

PRESCHOOL-AGED CHILDREN'S EMERGENT DISPOSITIONS WITH RESPECT TO MATHEMATICS

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Beginning to understand children's mathematical dispositions during the preschool years may be beneficial as early childhood experiences can predict student's achievement in subsequent educational settings (Fleer & Raben, 2005). Findings suggest that mathematical dispositions can be related to academic success in mathematics (Beyers, 2011a, 2012; Kusmaryono, Suyitno, Dwijanto, & Dwidayati, 2019; O'Dell, 2017). However, there are relatively few studies examining mathematical dispositions among preschool-aged children. However, it is critical to explore the nature of these dispositions and corresponding behaviors at this stage of development, because these behaviors may be directly related to mathematical gains in subsequent educational settings (Hofer, Farran, & Cummings, 2013). The current study aims to address the question of whether preschool-aged children demonstrate observable mathematical dispositions in a pre-kindergarten school environment.

The authors draw on a conceptual framework which includes three primary areas of mathematical dispositions: cognitive, affective, and conative dispositional functions (Beyers, 2001a). Within those three areas of dispositional functions reside 10 total dispositional functions¹, such as attitudes, beliefs, argumentation (Beyers, 2011b). The authors developed an observation rubric based on construct definitions and examples of dispositional functions in previous work. For example, within the affective dispositional function attitude, a child who has a positive attitude about mathematics may gesture gleefully or offer relevant verbal excitement when engaged in or about to engage in mathematical activity, when he or she had just previously not been excited. Conversely, a student's behavior might shift from excitement to a more apathetic state when a mathematical task or discussion is introduced.

The second author was a teaching assistant in an early childhood center. Math activities were done informally as part of games and more formally as part of instruction. The teaching assistant took copious field notes annotating her observations throughout the day. Any activity directly or indirectly involving mathematical content was highlighted in her field notes. Both authors then reviewed and coded a portion of the field notes together, and then the remainder independently. Evidence could have been of a verbal or non-verbal nature. Evidence was coded to reflect whether evidence of a dispositional function was present, and which dispositional function was observed. The authors achieved interrater reliability over .80.

The data show that some dispositions with respect to mathematics are present among preschool-aged children. There is evidence of dispositional functions from each of the three primary areas of dispositional functioning: cognitive, affective, and conative, but not all 10 dispositional functions within those three areas. Data include examples of the cognitive function argumentation, the affective function attitude, and the conative function persistence. Evidence for other dispositional functions, such as making connections, or beliefs about the nature of mathematics were not observed. It is possible that other functions were not observed because opportunities to engage or demonstrate those dispositional functions did not present themselves or those dispositional functions are not yet emergent. Further examination is warranted.

¹ For a complete discussion of the 10 dispositional functions (e.g., while engaging in mathematical activity, demonstrating a tendency to: make connections, make mathematical arguments, hold certain attitude or beliefs, etc...) please refer to Beyers, 2011b.

References

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