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Original Investigation

Protective Effects of Parental Monitoring of Children's Media Use

A Prospective Study

Douglas A. Gentile, PhD; Rachel A. Reimer, PhD; Amy I. Nathanson, PhD;
David A. Walsh, PhD; Joey C. Eisenmann, PhD

IMPORTANCE Children spend more time with electronic media than they do in any other activity, aside from sleep. Many of the negative effects that stem from media exposure may be reduced by parental monitoring of children's media use; however, there lacks a clear understanding of the mechanisms and extent of these protective effects.

OBJECTIVE To determine the prospective effects of parental monitoring of children's media on physical, social, and academic outcomes.

DESIGN, SETTING, AND PARTICIPANTS Prospective cohort design. Data were collected by in-home and in-school surveys in 2 communities in Iowa and Minnesota, where 1323 third- (n = 430), fourth- (n = 446), and fifth- (n = 423) grade students participated. A primary caregiver and teachers also provided data about the student.

INTERVENTIONS Participants in the current study were recruited to participate in a social ecological model-based obesity prevention program.

MAIN OUTCOMES AND MEASURES Body mass index, average weekly sleep, school performance, prosocial behavior, and aggressive behavior.

RESULTS Structural equation modeling revealed that parental monitoring of children's media influences children's sleep, school performance, and prosocial and aggressive behaviors and that these effects are mediated through total screen time and exposure to media violence.

CONCLUSIONS AND RELEVANCE Parental monitoring of media has protective effects on a wide variety of academic, social, and physical child outcomes. Pediatricians and physicians are uniquely positioned to provide scientifically based recommendations to families; encouraging parents to monitor children's media carefully can have a wide range of health benefits for children.

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Author Affiliations: Department of Psychology, Iowa State University, Ames (Gentile); Des Moines University, Des Moines, Iowa (Reimer); The Ohio State University, Columbus (Nathanson); Mind Positive Parenting, Minneapolis, Minnesota (Walsh); Department of Kinesiology, Michigan State University, East Lansing (Eisenmann).

Corresponding Author: Douglas A. Gentile, PhD, Iowa State University, Department of Psychology, W112 Lagomarcino Hall, Ames, IA 50011 (dgentile@iastate.edu).

The American Association of Pediatrics¹ (AAP) recommends that children 2 years and older consume no more than 1 to 2 hours of total screen time per day. Sisson and colleagues² used the National Health and Nutrition Examination Survey (2001-2006) to examine screen time among children aged 2 to 16 years for television/video, computer, and total screen time. Nearly half (47%) of all children and 49% of children in middle childhood (ages 6-11 years) exceeded the recommended 2-hour time limit on total screen time. Children spend an average of 40 hours per week engaged in television, movies, and/or video game play,³ which is more time than they spend in any other single activity except sleep.⁴

Exposure to excessive screen time has been associated with a variety of negative outcomes for children. The displacement hypothesis proposes that time spent watching television/movies or playing computer/video games takes time away from alternative physical, social, and academic activities.^{5,6} Each hour of screen time in early childhood is associated with a decrease in subsequent time spent in physical activities⁶ and an increased likelihood of being overweight or obese.⁷ Time spent watching television has been linked with a lower likelihood of eating fruits and vegetables and a higher likelihood of eating candy, fast food, drinking soda, and skipping breakfast, even when control-

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ling for potential covariates.⁸ Activity level and nutrition are both important risk factors for childhood obesity.

Several studies have documented that higher levels of screen time are associated with less sleep,^{9,10} more attention problems,^{11,12} and lower academic performance and involvement.¹³ A displacement framework has also been applied to examining the effects of screen time on academic activities such as studying, reading, and doing homework.¹⁴

The content of media can have effects independent of the amount of screen time. Greater screen time increases children's exposure to content that is violent, sexual, glorifies substance use, and advertises unhealthy foods, all of which may contribute to negative outcomes for children. Social cognitive and learning theories posit that the media can influence children's behavior through learning mechanisms. Specifically, media content can influence children's perceptions, affect, beliefs, and behavioral responses to others.^{15,16}

Children who report higher levels of media violence exposure are at increased risk for several negative social outcomes. Total screen time and media violence exposure have been associated with higher risk of victimization, aggressive behavior and bullying, lower attachment to parents and peers,¹⁷ and later risk behaviors.^{18,19} It is estimated that by the time children turn 18 years of age, they will have seen 200,000 acts of violence in the media.²⁰ Sharif and Sargent²¹ examined the effects of a variety of media consumption factors on school performance. Not only was weekday screen time and video game use associated with poorer academic performance, but viewing R-rated content also increased the odds of poor academic performance. The authors did not provide data to explain this finding, but it is likely that children who view more R-rated movies have lower parental monitoring.

Parental Monitoring

Many negative effects of both the amount and content of media may be mitigated by parental monitoring of children's media use. Parental monitoring includes talking with children about media content ("active mediation") and restricting the amount of and/or the content of media ("restrictive monitoring"). Active mediation can include offering opinions of media content, educating children about the purposes of various media (eg, advertising), or providing guidance and explanations. Active mediation is associated with a range of positive outcomes for children.^{22,23} Furthermore, restrictive monitoring is associated with less screen time,²⁴ more time spent reading,¹⁴ and prosocial outcomes.²⁵

Parental media monitoring typically subsides as children mature, with heavier parental involvement during early childhood and minimal involvement by the time children reach adolescence.²⁶ Middle childhood is an important time for parental media monitoring because it is a period of development in which children are typically given increased freedom to make decisions.

Previous Studies

Previous studies that have examined the impact of screen time have often analyzed only a small number of outcomes or have been cross-sectional in nature. There are no studies, to our

knowledge, that examine the prospective effects of parental monitoring of children's media on a variety of health and wellness outcomes. The purpose of this study was to determine the prospective influence of parental monitoring of media on children's physical, academic, and social wellness during middle childhood.

Specifically, parental media monitoring has been predicted to have primary, secondary, and tertiary influences on a wide range of outcomes. Parental monitoring should directly reduce total screen time and exposure to media violence (primary influence). Decreased screen time and media violence exposure should, in turn, influence sleep time, school performance, and prosocial and aggressive behavior (secondary influence). Screen time is predicted to influence body mass index (BMI) (tertiary influence). In this study, we used modern structural equation modeling analyses to test our hypothesized mediation models.

Methods

Participants and Procedures

Participants in the current study included 1323 third- (n = 430), fourth- (n = 446), and fifth- (n = 423) grade students. Each student's parent(s) and teacher also provided data about the student. Potential participants were recruited from 10 elementary schools in Minnesota and Iowa. Participants (47% male, 90% white) were recruited to participate in an obesity prevention program.^{27,28} Students and teachers completed surveys in their classrooms in the presence of a researcher while parents completed surveys from home. Children were 9 years of age (mean [SD], 9.21 [0.94] years), and the average education of parents was some college education (mean [SD], 4.33 [1.23] on a 6-point scale where 1 = some high school, 2 = high school, 3 = some college, 4 = 2-year degree, 5 = 4-year degree, 6 = graduate or professional school) at time 1. The first wave of data collection was in October and the second was in May during a school year. Parents provided written consent and children provided verbal assent to participate in this study, which was approved by the University of Minnesota institutional review board.

Measures

Demographics

Parents' education, marital status, minority status, and child's sex were used as covariates in the current study. Parents reported their highest level of education with an ordinal question from some high school to graduate or professional degree.

Parental Monitoring of Media

The Adult Involvement in Media Scale (AIM)^{29,30} was used and included 3 facets of media that monitored children's television and video game habits: limit-setting on amount (5 items), limit-setting on content (4 items), and active discussion about media (2 items).

Total Screen Time

We assessed time spent viewing television, playing video games, and using the computer by asking children for the

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Table. Intercorrelations Among Key Variables

	Parent Monitoring	TST	MVE	Grades	BMI	Sleep	Aggressive Behavior
TST	-0.36 ^a						
MVE	-0.29 ^a	0.49 ^a					
Grades	0.27 ^a	-0.25 ^a	-0.17 ^a				
BMI	0.02	0.00	0.00	0.02			
Sleep	0.22 ^a	-0.20 ^a	-0.22 ^a	0.08 ^b	-0.26 ^a		
Aggressive behavior	-0.12 ^a	0.26 ^a	0.34 ^a	-0.25 ^a	-0.01	-0.12 ^a	
Prosocial behavior	0.16 ^a	-0.29 ^a	-0.29 ^a	0.40 ^a	-0.01	0.12 ^a	-0.48 ^a

Abbreviations: BMI, body mass index; grades, teachers' report of students' average grade; MVE, media violence exposure; TST, total screen time.

^a $P < .001$.

^b $P < .01$.

amount of time they viewed each one during different times of the day, separately for weekdays and weekends. This approach has been used reliably with children.²⁹

Media Violence Exposure

Children named their 3 favorite television shows and 3 favorite video games, reporting how violent each was on a 4-point scale ("not at all violent" to "very violent") and how frequently they watched/played it on a 5-point scale ("I almost never watch this show" to "almost every day"). The violence and frequency ratings were multiplied and averaged across the 6 products to generate a media violence exposure value. This approach has been used validly with children in several studies.^{30,31} Furthermore, child ratings of violent media content have been shown to correlate with expert ratings¹⁶ and are equally valid compared with both media industry ratings and expert ratings in multiple countries.³²

School Performance and Physical Wellness

Children's classroom teachers reported the average grade for each child on a 13-point scale, ranging from A to F.³¹

Children reported their usual bedtimes and wake times for weekdays and weekends separately, from which weekly amount of sleep was calculated. Standing height and weight were measured by trained school nurses using standardized procedures.³³ Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared.

Social Wellness

Teachers completed a survey assessing the frequency of each child's observed aggressive and prosocial behavior.²⁹ Teachers responded to 4 items measuring physical aggression (eg, "This child hits or kicks peers") and 4 items measuring prosocial behavior (eg, "This child is helpful to peers") on a 5-point scale, with responses ranging from (1) never true to (5) almost always true.

Data Reduction and Analysis

Latent variables were created for parental monitoring, total screen time, media violence exposure, and prosocial and aggressive behavior. We followed the recommendation of Russell and colleagues³⁴ and created observed indicators (parcels) for the parent involvement and media violence exposure

variables. This helped to account for possible violations in multivariate normality that are often problematic when using individual items and reduced the number of parameters that would result if one were to use individual items. Model fit was thus improved due to the more limited number and better distribution of the parameters. Single-factor confirmatory analyses with the maximum likelihood method for each of the scales and parcels were created by combining high- and low-loading items to equalize the average loadings of each parcel on its respective factor.

These data were collected as part of an obesity prevention intervention called the Switch program.²⁷ Families were not blind to the obesity prevention goals of the program but were blind to the secondary goals of the research such as the focus on parental monitoring and media violence. We tested whether awareness of the intervention could have skewed our findings by influencing parent or child reporting. Time 1 measurements were taken before the program began and there were no significant differences in parental monitoring. Similarly, time 2 measurements were taken at the end of the program but there were no significant differences on any of the outcome measures between the experimental and control groups. All families were used in the statistical analyses.

Results

The **Table** shows the raw intercorrelations among each of the key constructs.

Primary Influences of Parental Media Monitoring

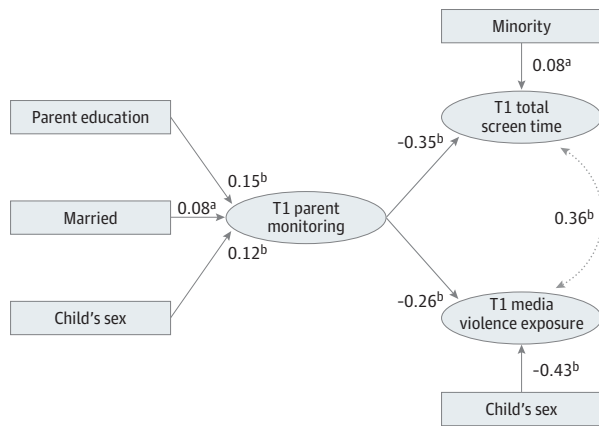
Figure 1 displays the predicted primary influence. At time 1, parental monitoring significantly predicted both lower total screen time (TST) (television, video games, and online computer time) and lower media violence exposure (television and video games). These paths were significant after controlling for parent education level, parental marital status, child sex, and minority status. The overall model fit was excellent.

Secondary Influences of Parental Media Monitoring

Using the model in **Figure 1** as a baseline, time 2 variables were included to test the hypothesized mediated pathways. **Figure 2** displays the final model including all child outcome vari-

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Figure 1. Basic Cross-sectional Model of Primary Effects of Parental Media Monitoring, Controlling for Parent Education, Marital Status, Child Sex, and Minority Status



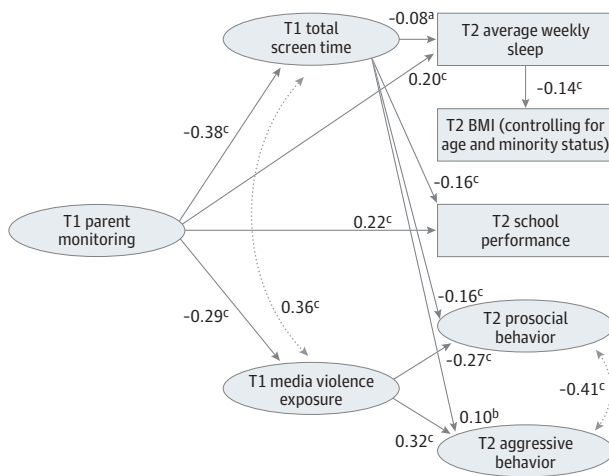
Model fit statistics: $\chi^2_{53} = 121.54, P < .001$, comparative fit index = 0.980, Tucker Lewis Index = 0.973, root mean square error of approximation = 0.031 (90% CI, 0.024-0.039), standard root mean square residual = 0.032.

T1 indicates time 1. All represented paths are statistically significant at the following levels:

^a $P < .05$.

^b $P < .001$.

Figure 2. Prospective Model of Secondary and Tertiary Mediated Effects of Parental Media Monitoring, Controlling for Parent Education, Marital Status, Child Age, Child Sex, and Minority Status



Controls not shown for simplicity. Model fit statistics: $\chi^2_{247} = 915.35, P < .001$, comparative fit index = 0.946, Tucker Lewis Index = 0.937, root mean square error of approximation = 0.045 (90% CI, 0.042-0.048), standard root mean square residual = 0.053. BMI indicates body mass index; T1, time 1; and T2, time 2. All represented paths are statistically significant at the following levels:

^a $P < .05$.

^b $P < .01$.

^c $P < .001$.

ables, with excellent overall model fit. Although not shown in Figure 2, the same control variables (parental education level, marital status, child sex, and minority status) were included in this model as in Figure 1. The mediated (indirect) effects were significant for all outcome variables (Box).

Box. Mediation Analyses: Standardized Regression Coefficients for the Mediated Pathways From Parent Monitoring to Outcome Variables

Outcome: sleep

Parent monitoring → total screen time → sleep: $\beta = 0.03, P < .05$

Outcome: BMI

Parent monitoring → sleep → BMI: $\beta = -0.03, P < .001$

Parent monitoring → total screen time → sleep → BMI: $\beta = -0.004, P = .06$

Outcome: grades

Parent monitoring → total screen time → grades: $\beta = 0.06, P < .001$

Outcome: prosocial behavior

Parent monitoring → total screen time → prosocial behavior: $\beta = 0.06, P < .001$

Parent monitoring → media violence exposure → prosocial behavior: $\beta = 0.08, P < .001$

Outcome: aggressive behavior

Parent monitoring → total screen time → aggressive behavior: $\beta = -0.04, P < .01$

Parent monitoring → media violence exposure → aggressive behavior: $\beta = -0.10, P < .001$

Abbreviation: BMI, body mass index.

The TST at time 1 predicts less sleep, poorer school performance, lower prosocial behavior, and higher aggressive behavior than at time 2. Increased parental monitoring reduced children's TST, which in turn resulted in more sleep ($\beta = 0.03, P < .05$). Similarly, more monitoring resulted in increased school performance ($\beta = 0.06, P < .001$), increased prosocial behavior ($\beta = 0.06, P < .001$), and lower aggressive behavior ($\beta = -0.04, P < .01$).

Media violence exposure predicted lower prosocial behavior and higher aggressive behavior at time 2. Higher parental monitoring resulted in lower media violence exposure, which in turn resulted in increased prosocial behavior ($\beta = 0.08, P < .001$) and decreased aggressive behavior ($\beta = -0.10, P < .001$).

Tertiary Influences of Parental Media Monitoring

The model in Figure 2 shows BMI as both a secondary and tertiary variable. Higher parental monitoring predicts more sleep, which in turn predicts lower BMI (mediated path $\beta = -0.03, P < .001$), controlling for parent education, marital status, child age, child sex, and minority status. In addition to this secondary influence, the tertiary mediated pathway from parental monitoring to TST to sleep to BMI just missed statistical significance ($\beta = -0.004, P = .06$).

Discussion

The purpose of this research was to determine the protective effects of parental monitoring of media on children's TST, exposure to media violence, sleep, school performance, and prosocial and aggressive behaviors. This prospective study across

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1 school year (7 months) demonstrates that parental involvement in children's media has immediate and long-term effects on a wide range of children's physical, social, and academic health outcomes. This study builds on previous research but is the first, to our knowledge, to examine the effects of parental monitoring on a variety of social, academic, and physical health outcomes over time among children. The results suggest that parental monitoring affects weekly sleep, school performance, and prosocial and aggressive behavior through TST. Additionally, prosocial and aggressive behaviors are influenced by parental involvement via children's exposure to violent content. These results provide strong evidence that parents' monitoring of media has positive indirect effects over time on factors that are important for a variety of health outcomes.

These findings are especially important because of their potential implications for targeted intervention development. Previous work has documented that most pediatricians are aware of and agree with the AAP recommendations.³¹ Pediatricians overwhelmingly believe that excessive screen time has negative effects on children's aggressive behaviors, risk for obesity, and school performance. However, nearly 75% of pediatricians feel some sense of futility in making AAP recommendations to parents. Providing health care professionals with specific recommendations for patients may alleviate this sense of futility and increase the effectiveness of such recommendations. The AAP does provide specific recommendations (eg, no televisions in bedrooms, limit TST to 1-2 hours a day),¹ but perhaps these seem too general. This study suggests some details that may be useful to provide to parents. Specifically, there are 4 types of parental monitoring: (1) co-viewing with the child, (2) restricting amount of time, (3) restricting the types of content, and (4) actively discussing the meaning and effects of media content with children (active me-

diation). Studies have found that co-viewing paired with active mediation, restricting amount, and restricting content are all powerful protective factors for children.³⁵ In contrast, co-viewing without active mediation tends to be a risk factor because parents then appear to give tacit approval to whatever is being viewed. Explaining these details to parents may provide pediatricians with a greater sense of efficacy. However, regardless of pediatricians' efficacy beliefs, this study demonstrates parental monitoring is broadly effective, and providing this information to parents can only be beneficial.

This study is limited by its relatively short time span (7 months). It is unclear whether these relations would continue to increase or decrease across time, although some researchers have suggested that media effects compound across time in a self-reinforcing spiral.³⁶ This study is also limited by its reliance on surveys for most measures (except BMI), although an earlier analysis found that children and parents are equally valid reporters of parental monitoring.³⁵ This study is strengthened by having data provided by multiple observers including children, teachers, nurses, and parents. Future research would benefit from a longer time frame and multiple measurements to test the spiral model.

Conclusions

This study demonstrates that the effects of parental involvement on children's media habits are neither simple nor direct and that they can affect a wide range of academic, physical, and social health outcomes. Therefore, pediatricians, family practitioners, nurses, and other health care professionals who encourage parents to be more involved in their children's media may be much more effective at improving a wide range of healthy behaviors than they realize.

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