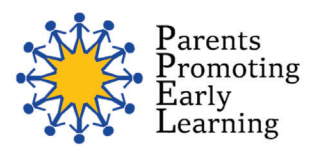




The Influence of Content and Context in Children’s Learning through Screen-Based Media

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Introduction

- Total screen time among children has tripled in recent years¹ and is negatively associated with children’s academic skills².
- Experimental studies using educational screen-based media have found benefits for children’s math³ and literacy skills⁴. Thus, prior negative associations may be driven by non-educational screen content.
- While portraying the benefits of educational programs, past studies do not typically account for (1) the total screen time that children experience, (2) the simultaneous influence of home learning environment (HLE) activities, and (3) background selection characteristics like socioeconomic status (SES) and child age¹.

Research Questions

- What are the associations between different types of screen content and academic skills?
- Do these associations remain after considering the context of HLE, SES, and child age?

Methods

Participants & Procedure

- 178 parent-child dyads
- Child age: M = 4.4 years, SD = 0.29
- Child gender: 50% female
- Race: 80% White, 17% Black, 3% Asian
- Income: Median = \$90,000;
- 27% low income, 33% middle income, 40% high income

Time Diary Interviews

- Two time diary interviews were conducted on a workday and non-workday.
- Parents reported all their and their child’s activities in the previous 24 hours, the length of time for each activity, and who was present.




Screen time coding

- During time diary interviews, parents provided the names of programs children engaged with throughout the day.
- Programs were coded as screen time if the child was:
 - Watching television on a traditional TV or handheld/mobile device
 - Playing with electronic media, videogames, and apps
 - Using screens for reading and math learning
- Programs were coded as educational or non-educational using Common Sense Media and investigator review.

Home Learning Environment (HLE)

- During the time diary interview, parents were also asked a variety of questions related to the academic stimulation activities their child engaged with throughout the day and the duration of these activities.

Child Assessments

Construct	Sample Items & Prompts
Literacy Skills	
Vocabulary Skills	<i>Developmental Vocabulary Assessment for Parents (DVAP)</i> ⁵ “Please select all the words on the list you’ve heard your child say.”
Phonological Awareness	<i>Comprehensive Test of Phonological Processing (CTOPP)</i> ⁶ “Say cowgirl,” “now say cowgirl without saying cow.”
Math Skills	
	<i>Woodcock-Johnson (WJ) Applied Problems Subtest</i> ⁷ “Three birds were sitting on the park bench. One flew away. How many birds were left?”
Number Skills	
Verbal Counting	“Can you show me how high you can count?”
Give-N Task ⁸	“Can you give bear N fish?”
Spatial Skills	
Patterning ⁹	 “Can you complete the pattern?”
Geometric Sensitivity ¹⁰	 “Which picture doesn’t belong with the rest?”
Mental Transformation ¹¹	 “Point to the picture that these pieces make.”

Results

	Mean(SD)	1	2	3	4	5	6	7	8	9
1. Literacy	-.02(.77)	1.0								
2. Math	.00(.9)		1.0							
3. Number	.03(.9)	0.62***	0.64***	1.0						
4. Spatial	.01(.8)	0.51***	0.64***	0.62***	1.0					
5. Total screen time	147.8(124.6)	-0.27**	-0.17*	-0.25**	-0.23**	1.0				
6. Educational screen time	50.4(66.8)	-0.05	-0.00	-0.10	-0.08	0.49***	1.0			
7. Non-educational screen time	94.9(100)	-0.29**	-0.19**	-0.22**	-0.22**	0.83***	-0.05	1.0		
8. HLE	128.3(124.1)	0.16*	0.05	0.11	0.09	-0.03	-0.03	-0.02	1.0	
9. SES	.01(.89)	0.41***	0.48***	0.38***	0.25**	-0.18*	0.04	-0.24**	0.0	1.0
10. Age	4.4(.29)	0.02	-0.03	0.26***	0.26***	-0.12	-0.09	-0.08	0.09	-0.11

Note: Outcomes are presented as z-scores. Literacy is a composite of DVAP and CTOPP. Number is a composite of Give-N and counting, and spatial is a composite of patterning, geometric sensitivity, and mental transformation. Total screen time, educational and non-educational screen time minutes and home learning activity durations from time diary interviews were summed across workday and non-workday. SES is a composite variable including parent education and income. * p < 0.05, **p < 0.01, ***p < 0.001, + = < 0.1.

Literacy Skills and Screen Content

	β	SE	t	p
Educational screen time	.01	.00	0.14	0.8
Non-educational screen time	-.20*	.00	-2.32	0.02
HLE	.16*	.00	1.88	0.06
SES	0.42***	.08	4.70	0.00
Age	.10	.22	1.18	0.24

After accounting for HLE, SES, and age, non-educational screen time remained a negative predictor of literacy skills.

Conclusions & Future Directions

- Total screen time and non-educational content were negatively associated with child outcomes, but educational content was not.
- Of all outcomes, only literacy skills were negatively predicted by non-educational screen time when accounting for HLE, SES, and child age.
- This research extends past literature by examining the impact of the content of screen-based media on children’s academic skills within the larger context of home learning and screen exposure in preschoolers’ families.
- Future work will investigate the impacts of parental monitoring and device type during child screen time.

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