POPULATION STUDY ARTICLE

Background media use is negatively related to language and literacy skills: indirect effects of self-regulation

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BACKGROUND: Media use is pervasive among young children. Over 95% of homes in the US have one or more televisions, and access to screen-based media continues to grow with the availability of new technologies. Broadly, exposure to large amounts of screen-based media is negatively related to language and literacy skills; however, questions remain as to the features of media that are detrimental to these skills and the mechanisms by which they are connected.
METHODS: A nationally representative sample of 922 children aged 3–7 years was recruited. Parents completed phone-based questionnaires of children's language, literacy, and self-regulation skills and a 24-h time diary in 2009. Path models were used to estimate the direct and indirect associations between context and content of media use with language and literacy skills.
RESULTS: Background and entertainment television, but not educational television, were negatively associated with language and literacy. Further, the link between background television and language and literacy skills was fully mediated by self-regulation.
CONCLUSIONS: Television left on in the background and entertainment programming (or that which is not child-directed) is particularly detrimental for language and literacy skills. Additional research is needed to further explore self-regulation as a mechanism by which screen use predicts academic skills.

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IMPACT:

- Background and entertainment television are negatively associated with language and literacy skills in 3- to 7-year-old children.
- We find no relation between educational programming and language and literacy skills.
- Self-regulation is a potential mechanism underlying the relation between background television and language and literacy skills.
- Anticipatory guidance for parents would be to consider turning off screen-based media devices when no one is watching.
- Parents should be mindful of the types of content their children are watching on screen-based media.

INTRODUCTION

Increasing attention from research, policy, and practice is being paid to school readiness across the United States, especially in light of the finding that children's early academic success has important implications for their later school achievement.[1] School readiness is a multivariate construct that broadly encompasses children's readiness to learn and includes traditional aspects of academic achievement such as language, literacy, and mathematics, as well as various noncognitive skills such as self-regulation, social skills, and gross and fine motor control.[2] Especially given the broad definition of school readiness, a wide range of structural, demographic, household, and child factors are associated with the development of children's school readiness skill.[3] While many of the factors associated with the positive development of school readiness skill are quite difficult or impossible to intervene upon (e.g., socioeconomic and demographic factors, genetics, environmental and neighborhood characteristics),[3,4] several can be addressed by small and subtle parenting choices. In particular, one understudied but potentially important feature of the home environment that might be associated with school readiness is screen-based media exposure.

In the present study, we investigate relations between forms of media use and specific school readiness skills: language, literacy, and self-regulation. Prior investigations have reported a negative relation between television exposure in early childhood and children's academic skills (e.g., refs. [5–7]); however, the mechanism underlying the negative relation between television exposure and school readiness skills remains largely unexplored in early childhood years. Here, we further explore the mechanism suggested by Ribner et al.[6] that self-regulatory skills mediate the relation between television exposure and academic skills.

Prevalence of screens
The American Academy of Pediatrics (AAP) recommends that children over the age of 2 years watch no more than 1–2 h of television per day.[8] However, studies consistently report that children watch more than the recommended amount and that parents are either unaware or unconcerned by recommendation;[9]

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parents consistently report that their children 8 years and under view an average of approximately 2 h of media exposure per day.[10] This experience is fairly ubiquitous in the US: a nationally representative census of media exposure of approximately 1400 parents of children aged 8 and younger conducted by Common Sense Media revealed that over 95% of homes have at least one television. Common Sense Media conducted a census of media exposure using a US nationally representative study of approximately 1400 parents of children aged 8 and younger.[10] Although the way that television is viewed has changed, the amount of television exposure has remained relatively constant over the past 20 years. Arguably understanding video viewing patterns is increasingly important due to the multiple forms of content delivery (streaming video, DVDs, cable, broadcast television, DVR, YouTube) and multiple devices on which to present video content (television set, laptop, tablet, smartphone). Children under 8 years frequently stream video content (21% of viewing time) or view from sites like YouTube (17% of viewing time) either on family television sets or mobile devices.[10] These estimates do not account for exposure to background television (i.e., television that the parents were viewing and was on in the room but that was not directed towards children), resulting in the likely underreporting of total media exposure.[11]

Media use and school readiness skills
In part due to the pervasiveness of screens in the typical American household, there has been a resurgence of research investigating potential effects of media use on school readiness skills. In general, research has described negative associations of electronic screen-based media exposure with children's school readiness skills.[5,6,12] However, there might be specificity in these relations: Age-appropriate and explicitly educational television programming (e.g., Sesame Street, Dora the Explorer) are, on average, positively associated or unassociated with children's academic, problem-solving, and social skills,[13,14] whereas entertainment television (e.g., SpongeBob SquarePants) is negatively associated with academic skills.[15,16] While there is suggestive evidence that watching certain types of television, including entertainment or developmentally inappropriate (i.e., content made for adults), is more negatively associated with school readiness skills, other research has suggested that background television of any kind— that is, any screen-based media that is on when no one is watching—is also negatively associated with school readiness skills and is often overlooked in measurement.[11] In fact, "Technoference" has been coined to denote everyday interruptions to interpersonal interactions or time spent together that occur due to digital and mobile technology devices.[17,18] Specifically, technoference may disrupt early social interactions that are necessary for the development of self-regulation, language and literacy skills. This specificity in associations between content and context of media exposure and school readiness skills requires further investigation.

The majority of studies on the relation between television exposure and school readiness skills have been limited in their scope of measurement. Most studies use a parent-report measure of screen time defined as the estimated amount of time children spend watching television. One such study using a nationally representative, longitudinal study found that children whose parents reported more screen time during toddlerhood did more poorly on tests of receptive vocabulary, number knowledge, classroom engagement, and gross motor skills in kindergarten.[5] Another study found similar results and found that increased parent-report of time spent watching television was negatively associated with children's school readiness skills, as well as with number of books in the home, time spent reading to the target child, and a measure of specific content instruction.[19] Other studies have reported greater specificity in the relations between parent-reported television viewing time and school readiness

skills. For example, one study found negative relations between time spent viewing television and performance on assessments of math and self-regulation, but not on an assessment of pre-literacy skills.[6]

A small and largely unrelated literature has related television exposure to decrements to children's self-regulatory skills. Experimental studies have found that children randomly assigned to watch entertainment television (as compared to educational television or another activity) display immediate decreases in cognitive and behavioral self-regulation, even after watching only 11 min.[15,20] Additionally, observational studies have suggested negative relations between background television exposure and child self-regulation.[21] Background television is also negatively associated with poorer sustained attention and cognitive processing,[22,23] suggesting a potential mechanism by which background television could act on children's self-regulatory skills. These findings further lend support to the idea of specificity in the relations between the content of television programming and school readiness outcomes; however, evidence is still limited.

The studies of television exposure and academic school readiness skills (i.e., math, language, and literacy), and those between television exposure and self-regulatory skills largely exist in isolation; however, there is reason to investigate relations between television exposure and both aspects of school readiness skills together. Self-regulatory skills are robustly related to children's academic school readiness skills, particularly in early schooling.[24] As such, self-regulation might serve as a mechanism by which television exposure is associated with early academic skills. Indeed, one prior study of the relations between television exposure and school readiness skills found that executive function—a multidimensional construct that encompasses the ability to regulate cognitions in the pursuit of goals—partially mediated the relation between parent-reported time spent watching television and math skills.[6] However, that particular study lacked specificity in the content and context of television exposure. As noneducational and background television might be particularly problematic for both academic and self-regulatory skills, further investigations of these relations are merited.

Present study
Despite great strides made by extant research, the specificity and mechanisms underlying previously documented relations between television use and school readiness skills remain unclear. Here, we leverage a nationally representative dataset to better understand these relations. Specifically, we investigate whether the content and context of media use—educational, entertainment, and background television—is related to children's language and literacy skills. In light of prior research, we anticipate that entertainment and background television in particular will be negatively related to children's language and literacy skills, while educational television and book reading will be positively related or unrelated. We further investigate whether self-regulation serves as a potential mechanism through which the relations between media use and language and literacy skills are related. As an important caveat, all data in this study are cross-sectional and interpretation of results should therefore be considered with caution: Causality cannot be inferred from present analyses; however, we explore relations and potential mechanisms that can be the basis for future experimental research.

METHODS
Participants
A total $N = 1454$ participants around the United States were contacted by a survey research firm. English-speaking families with children between the ages of 8 months and 8 years of age were targeted for contact and participated in a 50-min phone survey. The survey assessed family demographic characteristics,

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parenting practices, child media practices, and child language and literacy and self-regulatory skills for a randomly selected target child who fell within the age range of interest. For the purpose of the present study, the analytic sample was constrained to include only children between the ages of 3 and 7 years of age, resulting in a sample of $n = 922$ participants ($M_{age} = 66.19$ months; 461 girls).

Measures

Television exposure. Participants completed a 24-h time-use diary with data collectors over the phone. Parents reported an activity-by-activity list of their child's last typical day for a full 24-h period. The diary was adapted from a similar procedure used in the Child Development Supplement of the Panel Study of Income Dynamics[25] to include detailed questions of foreground and background media use, as well as type of media content (i.e., media program/show, book title, etc.). Prior studies have established the reliability and validity of time-use diaries for capturing activities done on a regular basis (e.g., ref. [26]). Two measures were created for foreground television: educational television was operationalized as amount of time in hours of age-appropriate content that was explicitly educational (e.g., Sesame Street, Dora the Explorer), and entertainment television was operationalized as any content that was not age-appropriate or did not have educational value (e.g., SpongeBob SquarePants). A total of 10% of program titles was double-coded for reliability of categorization (educational or entertainment) and coders demonstrated adequate reliability (Kappa = 0.75). Background television was defined as amount of time in hours spent in nonelectronic media activities in which a television was on in the background.

Self-regulation problems. Self-regulation was measured using subtests of the Behavioral Assessment for Children-Second Edition (BASC), a parent-report measure of problem behavior related to children's self-regulatory skills.[27] The BASC has previously been shown to correlate highly with other parent-report measures of children's behavioral self-regulatory skills, including the Behavior Rating Inventory of Executive Function and Connors' Parent Rating Scale.[28] The BASC has 16 primary scales—both clinical (e.g., hyperactivity, attention problems, aggression) and adaptive (social skills, leadership)—seven optional content scales (bullying, executive function), and five composite scales (e.g., internalizing problems, externalizing problems). We defined our self-regulation measure based on three BASC-2 scales: Two primary scales (hyperactivity and attention problems) and one content scale (executive function). The executive function scale is made up of individual items from hyperactivity, attention problems scales, as well as some not on either of those two scales. Each of the three subscales used in the present study has previously been shown to have good construct validity.[28,29] Overall, the BASC scales are reliable with internal consistency ranging 0.90–0.91 and test−retest reliability = 0.84. Sullivan and Riccio[28] reported $a = 0.84$ for the EF subscale. As a measure of problem behavior, higher scores reflect more problem behavior, and thus *worse* behavioral self-regulation.

Language and literacy skills. Individual measures of children's language and literacy skills were created from subscales of the Assessment of Language and Literacy. Parents reported on a series of items including questions about their child's phonologic and phonemic skills, vocabulary knowledge, and language complexity. Higher scores indicated more mature skills. For both measures, internal consistency was adequate ($a = 0.77$, $a = 0.91$, respectively).

Covariates

A series of covariates are included in all models to account for some of the variance contributed by confounding factors.

Covariates include child age in months, whether the child attended a child-care setting (and whether the child care was center-based or home-based), child sex, a measure of cumulative risk, and a measure of book reading. While individual demographic characteristics influence development, the accumulation of multiple demographic risk factors has been linked to effects that are above and beyond those effects attributable to any one characteristic.[30,31] The cumulative risk variable was an index measure that indicated whether the target child experienced two or more of the following demographic risk factors: family under 200% of the income-to-needs ratio (calculated by dividing family income by the 2009 federal poverty threshold for a family of the relevant size), single-adult caregiver household, household with four or more children, maternal education less than high school diploma, maternal age under 18 at the age of target child birth, and target child minority racial/ethnic background (i.e., Latino/a, Hispanic, African American, American Indian, or "other"). Book reading was obtained from the 24-h time diary. Book reading was operationalized as total amount of time in hours the target child read or was read to during the target day.

Analysis plan

To address our research questions, multiple simultaneous linear regressions were estimated using Mplus 8. We first investigated whether the content and context of television exposure—specifically, age-appropriate, educational programming; non-age appropriate and/or entertainment programming; and background television—were related to school readiness skills. Scores on assessments of language, literacy, and self-regulation were simultaneously regressed on estimates of educational programming, entertainment programming, and background television, as well as covariates. We next examined whether the relations between television exposure and children's language and literacy skills could be in part mediated by BASC self-regulatory scores. Scores on assessments of language and literacy skills were simultaneously regressed on self-regulation, the three television exposure variables, and covariates. Self-regulation was regressed on television exposure and covariates, and direct and indirect effects were estimated using bootstrapped confidence intervals with 1000 draws. A visual depiction of the path models tested is presented in Fig. 1.

Sample weights were used to adequately allow for inference for a nationally representative population. All coefficients in the models represent the unique variance attributable to each variable, adjusted for all other variables in the model.

RESULTS

Descriptive statistics are reported in Table 1. On average, parents reported that children watched nearly 2 h of foreground television per day ($M = 1.82$; SD = 1.70)—the AAP-recommended maximum amount. Of that, slightly more than 1.5 h ($M = 1.51$; SD = 1.59) was entertainment or non-age-appropriate content. Parents reported the television was on in the background during nonmedia activities nearly 3-1/2 h per day, on average ($M = 3.29$; SD = 4.01).

To address the first research question, scores on assessments of language, literacy, and self-regulation were simultaneously regressed on estimates of educational programming, entertainment programming, background television, and all covariates. Results are shown in Model 1 of Table 2. Over and above covariates, educational television was not associated with any school readiness outcome. Entertainment television was associated with parent-report self-regulation problems ($b = 0.67$, $p = 0.011$), but not with either language or literacy skills ($b = 0.07$, $p = 0.618$; $b = 0.03$, $p = 0.773$, respectively). Background television was associated with all skills (Literacy: $b = -0.13$, $p = 0.043$; Language: $b = -0.10$, $p = 0.070$; Self-regulatory problems: $b = 0.46$, $p = 0.003$). In total, variables in the model accounted for over 50%

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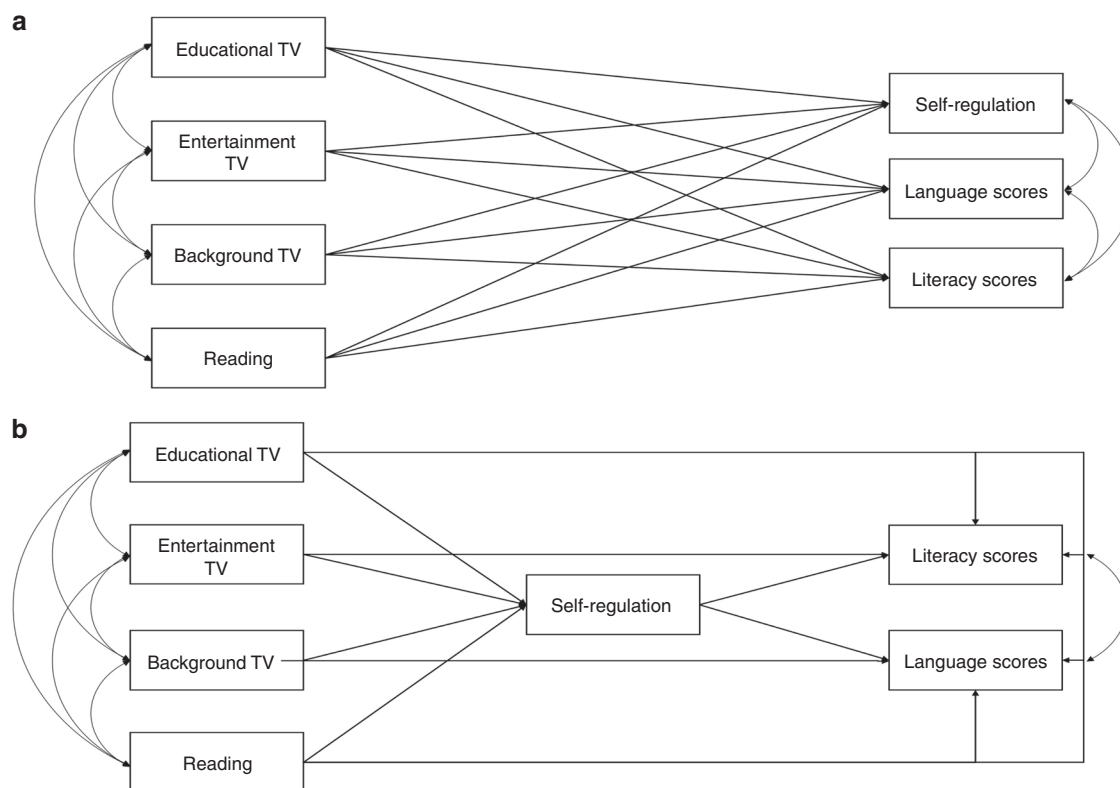AD Ribner et al.

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a

b

Fig. 1 Tested path models, results of which are presented in Table 2; all models control for child age, cumulative risk, child-care setting, and child sex. **a** refers to model 1: Self-regulation problems, language scores, and literacy scores were simultaneously regressed on media content and covariates. **b** refers to model 2: Indirect effects of media content on language and literacy via self-regulation problems were assessed.

Table 1. Unweighted descriptive statistics.

	Mean	SD	Range
Entertainment TV (h)	1.51	1.59	0.00–14.50
Educational TV (h)	0.31	0.70	0.00–8.25
Background TV (h)	3.29	4.01	0.00–21.40
Reading (h)	0.34	0.61	0.00–7.17
Self-regulation problems	49.96	10.15	21.24–88.22
Language skills	24.15	4.27	0.00–34.00
Literacy skills	20.04	6.48	1.00–28.00
Cumulative risk	1.35	1.53	0.00–10.00
Child age (months)	66.75	17.42	37.00–96.00

	N	%
Child-care setting		
Home-based care	65	7.0
Center-based care	233	25.2

of the variance in literacy ($R^2 = 55.3$), 13% of the variance in language ($R^2 = 13.1$), and over 10% of the variance in self-regulatory problems ($R^2 = 11.3$).

A second model was then estimated to test the indirect effects of television content and context on language and literacy skills through parent-reported self-regulation problems. Results are shown in Model 2 of Table 2. There was a direct association of self-regulation problems with child literacy and language, such that increased parent-reported self-regulation problems were associated with poorer literacy ($b = -0.11$, $p < 0.001$) and language

skills ($b = -0.07$, $p = 0.002$). With the inclusion of self-regulation problems in the model, the direct association between background television and literacy and language skills was attenuated such that the association was not significant ($b = -0.08$, $p = 0.210$; $b = -0.07$, $p = 0.198$, respectively). Indirect effects of background television on literacy and language via self-regulation problems were both significant ($b = -0.05$, 95%CI [−0.098, −0.007]; $b = -0.03$, 95%CI [−0.043, 0.00], respectively), suggesting self-regulation problems might be a mechanism by which television is associated with language and literacy skills. Further analysis of indirect effects showed indirect effects of entertainment television on literacy but not language skills through self-regulation problems ($b = -0.08$, 95%CI [−0.134, −0.006]; $b = -0.05$, 95%CI [−0.093, 0.001], respectively), suggesting that despite not seeing direct effects in Model 1 (or residual indirect effects over and above other study variables in Model 2), there might still be negative outcomes associated with watching entertainment or non-age-appropriate television.

DISCUSSION

Using a nationally representative sample of children between the ages of 3 and 7, we undertook the present study in an effort to better understand the relations between content and context of television viewing with school readiness skills, namely literacy, language, and self-regulation. Educational television viewing was relatively minimal, and individual differences were unassociated with any outcomes; entertainment television was associated with increased report of self-regulation problems; and background television was negatively associated with both language and literacy outcomes and increased self-regulation problems. Further analysis suggested the relation between background television

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Table 2. Path analysis results predicting literacy, language, and self-regulation skills.

	Model 1				Model 2			
	b	SE	β	p value	b	SE	β	p value
Literacy								
Child female	2.05	0.47	0.16	<0.001	1.99	0.43	0.16	<0.001
Child age	0.25	0.02	0.69	<0.001	0.25	0.02	0.68	<0.001
Cumulative risk	−0.33	0.15	−0.08	0.025	−0.20	0.15	−0.05	0.189
Home-based care	0.16	0.68	0.01	0.811	0.03	0.69	0.00	0.960
Center-based care	−0.41	0.69	−0.03	0.558	−0.32	0.64	−0.02	0.610
Reading (h)	0.27	0.41	0.02	0.516	0.18	0.39	0.01	0.646
Entertainment TV (h)	0.07	0.15	0.02	0.618	0.15	0.14	0.04	0.277
Educational TV (h)	−0.24	0.30	−0.03	0.417	−0.31	0.33	−0.03	0.341
Background TV (h)	−0.13	0.07	−0.09	0.043	−0.08	0.07	−0.06	0.210
Self-regulation problems					−0.11	0.03	−0.18	<0.001
Language								
Child female	1.29	0.43	0.16	0.003	1.26	0.42	0.15	0.003
Child age	0.04	0.01	0.16	0.004	0.04	0.01	0.16	0.006
Cumulative risk	−0.38	0.13	−0.14	0.004	−0.30	0.13	−0.11	0.022
Home-based care	0.76	1.14	0.04	0.504	0.68	1.16	0.04	0.558
Center-based care	−0.96	0.60	−0.10	0.109	−0.91	0.59	−0.10	0.123
Reading (h)	0.86	0.42	0.09	0.039	0.81	0.41	0.09	0.051
Entertainment TV (h)	0.03	0.12	0.02	0.773	0.08	0.12	0.03	0.519
Educational TV (h)	0.15	0.37	0.02	0.686	0.11	0.38	0.02	0.780
Background TV (h)	−0.10	0.06	−0.10	0.070	−0.07	0.05	−0.07	0.198
Self-regulation problems					−0.07	0.02	−0.16	0.002
Self-regulation problems								
Child female	−0.50	1.04	−0.03	0.630				
Child age	−0.01	0.04	−0.02	0.773				
Cumulative risk	1.20	0.38	0.18	0.002				
Home-based care	−1.14	1.66	−0.03	0.493				
Center-based care	0.72	1.45	0.03	0.619				
Reading (h)	−0.75	0.89	−0.03	0.402				
Entertainment TV (h)	0.67	0.26	0.12	0.011				
Educational TV (h)	−0.61	0.70	−0.04	0.381				
Background TV (h)	0.46	0.15	0.20	0.003				

and language and literacy skills was fully accounted for by self-regulation problems, thus attenuating the relations between television and early literacy and language skills.

These findings largely support our hypotheses. Given inconsistent findings of relations between television exposure and literacy and language skills in early childhood,[5,6,19] it is important to investigate potential sources of heterogeneity in results across studies. Here, we hypothesized that both entertainment and background television would be negatively associated with school readiness skills; however, we found no association for entertainment television with either literacy or language skills. There are a number of reasons this might be the case. First, we did detect an indirect effect of entertainment television on literacy, suggesting there might be shared variance with other covariates in the model that might account for the null effect. Second, it might be that the association between certain types of television and school readiness skills only exists for certain children; that is some children may be differentially susceptible to the potentially negative impact of some forms of media content.[32] Ribner et al.[6] found a moderation effect such that for children above the mean SES in their sample, there was no association between television viewing and school readiness outcomes. We did find an association between entertainment television exposure and parent-reported self-regulation problems, supporting experimental findings that some features of entertainment television—likely either pacing or content—negatively affects children's executive function.[15,20]

An additional mechanism that could mediate the relationships between self-regulation, media exposure, and language and literacy skills stems from the potential disruption to parent−child interactions via technoference. For example, background television interferes with the quality and quantity of parent−child interactions delaying their responses to bids for attention and decreasing child-directed speech.[33] The development of self-regulatory skills is dependent on social contingency, or the appropriate and timely back-and-forth manner of response, that occurs during responsive parent−child interactions.[34] As such, self-regulation and disruption of contingent interactions via technoference might serve as a mechanism by which television exposure is associated with early language and literacy skills. This hypothesis requires further empirical investigation using longitudinal designs. We also found an association between

background television and each school readiness outcome under investigation. This again supports prior research documenting particularly deleterious effects of background television.[21,35,36] Using in-home Language Environment Analysis language recording devices, Christakis et al.[35] reported a 7% decrease in adult speech per hour, decreased child vocalizations, and decreased conversational turn-taking when the TV was on. Even if toddlers were exposed to 2 h of background television per day (rather than the average 5.5 h), it is estimated that children would hear approximately 13,400 fewer child-directed words per week.[37] The relation between background television and self-regulation problems is of particular interest given findings that background television is negatively associated with measures of sustained attention and cognitive processing.[13,22,23] Collectively, these empirical studies combined with our findings suggest that the mechanism for disrupted outcomes might be due to interruptions in parental emotional regulation during daily parent—child interactions. Indeed, our analysis provides novel evidence of the role of self-regulation as a mechanism by which television might affect children's language and literacy skills.

Limitations and conclusions

There are several limitations to consider when interpreting these results. First, it is important to note that these data were all parent-report, collected over the phone, and were cross-sectional in nature. Therefore, only associations between variables can be calculated, and neither causality nor directionality can be inferred. Additionally, given that these data are all parent-report, there is a potential for bias, misinterpretation, or misreporting of information. As such, it was beyond the scope of data collection to gain insight into what might be important alternative explanations and complicating characteristics for relations reported here, notably dispositional and social factors that take place during media usage (for a review, see ref.[38]). Finally, the timing of data collection also merits attention: These data were collected in 2009, the year prior to the release of the Apple iPad and prior to the widespread availability of tablet and mobile phone-based media. In 2011—2 years after these data were collected—41% of families with children 0—8 had a smartphone and 8% had a tablet. In contrast, in 2017, 95% of families had a smartphone, and 78% had a tablet.[10] Given these monumental changes in the availability of screen-based media, it is feasible that the associations between self-regulation, media content, and language and literacy outcomes might be stronger than described in the present study. Future research should replicate these findings with a new cohort of children to examine the potential consequences of such a dramatically altered media landscape. For example, parents frequently report using mobile devices so that they can do chores such as making dinner, run errands, traveling, eat out at a restaurant, calm a child during transitions, or help a child fall asleep.[39] This pass-back behavior indicates that parents may be using mobile devices as "digital pacifiers" to manage children's behavior, whether to calm them or distract them in order to accomplish other tasks.[39] Parents of 15- to 36-month-olds at Women, Infants, and Children nutrition clinics reported use of mobile devices as a calming tool, particularly for children with poorer self-regulation.[40] It is unknown whether parents with more difficult infants use mobile devices more for calming, whether parents who felt more overwhelmed used mobile devices, or if mobile devices were likely to result in more socioemotional difficulties. The authors speculated that frequent use of mobile devices for self-regulation may result in the development of fewer other regulatory strategies by parents and children.[40] It is important to note that, although the number and mobility of devices has changed dramatically, viewing video content is still the primary media-based activity for children in this age range.[10] Future studies can use the present findings to critically assess whether the addition of mobile devices exacerbates the pattern of

results presented here or whether a more general mechanism of technoference may be disrupting child outcomes. Longitudinal data are needed to better understand the relationships between self-regulation, media exposure, and child outcomes. Cross-sectional data cannot assess directionality whereas longitudinal research will be able to better test the theory that there may be differential susceptibility to technoference for some children versus less vulnerable children.[32] For example, it would be possible to test whether self-regulation or parenting behavior moderates long-term outcomes.

Despite these limitations, these findings have theoretical and practical implications. This dataset is one of the first to provide an opportunity to investigate self-regulation as a potential mediator of the relations between television exposure and language and literacy skills; we posit that the splitting of attention and the reality of multitasking when a television is on in the background is negatively associated with children's behavioral self-regulatory skills, which subsequently negatively affects their language and literacy skills. Further investigation is needed to empirically test this hypothesized mechanism by which television affects school readiness skills. From a practical perspective, these results support recommendations made by the AAP[8] with regard to background television: Parents may wish to consider turning off screen-based media devices when children are not actively attending.

AUTHOR CONTRIBUTIONS
A.D.R. conceptualized the study. All authors contributed to the writing of the manuscript. All authors reviewed and approved the manuscript as written.

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