022, p. 1) state, violation-of-expectation provides “insights into the knowledge and cognitive capacities of infants who otherwise would not be able to verbally report those abilities”. The violation-of-expectation method involves familiarising or habitualising to a specific situation or image by showing this to the child; the novel situation or image is then shown and the looking time is measured (Turk-Browne et al., 2008).

As can be seen in the description of psychological research methodology above, the context in psychological research is very different from that in an early learning setting. However, sharing findings from psychological research still provides insights into the mathematical thinking that very young and preverbal children can engage with, and early childhood educators could benefit from being aware of this mathematical thinking when working with these very young and preverbal children. Although a range of research investigating the mathematical thinking of children up to 12 months of age from the field of psychology is presented, this is neither a systematic review nor a scoping review, rather, a snowball process that grew as research was identified; as a result, it is not exhaustive. This presentation aims to demonstrate how extensive very young and preverbal children's mathematical thinking is through mapping the findings from psychological research to broad mathematics curriculum areas of number and algebra (for example, quantity, operations, and patterns), measurement (such as size, time, and speed), geometry (including identification of attributes to create categories, comparisons of attributes, and spatial concepts), and prediction.

References

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