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Children's Hyperactivity, Television Viewing, and The Potential for Child Effects

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Abstract

Using data from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B; $n = 6,250$), this study examined whether children who display difficult behaviors early in life watch more television from year-to-year. Results revealed that 4-year-old children's hyperactive, but not aggressive, behavior was associated with an increase in television watching over the ensuing year. These potential child effects, however, were embedded in both proximate and distal ecologies. That is, the association between children's hyperactivity and increases in their television exposure over time was strongest among those in the low-end of the socioeconomic distribution and those whose parents displayed less optimal mental health. It was also stronger among girls. These results underscore the importance of considering child effects in future research and how intra-familial dynamics vary across different types of family contexts.

Keywords

Child effects; Child behavior; Television watching; ECLS-B

Television viewing among children in the U.S. is at an all-time high (Rideout, 2013), which has significant implications for their achievement, behavior, health, and other developmental trajectories (Christakis, 2009). In particular, a wealth of empirical evidence suggests that high levels of television viewing are particularly problematic for children's hyperactivity (Christakis, Zimmerman, DiGuseppe, & McCarty 2004; Miller et al., 2007; Thakkar, Garrison, & Christakis, 2006; Zimmerman & Christakis, 2007) and aggression (Manganello & Taylor, 2009; Mistry, Minkovitz, Strobino, Borzekowski, 2007). Such associations have been a source of great concern among pediatricians, educators, researchers, and laypersons and helped to spur recommendations by the American Academy of Pediatrics (2001, 2013) that parents limit their children's television viewing to 1–2 hours per day.

Although these observed effects of televising watching on children are important, they are also likely to be only part of the story. For very young children (and even older ones), how

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much children watch television is really about parental behavior, and parental behavior is not a decontextualized unidirectional path from parents to their children (Bell, 1968). Indeed, the developmental systems perspective (Lerner, 2006), suggests that children's development is part of a dynamic and reciprocal transaction between them and their parents. Thus, not only do parents influence children, but children also elicit (either actively or passively) new responses from their parents over time (Ansari & Crosnoe, 2015a, 2015b; Bell, 1968; Lee, Alschul, & Gershoff, 2015; Lugo-Gil & Tamis-LeMonda, 2008; Sameroff & MacKenzie, 2003; Yan & Dix, 2013). This notion of child effects — that children may actively and passively influence the ecologies that then shape their future developmental trajectories — has a long-standing history in developmental research but has been slow to develop, especially when compared with the child outcomes of parenting. In this study, we argue that these child effects are particularly relevant to developmental studies of children and television. If television viewing is an aspect of parenting, then the potential for children to elicit that kind of parenting needs to be better understood. As a means of opening up new lines of discussion and inquiry, we consider here which children elicit more television viewing over time.

As background, television viewing is often conceptualized as form of parenting and managing children (Rideout, 2013); in other words, the television can be used as a means of occupying children who exhibit difficult behavior. Yet, to date, only two studies have explored how such parenting may be evoked or elicited by different types of children, the child effects that are integral to the transactional processes of early childhood highlighted by developmental systems (Lerner, 2006). Both studies revealed that young children with difficult temperaments watched more television during the first two years of life, although these authors did not look at change over time (Radesky, Silverstein, Zuckerman, & Christakis, 2014; Thompson, Adair, & Bentley, 2013). Given the potential theoretical and practical value of understanding such child effects, we need to know more, such as whether and how different dimensions of young children's behavior predict television exposure over time and across contexts.

The first aim of this study, therefore, is to test the hypothesis that children who demonstrate problem behaviors early in life watch more television from year-to-year. Evidence for this hypothesis will suggest that children who display greater behavior problems watch more television over time (Radesky et al., 2014; Thompson et al., 2013). Importantly, we test this hypothesis by looking at and comparing two related but different dimensions of behavioral problems: hyperactivity and aggression. We focus on these two specific behaviors in light of the extant literature, which has consistently documented associations between television viewing and children's hyperactivity and aggression (Christakis et al., 2004; Manganello & Taylor, 2009; Miller et al., 2007; Mistry et al., 2007; Thakkar et al., 2006; Zimmerman & Christakis, 2007).

The transactional emphasis of developmental systems motivating this study of the potential effects of child behavior on their television viewing should be coupled with other points of emphasis in this theory, such as the value of viewing transactional processes within larger ecological systems (Lerner, 2006). That coupling suggests that the links between child behavior and television watching should be expanded to also consider whether these links

vary across different types of family contexts (Yoshikawa, Aber, & Beardslee, 2012). Essentially, some parents might be more susceptible to using the television as a response to their children's behavior problems than others. We consider three kinds of variability in the child effects here, focusing on ways of characterizing families that cross multiple ecological levels from distal stratification systems to more interpersonal and personal dimensions of family life.

To begin, children of distressed parents watch more television than children of non-distressed parents (Thomson & Christakis, 2007), and similar patterns emerge for families of low socioeconomic status (Thompson et al., 2013). In other words, parents' wellbeing (proxied by depressive symptoms and stress) and socioeconomic status (proxied by income and educational attainment) are likely to predict children's television exposure and their behavioral difficulties over time. The larger question, however, is how these factors — the first tapping into the proximate family ecology, the second into distal stratification systems — may condition the degree to which children elicit their own television viewing patterns over time.

As one example, some evidence suggests that socioeconomically disadvantaged parents are more reactive to external influences on their parenting than more advantaged parents (Augustine & Crosnoe, 2010; Crosnoe, Augustine, & Huston, 2012). In part reflecting the psychological and social resources available to them, they seem to change their parenting behavior more in relation to their own circumstances, especially moving away from more positive parenting practices in the face of challenges to themselves or their families (Augustine, 2014). Another well-documented pattern is that psychologically distressed parents are more reactive to children's behavioral difficulties and that one common reaction is to avoid conflict and suppress children's negative behavior (Dix, Moed, Anderson, 2014; Trew, 2011). As a result, more disadvantaged parents and parents in poorer mental health might be more likely to use the television as a means of managing their children's challenging behavior.

In line with our interest in child effects, we should not limit the consideration of ecological variability to aspects of parents' lives. Parents may also differentially react to children's problem behavior depending on other characteristics of children (e.g., Crosnoe, Ansari, Purtell, & Wu, 2015). To explore this possibility within our general framework, we focused on child gender. Although the role of gender in media use is complex (Anand & Krosnick, 2005; Huston, Wright, Marquis, Green & Samuel, 1999), it is clearer in terms of problem behaviors. Considering that girls are less likely to be hyperactive or aggressive than boys (Rubin et al., 2003), evidence of these behavioral issues might be particularly vexing to the parents of girls. Thus, if parents consider girls to be hyperactive or aggressive, they may be more likely to view it as problematic and, therefore, react to it. To the extent that television is a reaction to challenges raising children (Rideout, 2013), then increased viewing may be more common among girls perceived as challenging to raise as compared with boys.

Testing the hypothesis that family socioeconomic disadvantage, parents' psychological distress, and children being girls will moderate the associations between child behavior and television viewing across early childhood is the second aim of this study. Taken together

with our first aim, the results of this investigation can address gaps in the literature and advance theory by demonstrating the insights to be gained by reversing some of the assumed directions in the interplay of parents and children. It can also have more practical significance by pointing to potential targets for intervention during early childhood to curtail excessive television viewing.

Methods

The ECLS-B (Snow et al., 2007) followed a nationally representative sample of 10,700 children born in the U.S. in 2001. Children participating in the ECLS-B came from diverse socioeconomic and cultural backgrounds and were sampled from different counties or groups of counties across the country. The initial sample excluded children who had died, those who had been adopted after the issuance of the birth certificate, and children who were born to mothers younger than 15 years of age. The same children were followed from birth through kindergarten entry with data collection occurring at 9 months (2001–2002), 2 (2003–2004), 4 (2005–2006) and 5 years of age (2006–2007). At each wave of data collection, information was collected from multiple sources, including: parent, caregiver, and teacher interviews as well as direct child assessments (for more information on sampling procedures see, Snow et al., 2007). The analytical sample for this investigation included 6,250 children and families who participated in the preschool and kindergarten waves (note that sample sizes have been rounded to the nearest 50 per IES/NCES regulations). For sample characteristics, see Table 1.

Measures

Weighted samples descriptives for all focal variables can be found in Table 1.

Child behavior—Parents reported on children's behaviors at age 4 on a 5-point scale (1 = *never observed*, 5 = *very often observed*) using 8 items from the Preschool and Kindergarten Behavior Scales–Second Edition (Merrell, 2003). Sample items for aggressive behavior ($\alpha = .74$) include: has temper tantrums, destroys things that belong to others, and is physically aggressive. Sample items for hyperactive behavior ($\alpha = .64$) include: acts impulsively, is overly active, and pays attention (reverse coded). In both cases, the items were summed to create the final scale.

Television watching—In each wave of data collection, parents reported how many hours on a typical weekday that their children watched television. We truncated these scales at eight hours due to skew; less than 3% of families reported greater hours of television viewing. On average, children watched approximately 2 hours of television each day between the ages of 2 and 5 (see Table 1 for mean hours of television viewing across each time point).

Maternal and child moderators—Two socioeconomic characteristics of families were measured to capture the socioeconomic stratification that might moderate the potential effects of children's behavior on their television exposure. They include: parental education (Group 1 [G1] = less than high school; G2 = high school; G3 = some college; G4 = bachelors or greater) and household income (G1 = \$0–\$20,000; G2 = \$20,001–\$40,000; G3 =

\$40,001-\$75,000; G4 = \$75,001 and greater). Two indicators of parents' wellbeing were measured to capture potential moderation by parental adjustment and functioning. The first was *parenting stress* as measured by 5 items drawn from the Parenting Stress Index ($\alpha = .77$; Abidin, 1983), where parents responded to questions regarding parenting difficulties (e.g., "I feel trapped by my responsibilities as a parent", "I often feel tired, worn out, or exhausted from raising a family"). These items were summed (0–3 = not stressed, G1; 3–4 = mildly stressed, G2; 5–7 = moderately stressed, G3; 8 or more = severely stressed, G4). Different categorizations were examined with no differences in results. The second was parents' self-reported *mental health*, derived from 12 questions from the Center for Epidemiological Studies-Depression Scale ($\alpha = .88$; Radloff, 1977). These items were summed (note: the general rubric for evaluating scores on this scale is: 0–4 = not depressed, G1; 5–9 = mildly depressed, G2; 10–14 = moderately depressed, G3; 15 or more = severely depressed, G4). Finally, we also included *child gender* (1 = female) as a moderator.

Covariates—All moderators described above as well as the initial television measures (at ages 2 and 4) also served as covariates. To this list of covariates, we also added: children's age, race, preschool attendance, household language, household size, number of siblings, parents' employment status, parents' marital status, parents' immigration status, mothers' age, urbanicity, and region. To account for other domains of child development that have been linked with television exposure (Zimmerman & Christakis, 2005), we also adjusted for children's academic skills with assessments that were developed specifically for the ECLS-B ($\alpha = .92$; Najaran, Snow, Lennon, & Kinsey, 2010). Unless otherwise noted, all covariates were drawn from the age 4 wave of data collection.

Plan of Analyses

The focal analyses were conducted in two basic steps in the *Mplus* program (Muthén & Muthén, 1998–2013). In the first, children's age 5-television watching was regressed on their age 4 behaviors, the prior television measures (ages 2 and 4), and the covariates. In other words, we conducted lagged dependent variable models, which is a strong adjustment for omitted variable bias (National Institute of Child Health and Human Development Early Child Care Research Network & Duncan, 2003). In the second, this model was re-estimated in a multi-group framework in which the focal parameters (i.e., child behaviors $\rightarrow$ television watching) were compared across subsamples defined by socioeconomic indicators, dimensions of parental adjustment and functioning, and child gender. In this step, Wald's tests formally examined whether the focal regression coefficients significantly differed across groups. All modeling was conducted using: (a) longitudinal weights, ensuring that our sample was representative of the nation's children while also adjusting for non-response bias and differential cross-wave attrition; (b) clustering and stratification variables to adjust standard errors for shared variance due to the non-independence of cases within strata of the sampling frame; and (c) full information maximum likelihood estimation to address missing data.

Results

As can be seen in Table 2, at the national level, 5-year-old children watched an average of 1.94 hours of television per day, which is slightly less than the maximum amount of 2 hours recommended by the American Academy of Pediatrics (2013). Multivariate models examined whether children's behavioral difficulties differentiated this overall level of television watching. We began with hyperactivity.

The first model examined whether children's hyperactivity elicited greater television watching over time, net of the covariates and prior measures of television watching in the full sample. Results from these analyses revealed that hyperactivity at age 4 predicted more television watching a year later ($\beta = .04, p < .05$). To give a sense of the meaning of this observed association, the difference in television exposure between children of low (-1 standard deviation) and high ($+1$ standard deviation) hyperactivity corresponded to an additional .12 hours of television watching per day, which is on par with prior work examining whether toddlers with difficult temperaments watched more television (Radesky et al., 2014; Thompson et al., 2013). These models also revealed that some of the variables that were considered to be focal moderators of links between hyperactivity and television watching had significant main effects on television time. Specifically, the children of parents who were of lower socioeconomic status and/or had more depressive symptoms watched television more than other children. Children's gender and parents' parenting stress were not associated with television viewing over time.

The next step was to consider variation in this link between hyperactivity and television watching across different groups of families and children; in other words, whether the focal moderators did indeed condition the observed associations between child behaviors and the outcome (see Table 2). The first set of moderators concerned family socioeconomic status. The results revealed that the association between children's hyperactivity and television watching (net of prior television watching and the other covariates) was concentrated among families of lower socioeconomic status. That is, the tendency for parents of children viewed as more hyperactive to allow them to watch more television over time than children not rated as hyperactive was most common when parents earned less than \$20,000 per year ($\beta = .09, p < .01$) and had less than a high school education ($\beta = .17, p < .01$). The difference in television exposure between low and high hyperactive children corresponded to an additional .32 hours per day for the lowest-income families and an additional .66 hours for the least educated families. Parents of higher socioeconomic status did not demonstrate such a tendency. Wald's tests confirmed that the regression coefficients for hyperactivity significantly differed across the income (Group 1 vs. 3 and 4: $p < .05$) and educational (Groups 1 vs., 2, 3, and 4: $p < .05$) gradients.

The next set of moderators tapped into parental adjustment and functioning. Multi-group analyses revealed that parental depression (although not parental stress) conditioned some of the previously observed associations between children's hyperactivity and increased television watching. The tendency for parents of children viewed as more hyperactive to allow them to watch more television over time than children not viewed as hyperactive was most common among parents who were classified as severely depressed ($\beta = .17, p < .05$).

This effect size translated into an additional .62 hours of television per day for children who exhibited high hyperactivity as compared with those who were not considered to be hyperactive at all. This pattern was not found among parents who exhibited fewer depressive symptoms, and Wald's test confirmed that this apparent difference between more and less depressed parents was significant (Groups 4 vs. 1 and 2: $p < .10$).

Child gender was the final moderator. Multi-group modeling revealed that hyperactivity was associated with television viewing for girls ($\beta = .07$, $p < .01$) but not boys ($\beta = .00$, ns) and a Wald's tests confirmed that these estimates did differ significantly by gender ($p = .08$). In terms of effect size, hyperactive girls watched an additional .22 hours of television per day throughout the following year as compared with non-hyperactive girls. Changes in television viewing over time did not differ between hyperactive and non-hyperactive boys.

Turning from hyperactivity to aggression, results from the same set of modeling steps indicated that such behavior ($\beta = .00$, ns) did not predict television watching a year later, once the covariates and prior measures of television watching were controlled. Furthermore, this null result persisted across subgroups of children defined by family socioeconomic status, parenting stress, and child gender (results available upon request). We did, however, find that children's aggressive behavior predicted later television exposure ($\beta = .17$, $p < .05$) among parents' who were severely depressed. The effect size translated into an additional .62 hours of television per day for highly aggressive (vs. low) children. Similar patterns did not emerge for parents who exhibited fewer depressive symptoms, and this difference was statistically significant (Groups 4 vs. 1, 2: $p < .05$). When models included both children's hyperactive behavior and their aggressive behavior at the same time, the results for hyperactivity that we described above were robust. Thus, the link between children's behavior and television watching appeared to be specific to hyperactivity and did not generalize to externalizing problems.

Discussion

Television watching is a growing public concern as excessive viewing has harmful implications for children's academic and behavioral development (Christakis, 2009; Miller et al., 2007; Mistry et al., 2007; Thakkar et al., 2006; Zimmerman & Christakis, 2005, 2007). The focus of television research to date, however, has been based on unidirectional models in which television affects children, with less effort made to understand why parents let their children watch television (for two exceptions see: Radesky et al., 2014; Thompson et al., 2013). Developmental theory points to the importance of going beyond such models and emphasizes the need to consider the role of children in shaping their own multi-layered ecologies (Bell, 1968; Lerner, 2006). Pulling from central tenets of this theory, we extended the extant literature by reversing some of the assumed links between parents and their children and, in the process, underscore the value of considering child effects in future studies. Taken together, the results from this investigation have three take home messages.

First, we found evidence suggesting that children's hyperactive behavior, but not aggressive behavior, were associated with increased television viewing over time. This potential child effect corresponded to an additional .12 hours of television time per day for children viewed

as hyperactive versus those viewed as not hyperactive. Although not directly testable with the data at hand, one possible explanation for these associations is that parents might have used television as a means of managing (or coping with) with children's hyperactive behavior (Rideout, 2013). Why might this child elicitation pattern be specific to hyperactivity? Although children's aggressive behavior is often perceived to be intentional, reactive, or in retaliation, their hyperactive behavior may be viewed as more normative and less defiant by parents. In other words, if parents use the television as a method of managing children's behavior, then some level of hyperactivity might be viewed as more developmentally normative than aggression or at least not as frightening to parents. Furthermore, ample evidence suggests that parents manage children's aggressive and defiant behaviors through other more punitive forms of discipline, such as corporal punishment (Gershoff, Lansford, Sexton, Davis-Kean, & Sameroff, 2012; Lee, Alschul, & Gershoff, 2015), or other non-violent methods, such as time-out (Kim, Lee, Taylor, & Guterman, 2014).

Alternatively, it might be the case that children who display greater levels of hyperactivity (as compared with aggression) focus more when watching television than, for example, when playing with toys (e.g., Landau, Lorch, & Milich, 1992). Thus, future studies need to tease apart the mechanisms that underlie these aforementioned associations to help provide a more nuanced understanding of *why* parents are more reactive to their children's hyperactive, but not aggressive, behaviors. Although we examined two child behaviors that have been consistently linked with television viewing (Christakis et al., 2004; Manganello & Taylor, 2009; Miller et al., 2007; Thakkar et al., 2006; Zimmerman & Christakis, 2007), there are other behavioral outcomes that deserve attention. For example, children's withdrawn behavior may also be associated with higher levels of television viewing over time, but we could not examine this possibility in the ECLS-B due to unacceptable reliability ($< .50$). Thus, future studies should consider other skills and characteristics of children that might affect their television exposure.

Second, some parents appeared to be more reactive to their children's difficult behavior, suggesting that these intra-familial processes were embedded in broader and more diffuse ecological systems (Lerner, 2006). Similar to past studies on parenting (e.g., Augustine & Crosnoe, 2010; Crosnoe, Augustine, & Huston, 2012), we found that more disadvantaged parents were more reactive to external influences than more advantaged parents. We also found that these child effects were limited to families who did not have optimal mental health and those who had girls. These effects corresponded to an additional .22 to .66 hours of television per day within these populations and, in each case, these children exceeded the maximum hours of television recommended by the American Academy of Pediatrics (2001, 2013). In fact, these differences were larger than those reported by Radesky and colleagues (2014) who examined the associations of early child temperament and television viewing within the first two years of life; therefore, these effects were large enough to warrant further attention in future studies examining the adverse effects of television on children. These findings are also of practical value as they reveal potential areas for intervention in curtailing children's excessive media exposure among "at-risk" populations. In sum, our findings reveal that it is important to consider both additive and interactive effects when

examining the effects of children on their parents as these intra-familial dynamics were embedded in broader ecological systems.

Third, the results from this investigation have implications for developmental science more broadly. Although children are often conceptualized as passive recipients of their parents' parenting, these results underscore the necessity in explicitly modeling the role of children in shaping their own ecologies, which has been a key theme of developmental systems theory (Lerner, 2006). Yet, to date, many scholars have neglected these child effects and instead relied on unidirectional models in which parents affect their children. In reality, as these results suggest, these child effects models can provide considerable insight into child development and family functioning more broadly, and thus, require greater empirical attention. Despite the potential insight that can be gained from such models, they do not imply cause and effect.

These general points of discussion must be considered in light of the limitations of our work, beyond those discussed above. As one example, the ECLS-B did not collect data on television programming, which has important implications for child development (Huston et al., 1999; Wright, 2001). Notably, however, our results, regardless of content, are the same: hyperactive children watch more television than non-hyperactive children over time; whether the television content, in turn, reinforces different types of child behavior is beyond the aims of this study and the data available in the ECLS-B. An additional caveat to this limitation is that these child effects were largely operating among disadvantaged and psychologically distressed families, which prior work suggests is the population of children who are least likely to watch educational programming (Huston et al., 1999). As another example, the media landscape has evolved considerably in the last decade and, therefore, the experiences of children today are quite different from the experiences of the children and families who took part in the ECLS-B (birth cohort of 2001). Although these child effects are likely to extend to other forms of media, this requires continued empirical attention before firm conclusions can be drawn. Even so, children's television watching continues to be one of the primary mediums of media consumption, especially among lower-income families (Lauricella, Wartella, & Rideout, 2015; Rideout, 2013).

Of course, we do not know *why* parents were reactive to their children's hyperactive behavior. As discussed above, one possibility is that this reaction was a coping strategy by parents to manage their children's behavior (Rideout, 2013). If that coping was the case, however, using the television to manage children's misbehavior might be less harmful for children's developmental trajectories than other parenting strategies (e.g., spanking; Gershoff, et al., 2012; Lee, et al., 2015). Unfortunately, these possibilities could not be addressed with these data, but they also require empirical consideration. Furthermore, considering that our measures of aggressive and hyperactive child behaviors were based on parent report, it is possible that parents who were less tolerant of their children's misbehavior rated their children as demonstrating higher behavior problems than their actual behavior. Thus, although parents' report of child behavior is commonplace in the literature on parenting and child development (Ansari & Crosnoe, 2015a; Lee et al., 2015; Radesky et al., 2014), future studies need to incorporate other methods of assessing children's behavioral difficulties at home (e.g., direct observations) to confirm that our findings are

robust to such shared rater variance. Along these same lines, our measure of hyperactivity demonstrated low reliability, which makes it harder to document change in our focal constructs; therefore, future studies with stronger measures are also needed.

Finally, although this study demonstrates that children's hyperactive behavior affect the time they spend watching television from year-to-year, due to data limitations, this study could not examine whether increases in television time, in turn, caused and/or reinforced children's hyperactivity after kindergarten. It is worth noting, however, that the extant literature has consistently shown that greater television time is associated with less optimal behavior (Christakis et al., 2004; Miller et al., 2007; Thakkar, et al., 2006; Zimmerman & Christakis, 2007). Nonetheless, future studies should also consider whether these associations between children's hyperactivity and television viewing reinforce children's behavior problems over time.

With these limitations in mind, the results from this investigation suggest that future researchers should pay closer attention to the role of child effects in developmental research, especially regarding parenting, which can be directed to children, elicited from them, or both. This idea is central to many longstanding theories in developmental science (e.g., Bell, 1968; Lerner, 2006; Sameroff & MacKenzie, 2003), but has remained relatively understudied when compared with the child outcomes of parenting. Future studies of parenting effects on child development should explore both directions and consider how these processes are embedded within larger ecological systems. As for the growing literature on television, these results reveal the need to think about how children affect the time and type or programming they watch. Doing so in future studies will provide a more comprehensive understanding of the role of television in the developmental ecology and, ultimately, what the implications are for children's development.

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Highlights

- We examine children's behavior as a predictor of television exposure over time
- Children's hyperactive behavior was associated with increased television watching
- These child effects were embedded in both proximate and distal ecologies
- These effects were stronger among depressed and low-SES parents and parents of girls
- Results underscore the value of considering child effects in developmental research

Table 1

Weighted demographic characteristics among sampled children and families.

Variables	<i>Proportion or M (SD)</i>
Child characteristics	
Race/ethnicity	
White	0.54
African-American	0.14
Latino/a	0.25
Asian-American	0.03
Other race/ethnicity	0.04
Age	52.40 (4.01)
Gender (female)	0.49
Academic skills	26.93 (9.21)
Hyperactivity	10.03 (3.15)
Aggression	11.56 (3.14)
Attended preschool at age 4	0.59
Time spent watching television	
Age 2	2.35 (1.97)
Age 4	2.24 (1.96)
Age 5	1.94 (1.49)
Parent/household characteristics	
Household income	
\$0-\$20,000	0.28
\$20,001-\$40,000	0.24
\$40,001-\$75,000	0.27
\$75,001 or greater	0.21
Parent highest education	
Less than high school	0.10
High school or equivalent	0.23
Some college	0.34
Bachelors or greater	0.33
Parenting stress	
Not stressed	0.27
Mildly stressed	0.21
Moderately stressed	0.30
Severely stressed	0.22
Parents' mental health	
Not depressed	0.59
Mildly depressed	0.22
Moderately depressed	0.12
Severely depressed	0.07
Immigrant parent	0.23

Variables	Proportion or <i>M</i> (<i>SD</i>)
Parent marital status	
Married	0.67
Separated/divorced	0.09
Single	0.21
Non-biological	0.03
Mothers' age	32.16 (6.50)
Mothers' employment status	
Full time	0.41
Part time	0.19
Unemployed	0.40
Non-English household language	0.19
Household size	4.56 (1.39)
Number of siblings	1.39 (1.11)
Region	
Northeast	0.16
Midwest	0.22
West	0.24
South	0.38
Urbanicity	
Urbanized areas	0.72
Urban clusters	0.16
Rural	0.12

Note. Weighted descriptive statistics were generated after addressing missing data with FIML estimation.

Table 2

Effects of children's hyperactive behavior at age 4 on their television viewing at age 5.

	B (SE)	β	SD of TV hours	Extra hours of TV per day ¹	Total hours of TV per day ²		
					Low hyper.	Average hyper.	High hyper.
Model 1: Full sample							
Main effect of hyperactivity	0.02 (0.01) *	.04	1.49	0.06	1.88	1.94	2.00
Model 2: Stratification by income							
G1: \$0-\$20,000	0.06 (0.02) ** <i>a</i>	.09	1.75	0.16	2.14	2.30	2.46
G2: \$20,001-\$40,000	0.02 (0.03) <i>a, b</i>	.04	1.58	0.06	2.07	2.13	2.19
G3: \$40,001-\$75,000	-0.01 (0.02) <i>b</i>	-.02	1.37	-0.03	1.84	1.81	1.78
G4: \$75,001 or more	0.00 (0.02) <i>b</i>	.00	1.15	0.00	1.59	1.59	1.59
Model 3: Stratification by education							
G1: Less than high school	0.11 (0.04) ** <i>a</i>	.17	1.92	0.33	2.24	2.57	2.90
G2: High school/GED	-0.01 (0.02) <i>b</i>	-.02	1.55	-0.03	2.18	2.15	2.12
G3: Some college	0.02 (0.02) <i>b</i>	.03	1.39	0.04	1.91	1.95	1.99
G4: B.A. or greater	0.03 (0.02) <i>b</i>	.05	1.28	0.06	1.54	1.60	1.66
Model 4: Stratification by depression							
G1: Not depressed	0.02 (0.02) <i>a</i>	.03	1.45	0.04	1.83	1.87	1.91
G2: Mildly depressed	0.02 (0.02) <i>a</i>	.03	1.56	0.05	1.92	1.97	2.02
G3: Moderately depressed	0.03 (0.03) <i>a, b</i>	.05	1.42	0.07	2.00	2.07	2.14
G4: Severely depressed	0.11 (0.04) * <i>b</i>	.17	1.80	0.31	2.10	2.41	2.72
Model 5: Stratification by parenting stress							
G1: Not stressed	0.03 (0.02) <i>a</i>	.05	1.47	0.07	1.91	1.98	2.05
G2: Mildly stressed	0.00 (0.03) <i>a</i>	.01	1.49	0.01	1.85	1.86	1.87
G3: Moderately stressed	0.03 (0.02) <i>a</i>	.04	1.44	0.06	1.81	1.87	1.93
G4: Severely stressed	0.01 (0.02) <i>a</i>	.02	1.59	0.03	2.07	2.10	2.13
Model 6: Stratification by gender							
Female	0.04 (0.02) ** <i>a</i>	.07	1.51	0.11	1.81	1.92	2.03

Total hours of TV per day ²						
	B (SE)	β	SD of TV hours	Extra hours of TV per day ¹	Low hyper.	Average hyper. High hyper.
Male	0.00 (0.01) ^b	.00	1.47	0.00	1.97	1.97 1.97

Note.

¹ Calculated by multiplying the standardized coefficient by the weighted standard deviation of TV time within each group.

² Calculated by adding/subtracting extra hours of TV per day from the weighted mean of each group.

^{a,b} Different superscripts within each model indicate that the hyperactivity coefficients were significantly different across groups. G = group.

 $p < .001$.

**
 $p < .01$.

*
 $p < .05$.