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STEM Media in the Family Context: The Effect of STEM Career and Media Use on Preschoolers' Science and Math Skills

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ABSTRACT

Children's learning of science, technology, engineering, and mathematics (STEM) is important for their achievement in related fields. Before formal schooling, families can expose children to STEM by sharing knowledge and influencing children's use of learning tools, including media. We investigated whether parent attitudes towards STEM media and having a family member with a STEM career is related to children's science and math media use, and whether these factors predict children's science and math skills. We surveyed 296 American parents of children 3- to 5.5-years old on their attitudes toward STEM and their children's use of STEM television, computer games, and apps. Regression analyses showed that positive attitudes toward science and math media positively predicted children's science and math media use. Having a STEM-career family member was a negative predictor. Children's science and math media use was negatively related to their reported science and math skills. However, there was an interaction: children from non-STEM career families who consumed the most science and math media reportedly had worse science and math skills. Our findings have implications for how families can support science and math learning. These results can direct research on the role of media in early STEM education.

Keywords: informal learning, family environment, children's media, parent survey, STEM career

INTRODUCTION

In the United States, educators, researchers, and government agencies have been increasingly focused on promoting children's engagement with science, technology, engineering, and mathematics (STEM) in order to prepare youth for the needs of the global market. Before children enter formal schooling, the family environment may play an especially important role in exposing children to STEM concepts. For example, family members, such as parents, can share STEM knowledge, expose children to learning experiences like science museums, and encourage children's use of science and math learning tools and participation in STEM activities. Despite a plethora of research showing that the family context plays an important role in child development (e.g., Bronfenbrenner, 1986; Jant et al., 2014; Maloney et al., 2015; McCarthy et al., 2015), little research has investigated how family factors are related to practices around children's informal learning of science and math early in life, before they begin schooling. In the United States, children who have not begun compulsory primary education have the option of enrolling in preschool programs, which typically includes children between the ages of 3 to 5 years of age. Using data from a survey of American parents with preschool-aged children (between 3- to 5.5-years old), we investigated whether parent attitudes toward science and math media and having a family member in a STEM career are related to young children's reported science and math media use, and if these factors and children's science and math

media use predict children's reported science and math skills. By investigating whether children's family environment is related to their science and math skills, researchers and educators can better understand how to promote opportunities for family members to directly (e.g., sharing expertise) and indirectly (e.g., encouraging media use) support children's informal STEM learning.

Early Exposure to STEM Learning

Exposure to STEM learning opportunities early in life is important because the development of STEM skills can further students' interest and educational attainment in STEM, as well as expand their career choices later in life (Bybee and Fuchs, 2006; DeJarnette, 2012; Nugent et al., 2010; Wai et al., 2009; Watts et al., 2014). For example, research shows that children who received science instruction for longer periods of time and more regularly in kindergarten performed better than peers on a science assessment in third grade (Saçkes et al., 2011). Considering math, much research suggests that math learning that occurs prior to a child entering formal schooling has long-term benefits on their math achievement (Duncan et al., 2007; Nguyen et al., 2016; Watts et al., 2017; Watts et al., 2014). For example, Watts and colleagues (2014) found that children's math ability in preschool predicted their achievement in math at age 15. Research also shows that high school students with strong spatial abilities – an important STEM skill – are more likely to pursue advanced degrees and careers in STEM fields (Wai et al., 2009). Thus, promoting early STEM learning may have long-term implications on STEM achievement in school and on children's pursuit of a future STEM career.

One potential way of supplementing children's early STEM learning is through educational media (e.g., television, videos, computer games, apps), which can be a powerful learning opportunity through which children are exposed to STEM concepts before they enter formal schooling (Pasnik and Hupert, 2016). Much research shows that preschool-aged children can learn from educational television (e.g., Anderson et al., 2001; Fisch et al., 1999; Kirkorian et al., 2008) including science and math concepts. For example, there has been a plethora of research on *Sesame Street*, a media property that debuted in the United States in 1969 and has expanded into many different productions globally. Research shows that long-term viewing of *Sesame Street* at young ages can impact later student achievement in many subject areas. Specifically, children who watched *Sesame Street* at age 5 had higher academic grades, including science and math, 10 years later during secondary school (Huston et al., 2001).

A number of evaluative studies also show that children can learn important STEM concepts from media. For example, exposure to the *Sid the Science Kid* and *Peep and the Big Wide World* programs and interactive games significantly increased preschoolers' science talk at home (Penuel et al., 2010). Additionally, children's exposure to *Peg + Cat* programs and interactive games, along with parents' exposure to material that support parent engagement, promoted preschoolers' learning of ordinal numbers and spatial relationships (Pasnik et al., 2015). These properties are all available via public-access television stations in the United States, and therefore are widely accessible to preschool-aged children.

Recent research also suggests children can learn foundational STEM concepts from interactive media, which has been defined as "technology that invites the child to physically manipulate the platform and is contingent to the child's manipulations" (Aladé et al., 2016, p. 434). Several studies have explored children's STEM learning from touchscreen devices in short, lab-based experiments. For example, Aladé and colleagues (2016) found that playing an interactive game or watching a non-interactive video on a touchscreen device both supported 4- to 6-year-olds' learning to measure. Additionally, Huber and colleagues (2016) found that children aged between 4 to 6 years could learn to solve a spatial problem on a touchscreen and then transfer that learning to a 3-dimensional context. Furthermore, evidence from a longitudinal study indicates that using a math app, *Bedtime Math*, at home with a parent over the course of a year leads to significant improvements in primary school children's math skills compared to children who played a reading app (Berkowitz et al., 2015). Children's learning from interactive media does however seem to depend on age. For example, Schroeder and Kirkorian (2016) found that older preschool-aged children could learn STEM concepts (i.e., quantity and growth) from a touchscreen app regardless of whether they watched or played the game, whereas younger children only learned if they watched rather than played the game. Although research on interactive STEM media is emerging, the existing evidence along with the longstanding research on children's learning from STEM television programming suggests STEM media can be an important learning tool for young children.

Effects of Family Environment on Children's Media Use and Learning

The family system is an important context for children's STEM learning, both because the family environment is a space where children are exposed to STEM concepts during family interactions, and because families monitor whether and how children are exposed to STEM learning opportunities. Bronfenbrenner (1986) posited that children's development can only be fully understood by acknowledging the distal and proximal ecological systems that promote or deter children's development and viewed family functioning as an important context for human development. According to this theoretical perspective, children are directly affected by entities in their microcosm,

such as their family, school, and activities. Importantly, these entities can also interact with each other, such as family members monitoring what activities their children do. Therefore, families themselves provide a context for directly influencing children, but also interact with other entities that can indirectly affect children's development.

We adopt Bronfenbrenner's theory by considering the proximal (i.e., family context) and distal (i.e., media context) and their relation to children's development. Specifically, we consider how family involvement in STEM careers and children's use of STEM media may affect children's learning of STEM skills. Firstly, families may directly affect children's short- and long-term learning by sharing their STEM knowledge and teaching their children how to engage in STEM activities. Adults can help develop children's curiosity toward STEM (Early Childhood STEM Working Group, 2017). For example, one intervention study showed that supporting family engagement around their preschool-aged children's math learning helped improve preschoolers' mathematical knowledge (McCarthy et al., 2015). Moreover, research shows that parental beliefs and attitudes toward math affect first and second graders' own beliefs and attitudes toward math (Maloney et al., 2015).

Another research study asked doctoral students in the physical sciences what factors encouraged their early interest in science and found that family involvement in science facilitated early interest, with parent occupation being one primary source of early interest (Dabney et al., 2013). Although the specific impact of parent occupation on children's interest was not specified, other researchers have posited that having a parent in a STEM career has a positive influence on children's involvement and subsequent learning of STEM (Sonnert, 2009; Tai et al., 2006). One possibility is that parents or other caregivers who have a STEM career may share their STEM knowledge and interest with their children, promoting learning and engagement with STEM concepts. Research shows that providing parents with science information via cue cards at a science exhibit facilitated parent talk with their children, which promoted children's learning compared to children whose parents did not receive cue cards (Jant et al., 2014). In this vein, immediate family members who already have STEM knowledge from their career may be primed to subsequently engage children in more STEM learning compared to children who do not have an immediate family member with a STEM career.

Secondly, families may also indirectly affect children's STEM learning by influencing children's use of STEM learning tools, particularly their media use. One research study showed that family demographics predicted 3- to 7-year-old children's exposure to *Sesame Street* (Pinon et al., 1989). These researchers found that children with a younger sibling were more likely to watch *Sesame Street*, and parental encouragement of watching *Sesame Street* was positively related to children's viewing. This finding is complemented by more recent research showing that parent attitudes toward media predicts their children's media use (Cingel and Krcmar, 2013; Lauricella et al., 2015; Rideout and Hamel, 2006). Cingel and Krcmar (2013) surveyed parents of children between the ages of 6 months and 5 years and found that while parents reported agreement with the statement "I believe educational [television/DVDs/computers] are helpful to my child's cognitive development," parents also reported high agreement with the statement "I worry that electronic media will have a negative effect on my child's cognitive development" (p. 383). In turn, Cingel and Krcmar (2013) found that their measure of positive parent attitude toward screen media was positively related to children's overall media use. Moreover, Lauricella, Wartella, and Rideout (2015) found that positive parent attitudes toward television, smartphones, and computers were associated with more child use of these devices. Therefore family structure and attitudes toward media can influence children's exposure to educational media, thereby impacting their potential opportunity to learn.

The Current Study

Previous research suggests families influence children's exposure to STEM, but little research has investigated specific family factors, their relation to STEM exposure, and children's informal learning. We surveyed American parents of 3- to 5.5-year-old children to investigate the relation between media use, family context, and children's science and math skills. Specifically, we investigated whether parent attitudes toward the educational value of media and having a family member with a STEM career predict parent report of children's science and math media use (Research Question 1). Additionally, we were interested in whether there may be differences in media use for families with and without a member in a STEM career, and whether these differences affect children's STEM skills. Therefore, our second research question asked whether children's science and math media use, having a family member in a STEM career, and their interaction were related to parent report of children's science and math skills. The research questions addressed in this paper are important given the global efforts to teach STEM to students (Kennedy and Odell, 2014) including the efforts to teach STEM to young children during the influential time before they enter formal schooling (Clements and Sarama, 2011). Importantly, this research was also motivated by the continuing focus on utilizing media, such as television, apps, and educational games, as tools for STEM education (McClure et al., 2017). With a better understanding of the possible direct and indirect pathways through which families influence their children's exposure to STEM concepts, researchers and practitioners will be better equipped to help families support children's early STEM learning.

METHOD

Participants

A total of 296 American parents of preschool-aged children (3 to 5.5 years) completed the online survey. Most of the respondents were female (78%), 20% were male, and 2% (n = 7) did not report their sex. Our sample was 75% White, 6% Black, 8% Hispanic/Latino, 9% Asian/Pacific Islander, and 2% Other/multiracial. We also asked parents to report their highest education level: 8% of our sample had attained a high school education or less (i.e., less than 12 years of formal education), 12% completed some university (i.e., tertiary) education, 30% obtained an Associate's degree (i.e., equivalent to two years of tertiary education or certification at a vocational school), 28% obtained a Bachelor's degree, and 22% of our sample obtained a Master's degree or a professional degree. Additionally, 54% of children were male and 45% of children were female. The average age of children was 4.25-years (SD = .76 years; median = 4.5 years). Fifty-one percent of respondents indicated that they lived in Illinois, which is the U.S. state where the research team is located and where they typically recruit for studies. The remaining participants resided in various states throughout the United States.

Procedure

Informed consent was obtained from all participants included in the study in accordance with the University's ethics boards. The survey questions analyzed here were part of a larger survey, which took approximately 40 minutes to complete. Parents were recruited using a variety of methods, including via a University database of families interested in participating in studies, Facebook postings, parent group websites, and via word-of-mouth. Parents with STEM careers were not specifically recruited for the study.

All participants took the survey online via Qualtrics. Participants were directed to a page that described the survey and asked participants for their informed consent. After agreeing to participate, participants were directed to the first page of the survey. Participants received a $10 Amazon electronic gift card and were also entered into a drawing to win one of three $100 Amazon electronic gift cards upon completion of the survey.

Measures

Parents answered a series of questions about their beliefs and attitudes toward educational media, the frequency of their child's media use (i.e., television, apps, computer games) in their home, their family involvement in a science- or math-related career, and their perceptions of their child's ability to perform science and math skills.

Parent attitudes toward science and math media. To measure parents' attitudes about science and math media as educational tools, we asked parents three separate questions related to the survey questions used by Cingel and Krcmar (2013). Parents were asked three questions about how much their child has learned about science and math from television/DVDs, computer games, and apps. Specifically, parents were asked, "In your opinion, how much has [child's name] learned about the following subject areas from watching educational TV shows or DVDs?" Parents separately rated their response for science and math on a 5-point Likert scale anchored by "nothing" to "a lot" including the option to select "Not Applicable." Next, parents individually answered the same question about "educational computer games" and "educational apps on mobile devices" by rating their response for math and science on the same 5-point scale.

To investigate parents' *overall* attitudes toward educational media, we averaged parent ratings for the three statements about television/DVDs, computer games, and apps and created separate scales for science media (M = 2.96, SD =.98; α = .67) and math media (M = 3.03, SD = .96, α = .64).

Children's science and math media use. To measure children's use of science and math media, parents were asked about the frequency of their children's use of science and math media. Specifically, parents were asked, "How often does [child's name] do each of the following activities at home or outside of school?" Below, parents rated three items "Watch science-related TV shows or videos via TV, DVDs, or online; Play science games on the computer; Play science apps on a mobile device." Parents were asked the same three questions for math. Responses were measured on a 6-point Likert scale anchored by "never" to "daily." The scores were averaged for science and math to obtain a science media use score (M = 3.15, SD = 1.48, α = .73) and a math media use score (M = 3.32, SD = 1.47, α = .69).

Family involvement in a science or math career. Parents were asked "Does anyone in your immediate family have a science- or math-related career?" Participants then received an explanation of what constituted a science- or math-related career: "A science- or math-related career is one that requires studying science or math at the college or university level. Careers like an engineer, accountant, weather forecaster, economist, and doctor are all examples of science- and math-related careers." Of the 287 responses to this question, 45% reported that someone in their family worked in a science- or math-related career (n = 129), and 55% reported that no one in their family worked in a science- or math-related career (n = 158).

Children's science and math skills. We identified preschool science and math skill by referencing parent resources and school readiness standards for teachers, including the Head Start Early Learning Framework (U.S. Department of Health and Human Services, 2011), the Early Childhood Longitudinal Survey (National Center for Education Statistics, 2011) and academic research (Brenneman, 2011; Brenneman et al., 2009). We asked parents to rate how well their children performed a variety of science- and math-related activities by asking "When [child's name] does each of the following activities, how often does he/she do them correctly?" Parents rated their response on a 6-point Likert scale anchored by "does not do this activity" to "all of the time." For science, parents rated the following six items: *Describes basic life cycle concepts; Sorts object and living things based on similarities and differences; Describes cause and effect relationships between objects; Describes the physical properties of objects and living things; Makes educated guesses based on past experiences; Describes concepts of body parts and processes.* For math, parents rated the following five items: *Counts to 20 or more; Identifies basic shapes; Identified written numbers; Identifies spatial relationships; Identifies numerical relationships.*

The scores were averaged for science skill items and math skill items to obtain a science skill score (M = 3.95, SD = .78, α = .82) and a math skill score (M = 4.07, SD = .72, α = .68).

RESULTS

Children's Science and Math Media Use

Research Question 1 focused on the relationship between parent attitudes toward science and math media as being educational, family involvement in a science or math career, and their children's science and math media use. To answer this question, we ran two linear regressions predicting science media use and math media use. For science media use, we entered parent attitudes toward science media being educational and STEM career (yes or no) as predictors of children's science media use. Demographic information including child age, child gender, and parent education were entered as control variables. The regression was significant, R = .68, adjusted R^2 = .45, $F(5, 278)$ = 46.34, p < .001. Parent education was negatively related to children's reported science media use (β = -.11, p <. 04). Parent reports of how much their child has learned from science media positively predicted children's reported science media use (β = .56, p <. 001, see **Table 1**). Additionally, having a family member with a science or math career was negatively related to children's reported science media use (β = -.18, p <. 001).

Table 1. Regression analyses for children's science and math media use

	Science			Math		
Variable	***B***	***SE B***	***β***	***B***	***SE B***	***β***
Child Age	-.01	.05	-.01	.01	.04	.01
Child Gender	-.05	.07	-.03	-.06	.06	.04
Parent Education	-.09	.04	-.11*	-.03	.38	-.04
Family STEM Career	-.54	.15	-.18***	-.41	.13	-.14**
Media as Educational	.84	.07	.56***	1.06	.07	.68***
ΔR^2		.45			.55	
ΔF		46.34**			68.89***	

Note: *indicates p < .05, **indicates p < .01, ***indicates p < .001

The second regression predicted math media use by entering parent attitudes toward math media being educational and STEM career (yes or no), as well as demographic variables including child's age, child gender, and parent education. The regression was significant, R = .75, adjusted R^2 = .55, $F(5, 278)$ = 68.89, p < .001. Parental report of how much their child has learned from math media was positively related to children's reported math media use (β = .68, p <. 001, See **Table 1**). As with science, having a family member with a science or math career was negatively related to children's reported math media use (β = -.14, p <. 01).

Children's Science and Math Skills

Research Question 2 focused on the relationship between children's science and math media use, family involvement in a science or math career, and children's science and math skills. To answer this question, we ran two linear regressions predicting children's science skills and math skills. For science skills, we entered child's age, child gender, and parent education as control variables along with science media use and STEM career (yes or no). Because we were interested in the relation between media use and family factors, we also entered the interaction between STEM career and science media use into the model. The regression was significant, R = .41, adjusted R^2 = .15, $F(6, 277)$ = 9.25, p < .001. Child age was positively related to children's reported science skills (β = .20, p < .001). Children's reported science media use was negatively related to their reported science skills (β = -.27, p = .001). Having a family member with a science or math career was not a predictor of children's science skills

(β = -.09, p = .52). However, there was an interaction between STEM career and science media use (β=.33, p = .01). While STEM families reported high science skills regardless of science media use, non-STEM career families who consumed the most science media reported their children had significantly worse science skills (See **Table 2**).

Table 2. Regression analyses for children's science and math skills

	Science			Math		
Variable	***B***	***SE B***	***β***	***B***	***SE B***	***β***
Child Age	.10	.03	.20***	.17	.03	.36***
Child Gender	-.01	.09	.01	.14	.08	.10
Parent Education	.03	.03	.07	.07	.02	.17
Family STEM Career	-.36	.21	-.09	-.35	.20	-.24
Child Media Use	-.14	.04	-.27**	-.16	.04	-.32***
STEM Career*Media Use	-.17	.06	.33*	-.16	.06	.40**
ΔR^2		.15			.22	
ΔF		9.25***			13.87***	

Note: *indicates $p < .05$, **indicates $p < .01$, ***indicates $p < .001$

The second regression predicted math skills using child's age, child gender, parent education as control variables, along with math media use, STEM career (yes or no), and the interaction between STEM career and math media use. The regression was significant, R = .49, adjusted R^2 = .22, $F(6, 277)$ = 13.87, $p < .001$. Child age was positively related to children's reported math skills (β = .36, $p < .01$). Children's math media use was negatively related to their reported math skills (β = -.32, $p < .001$). Having a family member with a science or math career was not a significant predictor of children's math skills (β = .-.24, p = .08). However, there was an interaction between STEM career and math media use (β = .40, p = .002). As with science, STEM families reported high math skills regardless of math media use, but non-STEM career families who consumed the most math media reported their children had significantly worse math skills (See **Table 2**).

DISCUSSION

The results provide insight into the relation between family factors and 1) children's reported science and math media use, and 2) children's reported science and math skills. First, the initial set of regressions provide additional support to prior research showing that parent attitudes toward media predicts children's media use (Cingel and Krcmar, 2013; Lauricella et al., 2015), including science and math media. Specifically, we found that parent attitudes toward the educational value of science and math media positively predicted their children's reported use of that media. These results add support to our hypothesis that parents may indirectly affect their child's exposure to STEM concepts by influencing how often their child is exposed to science and math television, apps, and computer games. However, more research is needed to understand the nature of children's exposure to media, including what science and math content children are exposed to and how parents interact with their children around STEM media.

Notably, our results also suggest the larger family context – outside of parents exposing their child to STEM media – may play an important role for children's learning. We found that having an immediate family member in a STEM career was negatively related to science and math media use. But importantly, variations in media use had little effect on skills for children from STEM career families. Instead, children *without* a family member in a STEM career who used the most science and math media had reportedly worse science and math skills compared to children without a family member in a STEM career who used less science and math media. In contrast, children with a family member in a STEM career had reportedly higher science and math skills regardless of their media use. As we hypothesized, there were important differences in media use for families with and without a member in a STEM career, but these differences were only related to children's skills for non-STEM career families.

STEM Learning in the Family Context

Children can potentially be exposed to multiple science and math learning opportunities within the family context (Bronfenbrenner, 1986), either from direct instruction from family members (e.g., Jant et al., 2014) or from family members indirectly exposing children to different learning opportunities, like educational media (Cingel and Krcmar, 2013; Lauricella et al., 2015; Rideout and Hamel, 2006). We found that families with a member in a STEM career have children who use *less* science and math media compared to families without a member in a STEM career. One hypothesis is that STEM career families may be more adept at identifying STEM opportunities in everyday life in comparison to non-STEM career families because of their career and educational experiences. Previous research has found that parents who engage in science talk with their children better prepare them for school science discussions (Crowley et al., 2001). Perhaps families with a STEM-career member are better able to

identify opportunities to highlight STEM concepts in everyday experiences, and therefore turn to media less as a source of supplemental information.

In contrast, families *without* a member in a STEM career may be less likely to find opportunities to integrate STEM learning into their child's out of school activities, and also may be less comfortable supporting STEM learning at home. Research shows that parents and teachers often report discomfort supporting science and math learning for preschool-aged children (Berkowitz et al., 2015; Brenneman et al., 2009; Copley, 2004; Tu, 2006). As a result, families with less STEM experiences may turn to media more to supplement their perceived lack of expertise, which may be why not having a family member in a STEM career was positively related to viewing media as good sources of STEM education. Non-STEM career families may feel as if media can supplement their children's informal STEM learning in ways that they do not feel entirely comfortable supporting themselves. However, our results show that these children's reported science and math media use was negatively related to their reported science and math skills, which calls into question what media children are consuming and how families are using it to support children's learning.

Our results have implications for how the family context can be leveraged to improve preschool-aged children's exposure and potential learning of science and math, as well as where there are opportunities for future research to supplement our findings. First, our research suggests that it may be beneficial to help parents and other close family members identify science and math learning opportunities in everyday activities including media, especially families who may lack confidence in their own STEM skills. There are uplifting findings from multiple studies that indicate that with some support, parents of different backgrounds can be primed to talk about specific science curricula with their children (Haden et al., 2014; Jant et al., 2014), and that media can support parent scaffolding opportunities (Pasnik et al., 2015). More so, research shows that children who have a parent with math anxiety benefit the most from co-using a math app with their parent (Berkowitz et al., 2015). Here, the app not only helped children learn math skills, but provided resources that scaffolded parents' abilities as teachers. Incorporating tips for joint media engagement around science and math media may be especially important for parents and family members who feel uneasy about teaching their child science and math concepts.

Limitations and Future Directions

Despite the important implications of this research, this study had limitations. First, although surveys are useful for measuring parent attitudes toward media, parents may not know exactly what content their children are consuming across multiple devices. Some television programs and games certainly teach science and math concepts in well-constructed narrative contexts or game designs that are less explicitly about science or math (Mayo, 2009), and television programs that claim to teach STEM concepts vary in their actual representation of STEM subject areas (Lovato et al., 2017). Moreover, parent report of children's skills may be less accurate than direct child measures of their science and math skills (Jordan, 2001; Schmitt, 2000). However, parent perception of children's skills may be the best estimation given that our sample included young children who were not yet enrolled in formal education.

Our research raises interesting questions about the indirect role of science and math media as a tool for learning within the larger family context. For example, it is important to consider whether the interaction between STEM career and media use that we found in our analyses may be an outcome rather than the cause of children's poorer science and math skills. For non-STEM career families, it is possible that they identify that their children need to improve their science and math skills and therefore use media as a primary tool to supplement their children's learning. In this sense, media use is the outcome rather than the cause of children's poor science and math skills. In contrast, STEM career families may rely more heavily on other approaches that are not media-based. If difference in family career involvement in STEM reflect differences in how families are engaging their children in STEM, then it is necessary to better understand the nature of those differences so that early educators and practitioners will be better equipped to help families support their children's STEM learning.

Conclusion

Our research highlights the important role family context plays in children's STEM learning while also calling for more research on whether and how families promote their children's STEM learning, both through educational media and with other activities. This paper emphasizes the complex and sometimes indirect means by which family members may influence their children's STEM skills; family members with STEM careers may be less likely to use media as a tool for STEM learning, but there only seems to be a relation between STEM media and STEM skills for children from non-STEM career families. Additional research is crucial to understanding the nature of this relationship, particularly whether media indeed serves as a supplemental tool or instead as a substitute for exploration and discussion. With future research, researchers and educators can better understand how the family environment influences children's STEM learning, and how practitioners can best communicate with families on how to optimally help children engage with STEM outside of formal school environments.

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