

February 2021

Dear parents,

We are writing to thank you for participating in our study during Fall 2020. We finished our data collection in December and wanted to share some of our initial findings with you. Knowledge of repeating and growing patterning (e.g., predictable sequences in objects and numbers) are closely connected with broader mathematical thinking and achievement. The purpose of this study was to revise and create an online assessment of pre-k and kindergarten children's patterning skills to better understand their knowledge and to help parents and teachers plan math activities.

After gaining parental permission, we worked with 96 children in pre-k or kindergarten. Each child completed a 30-minute online session with a researcher in which they answered a series of questions about 2 types of patterns. One focused on *repeating patterns*, which are sequences that follow a rule where one part of the sequence repeats over and over (e.g., ABBABBABB where ABB repeats over and over). The other focused on *growing patterns*, which are sequences that follow a numeric rule (increases or decreases in objects or numbers by a set amount e.g., 1,3,5,7,9). Children were asked to complete patterns (e.g., ABCABC___) and identify pattern rules (e.g., "how does my pattern grow?"). Additionally, we examined children's ability to identify repeating patterns with new objects (pattern abstraction) and distinguish repeating patterns from nonpatterns. Finally, participants completed a number identification task where they verbally labelled written numerals presented to them on screen.

Overall, children demonstrated more knowledge of repeating than growing patterns, as we expected. Children were most successful at distinguishing repeating patterns from nonpatterns and completing repeating patterns. Children had mixed success at extending repeating patterns and identifying repeating patterns composed of new objects (pattern abstraction). They also had mixed success completing and extending growing patterns and were better with growing patterns that changed by a unit of 1 (e.g., 6, 7, 8, _) than by a unit of 2 (4, 6, 8, _). Interestingly, they performed similarly on growing pattern tasks that utilized objects and those that utilized written numerals. Children were least successful at identifying the pattern rule in growing patterns (e.g., the pattern 1, 3, 5 grows by 2).

Currently, we are using these data to guide additional research on the development of children's patterning skills as well as patterning activities that parents and teachers can use to support their children's developing knowledge. We look forward to conducting more studies on patterning and math more broadly to support this important aspect of math education.

Again, we appreciate your participation in our study. Please feel free to contact us directly with any further questions or visit our lab website (<http://bit.ly/VanderbiltChildrensLearningLab>), our parent resource website (<https://childrenslearninglabresources.wordpress.com/>), or follow us on twitter @childrens_lab.

Sincerely,



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