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Introduction

- On average, U.S. children earn significantly lower math scores on international assessments than children from other industrialized nations (TIMSS, 2011; PISA, 2012)
- Children’s engagement in home-based math activities predicts their early math skills (Clements & Sarama, 2006; Ramani & Siegler, 2008), which predicts their future math achievement (Duncan, et al., 2007)
- There are many opportunities afforded to children to use math at home (e.g. Ginsberg, Lee, & Boyd, 2008), but little research has examined the extent to which children actually use math during those activities
- Although children may be engaging in activities that have the potential to foster math, research shows that they may not actually engage in the aspects of those activities that foster math (Tudge & Doucet, 2004)
- Few studies have examined which math skills are most commonly fostered by children’s home-based math activities and whether home-based math engagement is associated with children’s understanding of how math is used in everyday activities

The Current Study

What is the nature of children’s math engagement at home?

- 1) What percentage of grade school children engaged in specific math-related activities?
- 2) What are the most common skills fostered by the games and sports children play at home?
- 3) Does the number of math skills fostered by children’s activities predict their awareness of math in everyday activities?

Method

Participants

- 99 children
 - 41 girls, 58 boys
 - 33 rising 1st graders, 23 rising 2nd graders, 23 rising 3rd graders, and 20 rising 4th graders

Measures

Mathematics Conceptions Questionnaire (MCQ)

Questions addressed engagement in math related activities including cooking, grocery shopping, board games, etc, and how math was used in each.

Procedure

- Children were individually interviewed by a trained research assistant

Coding

Math Engagement at Home

“How often do you (Ex: help with cooking) at home?”
(1=Almost Never, 2=Sometimes, 3=Almost Everyday)
If child answered at least sometimes, he/she was asked:
“How do you (help with cooking)?”

Method Continued

Coding (cont’d)

Children’s Awareness of Math in Daily Activities

“Do you think math is used when you (Ex: help with cooking) at home?”

If yes, “How is math used when you(cook)?”

(Scored on a 0-3 scale based on correctness and sophistication of response)

Nature of Children’s Engagement

Children’s descriptions of activity engagement were coded as math related or non-math related

Math Activity	Math Related	Non-Math Related
Help with cooking	Measuring Temperature or time	Pour/mix/stir ingredients Read instructions
Help at the grocery store	Help pay Weigh items	Read grocery list Push the cart

Results

Which activities did children report engaging in most frequently at home?

Activity	Mean (SD)
Using computers	2.11 (0.77)
Keeping score in games or sports	2.09 (0.63)
Playing video games	2.09 (0.72)
Using blocks or Legos	2.05 (0.71)
Helping at the grocery store	2.04 (0.67)

- First graders played on the computer, $F(3,95)=3.38$, $p=.022$, and helped with cooking, $F(3,95)=3.08$, $p=.031$, significantly more than second and third graders
- Younger children played with puzzles more than older children, $F(3,95)=6.52$, $p<.001$

What are the most common math skills potentially fostered by the games and sports children play at home?

Math Skills	Number of Children	Percent of Children
Counting	89	89.9%
Number Knowledge	79	79.8%
Number Transformation	79	79.8%
Problem Solving	77	77.8%
Connections	76	76.8%

Results Continued

What percentage of grade school children are engaged in specific math-related activities?

Math Activity	Number of Children	Percent of Children
Cooking	55	55.6%
Grocery Store	76	76.8%
Money	55	55.6%

Of children who did these activities, what percentage mentioned math-related engagement?

Math Activity	Number of Children	Percent of Children
Cooking	10	18.2%
Grocery Store	6	7.8%
Money	55	100.0%

Does the number of math skills fostered by children’s games and sports predict their awareness of math in everyday activities?

Predictor	β	SE	p
Grade Level	.43	.05	<.001
Number of Skills Fostered	.03	.02	.064

- The number of math skills fostered by the games and sports children played at home marginally significantly predicted their awareness of math in daily activities, $\beta=.03$, $t(96)=1.88$, $p=.064$, when controlling for grade level.

Discussion

- Although the majority of children are engaging in activities that can be math-related, very few children who help with cooking or at the grocery store are engaging in the math-related aspects of those activities
- It may be important for children to engage in activities that foster a variety of skills in order for them to be more aware of math in those activities
- Additionally, parents may need to be made aware of the potential benefit of engaging children in math-related aspects of activities at home
- Future research is needed to better understand the ways in which children engage in math activities at home and their awareness of how math is used outside of the school context
- Understanding children’s beliefs about math will help guide interventions to improve math achievement