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EMPIRICAL RESEARCH

Video Game Violence Use Among "Vulnerable" Populations: The Impact of Violent Games on Delinquency and Bullying Among Children with Clinically Elevated Depression or Attention Deficit Symptoms

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Abstract The issue of children's exposure to violent video games has been a source of considerable debate for several decades. Questions persist whether children with pre-existing mental health problems may be influenced adversely by exposure to violent games, even if other children are not. We explored this issue with 377 children (62 % female, mixed ethnicity, mean age = 12.93) displaying clinically elevated attention deficit or depressive symptoms on the Pediatric Symptom Checklist. Results from our study found no evidence for increased bullying or delinquent behaviors among youth with clinically elevated mental health symptoms who also played violent video games. Our results did not support the hypothesis that children with elevated mental health symptoms constitute a "vulnerable" population for video game violence effects. Implications and suggestions for further research are provided.

Keywords Video games · Aggression · Violence · Mental health

Introduction

Whether violent video games do or do not contribute to behavioral aggression and societal violence among youth has been debated, at the time of this writing, for three decades. By societal violence, we refer to a range of behaviors, from bullying and physical fighting to criminal assault and even homicide, which are of concern to lawmakers and parents. We contrast societal violence with the measures of relatively mild aggression (or perhaps competition) often used in laboratory studies of college students, which arguably do not tap well into the issue of societal violence (Kutner and Olson 2008). Caution is required in generalization of laboratory aggression measures to societal violence as the potential for misinformation is considerable (Ferguson et al. 2011). To date, no consensus has been reached on the matter of whether violent games and societal violence are linked: some scholars argue that violent games contribute to behavioral aggression (Fraser et al. 2012) or even societal violence (Strasburger 2007), while others suggest that video games have a negligible influence on aggression (Puri and Pugliese 2012) or may even reduce aggression (Colwell and Kato 2003).

Existing societal concerns about video games have intensified after the 1999 Columbine High School massacre (Ferguson 2013) and other well-publicized school shootings. The tragic 2012 Sandy Hook Elementary School murders in Newtown, Connecticut resurrected these debates amid reports that the 20-year-old shooter was an avid gamer (e.g., Henderson 2012). The Newtown shooting also brought renewed attention to wide discrepancies in opinion regarding whether violent video games influence criminal behavior. The Brown v EMA (2011) Supreme Court decision, in which the Court ruled that a California law restricting the sale or rental of violent games to minors was an unconstitutional violation of the First Amendment, highlighted the limitations of existing studies of violent video games and the difficulty of applying this pool of research to policy-relevant questions. A series of appellate court rulings made similar points (see Brown v EMA 2011, p. 12). Given these court rulings, and

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the recurring media focus on video games, researchers need to do more to answer the questions of greatest public concern regarding video games and any potential harm to youth. The recurrence of these concerns with each school shooting or court ruling points to the need for studies that can meaningfully inform policy and legal debates.

Video Game Violence Research: What is the Evidence?

Much speculation focuses on the issue of whether violence in video games or other entertainment media, such as television, can contribute to real-life violence. Evidence to date is scant. For instance, in a recent meta-analysis that focused on criminal aggression, Savage and Yancey (2008) found that exposure to media violence shared only trivial amounts of variance with criminal aggression. Similarly, in a large sample of youth aged 10–15, Ybarra et al. (2008) found that violent media exposure did not predict violence once other confounding variables were controlled. It is also noteworthy that the explosion in popularity and availability of video games has coincided with a precipitous decline in youth violence, not a rise (see Ferguson 2013 for discussion).

There exists a large pool of studies examining video game violence effects in college students using laboratory methods and measures of relatively mild aggression. The validity of these measures has been debated within the research community (e.g. Giancola and Zeichner 1995; Ritter and Eslea 2005). One point of contention is the lack of clear correspondence between these measures and the types of aggressive behaviors of interest to policy makers and parents. For instance, such studies have examined outcomes such as filling in the missing letters of words, where "kill" rather than "kiss" is considered more aggressive (Farrar et al. 2013); self-ratings of hostile feelings (Williams 2011); or administering non-painful bursts of annoying noise to consenting opponents in a reaction-time test (Anderson and Dill 2000). Taken at face value, such studies may be generalizable to competitiveness rather than aggression, or perhaps to mild aggressive acts (the equivalent of children sticking tongues out at each other), but cannot be generalized to societal violence. Even these studies produce mixed results, however, and have been criticized for methodological issues such as failing to match violent and non-violent video game play conditions carefully (Adachi and Willoughby 2011), using unstandardized outcome measures that may allow researchers to pick and choose outcomes fitting their hypotheses (Ferguson 2013), and high potential for demand characteristics.

By contrast, studies of video game effects on violent behaviors among children, conducted outside laboratory settings, remain relatively few in number. Such studies differ in quality and standardized approach to measurement. One study (Anderson et al. 2008) found weak links between video game violence and aggression in US and Japanese children, although interpretation of results is complicated by the use of non-standard measures of aggression and inadequate control for other variables. A later German study tying media violence, including video game play, to aggression in children (Krahé et al. 2012) also did not use standardized assessments. That study may have been compromised by the introduction of a media education program into the schools mid-way through the longitudinal period (e.g., Möller et al. 2012) introducing demand characteristics (i.e., advertising the study hypotheses to prime respondents to answer surveys in a particular way, not representative of how they actually behave). Another recent study that links violent games with aggression, by Willoughby et al. (2012), carefully controlled for important "third" variables. With other variables controlled, exposure to violent video games correlated with later aggression with an effect size equivalent to $r = .07$, indicating that violent game use was associated with approximately half a percent increase in aggressive behavior. The authors noted, however, that it may be competitive qualities of the games, not violent content, which led to this increase (see Adachi and Willoughby 2011). In a follow-up longitudinal study (Adachi and Willoughby 2013), the authors confirmed that competition predicts later aggression, irrespective of violent game exposure history.

Few other studies of children and video games have made a solid case for a connection to aggression or violent outcomes. Several have suggested that use of violent video games might reduce aggression (Colwell and Kato 2003; Shibuya et al. 2008[1]). Others indicate that, with other factors controlled, effects are null (Ferguson 2011; von Salisch et al. 2011; Wallenius and Punamäki 2008; Ybarra et al. 2008) or that effects may be idiosyncratic among children (Unsworth et al. 2007). Meta-analyses (e.g., Sherry 2007) have found weaker effects in studies of children than for college students, the opposite of what might be expected developmentally. Thus, overall, it is

[1] We note the issue that some research reports insinuate links between violent games and aggression, where their data fail to support such insinuations. We note that in Shibuya et al. 2008, in their Table 2, the video game exposure by violence presence variable is associated with a reduction in aggression in boys, but not girls. For Ybarra et al. (2008) the null effect for violent video games is noted in their Figure 2, although they largely ignore their own results to imply links between violent games and youth aggression. These papers highlight the need to closely examine research results when understanding the true implications of a research study. The rhetoric employed by scholars in their abstracts and discussion sections does not always match their data.

difficult to make clear conclusions about links between video game violence and childhood aggression or violence.

Post-Sandy Hook, a view emerged, typified by the report of the US House of Representatives Gun Violence Prevention Task Force (2013), that current research probably did not support concerns that the average child was harmed by video game violence. Rather, attention should be focused on prevention and early intervention with "at-risk youth," with particular emphasis on mental health. This is a reasonable hypothesis, but one that has not been studied extensively. Several studies of college students by Patrick Markey found that violent video games may interact with preexisting anger symptoms in some young adults to increase hostility, although he has been cautious about extending these findings to violence in children (Giumetti and Markey 2007; Markey and Markey 2010; Markey and Scherer 2009). These warnings are consistent with those of criminologists who warn against generalizing laboratory aggression measures to criminal violence (Savage 2008). One recent analysis with children (Ferguson 2011) was unable to confirm the hypothesis that children with preexisting antisocial traits were adversely influenced by violent video games. However, more research would certainly be welcome.

The Current Study

The current study is intended to address gaps in the existing literature by considering the impact of exposure to violence in video games on criminal delinquency and bullying behaviors in a sample of children with clinically elevated mental health symptoms. It is important to note at the outset that the vast majority of children with mental health symptoms do not engage in violent behavior. Although some symptoms of mental health problems such as depression (Ferguson 2011) and attention deficit disorder (Wymbs et al. 2012) have been identified as risk factors for aggressive or violent behavior, this occurs only in combination with other significant risk factors, not as a direct result of the mental health symptoms. Thus, scholars must exercise caution not to further stigmatize mental illness by insinuating links with violence.

Rather, our analyses are intended to address the hypothesis that children with clinically elevated mental health symptoms consistitute a "vulnerable" population of individuals who may be susceptible to video game violence effects even if clinically "normal" children are not. We thus test two main hypotheses. First, it was hypothesized that children with clinically elevated symptoms of depression will demonstrate a correlation between violent video game exposure and criminal delinquency and bullying behavior-related outcomes. Second, it was hypothesized that children with clinically elevated attention deficit symptoms will demonstrate a correlation between violent video game exposure and criminal delinquency and bullying behavior related outcomes.

Methods

Participants

The current study includes a subset of participants from a large federally funded project examining video game violence effects on youth. Details related to the initial development and recruitment for this project can be found at Kutner and Olson (2008). Only children who scored in the clinically significant range on clinically validated scales related to depressive or attention deficit symptoms (scales discussed below) were included in the current analyses. These included 377 children: 182 with clinically elevated attention deficit symptoms, and 284 with clinically elevated depressive symptoms. Clinically elevated symptoms were comorbid for 89 (23.6 %) children. There were 234 females in the sample and 140 males (3 chose not to report their gender). The mean age of the children was 12.93 (SD = .76). Children were recruited from both an urban and suburban school. The ethnic makeup of students in the urban school was 50 % white, 43 % black, 2 % Asian, 5 % Hispanic and <1 % other. The ethnic makeup of students in the suburban school was 90 % white, 4 % black, 4 % Asian, 1 % Hispanic and 1 % other (individual students were not asked to report their ethnic background).

Measures

Depression/Attention Symptoms

Symptoms of depression and attention-deficit/hyperactivity problems were assessed using the relevant subscales of the youth self-report version of the Pediatric Symptom Checklist—17 (PSC; Gardner et al. 1999). This instrument is a validated, brief screening device for mental health problems in children, and provides clinical cut-offs to identify children whose symptoms merit further evaluation. Participants were asked to rate whether they experienced particular mental health symptoms "never," "sometimes" or "often." With the current sample, coefficient alpha for the ADHD subscale was .75 and for the depression subscale .80. The sample reported mean was 5.41 and standard deviation was 2.28.

Trait Aggression

The Attitudes Toward Conflict scale (ATC; Dahlberg et al. 1998) consists of eight Likert items related to potential

aggressive responses to various hypothetical situations. Sample items include, "It's OK for me to hit someone to get them to do what I want" and "I try to talk out a problem instead of fighting." Due to the stability in trait aggression it is commonly regarded as an important control variable and we include it here for this reason. Trait aggression correlated with video game exposure at $r = .24$ for youth with elevated attention deficit symptoms and .23 for youth with elevated depressive symptoms. However, predictive relationships between exposure to video game violence and trait aggression became non-significant in regression equations with gender, parental involvement, stress and family/peer support controlled. Thus, we are confident that our use of trait aggression as a control variable does not miss relationships between video game violence and trait aggression with other factors controlled. Coefficient alpha for the current sample for the ATC was .76. The sample reported mean was 16.48 and standard deviation was 4.60.

Parental Involvement

To measure parents' involvement with their children's media use, sharing media consumption with children and making media consumption decisions for them, a nine-item Likert-scale was created for this study. Examples of questions included in this scale are "My parents play electronic games with me," and "My parents tell me I can't play a particular electronic game." Coefficient alpha for the current sample was .68. The sample reported mean was 18.48 and standard deviation was 4.12.

Support from Others

We compiled a sixteen item Likert-scale measure of perceived support from peers and family. This measure was based on two existing measures (Lerner et al. 2005; Phillips and Springer 1992) of peer support and family support. Overall coefficient alpha for the resultant scale was .87. The sample reported mean was 44.35 and standard deviation was 10.22.

Stress

The Stressful Urban Life Events scale (SULE; Attar et al. 1994), a 19 item yes/no scale, was used to measure total stress that children in the current sample had experienced during the past year. The SULE addressed stressors such as getting suspended from school, getting poor grades on one's report card, or experiencing the death of a family member. Coefficient alpha for the total stress scale was .67 for the current sample. The sample reported mean was 4.82 and standard deviation was 2.96.

Exposure to Video Game Violence

In the current study, we used Entertainment Software Ratings Board (ESRB) video game ratings as an estimate of exposure to violence in video games. Respondents were asked to write the names of five video games that they had "played a lot" in the past 6 months. ESRB ratings were then obtained for each game, and ordinally coded (a maximal score of 5 for "Mature," 4 for "Teen," etc.). The sample reported mean was 29.97 and standard deviation was 30.09.

Many factors go into an ESRB rating, including language, sexual content, and use of (or reference to) drugs or gambling. However, among those factors that determine the age-based rating, violence appears to take priority. Descriptors of listed games were reviewed to ensure that high ratings had not been obtained primarily for sexual content; this was not the case for any of the games. Common violence-containing games named by participants included those in the *Halo*, *Grand Theft Auto*, and *Mortal Kombat* series. The ratings were summed across the 5 games listed, then multiplied by the number of hours per week that the child reported playing video games. As with all attempts to assess game content exposure, this is only an estimate; however, it removes some of the subjectivity inherent in previous methods. This approach has been found to be reliable and valid in previous research (Ferguson 2011; Lenhart et al. 2008).

Delinquency

A six-item Likert scale of general delinquency was compiled from several existing delinquency scales (Brener et al. 2002; Elliot et al. 1985; Leffert et al. 1998). Questions addressed physical aggression (been in a physical fight; hit or beat up someone) as well as more general delinquency (stole something from a store; got into trouble with the police; damaged property just for fun, such as breaking windows, scratching a car, or putting paint on walls; skipped classes or school without an excuse). Participants were asked to report how often these behaviors occurred within the previous twelve months. Coefficient alpha for the resultant scale was .75 for the current sample. The sample reported mean was 3.00 and standard deviation was 3.95.

Bullying

The Revised Olweus Bully/Victim Questionnaire (Olweus 1996) was used to assess bullying behaviors. The bullying perpetration scale consisted of 9 items in which participants were asked to rate how often they had engaged in bullying behaviors over the past couple of months. Items

inquire about physical aggression, verbal aggression, threats and social exclusion. A coefficient alpha of .86 was obtained for the current sample. The sample reported mean was 2.68 and standard deviation was 4.27.

Procedure

All procedures described within this study were approved by local IRB and designed to comport with APA standards for ethical human research. An "opt out" procedure was used for student involvement, with parents notified of the study through school newsletters and notices sent home to students. Youth assent for participation was obtained for all participants. Teachers were not present during data collection, which occurred during the school day.

Primary data analysis used for the testing of the study hypotheses were OLS multiple regressions. Gender, parental involvement, trait aggression, stress, family/peer support and exposure to video game violence, as well as the interaction between exposure to violent video game and trait aggression, were entered simultaneously in the regression equation. In keeping with the recommendations of Simmons et al. (2011), we certify that this analysis approach was selected in advance and was not altered to produce particular results. An interaction between trait aggression and exposure to video game violence was tested by first centering the variables to avoid multicollinearity. Collinearity diagnostics for all regressions revealed absence of any concerns with all VIFs below 2.0. Youth with depressive or attention deficit symptoms will be considered separately.

Results

Video Game Exposure

Children in our sample were generally very familiar with electronic games. Of our sample, 84.4 % reported playing video games on a computer, 81.2 % on a console and 50.4 % on a handheld device in the previous 6 months. Only 6.1 % reported playing no games at all during that time. Similarly, only 11.4 % of our sample had no exposure to violent video games. Boys had considerably more exposure to violent video games than did girls [$t(189.24) = 9.07$, $p < .001$, $r = .46$, 95 % CI = .38, .54]. Kurtosis and skew were acceptable, suggesting a normal distribution of scores.

Video Game Influences

With the sample of children with clinically elevated depressive symptoms and regarding delinquent criminality as an outcome only stress ($\beta = .30$) and trait aggression ($\beta = .42$) were predictive of delinquent criminality. Neither exposure to video game violence nor the interaction between trait aggression and exposure to video game violence were predictive of delinquent outcomes. The adjusted R^2 for this regression equation was .36. These results are presented in Table 1.

With the same sample of children with clinically elevated depressive symptoms but considering bullying behaviors as an outcome, once again only stress ($\beta = .23$) and trait aggression ($\beta = .28$) were predictive of bullying behaviors. Neither exposure to video game violence nor the interaction between exposure to video game violence and trait aggression were predictive of bullying related outcomes. The adjusted R^2 for this regression equation was .22. These results are presented in Table 2.

With the sample of children with clinically elevated attention deficit symptoms and regarding delinquent criminality, as with the sample of children with clinically

Table 1 Delinquency regression: beta weights and significance of entered variables for adolescents with clinical elevated depressive symptoms

Variable	β	95 % confidence interval	*t* test	Significance
Gender	.06		0.92	.36
Parental involvement	−.01		−0.05	.96
Stress	.30	(.19, .40)	4.73	.001*
Family/peer support	−.07		−0.96	.34
Trait aggression	.42	(.32, .51)	6.08	.001*
VGV	.04		0.55	.59
VGV × trait aggression	.04		0.64	.53

VGV exposure to video game violence

Table 2 Bullying regression: beta weights and significance of entered variables for adolescents with clinical elevated depressive symptoms

Variable	β	95 % confidence interval	*t* test	Significance
Gender	−.11		−1.74	.14
Parental involvement	−.01		−0.09	.92
Stress	.23	(.12, .34)	3.24	.001*
Family/peer support	−.05		−0.67	.50
Trait aggression	.28	(.17, .38)	3.74	.001*
VGV	−.07		−0.95	.34
VGV × trait aggression	−.02		−0.23	.82

VGV exposure to video game violence

Table 3 Delinquency regression: beta weights and significance of entered variables for adolescents with clinical elevated attention deficit symptoms

Variable	β	95 % Confidence interval	*t* test	Significance
Gender	.06		0.71	.48
Parental involvement	.06		0.70	.49
Stress	.32	(.18, .44)	4.21	.001*
Family/peer support	−.15		−1.69	.10
Trait aggression	.38	(.25, .50)	4.23	.001*
VGV	.04		0.45	.65
VGV × trait aggression	.03		0.39	.70

VGV = exposure to video game violence

elevated depressive symptoms only stress (β = .32) and trait aggression (β = .38) were predictive of delinquent criminality. Neither exposure to video game violence nor the interaction between trait aggression and exposure to video game violence were predictive of delinquent outcomes. The adjusted R^2 for this regression equation was .37. These results are presented in Table 3.

Finally, with the sample once again of children with clinically elevated attention deficit symptoms and with regards to bullying behavior only trait aggression (β = .41) was predictive of bullying behaviors along with the interaction between trait aggression and exposure to violent games (β = −.22) suggesting that highly trait aggressive children who also played violent video games were less likely to engage in bullying behaviors. Exposure to Video game violence was not a significant predictor of bullying behaviors. The adjusted R^2 for this regression equation was .19. These results are presented in Table 4.

Table 4 Bullying regression: beta weights and significance of entered variables for adolescents with clinical elevated attention deficit symptoms

Variable	β	95 % confidence interval	*t* test	Significance
Gender	−.06		−0.61	.54
Parental involvement	.06		0.65	.52
Stress	.12		1.38	.17
Family/peer support	.01		0.02	.99
Trait aggression	.41	(.28, .52)	4.17	.001*
VGV	.06		0.60	.55
VGV × trait aggression	−.22	(−.08, −.35)	−2.27	.03*

VGV exposure to video game violence

Discussion

The 2011 Supreme Court (Brown v EMA 2011) case seemed to have briefly cooled speculation about video game violence effects on children. The tragic 2012 shooting of young children in Newtown, Connecticut by a 20-year-old male reportedly fond of playing violent video games put the issue back on the front burner (Gun Violence Prevention Task Force 2013). The consensus from the government (e.g., Gun Violence Prevention Task Force 2013) seems to have been that current research does not consistently link exposure to video game violence with aggression or societal violence, but more research is necessary to assess effects on potentially vulnerable subgroups of children. The current study is an attempt to fill that gap by considering correlational violent video game effects in a sample of youth with clinically elevated mental health symptoms. Our results did not provide support for the hypotheses that exposure to violent video games would be associated with increased delinquency or bullying behaviors in children with elevated mental health symptoms.

Our results indicated that violent video games were associated with neither delinquent criminality nor bullying behaviors in children with either clinically elevated depressive or attention deficit symptoms. Nor did we find support for the belief that trait aggression would interact with video game violence within this sample of youth. That is a particularly interesting finding given that a combination of mental health symptoms and long-term aggressive traits are common elements to attackers who carried out school shootings (US Secret Service and US Department of Education 2002). Our results cannot, of course, be generalized to mass homicides. We do note that our findings with more general forms of youth violence are similar to those of the Secret Service report, in that trait aggressiveness and stress were risk factors for negative outcomes where exposure to video game violence was not. The only exception was our finding that, for children with elevated attention deficit symptoms, trait aggression and video game violence interacted in such a way as to predict reduced bullying. This could be considered some small correlational evidence for a cathartic type effect, although we note it was for only one of four outcomes and small in effect size. Thus we caution against overinterpretation of this result.

None of the hypotheses related to video game violence effects on vulnerable youth were supported. Although this is only one piece of evidence, this early result does not support the belief that certain at-risk populations of youth, at least related to clinically elevated depression and attention deficit symptoms and trait aggression, demonstrate negative associations between violent video games and aggression related outcomes. It may be that the

influence of media is simply too distal to impact children, even those with mental health symptoms. We do note that our results do not rule out motivational models of media use, wherein effects are driven by user motivations rather than automatic modeling of content. However, we found little evidence to support beliefs in reliable probabilistic models of automatic media modeling of violence in children with elevated depressive or attention deficit symptoms.

We note that our results differ from those of Patrick Markey (Giumetti and Markey 2007; Markey and Markey 2010; Markey and Scherer 2009). There are several possible explanations for the differing results. For example, Markey's work considered hostile feelings in the short term as outcome. It may be that such feelings do not persist or do not extend to actual violent behavior. Markey's work also examined college students, whereas ours look at youth. Differences between laboratory-based work and correlational work also may help explain the differences in findings.

Developmental and Theoretical Perspectives

Across youth and across outcomes, the current levels of stress and trait aggression were the most consistent predictors of negative outcomes in youth. These results are consistent with a model of aggression known as the Catalyst Model, which is basically a diathesis stress model of violence (Ferguson et al. 2008). Although we did not specifically set out to test the Catalyst Model, our results are a good fit for this theory's predictions that violence is the product of crystallized personality traits coupled with stressful triggers from the environment.

From a developmental perspective, the Catalyst Model suggests that such personality traits results from a combination of genetic propensity coupled with harsh upbringing, although these were variables beyond our current dataset. However, the Catalyst Model generally assumes that exposure to media violence is a normative rather than deviant experience (see also Olson 2010). This may differ from the perspective of many commentators concerned about harmful media influences. For instance, much attention has focused on whether Adam Lanza (the Newtown, Connecticut shooter) had significant exposure to violent video games (e.g. Henderson 2012). It is worth noting that, statistically speaking, it would be more unusual if he did *not* play violent video games, given that the majority of youth and young men play such games at least occasionally (Lenhart et al. 2008; Olson et al. 2007). Thus, it may be a mistake to take the perspective that exposure to violent video games or other media is a developmentally abnormal experience. Our results support that generally accepted thinking, even for children with elevated mental health systems, may need to be changed.

The Catalyst Model has the advantage of acknowledging that not all learning opportunities are equal. That is to say, proximal influences, such as family environment, are considered to have a greater impact than distal influences, such as electronic media. We believe that this is superior to traditional social cognitive models of aggression that equate all learning opportunities and thus lack nuance and an acknowledgement of developmental trends in which children are known to process different sources of information differently (Woolley and Van Reet 2006). The Catalyst Model also relies less on the assumption that aggressive cognitions and behaviors are based primarily on cognitive aggressive scripts, which does not appear to be an effective approach to understanding serious aggression. The Catalyst Model fits best with our observations of stress and trait aggression as the primary predictors of delinquency and bullying in youth, although as a correlational study our findings can not address the causal assumptions of the Catalyst Model.

In addition to looking at violence from more of a diathesis-stress approach, there may be value in viewing media use from more of a motivational perspective, such as the uses and gratifications approach (Sherry et al. 2006) or Self-Determination Theory (Przybylski et al. 2010; Ryan et al. 2006). These theoretical approaches have in common the value of taking the user experience as a primary driving factor of the relationship between the user and media, rather than presuming that content drives the relationship. In the typical "hypodermic needle model" of media effects, effects are traditionally conceptualized as Stimulus/Response, or perhaps Stimulus/Organism/Response if the individual is considered as a moderating variable (see Ferguson and Dyck 2012 for discussion). There may be greater value in considering the relationship from more of an Organism/Stimulus/Response arrangement, with the organism rather than the stimulus as the primary driving force of the relationship between media and behavior. That is to say, individuals may select certain kinds of media in order meet needs they have or reach desired emotional states. Even specific forms of media may have idiosyncratic effects on users dependent upon how they consume and process media.

Limitations and Conclusions

As with all studies, ours has limitations that are important to consider. First, our sample includes children with mental health symptoms above clinical cut-off points on a validated screening tool, but screening results do not constitute official diagnoses of mental health disorders. Further,

although we considered mental health and trait aggression, it is possible that other issues may place some children in vulnerable populations that we did not identify. Our study involves concurrent correlational data; thus, it is not possible to make causal inferences or to test the directionality of observed relationships. Reliabilities of the stress and parental involvement scales were also lower than ideal. These two scales appear to tap into a broad array of issues, which may explain this result; future researchers may wish to consider more narrowly constructed scales. Lastly, although our delinquency scale was compiled from existing well-validated scales, it would be valuable to see our results replicated using clinical outcomes such as the Child Behavior Checklist or criminological outcomes such as the Negative Life Events scale (Paternoster and Mazerolle 1994).

Our results suggest that the association between violent video games and aggression related outcomes in children, even those with clinically elevated mental health symptoms, may be minimal. Our research contributes to the field of youth and media by providing evidence that a timely, policy-relevant, and seemingly reasonable hypothesis—that mentally vulnerable children may be particularly influenced by violent video games—does not appear to be well supported. However, more research on this population, and on others likely to be at increased risk (such as children exposed to violence in their homes or neighborhoods), is needed to guide parents, health professionals and policymakers. It may be valuable for future researchers to consider alternate models of youth's media use, particularly those that focus on motivational models in which users, rather than content, drive experiences. Content-based theoretical models do not appear to be sufficient for a sophisticated understanding of media use and effects.

A Word of Caution

Scholarship produced in the emotional and politicized environment that follows a national tragedy (see Ferguson 2013) can give the appearance of a "wag the dog" effect, with research commissioned based upon, and then used to support, an a priori political agenda. As Hall et al. (2011) noted in their article on the Supreme Court and video games, a rush to judgment grounded in legislators' interpretations of "unsettled science" may damage the credibility of the scientific process. Scholars would be wise to proceed carefully, with close attention to sound methodology and discussion of limitations, as they design and conduct the next wave of studies. Studies which move beyond traditional social cognitive automatic processes to consider how youth select, interpret and involve media in their identity development as active consumers of media would be of particularly high value.

Author contributions CJF conducted the main analyses for the paper and wrote the initial draft. CO collected the data an contributed to revising drafts of this paper. Both authors participated equally in conceiving and designing the analyses. Both authors read and approved of the final manuscript.

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