

# Effects of Playing Computerized versus Tactile Learning Games on Preschoolers' Attention Skills and Comprehension: A Pilot Study

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## Introduction

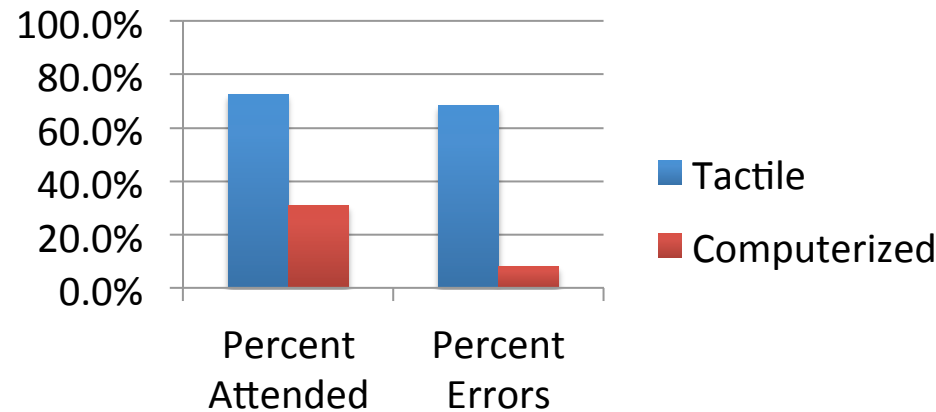
- Early childhood is a significant time for cognitive development, including early literacy and numeracy skills (Purpura, Hume, Sims, & Lonigan, 2011; Blair & Razza, 2007).
- Both tactile number games interventions and computerized number games interventions have been shown to improve young children's number sense (Wilson, Dehaene, Dubois, & Fayol, 2009).
- However, it is unclear how activity format (tactile vs. computerized) affects children's attention and comprehension while playing these games.
- Hypotheses: Children's attention will be greater while playing the computerized game, but children will have a greater understanding of the game when it is a tactile board game.

## Method

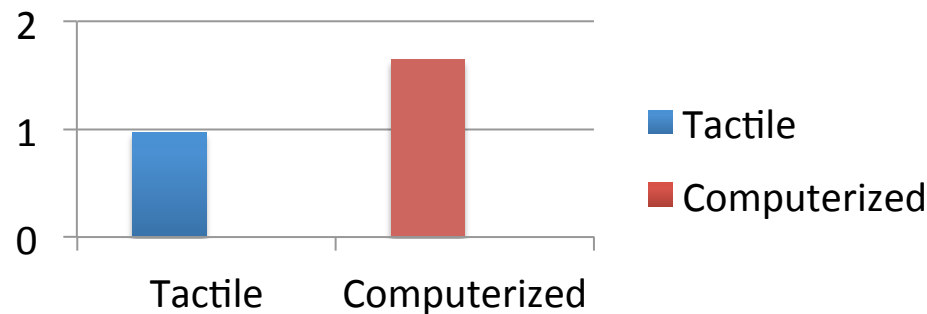
- Children (N = 12; Age= 3-6 ) were randomly assigned to play a tactile or computerized version of the Linear Numbers Board Game (Siegler & Ramani, 2009).
- Videotapes of game play were coded for children's attention (how long before they looked away), distraction (how many times they looked away), and comprehension (how many errors they made).

## Results

Comparisons Between Completing Tactile and Computerized Games on Attention and Understanding



Comparisons Between Completing Tactile and Computerized Games on the Number of Times Looked Away



## Conclusions

- Older children attended more to the game regardless of the condition and also made fewer errors.
- Children paid more attention and were less distracted in the tactile version of the game compared to the computerized game.
- Children had a harder time understanding the tactile version of the game compared to the computerized version.
- Potential explanation: research indicates executive functioning skills are linked with motor skills.
- Tasks that require complex motor skills appear to strain cognitive resources in young children (Cameron et al., 2012).
- Having the added component of physically moving the pieces in the tactile version may leave more room for error.
- Limitations: sample size, difficulty operating laptop and understanding number line.
- Future research: impacts on other skills, long-term effects.

Purpura, D. J., Hume, L. E., Sims, D. M., & Lonigan, C. J. (2011). Early literacy and early numeracy: The value of including early literacy skills in the prediction of numeracy development. *Journal Of Experimental Child Psychology*, 110(4), 647-658. doi:10.1016/j.jecp.2011.07.004; Blair, C., & Razza, R. P. (2007). Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. *Child Development*, 78(2), 647-663. doi:10.1111/j.1467-8624.2007.01019.x; Back to school Apps for primary school children and younger. (2014). Retrieved from <https://www.adjust.com/assets/downloads/back-to-school-app-report-2014-adjust.pdf>; Wilson, A. J., Dehaene, S., Dubois, O., & Fayol, M. (2009). Effects of an adaptive game intervention on accessing number sense in low-socioeconomic-status kindergarten children. *Mind, Brain, and Education*, 3(4), 224-234.; Siegler, R. S., & Ramani, G.B. (2009). Playing linear number board games- but not circular ones- improves low-income preschoolers' numerical understand. *Journal of Educational Psychology*, 101, 545-560.; Cameron, C. E., Brock, L. L., Murrah, W. M., Bell, L. H., Worzalla, S. L., Grissmer, D., & Morrison, F. J. (2012). Fine motor skills and executive function both contribute to kindergarten achievement. *Child development*, 83(4), 1229-1244.

