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Evaluating the effect of educational media exposure on aggression in early childhood ☆

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ABSTRACT

Preschool-aged children ($M = 42.44$ months-old, $SD = 8.02$) participated in a short-term longitudinal study investigating the effect of educational media exposure on social development (i.e., aggression and prosocial behavior) using multiple informants and methods. As predicted, educational media exposure significantly predicted increases in both observed and teacher reported relational aggression across time. Follow-up analyses showed that educational media exposure also significantly predicted increases in parent reported relational aggression across more than a two year period. Results replicate and extend prior research that has demonstrated links between educational media exposure and relational aggression, but not physical aggression, during early childhood.

Over the past fifty years, hundreds of empirical studies have demonstrated that exposure to media influences children's beliefs, attitudes, and behavior (see Gentile, 2003; Roberts & Foehr, 2004). Exposure to violent media during early childhood is considered especially harmful, with results from a meta-analysis (Paik & Comstock, 1994) indicating that individuals of all ages can be influenced by media exposure, though preschoolers showed the largest effect size. There are several possible explanations for this developmental difference (see Gentile & Sesma, 2003). First, learning during this developmental period is especially critical, as younger children are not likely to have incorporated social norms against aggressive behavior (e.g., Huesmann, 1998). Second, younger children have problems differentiating reality from fantasy between two- to five-years of age (e.g., Richert & Smith, 2011). As a result, they are increasingly likely to imitate even the most unrealistic behavior patterns. Third, media exposure during early childhood may be an especially salient influence on social relationships because social development is likely more malleable than in later childhood or adolescence and younger children have less control over the activities they engage in compared to older children (Huston, Wright, Marquis, & Green, 1999). Taken together, various cognitive and social factors at this developmental period may make young children more susceptible to effects of media.

Media exposure

Theories regarding media effects on children and adolescents often fall into two general categories: those associated with the *amount* of exposure and those associated with the *content* of the programming (see Anderson, Huston, Schmitt, Linebarger, & Wright, 2001).

In contrast to amount effects, in which time spent with media displaces alternative activities (e.g., physical activities, reading, or socialization), content effects refer to changes (behavioral, physiological, social, etc.) due to the messages and behavioral models in the programming of the media being consumed (Anderson et al., 2001). Amount- and content-specific theories of media effects are valuable for explaining general media effects; however, researchers have an integrated model of media effects and aggression: the general aggression model.

Anderson and colleagues (e.g., Anderson, 1997; Anderson, Anderson, & Deuser, 1996; Anderson & Bushman, 2002) proposed an integrated model of human aggression, the general aggression model (GAM: see Carnagey & Anderson, 2003), to describe and predict short- and long-term increases or decreases in aggressive behavior (Gentile & Stone, 2005). According to the GAM, input variables, the individual's present internal state, and outcome variables reciprocally interact to produce aggressive behavior by priming aggression-related cognitions, increasing anger-related affective state, and/or increasing arousal (Lindsay & Anderson, 2000). The GAM can be used to interpret and predict the effects of most experiences or situations to which an individual is exposed that could result in aggression. Exposure to violent media, for example, has been demonstrated to increase each of the three posited

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internal state routes — aggressive thoughts, feelings, and affect (Anderson & Bushman, 2001).

The association between violent media consumption and physically aggressive and prosocial behavior has been thoroughly investigated in the literature (see Gentile & Stone, 2005; Huesmann, Moise-Titus, Podolski, & Eron, 2003). These effects have also been successfully extended to the study of relational (and indirect) aggression in several studies (e.g., Coyne & Archer, 2005; Coyne et al., 2008; Gentile, Mathieson, & Crick, 2011; Möller & Krahé, 2009). Comprehensive meta-analyses (e.g., Anderson & Bushman, 2001; Anderson et al., 2010; Paik & Comstock, 1994) have documented short- and long-term negative effects of violent media exposure, across media types, experimental methodologies and samples. Not surprisingly, the majority of studies on links between media exposure and aggressive behavior in children focus on violent media content. In contrast, exposure to prosocial media (e.g., TV) has documented effects on increasing prosocial behavior, positive social interactions, and tolerance for others (see Gentile et al., 2009; Mares & Woodard, 2005; Wilson, 2008). Educational programming is defined as media products that have an explicit intent to education children in a school-related skill such as literacy, numeracy, as well as social–emotional and character development domains (Vandewater & Bickham, 2004). Furthermore, educational media (which are often believed to have prosocial themes) have documented value for educational outcomes (e.g., Fisch & Truglio, 2001). A recent meta-analysis documented large effects for links between prosocial content and altruistic/prosocial behavior (Mares & Woodard, 2005). Interestingly, Mares and Woodard (2005) make the distinction between purely prosocial or aggressive content from aggressive prosocial content, in which positive messages follow aggressive actions or violent content. Mares and Woodard (2005) further indicate that this specific type of media content included cases in their meta-analysis in which physical or verbal aggression was resolved in a prosocial manner and they found that this category of content was problematic with regard to aggression and other outcomes of interest. The meta-analysis did not explicitly mention relational aggression, it is likely that similar processes occur for this behavior as well.

There is also evidence that viewing media violence can lead to forms of aggression among viewers different from the form viewed, a phenomenon known as the "crossover" effect (see Coyne et al., 2008). Specifically, several studies have demonstrated that televised physical aggression can lead to relational aggression in viewers. Huesmann et al. (2003) found that girls who viewed physical violence on television as children engaged in more indirect aggression as adults. Ostrov, Gentile and Crick (2006) also found that young children who viewed high amounts of physical violence on TV were more relationally aggressive. In an experimental design, Coyne, Archer, and Eslea (2004) demonstrated that adolescents who viewed physical aggression were in some cases subsequently more indirectly aggressive. Linder and Gentile (2009) also found that exposure to televised physical aggression was positively associated with teacher reports of indirect aggression in a sample of fifth grade girls. Gentile, Coyne and Walsh (2011) found that children's consumption of media violence early in a school year predicted higher verbal, relational, and physical aggression, as well as less prosocial behavior later in the school year. Although the GAM model as originally described by Anderson and his colleagues does not specifically predict crossover effects, it fits within the model. Media violence does not have its effects solely through modeling, but also by increasing aggressive feelings, arousal, and thoughts. These are not necessarily specific to what was modeled, and can be generalized to new situations. If children become more willing to aggress, *how* they aggress will be determined by multiple factors, such as sex (i.e., boys tend to be more willing to hit, whereas girls tend to use relational aggression more) or opportunities (e.g., people tend to be aware of the greater likelihood of being caught and punished for physical aggression).

Only one study to date, however, has investigated educational media exposure (EME) and subtypes of aggression (i.e., physical and relational) in preschoolers (Ostrov et al., 2006). Using a sample of 78 preschoolers, Ostrov et al. (2006) evaluated the effects of media exposure on aggressive and prosocial behaviors. Interestingly, EME was associated with future relational aggression. After reviewing the most frequently reported programs the authors speculated that many of the educational programs model relationally aggressive behavior as a way to frame friendship conflicts (Ostrov et al., 2006). The reconciliation among the friends occurs at the end of the programs and given research that suggests that young children have difficulty understanding plots and connecting content across a program (Bryant & Anderson, 1983) and given that young children often focus and retell specific components of the story rather than the overall general principle (Goldman, Reyes & Varnhagen, 1984), the authors posited that young children are not attending to the overall educational lesson, but are instead learning and in turn modeling the relationally aggressive behaviors (Ostrov et al., 2006).

The hypothesis raised by Ostrov et al. (2006) that young children may not be learning the social and emotional lesson often found in educational media is consistent with a recent study by Mares and Acosta (2008) who examined if kindergarten children (89% were 5-year-olds) could identify the correct moral lesson in an episode of Clifford the Big Red Dog (a PBS Kids show that was frequently watched in the Ostrov et al., 2006 study). Interestingly, this study found that only 19% of the children identified the correct moral lesson and 89% of the children focused on irrelevant information and misunderstood or misinterpreted the intended moral lesson (Mares & Acosta, 2008). Past research has also found that children have difficulty remembering (i.e., recognition and recall) the motives of TV characters or the consequences of actions within the context of an action–adventure television program (Collins, Wellman, Keniston, & Westby, 1978). Collectively, this work suggests that young children who are exposed to cases of relational aggression within educational media may not attend to moral lessons of reconciliation or learn conflict resolution skills, but rather would focus on and learn about the aggressive behavior.

Importantly, content analyses of children's programming (e.g., Disney films) have shown that indirect or relational aggression was portrayed as high as 9.23 times per hour, although it was primarily depicted by "bad" characters, which might decrease the reinforcing value of the content in these cases (Coyne & Whitehead, 2008). Furthermore, the research on the crossover effect suggests that any aggressive modeling in children's programming could lead to greater aggression, although how it is expressed is likely to be moderated by individual and situational factors (e.g., even young children know that they will get in trouble if they hit, so they may use relational aggression as it has a lower likelihood of punishment from adults; Werner, Senich, & Przepyszny, 2006). Given how novel the initial findings were documenting links between educational media exposure and relational aggression, the original authors called for the replication and extension of the effect (Ostrov et al., 2006), which is the central goal of the current study.

Study objectives

Taken together, although the association between media effects and aggressive thoughts, feelings, and behaviors has been extensively demonstrated in previous research, significant gaps in the literature exist. Most notably, research investigating alternate subtypes of aggressive behavior (e.g., relational aggression) in early childhood is clearly lacking and more focus on educational media content is needed. In order to address these gaps in the literature, the primary goal of the current study is to evaluate the association between EME and prospective displays of aggressive behaviors in preschoolers. Ostrov et al. (2006) only demonstrated that educational media was associated with future relational aggression and in the present study we predict that educational media will also be associated with *increases* in

relational aggression across time. We anticipate that these effects will be unique to relational aggression and not physical aggression. To support the robustness of these relations, we further aim to replicate these effects with both observations and teacher reports of aggressive behavior. Finding similar effects across the independent informants, which are known to contribute unique information in the prediction of various outcomes (e.g., Ostrov et al., 2008), would provide strong support for our key hypothesis.

An additional improvement on the existing literature (e.g., Ostrov et al., 2006) is controlling for the alternative subtype of aggression in the respective models (e.g., initial physical aggression will be controlled in the relational aggression model). Further, given past associations between gender, age, and SES with aggressive behavior and media effects (for reviews see Card et al., 2008; Dodge, Coie & Lynam, 2006; Gentile, 2003) we statistically control for these variables.

Method

Participants

Children were recruited from four nationally accredited, university affiliated childcare centers in a large city in the northeast US, participating in a larger project (e.g., Ostrov et al., 2008). Parents of participating children were invited to complete a parent questionnaire packet distributed and collected via US mail, and were compensated with a $10 gift certificate for their time. Of the 75 children participating in the project, packets for 47 children (63%) were completed by parents; 43 were mothers (91.5%) and 4 were fathers (8.5%).

At Time 1, the sample comprised 47 children (17 males and 30 females), between the ages of 30 and 58 months ($M = 42.44$ months, $SD = 8.02$). The sample was relatively diverse: Asian (10.6%), Caucasian (66%), Latino (2.1%), multi-racial (10.6%), Native American (4.3%), and other/unknown (6.4%). The majority of parents were married (87.2%), with the remainder being single (8.5%), divorced (2.1%), or in other situations (2.2%). On average, parents had a four-year degree (ranging from some high school to a graduate or professional degree) and mean family income between $55,000 and $100,000 (ranging from $15,000 to over $100,000), suggesting the children were from primarily middle class families. Between time points, seven (four girls) participants switched schools or moved out of the country, resulting in a final participant sample at Time 2 of 40 children. An additional two (one girl) participants were missing media exposure data due to incomplete parent packets. Thus, the final sample consisted of 38 children (25 girls). A power analysis using G*Power 3.1.3 (Faul, Erdfelder, Buchner, & Lang, 2009) with $\alpha = .05$, $1\text{-}\beta = .80$, and $r^2 = .37$ (based on the Ostrov et al., 2006 prospective finding between educational media exposure and relational aggression), suggested we would need 18 participants for correlations. However, without prior regression models to base our estimate on, the power analysis for regression models was more difficult to conduct. We estimated that with $\alpha = .05$, $1\text{-}\beta = .80$, a medium effect ($f^2 = .20$; based in part on Ostrov et al., 2006), and regression models with six total predictors, we would need a sample size of 42 (Faul et al., 2009). Given the unforeseen circumstances (attrition and the aforementioned errors) we are slightly underpowered for detecting these anticipated medium effects and caution should be exercised in the interpretation of the findings. Importantly, there were no significant differences between those that stayed in the study and those that did not on any of the key study variables, $ts < 1.40$, n.s.

Procedure

The project was approved by the local social and behavioral sciences IRB. All children were invited to participate and parental consent was collected. Observations and teacher reports were conducted at two time points (fall and spring) with approximately four months in between. Parent packets were collected during the middle of time 1 (fall).

Measures

Observations of aggression

Children's social interactions were observed and recorded using the Early Childhood Observation System developed by Ostrov and Keating (2004) and revised by Crick and colleagues (Crick et al., 2006) that uses a focal child sampling with continuous recording approach. One child is randomly chosen from the class roster and observed for ten minutes during free play. Each child was observed eight times, resulting in 80 min of total observation at each of the two larger time points (or 160 min per child across the study). No child was observed more than one time per day. Behavior categories included *physical aggression* (e.g., hitting, pushing, kicking) and *relational aggression* (e.g., friendship withdrawal threats, excluding child from playgroup). Behavioral categories were summed to create physical and relational aggression scores. Previous research has shown acceptable levels of inter-rater reliability with Intra-Class Correlation Coefficients (ICCs) ranging from .78 to .91 for physical aggression, and .70 to .85 for relational aggression (e.g., Ostrov et al., 2006; for a review see Leff & Lakin, 2005). Observations were conducted by graduate and undergraduate students who were trained via videotapes, vignettes and in-vivo practice reliability observational sessions. Inter-rater reliability was assessed for 10–15% of total observations and ICCs were calculated. ICCs with absolute agreement have been demonstrated to be appropriate given the nature of the current data (McGraw & Wong, 1996), and have been used with the ECOS in the past (e.g., Crick et al., 2006; Ostrov & Keating, 2004). ICCs assessing inter-observer agreement in the current study, across both time points, for physical aggression and relational aggression were all greater than .75.

Teacher reports of aggression

The Preschool Social Behavior Scale—Teacher Form (PSBS-TF; Crick, Casas, & Mosher, 1997) was used to assess children's relational and physical aggression. This measure contains 16 items including 6 relational aggression items (e.g., "This child tells a peer they won't be invited to their birthday party unless s/he does what the child wants"), and 6 physical aggression items (e.g., "This child kicks or hits others"). Four additional positively toned filler items are included to avoid a negative response bias. A 5-point rating scale from 1 (*never or almost never true*) to 5 (*always or almost always true*) was used. The psychometric properties of this measure have been supported (e.g., Crick et al., 1997, 2006). Four (two girls) children were missing teacher report data due to incomplete packets. In the current sample, Cronbach's α's $> .80$ for all scales at the two time points.

Parent-reported media exposure

Items evaluating media habits were included in the family information questionnaire and come from the MediaQuotient survey (Gentile & Walsh, 2002). For each media product, parents estimated how many hours per day their child was engaged with such media, using a 4-point scale (i.e., *0–1*, *1–2*, *3–4*, *5 or more*). Parents rated how educational they considered the "television/movies" and "video/computer games" their child played during the school year. More specifically, for each media product (i.e., television/movies, video/computer games), parents rated how educational they considered each media product using a 7-point scale from 1 (*Almost Never*) to 7 (*Almost Always*). An educational exposure score was computed for each medium by multiplying the number of hours spent with each media product by its subjective educational rating (for similar procedures, see Gentile, Coyne et al., 2011; Gentile, Mathieson et al., 2011). An overall index of educational media exposure (EME) was calculated by summing the educational rating provided for television/movies and video/computer games, respectively (Ostrov et al., 2006).

Media researchers have commented that it may be unreasonable to expect specific media scales, such as educational media indices, to have

high reliabilities. Gentile and colleagues (2004) noted that it is likely that some children prefer media differently across various mediums, and as a result, the specific media index may appear unreliable when in fact the scale is measuring exactly what it is designed to measure (Gentile, Lynch, Linder, & Walsh, 2004; Gentile & Walsh, 2002). Given this recommendation, Cronbach's α was not computed. However, responses were significantly correlated (e.g., $r = .42$, $p = .004$, for the two items assessing educational exposure).

Importantly, the measure of EME (and similar approaches for violence exposure; e.g., Gentile, Coyne et al., 2011; Gentile, Mathieson et al., 2011) has demonstrated acceptable validity and reliability (Ostrov et al., 2006). For example, Ostrov and colleagues asked parents to provide the frequency of each child's three favorite television programs and an inspection of the content of these shows suggests that the most frequent "programming to which the participants were exposed was found on PBS, Disney Channel, and Nickelodeon and may be coded as prosocial or educational in nature" (Ostrov et al., 2006, p. 619). Ostrov et al. (2006) further noted that these programs were rated as "educational" and were not rated as "violent" by the parents. Given the similarities in the present sample to the Ostrov et al. (2006) study with respect to age, ethnicity, SES, and marital status (as well as the quality of child care center from which the participants were recruited), and due to space restrictions in our parent packet we did not ask parents to report on the specific programs. However, parents uniformly reported that children were exposed to "educational" rather than "violent" media. Violent media exposure was assessed using the same types of items and procedures as EME (i.e., parents indicated how violent they considered the television/movies and video/computer games their child played during the school year on a 7 point scale from 1 "*not at all violent*" to 7 "*extremely violent*"). Using the same procedures as described by Ostrov et al. (2006) the current measure of violent media exposure was not significantly correlated with EME, $r = .28$, $p = .11$, which demonstrates that parents discriminated between "educational" and "violent" content. In addition, parents reported that children were exposed to significantly more educational media ($M = 10.62$; $SD = 3.65$) than violent media ($M = 8.54$; $SD = 4.79$), $t(34) = 2.38$, $p = .023$, $d = .49$, as would be expected for children of this age.

Follow-up assessment

To bolster the validity of the EME, a follow-up assessment (i.e., Time 3) was conducted. Participants and a parent were invited to visit the laboratory to complete a small parent report packet for which they were compensated ($20 gift card). The lag between Time 1 and Time 3 assessments was slightly more than two years and three months ($M = 27.92$ months; $SD = 1.91$; Range = 25.97–31.47). Of the original 38 families, 27 (71%) completed the follow-up study. There were 18 girls and 9 boys and the ethnicity percentages were similar to the initial time point (14.8% Asian, 66.7% Caucasian, 3.7% Latino, 7.4% multi-racial, 7.4% other races or ethnicities). For one child, a different parent completed the measures at Time 3 compared to Time 1 (i.e., father participated at Time 1 and mother participated at Time 2).

Follow-up measures included parent reports of child aggression and media exposure. The Children's Social Behavior—Parent Report (CSB-P), which was revised from the Children's Social Experience measure used by Casas et al. (2006) and developed by Crick (2006), was used to assess relational and physical aggression. The CSB-P has 13 items on a 5-point scale ranging from 1 (*Never true*) to 5 (*Almost always true*). The relational aggression subscale contains 5 items (e.g., "spreads rumors, secrets, or gossips about other kids"), and the physical aggression subscale has 4 items (e.g., "hits or kicks other kids"). Four additional prosocial items are included to avoid a negative response bias. Casas et al. (2006) supported the validity of the original measure with moderate associations between mother and father reports for both relational and physical aggression. Ostrov and Bishop (2008) further supported the validity of the measure with significant associations between parent and teacher reports for physical ($r = .45$, $p < .01$) and relational ($r = .40$, $p < .01$) aggression. In the present study, the CSB-P was reliable for physical aggression (Cronbach's $\alpha = .71$), but was slightly lower than conventional thresholds for relational aggression (Cronbach's $\alpha = .67$) at Time 1. At Time 3, the CSB-P was reliable for both physical (Cronbach's $\alpha = .76$) and relational (Cronbach's $\alpha = .73$) aggression.

Parents also completed media exposure measures at the follow-up assessment. Parents first completed the aforementioned measure from Time 1 assessing EME. Parents also completed the Parental Survey of Media Exposure (PSME, Ostrov et al., 2006), which asks parents to report on their child's three favorite television shows and their child's three favorite movies/videos. For each named media product (i.e., television shows as well as movies/videos), parents were asked to rate how "educational" they consider each media product to be on a 7-point scale (1 = *Not at all educational*, 7 = *Extremely educational*) and items were summed to create an overall index. The majority of shows that were listed included shows that are educational or informational in nature with a social and emotional emphasis and are found on channels such as PBS and Nick Jr. including: Arthur, Caillou, Clifford the Big Red Dog, Curious George, Franklin, and Reading Rainbow. Additional programs were reported and included Hannah Montana, Full House, and Sponge Bob Square Pants, although these shows generally received low "educational" ratings by the parents.

The partial correlation (controlling for SES) between general EME at Time with the PSME (i.e., educational ratings of named programs) at Time 3 was significant and moderate providing important validity for the EME used in the present study, $r_p = .52$, $p = .026$. In addition, the stability of the EME from times 1 to 3 was significant even when controlling for SES, $r_p = .53$, $p = .023$. Collectively, these findings support the validity of the EME.

Results

Preliminary analyses indicated that there were no skew (<1.73) or kurtosis (<2.53) concerns (Kline, 2005). There was one outlier for each of the four observed aggression variables and these were respectively reduced to the magnitude of 3 *SD* above the mean (Kline, 2005). Descriptive statistics and correlations among the key study variables are presented in Table 1. Correlations revealed that observations of physical and relational aggression were not significantly associated at Time 1 or 2, but correlations between physical and relational aggression were moderately correlated at times 1 and 2 for teacher reports. Despite the lack of statistically significant associations among the observed constructs we control for the alternative subtype of aggression in all the respective models given our a priori goal of testing unique effects and the knowledge that some of these correlations are in the theoretically predicted range despite the lack of significance (likely due to the sample size). All subsequent models were run controlling for violent media exposure and there were no differences between those models with and without the covariate and so it was removed for simplicity.

Association between educational media exposure and aggressive behaviors at Time 2

To evaluate the stated objectives, four regression models were conducted: assessment of the relation between EME and prospective displays of observed and teacher-reported (in separate models) (a) relational aggression and (b) physical aggression. In order to predict the respective behavior category (e.g., physical aggression at Time 2), observations (or teacher reports in separate models) of the behavior at Time 1 (e.g., physical aggression at Time 1) as well as the alternative aggression subtype at Time 1, entered the regression model at step 1, and EME was entered at step 2. In addition, age, gender, and SES were all entered at step 1 as covariates. As seen in Table 2, EME significantly

Table 1
Descriptive statistics and correlations for key study variables.

	1	2	3	4	5	6	7	8	9	*M*	*SD*	Range
1. RA-O T1	–	.03	.30	.13	.52***	.25	.47**	.09	−.15	0.94	1.19	0.00–5.00
2. PA-O T1		–	.04	.15	-.004	.42**	−.20	−.01	−.03	2.54	2.60	0.00–10.00
3. RA-TR T1			–	.55***	−.06	−.01	.59***	.29	−.09	10.74	5.42	6.00–23.00
4. PA-TR T1				–	.01	.52***	.37*	.70***	.07	10.47	4.89	6.00–22.00
5. RA-O T2					–	.30	.38*	−.01	.21	2.43	3.07	0.00–12.17
6. PA-O T2						–	.07	.39*	.12	1.66	2.16	0.00–8.57
7. RA-TR T2							–	.38*	.01	12.27	5.88	6.00–25.00
8. PA-TR T2								–	.07	9.83	4.83	6.00–20.00
9. EME-P T1									–	10.62	3.65	2.00–20.00

Note. RA = Relational Aggression; PA = Physical Aggression; EME = Educational Media Exposure; O = Observation; TR = Teacher Report; P = Parent Report; T1 = Time 1; T2 = Time 2.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

predicted increases in observed relational aggression. It is notable that these effects with relational aggression were also found with teacher informants. EME was not associated with changes in either observed or teacher-reported physical aggression.

Associations between educational media exposure and aggressive behaviors at Time 3

To test if the effects held beyond the academic year, two regression models were conducted that examined if EME at Time 1 was associated with increases in parent reported relational aggression from times 1 to 3 (see Table 3). Given the small sample size in the follow-up portion of the study as well as shared method variance concerns (i.e., only parent report was available at both time points), caution should be exercised in the interpretation of the findings. Consistent with the aforementioned findings, EME predicted increases in parent reported relational aggression across on average two years and three months, even when controlling for initial physical aggression, age, gender, and SES. In addition, as shown in Table 3, EME did not significantly predict changes in parent reported physical aggression.

Discussion

The present study tested the association between educational media exposure (EME) and subtypes of aggression in early childhood using observational methodology. Results of this research provide evidence that EME can predict the exhibition of relational aggression in preschool children. The current study replicated past research (Ostrov et al., 2006) in which EME significantly predicted future relational aggression in preschoolers, but extended the past findings by revealing that EME was associated with *increases* in relational aggression. Moreover, our conservative model also controlled for initial physical aggression, as well as SES, gender, and age. In addition, we are also the first to demonstrate these effects using multiple methods and informants. Although most research on EME has documented a significant effect on positive academic and social outcomes, these results suggest that EME may simultaneously have a detrimental effect on children's social behavior. Ostrov et al. (2006) posited that it is possible that children may be exposed to relationally aggressive models within these programs and may not comprehend the conflict resolution skills that typically are depicted at the end of the program, (or may not understand how they relate to the earlier conflict) rather the young children focus on and learn the modeled behaviors. In fact, younger children tend to pay greater attention to perceptually-salient information (e.g., action, music; Schmitt, Anderson, & Collins, 1999), relative to older children, who attend more to cues that are plot-relevant (Calvert, Huston, Watkins, & Wright, 1982). Future experimental studies are needed to test the hypothesis that children are modeling behaviors from peer conflict scenarios seen in educational programs.

Despite the contributions of the current study, there are several limitations. First, the limited sample size reduced the power to find significant results. Although the sample size was similar to that used in other observational studies of aggressive behavior in early childhood (e.g., McEvoy, Estrem, Rodriguez & Olson, 2003; Ostrov & Keating, 2004; Stauffacher & DeHart, 2005) and was generally consistent with power analysis recommendations, attrition between time points constrained the study's power. Clearly, replication with larger, ethnically diverse samples is needed. Second, even though the follow-up analyses suggested moderate levels of agreement between the general EME and PSME ratings in which parents named programs, and most of the programs listed are generally believed and rated by the media industry to be "educational and informational," it is unclear how well parents can evaluate the educational value of children's media. More importantly, perhaps, future studies should measure both the perceived educational value and the amount of relational aggression in each media product (although it is similarly unclear how well parents can judge that). In

Table 2
Hierarchical multiple regressions: Associations between educational media exposure and aggressive behavior at Time 2.

Outcome, step, predictors	β	*F*, Δ*F*	R^2, ΔR^2
I. Relational aggression T2 (O)			
1. Gender	.06	$F(5, 33) = 1.25$, *n.s.*	.159
Age	.20		
SES	−.07		
Relational aggression T1 (O)	.28		
Physical aggression T1 (O)	.07		
2. EME T1 (parent report)	.34*	$\Delta F(1, 32) = 4.41$, $p = .04$	.102
II. Physical aggression T2 (O)			
1. Gender	−.28	$F(5, 33) = 4.51$, $p = .003$	.406
Age	−.24		
SES	.16		
Relational aggression T1 (O)	.37*		
Physical aggression T1 (O)	.35*		
2. EME T1 (parent report)	.14	$\Delta F(1, 32) = 0.94$, *n.s.*	.017
III. Relational aggression T2 (TR)			
1. Gender	.28	$F(5, 29) = 7.38$, $p < .001$	.560
Age	−.05		
SES	−.18		
Relational aggression T1 (TR)	.42*		
Physical aggression T1 (TR)	.30		
2. EME T1 (parent report)	.25*	$\Delta F(1, 28) = 4.11$, $p = .05$	.056
IV. Physical aggression T2 (TR)			
1. Gender	.05	$F(5, 29) = 5.48$, $p = .001$	.486
Age	−.06		
SES	.11		
Relational aggression T1 (TR)	−.03		
Physical aggression T1 (TR)	.69**		
2. EME T1 (parent report)	.07	$\Delta F(1, 28) = 0.27$, *n.s.*	.005

Note. O = observations; TR = teacher report; T1 = Time 1; T2 = Time 2; EMI = educational media exposure. * p b .05. ** p b .01.

Table 3
Hierarchical multiple regressions: Associations between educational media exposure and aggressive behavior at Time 3.

Outcome, step, predictors	β	F, ΔF	R^2, ΔR^2
V. Relational aggression T3 (P)			
1. Gender	.21	$F(5, 17) = 2.37$, *n.s.*	.41
Age	−.29		
SES	−.34		
Relational aggression T1 (P)	.22		
Physical aggression T1 (P)	.16		
2. EME T1 (parent report)	.49*	$\Delta F(1, 16) = 7.06$, $p = .017$	.18
VI. Physical aggression T3 (P)			
1. Gender	.08	$F(5, 18) = 3.63$, $p = .019$	.50
Age	.02		
SES	−.15		
Relational aggression T1 (P)	−.11		
Physical aggression T1 (P)	.69**		
2. EME T1 (P)	.17	$\Delta F(1, 17) = 0.80$, *n.s.*	.02

Note. P = parent report; T1 = Time 1; T3 = Time 3; EME = educational media exposure. * p b <.05. ** p b <.01.

addition, the findings from the follow-up portion of the study should be interpreted with caution given the small sample size and relatively small number of boys that participated. Third, although the format was similar to that used in previous studies (e.g., Anderson & Dill, 2000), social desirability could certainly have influenced the parental ratings in the present study and thus not only should future studies examine for and possibly control for these biases, but it may also be best for future studies to conduct content analyses of the nominated shows, similar to the approach taken by Linder and Gentile (2009) with older school-aged children. Future studies are needed that incorporate multiple measures of media exposure (e.g., parent report, media diaries, specific program content analyses) from multiple informants (e.g., children, siblings, parents, and peers) across mediums (e.g., television, video games, movies, and music) in order to determine the "gold standard" for assessing media exposure. Moreover, future research should specifically assess the actual TV programs, movies, and video games that children are exposed to, the relative amounts of time that they are exposed to each program, and expert raters should be used to assess the specific content of each show, movie, and videogame.

It is certainly possible that children who consume high levels of media receive less scaffolding from their parents with respect to how to navigate social relationships. In fact, we echo the calls of others that suggest that parents not just co-view, but actively mediate the content of the media (Warren, 2003). This mediation may allow young children the assistance that they need to appropriately connect the aggressive behaviors and friendship conflicts with the moral lesson of the program. We believe that this process requires active mediation and not just co-viewing (Warren, 2003), as co-viewing without the active engagement and scaffolding of the content may imply tacit approval of the aggressive behaviors. Perhaps relationally aggressive behavior would decline if parents actively mediated the educational programs with their young children and helped them to make the connections between the relationally aggressive behaviors and conflict resolution strategies. The fact that children are not following the plot line and learning the character development lesson in media programs and may just be attending to reinforced (i.e., the character gets what they want) relationally aggressive behaviors that they see displayed suggests the need for simpler and more explicit lessons for young children's programming (Mares & Acosta, 2008). A second implication, however, is that even shows that are considered to be child-friendly educational shows can have negative consequences if they model and reinforce relational or indirect aggression (Linder & Gentile, 2009). The current ratings (and the associated V-chip) do not discuss this type of information (Linder & Gentile), which leaves parents with limited information for making informed decisions for their children.

In conclusion, the present study documented that exposure to media that parents label as educational is prospectively associated with increases in relational aggression over time. These effects were replicated using three independent measures of relational aggression (i.e., observations, teacher reports, and parent reports) and after controlling for physical aggression, age, gender, and SES. In keeping with past work and current predictions the links were limited to relational aggression and not physical aggression. These findings suggest that parents, educators, media professionals, policymakers, and researchers should work collaboratively to reduce these potential harmful effects for young children.

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