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Media Managing Mood: A Look at the Possible Effects of Violent Media on Affect

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Abstract

Background   The potential impact of violent media on children's emotional well-being has been a source of controversy for several decades. To date evidence for a negative impact of violent media on emotional well-being has been mixed and increasingly connected to a "replication crisis" throughout psychological science.

Objective   The current study examines concurrent and prospective relationships between violent media use and symptoms of depression and anxiety in a sample of 536 mostly Hispanic youth (309 males, age range 10–14).

Methods   Youth and parents were surveyed regarding social environment, media use and mental health. 302 youth responded to a 1-year follow-up.

Results   Results indicated that neither violent television use nor violent video game use predicted anxiety or depression concurrently or depression prospectively with this sample.

Conclusions   The impact of media violence use on child mood symptoms appears to be minimal. Further research may wish to focus on particular at-risk groups.

Keywords   Video games · Television · Violence · Mental health · Depression · Anxiety

Introduction

The growing use of video games and other forms of entertainment media, particularly violent media, has raised considerable concern with regards to its effect on young children, adolescents, and young adults. These concerns have given rise to numerous studies regarding the examination of both positive and negative effects of entertainment media particularly related to aggression. To date, however, even meta-analyses of these studies

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have failed to reach a consensus regarding potential effects (e.g. Anderson et al. 2010; Ferguson in press; Paik and Comstock 1994; Savage and Yancey 2008; Sherry 2007). Nonetheless, media consumption remains high among youth with video game playing, in particular, on the rise (Casiano et al. 2012). The current manuscript concerns itself with the potential impact of exposure to violent media, particularly television and video games, on the emotional well-being of youth.

Theoretical Perspectives: Violent Media and Mood

Because scholars have typically approached media use from a modeling perspective in which media exposure is treated synonymously to real-life violence exposure (e.g. Bushman and Huesmann 2014), media psychology has often had difficulty understanding violent media use from a motivational perspective. Given that such media is treated as identical in form to real-life violence, it is expected to be traumatizing (e.g. Cantor 2012). From this framework, violent media may lead to anxiety and depression because media exposure is traumatizing, just like any other violence exposure. Some scholars even speculated exposure to violent media might increase suicide susceptibility, although evidence did not bear this out (Gauthier et al. 2014). However, unlike real-life violence exposure, many children selectively expose themselves to media violence.

Making an assumed equality between real-life violence and violent media may risk a false equivalence logical error, particularly given different motivational structures involved in real-life violence avoidance, and media violence approach. For instance, mood management theory suggests that people, including children, use media including violent media to repair mood and reduce stress (Rieger et al. 2015a). Exposure to difficult media can give meaning to issues people are anxious about, and reduce anxiety (Rieger et al. 2015b).

Mood management is an element of Uses and Gratifications Theory (UGT; Sherry et al. 2006). UGT suggests that the interaction between media and consumers is complex, more so than implied under traditional modeling theories. Consumers are active in selecting, processing and shaping media, and interactions between specific consumers, their motivations for using media, and specific media are more critical than the alleged generalized effects of content. Thus, a single example of media could potentially produce very different emotional reactions in different consumers depending upon their motivations and intent. With UGT theory in mind, we might expect the interaction between violent media and children's moods to be both normative and complex. For instance, motivation for exposure to violent media appears to be normative, particularly for boys (Olson et al. 2009). Thus, for moderate levels of exposure to violent media we would not expect motivationally driven exposure to be traumatizing, producing increased anxiety or depression.

The application of UGT has two further implications. First, although UGT would lead to the hypothesis that motivationally driven exposure to violent media is unlikely to produce increased anxiety or depression, this may not be true for all children. In particular, children already exposed to prior real-life violence may be susceptible to "triggers" from fictional media. For instance, Weems et al. (2012), found that watching television news coverage of natural disasters tended to increase stress symptoms in children, but mainly for children with pre-existing stress symptoms. One possibility is that children who have been previously exposed to violence, such as through bullying, may be particularly stressed by

watching violence in the media. However, it is also possible that the fictional nature of television shows and video games may result in different responses than non-fictional news shows.

Second, according to UGT we can expect that prior life experiences may play a role in the development of motivational structures that may direct both selective exposure to media and emotional state. Without a careful control for prior experiences, selection effects may be mistaken for meaningful relationships between media variables and outcomes. For instance, related to aggression, boys both tend to watch more violent media and are, on average more aggressive. Thus a correlation between violent media use and aggression may be a simple selection effect and controlling for aggression can eliminate this possibility. Similar issues may be in play for mood outcomes. When considering relationships between media exposure and behavioral outcomes it is considered best practice to control for variables related to gender, family environment, peer environment and personality (Breuer et al. in press; Savage and Yancey 2008). Doing so helps to control for selection effects in which predisposing to interest in violence may predict both media habits and behavioral outcomes. Indeed, research suggests that pre-existing proclivity to select violent media is often predictive of behavioral outcomes, whereas direct exposure itself may not be (Negy et al. 2013). Thus, it is crucial that correlational and longitudinal studies include proper controls for family violence, peer influences and aggressive personality. So too, it can be valuable to examine for the potential for media violence exposure to interact with aggressive personality variables in particular, given the potential for a downward spiral effect in which personality traits and media exposure influence one another (von Salisch et al. 2011).

Thus, utilizing a framework of UGT we might expect several things. First, because relationships between media use and mood variables are likely to be complex, we are unlikely to see practically significant correlations between violent media use variables and mood related outcomes. Second, this may not hold true for all children. In particular, those with prior exposure to violence such as via bullying, may be more prone to mood effects than children with less real-life violence exposure. Third, it is crucial to control for variables related to gender, peers, family and personality that might reasonably be related to a selection effect.

Are "Dose Effects" Possible?

Most previous studies of media use on mood have examined linear effects, with the assumption that more exposure would relate to greater anxiety or depression. However, results have generally been mixed at best. Recently, a meta-analysis (Ferguson in press) considered the strength of the relationship between video game violence exposure specifically, and depressive symptoms (among other outcomes). This meta-analysis concluded that the relationship between violent video game exposure and depressive symptoms was no different from zero, neither exacerbating nor reducing depression. However, this meta-analysis did not consider studies of anxiety.

Compared to aggression or even depression, studies of media violence influences on anxiety are very few. Some early work tended to conceptualize media violence as producing fearful responses in children (Cantor 2012). This may be accurate for very young children and age-inappropriate media, but violent media are often very popular among older children. As people tend to avoid stimuli that produce long-term fear responses (that

is to say, more than the adrenaline jolt expected from a scary movie), but this is not occurring for many young viewers of violent media (if youth selectively avoided violent media there would be little need to debate the topic), the relationship between media violence and anxiety would appear likely to be complex.

One recent study of college students (Madan et al. 2014) found exposure to violent movie clips to be related to anxiety, although mainly for students with low prior exposure to violent media. Lack of response among participants more versed in violent media was interpreted as desensitization, although these results may also be more parsimoniously interpreted as a matching issue between media and viewer. In other words, negative emotional reactions may occur whenever participants are asked to watch media they wouldn't otherwise choose. As a more peripheral issue, the literature review for this study employed citation bias (failing to cite existing studies conflicting with the authors' personal views), a questionable researcher practice indicative of researcher expectancy effects that are now known to be associated with spurious outcomes (Ferguson in press). Thus, clearly, more studies on this issue would be welcome.

Although evidence for linear relationships between violent media exposure and mood outcomes appear to be weak, it's possible that such relationships may be curvilinear. In recent years, most such research has focused on video game use. In one recent study by Pryzbylski (2014), different levels of time engagement with video game playing were studied in association with psychosocial adjustment. In terms of the aforementioned distribution of game playing habits observed by Przybylski and colleagues, different effects on quality of life and psychosocial development were observed at different levels of play, as compared to non-players. Adolescents ages 10–15 from the United Kingdom filled out multiple self-report inventories assessing factors such as game engagement (time spent playing), internalizing and externalizing problems, prosocial behavior and life satisfaction. Light players (1 h per day) were associated with higher levels of prosocial behavior than non-players, whereas moderate players did not show any positive or negative effects in terms of psychosocial development. However, heavy players showed a "mirror image" result to that of light players; they experienced lower levels of prosocial behavior than their nongaming peers. Heavy players showed higher levels of externalizing and internalizing problems (Pryzbylski 2014). Thus there may be a "dose effect" for video game use wherein light use of video games is associated with more positive outcomes regarding psychosocial development. However, effect sizes were generally very small suggesting that, at all dose levels, video games have only a minimal association with child development.

Additional studies also support the idea that youth involvement in game playing may have a small dose–effect relationship to both their psychological and physical health. A study conducted in Iran corroborated the results found by Pryzbylski (2014). Dolatabadi et al. found that short, supervised game playing stints correlated to higher quality of life, whereas pathological game playing (game playing that interfered with other life responsibilities) had negative long-term effects such as lower mental health scores (Dolatabadi et al. 2013). Desai et al. (2010) likewise found that those who engaged in pathological game playing were three times as likely to be depressed as those who did not report pathological game playing. Overall, these results suggest that rather than mere exposure, overuse should be a focus of media effects research, with the caveat that the effects of content as opposed to pathological use generally appear to be very small.

The Current Study

At present, little research has specifically examined the issue of violent media use and anxiety and depression in youth. This study seeks to further expand on the research concerning the effects of violent media on moods other than anger and aggression. Drawing on the idea that exposure to violence in real life causes anxiety and depressive symptoms, and using the assumption that the human brain might process violent media similarly to these real life experiences (e.g. Bushman and Huesmann 2014), we sought to examine possible correlations between media violence and depressive and anxiety symptoms in a sample of young adults. Hypotheses tested were that violent television and video game exposure would be positively associated with both short and long-term symptoms of depression and anxiety in youth. Further, the dosing effect relationship observed in some studies of general media use (e.g. Allahverdipour et al. 2010; Kutner and Olson 2008; Pryzbylski 2014) will also be examined with the expectation that heavy, as opposed to light or moderate exposure, will be most associated with negative outcomes. Thus the current study examines the following hypotheses:

H1 Exposure to television violence is correlated with increased anxiety and depression concurrently, and depression prospectively.

H2 The relationship between violent media exposure and mood symptoms is curvilinear, with most positive outcomes observed for light to moderate users relative to non or heavy users.

H3 The relationship between violent media exposure and mood symptoms will be moderated by prior exposure to bullying in real life.

Methods

All procedures were approved by local IRB and were designed to comport with APA standards for ethical human participant research. The authors have no conflicts of interest to declare.

Participants

Participants in the current study were included in a prior study of youth violence including both concurrent and prospective data (Ferguson 2011). As such the current study represents an analysis of secondary data. Data on recruitment and retention are provided in Ferguson (2011). The current study presents new data that have not been reported elsewhere, thus there is no resubmission of prior existing data (i.e. data presented here do not overlap with that presented in the previous study). 536 children from the original sample of 603 volunteered to participate in this prospective design at Time 1 (T1). As this sample was drawn from a small Hispanic-majority city population on the border of Mexico, this sample of youth were almost all (n = 519; 96.8 %) Hispanic. Proportions of Caucasian, African American, Asian American and other ethnic groups were 1 % or less. This ethnic composition is consistent with the ethnic composition of the city from which the sample was drawn and represents a "convenience" sample, meaning that Hispanics were not specifically recruited for a theoretical reason. However to date, few prospective studies of youth violence have considered Hispanic majority samples. As such, examining such a sample

may help generalize this research to ethnic groups beyond Caucasians. All participants were between the ages of 10 and 14 at T1 ($M = 12.34$, $SD = 1.33$) as this age was viewed as young enough that developmental processes may still be strong and easily observable. About an equal number of boys (275, 51.3 %) and girls (261, 48.7 %) were included in the study. Children included in this study were from the general community, not specifically at-risk children for serious mental health problems. 302 children were reassessed at T2 and drop-out appeared to be random (Ferguson 2011). Participant loss was examined relative to both demographic variables and study outcomes and predictors and found to be unrelated to these.

Predictor Measures

Table 1 presents means, standard deviations and coefficient alpha reliability for all measures (aside from demographic variables). With exceptions noted below, all materials used Likert-scale items and demonstrate psychometric properties suitable for use in multiple regression. As indicated in Table 1 the anxiety outcome variable demonstrated some positive skew. Reanalysis with square root transformation did not change the results, thus raw data results are presented here. All measures were included in the T1 assessment. For the T2 follow up, only the depression and variable was reassessed among the variables in the current study.

Demographic Variables

Two demographic variables were considered as potential risk or protective factors. First, parental/guardian marital status (married as opposed to divorced or unmarried) was considered as a potential predictor. Secondly, the child's involvement in extracurricular activities as measured by the Child Behavior Checklist (CBCL, Achenbach and Rescorla 2001) was included as a potential protective factor. On the CBCL, parents list and rate their child's involvement in sports, hobbies, clubs and jobs (up to three examples in each category) relative to same age peers.

Table 1 Means, standard deviations and coefficient alpha for all continuous variables

Variable	Mean	Standard deviation	Skew	Cron. Alpha
Depression T1	1.60	2.31	1.11	.80
Depression T2	1.61	2.31	1.39	.80
Anxiety	2.73	3.30	2.01	.81
Antisocial personality	18.17	5.40	.60	.70
Family attachment	21.14	5.96	−0.70	.86
Delinquent peers	10.91	3.58	2.53	.84
Activities	27.78	10.38	.23	N/A
CTS psychological Agg.	6.02	8.47	2.43	.81
CTS physical abuse	2.87	9.50	5.56	.88
Television violence	30.73	18.90	1.38	.75
Video game violence	22.95	20.04	1.47	.87

Media Violence Questionnaire

Child participants were asked to list their 3 favorite television shows and video games and estimate how often they play or view the media in question. Many media studies in the past asked respondents to rate violence levels in media they watched, although this runs the risk of variable estimates between respondents. In the current study, we took a slightly different approach, using existing Entertainment Software Ratings Board (ESRB) video game ratings as an estimate of video game violence exposure. ESRB ratings were obtained for each game reported by the respondent, and ordinally coded (a maximal score of 6 for "Adults Only," 5 for "Mature," 4 for "Teen," etc.). This ordinal coding system was designed to correspond to the levels of the ESRB rating system. A similar approach was used for television shows using the TV ratings system. ESRB or TV codes codes were multiplied by estimated time played and summed across the three games or television shows. This general approach has been used with success in the past (Olson et al. 2009). As with all attempts to assess game or television content exposure, this is only an estimate; however, it removes some of the subjectivity inherent in previous methods.

Negative Life Events

The Negative Life Events instrument is a commonly used and well validated measure of youth behaviors used in criminological research (NLE; Paternoster and Mazerolle 1994) and includes several variables which have received reasonable levels of support as risk/ protective factors in the criminological literature (e.g. Pratt and Cullen 2005). The NLE instrument was designed to assess for variables which could place strain on individuals, potentially increasing risks for negative outcomes. All of the following scales used 4-point Likert items. The following scales were used in this study:

1. *Antisocial personality* This scale was designed to assess for antisocial personality traits and propensity for delinquency. Items on this 11 item scale do not correspond to illegal or assault behaviors, rather they indicate character features associated with callousness toward others, dishonesty and lack of conscience (e.g., "It's important to be honest with your parents, even if they become upset or you get punished", "To stay out of trouble, it is sometimes necessary to lie to teachers", "You have to be willing to break some rules if you want to be popular with your friends", etc.)
2. *Family attachment* Items on this 7 item scale reflect involvement in shared activities with family, and the perception that family has influenced them (e.g., "On average, how many afternoons during the school week, from the end of school or work to dinner, have you spent talking, working, or playing with your family", etc.)
3. *Delinquent peers* This scale consists of 9 items. Participants report how often their peers engage in antisocial behaviors ranging from cheating on tests through violent assaults against other persons. Sample items include:
   "How often do your close friends purposely damage or destroy property that did not belong to them", "How often do your close friends hit or threaten to hit someone without any reason," etc.

Family Violence

The child's primary guardian was asked to fill out the Conflict Tactics Scale (CTS; Straus et al. 2003), a measure of positive and negative behaviors occurring in marital or dating

relationships. The CTS has been shown to have good reliability and corresponds well to incidents of dating and family violence. Its purpose in the present study was to measure conflict and aggression occurring within the family and thus the child's exposure to domestic violence. Subscales related to physical assaults and psychological aggression were used in the current study. The physical assaults subscale was found to have a significantly skewed distribution and a square-root transformation was conducted to produce a normalized distribution.

Activities

Child involvement in activities, family, school and social was reported by parents on the Child Behavior Checklist (CBCL Achenbach and Rescorla 2001) at T1.

Bullying Victimization

The Revised Olweus Bully/Victim Questionnaire (Olweus 1996) was used to assess bullying exposure. The bullying victimization scale consisted of 7 items in which participants were asked to rate how often they had been exposed to bullying behaviors over the past couple of months. Items inquire about physical aggression, verbal aggression, threats and social exclusion. A coefficient alpha of .83 was obtained for the current sample. This variable was included to test for possible interactions between bullying victimization and media violence exposure (Weems et al. 2012).

Outcome Measures

Depression

The withdrawal/depression scale of the *Child Behavior Checklist Youth Self-Report* (YSR; Achenbach and Rescorla 2001) indicated child depression. The CBCL is a well-known and validated measure of pathology in children and youth. Depression was reassessed at T2. It is noted that T1 depression data were available from both parent and child responses, but only child reported T2 depression data was available, thus our analyses focus on child reported depression. T1 results did not substantially differ for parent or child reported depression.

Anxiety

Parental responses on the Child Behavior Checklist (CBCL Achenbach and Rescorla 2001) were used to assess child anxiety. Given the brevity of the T2 reassessment, anxiety was not reassessed at this time. As this is an analysis of secondary data, T2 anxiety was not available.

Distribution of Clinical Scores

Depression scores were normally distributed, although anxiety scores demonstrated some positive skew. As expected from community samples proportions of children with symptoms in the clinically significant range were fairly small, 5.6 % for T1 depression, and 5.4 % for T1 anxiety.

Statistical Analyses

Main analyses consisted of a hierarchical multiple regression equation with anxiety at T1 and depression at T1 and T2 as the outcome measures. In each case gender and (in the depression prospective analysis) depression pre-score were entered on the first step, NLE variables (antisocial personality, family attachment and delinquent peers) and activity level were entered on the second step. Parental marital status was entered on the third step, CTS psychological aggression and physical assault were entered on the fourth step, and television and video game violence exposure entered on the fifth step. On the final step, one interaction term of theoretical interest was included namely an interaction between antisocial personality and media violent use (summed television and video games). Personality and media terms were centered before inclusion in the interaction term to reduce collinearity. Results did not differ significantly based on approach to handling of missing data. This hierarchy was designed theoretically to extend from most proximal variables outward. Multicollinearity was examined using tolerance and VIF statistics and found to be acceptable in all cases. Highest VIF values were 2.22, and lowest tolerance values were .45, which fall within most recommended acceptable guidelines (Keith 2006).

Results

Table 2 presents bivariate correlations for all study variables. As can be seen only one media related correlation with outcome variables was significant, namely television violence exposure with concurrent depression ($r = .09$, $p < .05$).

Predictive Relationships Between Media Violence Exposure and Mood Symptoms

For concurrent anxiety, results indicated that family attachment ($\beta = -.12$), delinquent peers ($\beta = .11$) and parental psychological aggression ($\beta = .19$) were all predictive of anxiety symptoms. The interaction between antisocial personality and media violence use was inversely related to anxiety ($\beta = -.09$) although only weakly. No other variables were predictive of anxiety symptoms, including exposure to television or video game violence. These results are presented in Table 3.

For concurrent depression, results indicated that family attachment ($\beta = -.22$), delinquent peers ($\beta = .25$), female gender ($\beta = .10$) and parental psychological aggression ($\beta = .17$) were all predictive of anxiety symptoms. No other variables were predictive of depressive symptoms, including exposure to television or video game violence, nor the interaction between antisocial personality and media violence exposure. These results are presented in Table 4.

For prospective depression, results indicated that only T1 depressive symptoms ($\beta = .16$) were predictive T2 depressive symptoms. No other variables were predictive of prospective depressive symptoms, including exposure to television or video game violence, nor the interaction between antisocial personality and media violence exposure. These results are presented in Table 5.

Because null results can be difficult to interpret using traditional null hypothesis significance testing, the null results for media were reanalyzed using Bayes factors with the approach advocated by Rouder and Morey (2012). With such an approach, Bayes factors

Table 2 Bivariate correlations between study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
Gender (female higher)	1	−.075	.078	−.013	.011	−.033	.086*	.052	−.196**	−.481**	.060	.050	.006
Antisocial personality		1	−.261**	.393**	−.149**	.066	.130**	.149**	.041	.069	.144**	.124**	−.063
Family attachment			1	−.114**	.120**	−.088*	−.085*	−.137**	−.001	−.020	−.231**	−.145**	−.050
Delinquent peers				1	−.044	.062	.127**	.102*	.047	.083	.289**	.167**	.058
Activities					1	−.078	.040	−.016	.096*	.051	.034	.065	.086
Parental Marital Status						1	−.013	.019	.041	.039	.007	.084	−.014
CTS psycheagg							1	.730**	.017	−.035	.163**	.236**	.077
CTS physical abuse								1	−.038	−.034	.097*	.180**	.042
Television violence									1	.479**	.090*	.054	.093
Video Game Violence										1	.029	.001	.014
T1 depression											1	.379**	.245**
T1 anxiety												1	.054
T2 Depression													1

* $p < .05$

** $p < .01$

Table 3 Multiple regression results for parental rated anxiety

Predictor variable	Model 1 β (t test)	Model 2 β (t test)	Model 3 β (t test)	Model 4 β (t test)	Model 5 β (t test)	Model 6 β (t test)
Gender (female higher)	.05 (1.05)	.06 (1.41)	.06 (1.45)	.04 (1.05)	.05 (1.08)	.05 (.95)
Antisocial personality		.05 (1.12)	.05 (1.10)	.03 (.72)	.03 (.68)	.03 (.63)
Family attachment		−.13 (−2.84**)	−.12 (−2.73**)	−.11 (−2.48**)	−.11 (−2.50*)	−.12 (−2.72**)
Delinquent peers		.14 (3.01**)	.14 (2.94**)	.12 (2.61**)	.12 (2.57**)	.11 (2.52*)
Activities		.09 (2.10*)	.10 (2.21*)	.08 (1.97*)	.08 (1.85)	.08 (1.92)
Parental marital status			.07 (1.66)	.08 (1.79)	.07 (1.74)	.07 (1.74)
CTS psycheagg				.20 (3.22**)	.19 (3.12**)	.19 (3.10**)
CTS physical abuse				.00 (−.01)	.01 (.07)	.00 (.04)
Television violence					.05 (1.00)	.06 (1.18)
Video game violence					−.01 (−.07)	.03 (.06)
Antisocial/media Int.						−.09 (2.07*)
Adjusted R^2	.000	.048	.051	.085	.084	.090
F for change in R^2	1.09	7.58***	2.75	10.83***	.59	4.27*

* $p < .05$

** $p < .01$

*** $p < .001$

Table 4 Multiple regression results for T1 child rated depression

Predictor variable	Model 1 β (t test)	Model 2 β (t test)	Model 3 β (t test)	Model 4 β (t test)	Model 5 β (t test)	Model 6 β (t test)
Gender (female higher)	.07 (1.69)	.09 (2.23*)	.09 (2.22*)	.09 (1.97*)	.10 (2.12*)	.10 (2.08*)
Antisocial personality		−.01 (−.18)	−.01 (−.17)	−.01 (−.33)	−.02 (−.40)	−.02 (−.42)
Family attachment		−.21 (−5.05***)	−.22 (−5.07***)	−.21 (−5.03***)	−.22 (−5.07***)	−.22 (−5.13***)
Delinquent peers		.27 (6.08***)	.27 (6.09***)	.26 (5.87***)	.26 (5.80***)	.25 (5.77***)
Activities		.08 (1.85)	.08 (1.81)	.07 (1.60)	.06 (1.39)	.06 (1.42)
Parental marital status			−.02 (−.48)	−.02 (−.38)	−.02 (−.47)	−.02 (−.47)
CTS psycheagg				.18 (2.97**)	.17 (2.82**)	.17 (2.80**)
CTS physical abuse				−.09 (−1.43)	−.07 (−1.27)	−.07 (−1.29)
Television violence					.08 (1.69)	.08 (1.75)
Video game violence					.01 (.12)	.01 (.17)
Antisocial/media Int.						−.04 (.86)
Adjusted R^2	.003	.127	.126	.139	.142	.141
F for change in R^2	2.85	19.66***	.23	4.95**	1.89	.74

* $p < .05$

** $p < .01$

*** $p < .001$

for a regression model can be compared with and without target predictor variables. If adding the predictor variables to a regression equation results in lower Bayes factors, this is evidence in support of the null hypothesis for the predictor variables. In each of the regressions, introduction of television and media violence variables reduced the Bayes factors for the regression models (from JZS Bayes Factor = 358612 to 41250.59 in support of the model for anxiety, from JZS Bayes Factor = $1.32e^{12}$ to $4.10e^{11}$ in support of the model for T1 depression, and from JZS Bayes Factor = 2.40 to 9.15 in support of the null for T2 depression. Each of these analyses lend further support to the null hypothesis in the current dataset.

Analysis of Curvilinear Trends

The potential for a curvilinear dosing trend was examined by including a curvilinear term for each of the media (television and video game) violence variables created by squaring centered versions of these variables. The antisocial/media interaction variable was removed from these regression equations to prevent multicollinearity. Otherwise the regression equations were rerun as indicated in the methods section, including the linear media terms.

Results of these regressions did not provide evidence for a curvilinear dosing effect. Specific standardized regression coefficients for curvilinear media terms ranged from ($\beta = -.10$ to .06). As with prior regression equations, reanalysis with Bayes factors confirmed that inclusion of curvilinear terms worsened regression models.

The potential for a dose effect was then examined using coded contrasts in a manner similar to Pryzbylski ([2014](#)). Przybylski examined specific number of hours of video game (but not television) exposure without respect to content. By contrast, our analyses consider specific violence exposure in two media. Thus it was not possible to use the same contrasts as Przybylski. However, the basic design of Przybylski was used by comparing those with light, medium and heavy exposure to violent media those with no such exposure at all (9.3 %). The overall media violence exposure had a mean of 28.98 ($SD = 24.14$, with slight positive skew 1.33 and kurtosis 2.51). Standard deviation units were used to create contrast units, with no exposure = 0, light exposure = 1–24, medium exposure 25–49, and heavy exposure equal to 50 + . As expected this developed a distribution that was roughly normal: non-exposure (9.3 %), light exposure (42.2 %), medium exposure (31.2 %), heavy exposure (17.4 %).

The basic regression analyses for each outcome were then rerun with the contrast codes substituting for the media exposure variables in Model 5. Each contrast (no exposure v light, no exposure v medium, no exposure v heavy) was run as a separate analysis. For parent rated only anxiety, and confirmed through Bayes factors, only heavy exposure to media violence correlated with parent rated anxiety ($\beta = .22$, $p = .022$, from JZS Bayes Factor = $3.91e^{8}$ to $5.36e^{11}$ in support of the model). Neither low nor moderate exposure to media violence ($\beta = .05$ and .10 respectively) were significantly predictive of anxiety. Results for time 1 depression indicated little evidence for support for a meaningful relationship between low, moderate or high media violence exposure and depression, with none of the contrasts approaching statistical significance ($\beta = -.03$, .01 and .11 respectively). Bayes factors for the model with the heavy violence exposure contrast were more supportive of the alternate hypothesis than null, however. Taken with the lack of significance in traditional hypothesis testing, results here should be considered inconclusive. However, for prospective depression, results for all media exposure contrasts clearly supported the null both in traditional hypothesis testing and in Bayesian analyses ($\beta = .05$, $-.08$ and $-.04$) respectively). Thus heavy viewing of media violence may have a small

Table 5 Multiple regression results for T2 child rated depression

Predictor variable	Model 1 β (t test)	Model 2 β (t test)	Model 3 β (t test)	Model 4 β (t test)	Model 5 β (t test)	Model 6 β (t test)
Gender (female higher)	−.01 (−.20)	−.02 (−.30)	−.02 (−.39)	−.02 (−.39)	−.02 (−.40)	−.03 (−.35)
T1 depression	.26 (4.23***)	.25 (3.87***)	.25 (3.85***)	.24 (3.72***)	.24 (3.62***)	.16 (3.60***)
Antisocial personality		−.10 (−1.47)	−.10 (−1.47)	−.10 (−1.51)	−.10 (−1.45)	−.10 (−1.44)
Family attachment		−.02 (−.31)	−.02 (−.33)	−.03 (−.41)	−.02 (−.34)	−.02 (−.31)
Delinquent peers		.05 (.68)	.05 (.69)	.04 (.65)	.04(.57)	.04 (.57)
Activities		.08 (1.24)	.08 (1.23)	.08 (1.23)	.07 (1.21)	.07 (1.17)
Parental marital status			−.01 (−.21)	−.01 (−.22)	−.02 (−.25)	−.02 (−.26)
CTS psycheagg				.06 (.74)	.06 (.78)	.06 (.77)
CTS physical abuse				−.02 (−.29)	−.03 (−.33)	−.02 (−.30)
Television violence					.08 (1.16)	.08(1.16)
Video game violence					−.04 (−.54)	−.04 (.54)
Antisocial/media Int.						.02 (.37)
Adjusted R^2	.057	.057	.054	.049	.046	.043
F for change in R^2	8.94***	1.01	.05	.29	.67	.13

* $p < .05$

** $p < .01$

*** $p < .001$

association with concurrent anxiety symptoms (and less certainly depressive symptoms), but evidence supports the absence of a long-term predictive relationship.

Analysis of Interaction with Bullying Victimization

To test the hypothesis that media violence exposure might interact with bullying victimization, the regression equations were once again rerun, with the interaction term between total media violence exposure and antisocial traits replaced by an interaction term between media violence exposure and bullying victimization. Results for this interaction term were non-significant for both anxiety and T2 depression ($\beta = .04$ and $-.15$ respectively), although a small protective relationship was found for concurrent depression ($\beta = -.16$, $p = .018$). However, despite centering, the interaction term remained slightly collinear (VIF $= 2.89$) with other media variables and thus should be interpreted only with caution.

Discussion

Concerns about the consumption of violent media and its subsequent effects on the behavior and mood of young children, adolescents, and young adults are on the forefront of debates considering violent behavior and maladaptation these age groups. Using 536 participants, ages 10-14, this study sought to examine the effects of violent media exposure on depressive and anxiety symptoms, but allowed for the control of other demographic and environmental factors. It was hypothesized that exposure to violent television and video games would be positively correlated with both short and long-term symptoms of anxiety and depression in those tested.

Regarding the hypothesis that media violence exposure correlates with mood symptoms (H1) results questioned the initial hypothesis for all outcomes. There were no significant correlative effects between the consumption of violent media and the short or long term presence of depressive or anxiety symptoms, with other variables controlled. Other factors, such as parent psychological aggression and delinquent peers were significantly predictive of short-term anxiety and depressive symptoms. These effects might suggest that more immediate and reality-based spheres of influence have stronger shaping effects on mood and behavior.

While the same variables were predictive of immediate anxiety or depressive symptoms, the only viable predictor of long-term depression (T2) was the instance of prior depressive symptoms (T1). This may suggest that, without the underlying pre-requisite of a depressive history (perhaps caused by chemical imbalance, etc.) depression, as it is experienced by youth, may be a rather fleeting or transitive experience. These findings echo the underlying principles of the Catalyst Model (Ferguson et al. 2008), which suggests that violent behavior results from a combination of genetic and social influences, and that stressful events catalyze violent or maladaptive behavior. Catalytic reactions occur faster and with greater likelihood in those who have a greater underlying propensity towards violence, etc. In this case, it can be observed that family and peer interactions are more potent social influences than violent media, and that those with prior depression are more at risk for depressive or maladaptive moods.

Regarding the second hypothesis, regarding curvilinear or dose dependent relationships between media violence exposure and mood symptoms, this hypothesis went largely unsupported as well except for heavy viewers of media violence and parent-rated anxiety. This result is consistent with other research (Ferguson 2014) which has found correlations

between reading "banned" books and internalizing symptoms in youth. However this finding is tempered against the observation that this was only one significant outcome among many tested. Further the relationship between media violence viewing, even heavy viewing, and prospective depression was negative (albeit non-significant). Thus, it remains unclear if consistent links exist between heavy media violence viewing and mood symptoms, particularly long-term.

Regarding the third hypothesis, that bullying victims may be particularly at risk for mood symptoms predicted by media violence exposure, results did not support this hypothesis. Results actually indicated a small protective relationship for concurrent depression, but this is again, only one outcome from several, and small in effect size. It is likely that our results differ from Weems et al. (2012) in that Weems and colleagues tested the impact of news disaster coverage rather than fictional media. It is probable that children process fictional media far different from realistic news coverage.

The absence of a clear relationship between violent media and mood symptoms in adolescents raises questions about why exposure to violent media has so little impact on mood, whereas exposure to violence in real-life can be mood impacting. It is possible that violent media, with its fantasy-based structure, is too detached from emotional processing, and that mood is more strongly influenced by continuous and emotionally salient social influences. It appears likely that the brain processes fictional and real-life violence differently. Future theories of media effects will do well to consider this observation. Theories such as UGT, which note the complex interchange between active media users and media experiences may be more fruitful than modeling based approaches.

The limitations of this study include its correlational nature, which limit any causal inferences, as well as its survey methodology; there is always risk of social desirable responding in self-repot studies. This study would also likely benefit from replications across different racial groups, and in different socioeconomic environments, to observe whether or not the same factors are consistently predictive of anxiety and depressive symptoms.

In conclusion, current results do not support the contention that violent media meaningfully impacts mental health symptoms in adolescents. This is likely because such media use is too distal to impact emotion, and most such media experiences are actively selected. We argue that future media effects theories would benefit from considering more differentiation between real-life and fictional exposures to violence. We hope that this study will contribute positively to ongoing debates on media violence effects.

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