J Youth Adolescence (2013) 42:109–122
DOI 10.1007/s10964-012-9803-6

EMPIRICAL RESEARCH

Not Worth the Fuss After All? Cross-sectional and Prospective Data on Violent Video Game Influences on Aggression, Visuospatial Cognition and Mathematics Ability in a Sample of Youth

Christopher J. Ferguson · Adolfo Garza · Jessica Jerabeck · Raul Ramos · Mariza Galindo

Received: 15 May 2012 / Accepted: 27 July 2012 / Published online: 9 August 2012

Abstract The United States Supreme Court's recent decision relating to violent video games revealed divisions within the scientific community about the potential for negative effects of such games as well as the need for more, higher quality research. Scholars also have debated the potential for violent games to have positive effects such as on visuospatial cognition or math ability. The current study sought to extend previous literature by using well-validated clinical outcome measures for relevant constructs, which have generally been lacking in past research. Cross-section data on aggression, visuospatial cognition, and math achievement were available for a sample of 333 (51.7 % female) mostly Hispanic youth (mean age = 12.76). Prospective 1-year data on aggression and school GPA were available for 143 (46.2 % female) of those youth. Results from both sets of analysis revealed that exposure to violent game had neither short-term nor long-term predictive influences on either positive or negative outcomes. A developmental analysis of the cross-sectional data revealed that results did not differ across age categories of older children, preadolescents or adolescents. Analysis of effect sizes largely ruled out Type II error as a possible explanation for null results. Suggestions for new directions in the field of video game research are proffered.

Keywords Video games · Aggression · Cognition · Child development · Adolescence

C. J. Ferguson (✉) · A. Garza · J. Jerabeck · R. Ramos · M. Galindo
Department of Psychology and Communication, Texas A&M International University, 5201 University Blvd., Laredo, TX 78041, USA
e-mail: CJFerguson1111@aol.com

Introduction

Beginning with their widespread availability in the 1970s, video games have been an issue of significant controversy within the general public and scholarly community. As early as 1983, the US Surgeon General speculated that video games (then mainly comprising titles such as Pac Man or Centipede) were one of the leading causes of family violence (Cooper and Mackie 1986). Debate has continued and arguably intensified in the scholarly community in recent years (e.g. Ferguson and Kilburn 2009; Gentile and Gentile 2008; Hall et al. 2011) often with considerable acrimony. Divisions also have opened between reviews of this literature by professional advocacy organizations, such as the American Psychological Association (2005) and the American Academy of Pediatrics (2009), that generally have supported the existence of negative effects, and independent government reviews in both the United States (Brown v EMA, 2011; US Department of Health and Human Services, 2001) and Australia (Australian Government Attorney General's Office, 2010) that have been less convinced by the existing research literature. The majority decision of the US Supreme Court considered the existing research unconvincing noting that "[t]hese studies have been rejected by every court to consider them, and with good reason: They do not prove that violent video games *cause* minors to *act* aggressively (which would at least be a beginning). Instead, '[n]early all of the research is based on correlation, not evidence of causation, and most of the studies suffer from significant, admitted flaws in methodology.'" The court also specifically noted weaknesses in common aggression measures stating that "[o]ne study, for example, found that children who had just finished playing violent video games were more likely to fill in the blank letter in 'explo_e' with a 'd'

(so that it reads 'explode') than with an 'r' ('explore'). App. 496, 506. The prevention of this phenomenon, which might have been anticipated with common sense, is not a compelling state interest." It is important to note that, although concerns about measures such as this dovetail with scholarly concerns (e.g. Kutner and Olson 2008), court justices are, by their own admission, not always the best arbiters of science. Comments about "common sense" are particularly likely to be perceived as naïve (Chabris and Simons 2010) given that common sense is particularly prone to both error and hindsight bias. Further, scholars and jurists typically use different standards of evidence when examining cause and effect (although this does not necessarily imply that current standards in social science are "correct" and court standards "incorrect" in this regard). Nonetheless, government reviews and scholarly concerns about existing research identify a compelling need for outcome research using more rigorous methodologies than often have been the case in the past.

Despite that much attention has focused on the potential negative influences of violent games, considerable attention also has focused on their potential positive influences particularly related to visuospatial cognition (e.g. Dye et al. 2009; Spence and Feng 2010). As with studies of aggression, this body of research comprises both correlational studies equating game play with increased cognition and processing, as well as randomized experiments. A meta-analytic review of this work found that it historically has been both more consistent and far larger in effect size than the aggression literature (Ferguson 2007), however this observation is tempered by acknowledgement of methodological limitations of this field as well (see below). It is important to note that this literature focuses on action games, which may or may not have violent content (Green and Bavelier 2006), although most of the experiments involved have used violent games. For reasons that are, as of yet, not well understood, shooter games (e.g. Call of Duty, Grand Theft Auto, Bioshock) appear to be particularly effective in this domain with some studies even generalizing this phenomenon to increase surgical performance among physicians (e.g. Rosser et al. 2007). Some evidence suggests that violent games may foster the ability in players to ignore or suppress distracting information in order to enhance attention and visuospatial processing (Mishra et al. 2011). In such a case, it may not be the violent content per se, but the pacing and fast action that comes with violent content that are more critical to the acquisition of such skills.

As with the aggression literature, the above conclusions are not without debate. A recent review of this research found that many of the studies suffer from similar flaws to that of the aggression research, such as the potential for demand characteristics and potentially poor matching of video games in experimental and control conditions in experiments and lack of well-validated outcome measures (Boot et al. 2011). Many measures used in cognition studies involve potentially interesting but non-clinical measures of visual scanning and selective attention. Although such outcomes can have value, their application to clinical constructs such as visuospatial intelligence remain unclear and largely untested. Despite this, discussions of this visuospatial effect often proceed in a manner so as to imply that playing action games can produce meaningful increases in cognition. Studies employing well-validated measures of clinically relevant cognition remain rare. In one recent experimental study (Valadez and Ferguson 2012), violent and non-violent video game conditions carefully matched on competitiveness, pace of action and difficulty were found to have little influence on either hostility or visuospatial cognition using a well-validated outcome instrument. Just as recent experimental work has suggested that competitiveness, not violent content, is a key variable in aggression studies (Adachi and Willoughby 2011), it may be that more carefully controlled experiments of visuospatial cognition may see less evidence for positive effects. Similarly, correlational and prospective studies that control better for confounding variables and that use better validated measures may help elucidate whether positive effects truly exist. Thus, we must be alert for the potential of methodology to confound results in both aggression and visuospatial cognition fields.

Methodological Issues That Reduce Confidence in Past Studies

As noted in the discussion above, much of the debate regarding whether violent games have positive or negative effects hinges upon the degree to which systematic methodological flaws introduced biases and confounds into the existing research. A noted, systematic confounds in aggression research have been identified by scholars (Adachi and Willoughby 2010; Ferguson 2010; Kutner and Olson 2008; Savage 2008; Sherry 2007), the Australian Government and the US Supreme Court. In many cases, these systematic errors persist despite being identified in the published literature as serious issues. Other scholars have argued that similar systematic biases may be at play in the literature on visuospatial cognition (Boot et al. 2011). Below we briefly highlight several of the major methodological issues that future research may wish to focus on improving. We focus on issues most pertinent to correlational/prospective/longitudinal designs given the focus of the current study.

Poorly Validated Outcome Measures

One of the issues that has been raised by scholars as an issue for video game violence research has been the use of poorly validated aggression measures (Ferguson and Kilburn 2009; Kutner and Olson 2008; Savage 2004). Put briefly here, it has been noted that much of the literature on video game violence has relied on measures that have not been clinically validated as indicators of real-world aggression, are often created ad-hoc, and lack standardization. This continues despite the fact that it has been known for some time that better validated measures of aggression that more closely measure the construct of interest tend to produce much weaker effects in media violence research (Paik and Comstock 1994). This finding has been confirmed by analyses of video game violence research (Ferguson and Kilburn 2009) wherein poorly validated and, particularly, non-standardized measures of aggression tend to produce much higher effects than do clinically validated standardized measures of aggression. This may be because, even acting in good faith, scholars may be able to select from among numerous potential outcomes those that most closely fit their a priori hypotheses, thus generating false positives. Simmons et al. (2011) recently addressed the issue of methodological flexibility and the potential generation of false positives in psychological science. It appears that this issue fits within this understanding. As such, it may be imperative for research of aggression to focus more exclusively on well-validated clinical measures such as the Child Behavior Checklist, particularly where such research often is generalized to clinically relevant aggression (i.e. youth violence) once communicated to the general public. Similarly, to date, studies of visuospatial cognition have tended to focus on laboratory measures that may not correspond well to real-life cognition (Boot, 2011), and there would be value in examining this issue using well-validated clinical measures of cognition as well.

Failure to Control for Important Confounding Variables

A second issue to get much attention has been the importance of controlling for potentially confounding variables that may result in spurious correlations between video game violence and aggression. For instance, related to media effects on teen sexual behavior, Steinberg and Monahan (2010) found that controlling for other ecological variables reduced media effects to non-significance. Within the field of video game violence, a small number of studies have attempted to use multivariate analyses of video game violence and other social risk factors to examine whether video game violence is a unique contributor to aggression. Most such studies have found that video game violence effects are reduced to non-significance once other social factors are controlled (e.g. Ferguson 2011; Ferguson et al., 2012; von Salisch et al. 2011; Wallenius and Punamäki 2008; Ybarra et al. 2008.) Unfortunately, despite the importance of controlling for genetic and evolutionary effects on aggression (Beaver et al. 2011), few studies are able to control for such variables. Willoughby et al. (2012) provide one contrast to this trend, with correlational links between video game violence and aggression persisting despite controlling for a host of other important variables. However, the authors argue that such links may be due to the competitiveness of such games rather than violent content (see Adachi and Willoughby 2011 or Przybylski et al. 2010 for experimental evidence along these lines). Sophisticated multivariate designs involving visuospatial cognition as outcomes are similarly very few in number.

Single Responder Bias

Briefly, the single responder bias involves a tendency for spuriously high correlations to result from attitudinal measures where a single responder replies to both the predictor and outcome measures (Baumrind et al. 2002). By pairing predictor and outcome measures for a single respondent, the respondent, consciously or unconsciously, may enter a response set and respond similarly to the two measures (e.g., spuriously inflating estimates of exposure to video game violence and aggressive behavior). This is generally overcome by collecting data from multiple respondents. It may be more difficult to collect data on multiple respondents for issues related to cognition, however, as both exposure to video games and visuospatial cognitive abilities are measured through the child/teen respondent. However, given that visuospatial tests involve cognition rather than attitudes, single responder bias effects may be less of a concern.

A Developmental Perspective

Much of the concern about video games, at least in the general public, focuses on the notion that children are particularly susceptible to the allegedly harmful effects of violent content. However, this has not been examined from a developmental perspective. For instance, the vast majority of research has been done on college students and what evidence exists, even taken on face value, suggests that the effects on children are far less than for college students. Given that most of the research and theory has been divorced from a developmental perspective (Kirsh 2003), it is unclear why these results are achieved as such. Why college students would be more susceptible to media effects is difficult to explain from a developmental

perspective, and it simply may be that college students are more often informed on media effects theories and thus able to hypothesis guess experiments. Further, the assumption that children are particularly vulnerable to media remains undemonstrated. Some scholars (e.g. Olson 2010) argue that children's interest in even violent entertainment is developmentally normal, wherein the use of such media allow children to explore their darker interests and fantasies in a developmentally healthy and harmless way. As such, there would be great value in examining the influence of video game violence across age groups, to examine for developmental differences in potential influence. As of yet, we are unaware of any research to have done so.

The Current Study

Given mixed results from previous studies and increasing demands for higher quality research from both government agencies and among scholars (e.g. Boot et al. 2011; Hall et al. 2011), the current study seeks to examine both positive and negative correlates of violent video game use in a sample of Hispanic majority youth. To date, Hispanic youth generally have been underrepresented in studies of video game violence. Furthermore, longer-term influences of video game violence on aggression and civic behaviors were examined in a subgroup of participants who volunteered for a prospective follow-up. This study improves upon previous studies by employing well-validated clinical outcomes measures, controlling for potential confounding variables and employing multiple respondents. Clinically validated measures of aggression, visuospatial cognition and academic achievement were employed in order to improve upon previous research designs. Data were collected from both youth and parents and multivariate analyses were employed to reduce the potential for spurious positive findings. Furthermore, we included developmental analysis of children across developmental age ranges.

In this article, we test several hypotheses. First, we test the hypothesis that exposure to violent video games will be correlated positively with aggressive behaviors in youth, both concurrently and prospectively one year later. Second, we test the hypothesis that exposure to violent video games will be correlated negatively with civic behaviors both concurrently and prospectively one year later. We note that both of these hypotheses are worded consistent with the "harm" view of exposure to violent video games, despite inconsistencies in past literature. Third, we test the hypothesis that exposure to violent video games will be correlated positively with visuospatial cognition both concurrently and prospectively one year later. Fourth, we test the hypothesis that exposure to violent video games will be correlated positively with mathematics both concurrently and prospectively one year later. Likewise, as with the aggression and civic behavior analyses, our hypotheses are worded such as to test for presumed links despite some debates within the scholarship. These hypotheses are worded to be consistent with the approach of null hypothesis significant testing, in testing the affirmative hypotheses (essentially testing the probability of a given set of data under the assumption that the null hypothesis is true, see Cohen 1994). In all cases, it is hypothesized that correlational and predictive relationships will remain after controlling for other relevant social variables such as family, peer and personality variables.

Methods

Participants

Participants in the current study included 333 youth between the ages of 10 and 17 ($M = 12.76$, $SD = 1.88$). Participants were approximately equal in regards to gender distribution (51.7 % female). The majority of participants were Hispanic (92.8 %) which is reflective of the local population from which the sample was drawn. Although a Hispanic majority sample represents a sample of convenience rather than a theoretically planned ethnicity sample, it is worth noting that most previous studies of video game violence have employed Caucasian heavy samples of convenience. As such, the current sample represents a broadening of the data pool to a historically underrepresented group.

Measures

With exceptions noted below, all materials used Likert-scale.

Video Game Violence Questionnaire

Child participants were asked to list their 3 favorite video games and rate how often they play the game. 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.). Each game had the time played multiplied by the violence rating, and this was summed across games. The ESRB system has been supported by the Federal Trade Commission (2009) and the Parent Teacher Association (2008) as effective and reliable. This general approach has been used with success in the past and has been found to be highly reliable and valid (Ferguson 2011; Olson et al. 2009). Coefficient alpha of this measure with the current sample was .83.

Delinquency Risk Factors

The Negative Life Events instrument is a commonly used and well validated measure of youth behaviors in criminological research (NLE; Paternoster and Mazerolle 1994) and includes the following scales used in this study as control variables:

Antisocial personality This scale is designed to include items related to long-term antisocial traits and beliefs which predict delinquency (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, etc.; alpha = .63). Research has indicated that this scale is a good predictor of juvenile delinquent behaviors (Paternoster and Mazerolle 1994). The alpha was lower than desired, but previous work has identified antisocial personality as a critical control variable (Ferguson 2011) and thus we retain it here. It is cautioned that the low alpha may truncate correlations between antisocial personality and outcome variables, but is unlikely to otherwise effect the analyses for other variables.

Family attachment This scale was designed to measure the degree to which youth spent time with or were helped by their family (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.; alpha = .80). As with the antisocial trait subscale, this scale has been found previously to predict resilience to juvenile delinquency (Paternoster and Mazerolle 1994).

Delinquent peers This scale is intended to measure exposure to peers who are involved in delinquent or illegal activity (e.g., How many of your close friends purposely damaged or destroyed property that did not belong to them, etc.; alpha = .84). Some past research has indicated that delinquent peers are one of the stronger social risk factors for aggression in youth (Ferguson et al. 2009).

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. It is used here to get a measure of conflict and aggression occurring between the primary caregiver and their spouse or romantic partners and thus a sense of the child's exposure to domestic violence. Subscales related to physical assaults (alpha = .83) and psychological aggression (alpha = .77) were used in the current study.

Child Depressive Symptoms

The withdrawal/depression scale of the *Child Behavior Checklist* (CBCL; Achenbach and Rescorla 2001) as measured through parental responses indicated child depressive symptoms. This scale has no item overlaps with the aggression/rule breaking scales described below. Coefficient alpha of the scale with the current sample was .73.

Parental Supervision

In order to examine the influence of parental monitoring and participation on children's video game playing behavior and media use a scale of 6 items was created to tap this construct. Sample items include "I use parental content blockers such as the V-chip for television, or parental controls on video game machines" and "I restrict my child from using video games or watching television shows with controversial content (violence, sexual themes, strong language)". Coefficient alpha for this scale was .80 with the current sample. This measure was newly designed for this study.

Parental Depressive Symptoms

Parents' severity of depressive symptoms was operationally defined as the total score on the Beck Depression Inventory-II. Only a single parent responded to this, typically the biological mother. The Beck Depression Inventory-II (BDI; Beck 1996) was used to measure depression symptoms in respondents. The BDI is a 21-item assessment of the severity of depressive symptoms for use in people ages 13 and over. In our study, the BDI had high internal consistency (Cronbach's $\alpha = .90$).

Clinically Relevant Aggression

Regarding mental health, youth's primary caregivers filled out the *Child Behavior Checklist* (CBCL, Achenbach and Rescorla 2001). The CBCL consists of parent report on problematic behaviors which may represent psychopathology. The CBCL is a well researched and validated tool for measuring behavioral problems in children and adolescents. These indices were used to indicate outcomes related to delinquency and aggressiveness. Alpha for rule-breaking with our sample was .76 with .87 for aggression.

Bullying

The Olweus Bullying Questionnaire (OBQ; Olweus 1996) was used to measure bullying behaviors perpetrated by the child participant in the current study. This measure is commonly used and well researched with high reliability

and validity reported. With the current sample, alpha was .79.

Delinquent Behavior

The NLE questionnaire described above, has a subscale related to *general delinquency* (e.g., How many times in the following year have you stolen something worth more than $50, etc.). Alpha for the delinquency scale was .89 with the current sample. As indicated above, these scales are widely used in criminological research and do not overlap in items with the predictor scales described above.

Civic Behaviors

A three item scale of civic involvement was developed based on the content domain used by Lenhart et al. (2008). These three items asked about frequency of involvement in volunteer activities, charitable causes and giving, and elections and electoral processes. Alpha for this scale with the current sample was .56. The low alpha is likely due to the relatively wide range of behaviors included. We have retained this as an outcome measure, nonetheless, understanding the potential for outcomes to be truncated due to the low reliability. This measure was newly designed for this study.

Wide Range Achievement Test-IV (WRAT)

The WRAT (Wilkinson and Robertson 2006) is a brief (15–20 min) achievement test for reading, spelling and math ability. This measure has demonstrated excellent reliability and validity in past research. Math achievement was included as an outcome to examine whether video game use might correlate highly with math achievement. Wilkinson and Robertson reported coefficient alphas and test–retest scores for math achievement at .70 and above, with alphas typically above .80, although varying by grade level, and test–retest with alternate forms a little lower but above .70.

Visuospatial Cognition

Visuospatial cognition was operationally defined as the standardized score of the matrices subscale on the Kaufman Brief Intelligence Test-II. The Kaufman Brief Intelligence Test-II (KBIT; Kaufman and Kaufman 2004) was used to measure visuospatial cognitive skills in participants. The matrices subtest consists of 46 multiple-choice type items. Participants must choose which of 6 possible answer choices best completes a 2 × 2, 2 × 3, or 3 × 3 matrix. These tasks involve mental imagery, visual attention and pattern recognition and visual manipulation and thus are a reliable index of visuospatial intelligence. As per standardized assessment procedures, raw scores were standardized across relevant age groups.

Statistical Analyses

Main analyses consisted of hierarchical multiple regression equations. Separate hierarchical multiple regressions were run for each of the outcome measures related to pathological aggression (parent and child versions of the combined CBCL aggression and rule-breaking scales, and dating violence), visuospatial cognition and academic achievement in math. Consistent with the recommendations of Simmons et al. (2011) we certify that these data analyses procedures were all pre-planned prior to running data analysis. In each case, gender, and child depressive symptoms level were entered on the first step, NLE variables (antisocial personality, family attachment and delinquent peers) were entered on the second step, CTS psychological aggression and physical assault were entered on the third step, parental supervision and parental depressive symptoms entered on the fourth step and exposure to video game violence entered on the fifth step. Interaction terms between antisocial traits and depressive symptoms and antisocial traits and exposure to violent games were added on a final step. These variables were centered prior to creating the interaction term. This hierarchy was designed theoretically to extend from most proximal variables outward (e.g. Bronfenbrenner 1979). Multicollinearity was examined using tolerance and VIF statistics and found to be acceptable in all cases. Highest VIF values were 2.0, and lowest tolerance values were .50.

1-Year Follow-Up

During the cross-sectional portion of the study, we asked whether participants would be willing to be contacted by phone a year later for a follow-up. Despite not offering incentives for the follow-up, a fair number of participating families did agree. In order to maximize the willingness of participants to agree to the follow-up without incentive, it was decided that a short phone follow-up would be the best recourse. This precluded reassessment with the WRAT and KBIT, which require written materials and which are more time intensive. The follow up reassessed for clinically validated aggressiveness as measured by the parent and youth self report versions of the CBCL, as well as civic behaviors. Youth also reported their current depressive symptoms using the youth self report version of the CBCL and also were reassessed for exposure to violent games at T2.

For the T2 assessment 143 children and families agreed to participate and had up-to-date contact information.[1] This group did not differ demographically from those children and families who did not participate in the follow up. The T1 outcome measures also were assessed using *t* test analyses to determine whether differences existed between those who were reassessed compared to those who did not volunteer or who were unavailable at T2. No differences were found between these groups, suggesting that there were no selective differences between volunteers and non-volunteers.

As with the cross-sectional portion of the study, outcomes (child and parent rated clinical aggressiveness and civic behaviors) were analyzed using hierarchical regressions. In each case, age, gender, the T1 outcome variable, and T2 child depressive symptom level were entered on the first step, NLE variables (antisocial personality, family attachment and delinquent peers) were entered on the second step, CTS psychological aggression and physical assault were entered on the third step, parental supervision and parental depressive symptoms entered on the fourth step and T1 exposure to video game violence entered on the fifth step. Interaction terms between antisocial traits and T2 depressive symptoms and antisocial traits and T1 exposure to violent games were added on a final step. VIF and tolerance statistics identified multicollinearity issues between the two family violence variables (physical assaults and psychological abuse) with VIF at approximately 3.0 and "bouncing beta" results for those variables in the subsequent outcomes related to aggression.[2] As such, psychological assaults as a variable was removed from the follow up assessment analysis. This did not affect the results for the other variables.

Results

Bivariate Correlations Between Video Game Violence and Outcomes at Time 1

In order to assess the basic bivariate association between exposure to video game violence and the seven outcomes, Pearson r correlations were run. For most outcomes, the correlations were non-significant: delinquency ($r = .05$), CBCL rule-breaking ($r = .04$), CBCL aggression ($r = -.06$), KBIT ($r = .02$) and bullying ($r = .09$). Only for civic behaviors ($r = .11$, $p < .05$) and the WRAT ($r = -.12$, $p < .05$) were bivariate correlations significant. Exposure to violent games is thus positively correlated with increased civic behavior but negatively correlated with math achievement. However these small correlations may be explained by other variables and, thus, it is important to consider multivariate analyses.

Hierarchical Multiple Regression Analyses at Time 1

As noted above, hierarchical multiple regression analyses were run for each outcome variable. Results are presented in Table 1.

For the criminal delinquency outcome variable, only parental supervision and influence was predictive of reduced delinquency ($\beta = -.13$). Bullying behaviors were predicted by antisocial personality traits ($\beta = .32$) and peer delinquency ($\beta = .33$) with family attachment acting as a protective factor ($\beta = -.11$). Parent rated rule breaking behavior was best predicted by male gender ($\beta = .13$), depressive symptoms ($\beta = .48$), antisocial personality traits ($\beta = .12$) and parental depression ($\beta = .14$). Parent rated aggressive behavior was best predicted by child depression ($\beta = .54$), parental depressive symptoms ($\beta = .16$) and family attachment as a protective factor ($\beta = -.12$). Civic behaviors were negatively predicted by family attachment ($\beta = -.19$), delinquent peers ($\beta = -.12$) and exposure to psychological aggression ($\beta = -.18$) in the family of origin. KBIT standardized scores were best predicted by both psychological aggression ($\beta = .20$) and physical assaults ($\beta = -.17$) in the family of origin as well as the interaction between antisocial traits and exposure to violent games ($\beta = .16$). WRAT scores in math achievement were not predicted by any of the included study variables.

Developmental Analysis at Time 1

Given that we had children and teens across a fairly wide age range, we saw value in examining developmental aspects of video game violence use and behavior. For these analyses we divided children across late childhood (age 10–11), preadolescence (12–13), and adolescence (14–17). This would allow us to examine developmental trends across developmental categories.

First, we considered the issue of exposure to violent video games. A one-way ANOVA was used to examine potential differences in exposure to video game violence across these age categories. However this analysis was

[1] The local community includes both a high number of federal government workers and migrant workers. Thus, relatively frequent changes in home (and thus telephone) status are more common than in other municipalities.

[2] Bouncing beta results occur when two collinear predictors produce spuriously high results in opposing directions. Such nonsensical results are often an indication of multicollinearity.

Table 1 Multiple regression results for seven outcome variables, cross-section outcomes

Predictor variable	Delinquency	Bullying	Rule-breaking	Aggression	Civic	KBIT	WRAT
Male gender	.04	−.09	.13 (.23,.02)*	.02	.06	.12	.04
Depressive symptoms	−.03	.06	.48 (.56,.39)*	.54 (.61,.46)*	.11	.03	−.02
Δ R^2	.00	.04*	.33*	.43*	.02*	.02	.00
Antisocial personality	.08	.32(.41,.22)*	.12 (.22,.01)*	.06	.00	.05	−.11
Family attachment	.04	−.11(−.21, − .01)*	−.06	−.12 (−.22, − .01)*	−.19 (−.29, − .09)*	.12	.02
Delinquent peers	.10	.33 (.42,.23)*	.05	.05	−.12 (−.22, − .01)*	−.09	−.02
Δ R^2	*.04**	*.34**	*.03**	*.04**	*.05**	*.02*	*.00*
CTS psychological agg.	−.11	−.02	.11	.04	−.18 (−.28, − .08)*	.20 (.30,.10)*	.13
CTS physical abuse	.10	−.01	−.02	−.06	.11	−.17 (−.27, − .07)*	−.09
Δ R^2	*.00*	*.00*	*.02**	*.00*	*.02**	*.02**	*.00*
Parental supervision	−.13 (−.23, − .02)*	.02	.04	−.02	−.04	−.05	−.09
Parental depression	.08	−.01	.14 (.24, .03)*	.16 (.26, .05)*	−.06	−.04	.02
Δ R^2	.02*	.00	.02*	.02*	.01	.00	.01
Video game violence	.02	.05	−.01	−.02	.07	.10	−.09
Δ R^2	*.00*	*.00*	*.00*	*.00*	*.00*	*.01*	*.01*
Antisocial/DS int.	.02	−.05	−.06	.08	.04	−.03	.12
Antisocial/VVG int.	.00	.08	.00	−.05	−.09	.16 (.26,.06)*	.01
Δ R^2	*.00*	*.01*	*.00*	*.00*	*.01*	*.03**	*.01*

Numbers in parentheses represent 95 % confidence interval for standardized regression coefficients. Confidence intervals included only for significant results. Italicized rows on the table represent steps in the regression model. Adjusted R^2 is reported for each step in the hierarchical models. *VVG* video game violence, *DS* depressive symptoms

* Statistical significance

non-significant F(2, 330) = 1.09, $p = .34$ indicating little difference in exposure to video game violence across late childhood and adolescence. Second we reran our regression analyses separately across the four age categories. Exposure to video game violence was not a significant predictor of either positive or negative outcomes for any age group. Taken together these results suggest that the influence of video game violence on children and teen's development across outcomes is both stable and negligible.

Bivariate Correlations at Time 2

Bivariate correlations between T1 and T2 exposure to violent video games were significant ($r = .33$, $p < .01$). This correlation was small, however, indicating considerable change and flexibility in children's patterns of game exposure over time. Bivariate correlations between T1 exposure to violent games and outcomes were non-significant for all T2 variables including child rated aggression ($r = -.09$), parent rated aggression ($r = .01$), civic behaviors ($r = -.06$) as well as the T2 depressive symptom variable ($r = -.11$). Bivariate T2 exposure to video game violence correlations similarly were non-significant for all T2 outcomes including child rated aggression ($r = -.01$), parent rated aggression ($r = .07$), civic behaviors ($r = .07$) as well as the T2 depressive symptom variable ($r = -.03$). Antisocial traits and T2 exposure to video game violence were also unrelated ($r = -.01$).

Hierarchical Multiple Regression Analyses at Time 2

Regression results are presented in Table 2. The best predictors of youth self-reported aggression on the CBCL at T2 were current (T2) depressive symptoms ($\beta = .31$) and antisocial traits ($\beta = .40$) as well as their interaction ($\beta = -.40$). For parent reported aggression on the CBCL only T1 aggression was a significant predictor of T2 aggression ($\beta = .56$) along with delinquent peers ($\beta = .24$). For civic behaviors, only T1 civic behaviors were predictive of T2 outcomes ($\beta = .34$).

Table 2 Multiple regression results for three outcome variables, prospective outcomes

Predictor variable	YSR aggression	Parent rated aggression	Civic
Age	.06	−.19	.13
Male gender	.08	−.06	.01
T2 depressive symptoms	.31 (.45, .15)*	.10	−.05
T1 outcome score	.23	.56 (.66, .44)*	.34 (.48,.18)*
Δ R^2	*.11**	*.22**	*.09*
Antisocial personality	.40 (.54, .24)*	.00	.26
Family attachment	.04	.16	.08
Delinquent peers	−.03	.24(.39, .08)*	−.16
Δ R^2	*.05*	*.08*	*.03*
CTS Physical abuse	−.02	−.16	.19
Δ R^2	*.00*	*.00*	*.01*
Parental supervision	−.10	−.19	.13
Parental depression	.04	−.04	.02
Δ R^2	*.02*	*.05*	*.01*
T1 Video game violence	.10	−.01	−.15
Δ R^2	.00	.00	.01
Antisocial/DS int.	−.40 (−.53, −/25)	−.22	−.01
Antisocial/VVG int.	−.06	−.18	−.17
Δ R^2	*.09**	*.04*	*.02*

Numbers in parentheses represent 95 % confidence interval for standardized regression coefficients. Confidence intervals included only for significant results. Italicized rows on the table represent steps in the regression model. Adjusted R^2 is reported for each step in the hierarchical models. *VVG* T1 Video Game Violence, *DS* T2 Depressive Symptoms, *YSR* Youth Self-Report on CBCL. T1 CBCL aggression was used as the control for the aggression outcomes, T1 civic behavior for the civic behavior outcome

* Statistical significance

Developmental Analysis at Time 2

We further examined developmental trends in stability of violence exposure. We examined the degree to which stability in exposure to video game violence from T1 to T2 varied across age categories. We found that stability in exposure to video game violence was similar across late childhood ($r = .35$, $p < .001$), preadolescence ($r = .29$, $p < .001$) and adolescence ($r = .34$, $p < .001$). Unfortunately given the smaller sample size in the prospective study, it was not possible to rerun our regression analyses as we had done with the cross-sectional portion of the study.

Discussion

Debate continues regarding the impact of violent video games on youth behavior, both in regards to aggression as well as cognitive performance. Scholars have expressed concern that many past studies have relied on flawed methodology including poorly validated outcome measures, failure to control for third variables and single responder bias (e.g. Boot et al. 2011; Hall et al. 2011; Kutner and Olson 2008; Sherry 2007). The current article adds to the current literature by conducting analyses correcting for these issues, using well-validated outcome measures, controlling for other important variables, using outcome data from parents and children and using a youth sample.

The current article describes two data timepoints from a sample of youth in a Hispanic majority city in the south. 333 youth were available for an original cross-sectional study, and 143 volunteered for a one-year follow up assessment despite no compensation being offered. Results from both the cross-sectional study and the prospective follow-up found little evidence for a relationship between video game violence use on either clinically significant aggression or civic behaviors. Cross-sectional data also suggested lack of a predictive relationship between exposure to video game violence and visuospatial cognition or math performance in youth. By contrast, behavioral outcomes generally were better predicted by internal factors such as antisocial traits and current depressive symptoms, or by family and peer influences. Cognitive outcomes were generally more difficult to predict reliably with the current data.

Despite the failure of exposure of violent video games to predict outcomes, other variables are worth noting. Regarding cross-sectional data, for the KBIT, exposure to violent video

game interacted with antisocial personality traits, such that increases in KBIT scores tended to occur in association with both greater antisocial traits and greater exposure to violent games, but this relationship did not hold for non-antisocial youth. As for aggression, although results varied somewhat across specific outcomes, in general, the best predictors of aggression related outcomes were internal variables such as antisocial traits or depressive symptoms, as well as family and peer influences. Similar effects were found for civic behaviors, although unexpectedly civic behaviors were associated negatively with family attachment. We suggest that this is most likely due to the items for family attachment involving time spent together. A zero-end sum game for time may have occurred for these two variables, with time spent on family activities detracting from available time for civic involvement and vice versa.

Results in the prospective follow-up were similar. As with the cross-sectional results, exposure to video game violence was not predictive of either aggressive or civic behavior outcomes prospectively. Aggressive behavior was best predicted by antisocial traits or depressive symptoms (for child rated behavior) or delinquent peers. Civic behavior proved harder to predict long-term, with only previous civic behavior predictive of outcome. These results are consistent with results of previous research indicating that long-term prediction of clinically significant youth aggression can be difficult (Ferguson 2011).

We note that the effect sizes for the relationship between exposure to video game violence and time 2 outcomes were all very small, even for bivariate outcomes. Further, the effect sizes demonstrated no trend suggesting even very small effects on aggression in a "harm" related direction. All effects appear to be both trivial in size and randomly distributed around the zero point. Therefore, the likelihood of the results described here being due merely to Type II error is negligible.

In general, these results support previous concerns expressed by scholars that the influence of violent video games, whether negative or positive, may be far more minimal than previously had been thought (Boot et al. 2011; Kutner and Olson 2008; Sherry 2007; von Salisch et al. 2011). Several scholars now have expressed concerns that the research on both aggression (e.g. Hall et al. 2011a; Kutner and Olson 2008; Sherry 2007) and visuospatial cognition (Boot et al. 2011; Valadez and Ferguson 2012) had become orthodox with scholars demonstrating great preference for "statistically significant" rather than null findings. To some extent, this can be seen as a product of the methodological flexibility issue in psychology more broadly (Simmons et al. 2011; Lebel and Peters 2011), which allows for researchers to potentially select data management and analysis methods that produce outcomes that best fit their a priori hypothesis at the expense of methods that produce null results. We note that this does not necessarily imply bad faith on the part of scholars, rather simple human bias. Indeed, scholars who have addressed this issue acknowledge it as a widespread and largely good-faith problem. However, given the particular political atmosphere involving video game violence, this field may have been particularly prone to confirmation bias and theoretical orthodoxy and rigidity. Unfortunately, such orthodoxy has arguably done much damage to the credibility of this field (Hall et al. 2011).

Video Game Violence Use from a Developmental Perspective

Much of the debate on exposure to video game violence, particularly in the general public and in legal cases, has focused on the preconception that children and teens are particularly impressionable to allegedly harmful media content. Interestingly, social cognitive theories of media exposure do not necessarily make such distinctions, however, implying that similar cognitive processes are at work for all individuals regardless of developmental age (Ferguson and Dyck 2012; Kirsh 2003). Thus, much of the scholarly debate appears to have avoided developmental issues, despite that these are central to the debates in the general public.

That having been said, although the notion of developmental vulnerability is implicit in much of the concern, evidence for such vulnerability has remained absent. As Sherry (2001) has noted, even taken at face value, effects for children in the research were lower than for college students (we argue this may be due to college students' often being aware of the underlying theories and thus more prone to demand characteristics and hypothesis guessing). Furthermore, Olson (2010) has argued that interest in video games including those with violent content is developmentally appropriate for children, particularly males, who need fantasy outlets to explore dark topics in a healthy manner. Lenhart et al. (2008) find that such interest appears to be part of normal, healthy social development in teens. It has been observed (e.g. Ferguson, 2010) that children throughout history have been interested in violent entertainment of one form or another, suggesting a normative developmental process.

Thus, beliefs in harmful media violence effects largely have depended upon cognitive theories removed from a developmental perspective, which nonetheless fed into preconceived notions about developmental weaknesses in youth, preconceived notions which have not been borne out through empirical research (Ferguson and Dyck 2012). It may be helpful for scholars to reconsider the theoretical perspective from which media effects research is conducted (Gill 2012). Specifically, it may be time to replace

social cognitive theories that presume media as something *done to* youth (Gill 2012) and instead focus on more subtle and sophisticated understanding of the processes, developmental and otherwise, which lead youth to be attracted to specific media. The uses and gratifications perspective (Sherry et al. 2006) may be a particularly effective replacement for social cognitive theories. Uses and gratifications suggest that media use is an active process by which individual consumers select media to watch in accordance with their own motivations and what they seek to get or achieve from watching media. Such a perspective is easily considered from a developmental perspective, with the understanding that children seek out media that fits their interests, motivations, internal drives or what they hope to learn. Thus, uses and gratifications theory may lead to a more sophisticated analysis of media effects whereby consumers, including children, are an active driving force in media effects, rather than merely a passive recipient (Ferguson and Dyck 2012; Gill 2012).

Moving Forward with Video Game Research

In general, both from our own research, and from a broader view of the field, we suggest that it is becoming increasingly apparent that the influences of video games, whether violent or not, upon society are more minimal that previously thought, aside from their aesthetic merits. For example, although societal data are just one form of data and should not be considered in isolation, behavioral indicators for youth including the commission violent crime, have improved vastly during the video game era, not declined (Childstats.gov 2011). We do not conclude that video games are responsible for these behavioral improvements, far from it. But we do look to these data as well as those from the increasingly inconsistent research field as an indication that it may be time for video game researchers to reassess how they approach the scientific process.

First, we note that there has been a tendency for both society and the scholarly community to view video games as something that is *done to* youth. In the scholarly community, this probably fits well with standard social science models of behavior that historically have emphasized learning and automatic processes (Pinker 2002). It may be time to reevaluate such mechanistic views of behavior. Rather, we suggest that the interaction between both youth and adults and aesthetic expressions in all forms are far more subtle and active (that is directed by the consumer, not the media) than often expressed in social science (Markey and Markey 2010; Rentfrow et al. 2011). We suggest that it may be time to replace more passive social-cognitive and other automatic process models of media effects with those that emphasize the active and motivational (e.g. Ryan et al. 2006) elements of video game engagement.

Second, we also note a tendency in society and the scholarly community, whether intentional or not, to dichotomize games as "violent" or "prosocial," which we further regard as an error. Although there certainly are some violent games with no redeeming social value, many violent games involve prosocial themes of heroism, love, honor, sacrifice, bravery and teamwork (Ferguson and Garza 2011). Once again, we suspect this is an issue of oversimplification, presuming that media effects are easily broken down into distinct categories with clear effects. We suggest that the time has come for the scholarly community to discard such a simplistic approach to categorizing games, as well as in general to reconsider the broad strokes "violent entertainment is always harmful" view that has implicitly underlay media violence research for decades.

Third, we note that, historically, models of media effects have failed to carefully distinguish fictional from non-fictional media. However, research has been indicating that children begin to develop the ability to distinguish reality from fantasy early on (Boerger et al. 2009; Woolley and van Reet 2006). Naturally, this is not an ability that comes on as a light switch; it is one that develops across childhood and perhaps into adulthood, yet it is an overlooked developmental process. It is perhaps most dramatically demonstrated in children's belief in Santa Claus (in Western cultures at least). Despite not only their parents but the entire society effectively deceiving children about the existence of Santa Claus (including red herring "evidence" such as old men in Santa suits at the mall), most children are able to reason out the fantastical nature of his existence by the mid-elementary years. Thus, there are good reasons to suspect that the influences of fictional versus ostensibly non-fictional media (such as advertising) may be far different. We suggest that future research consider these developmental processes when considering media effects. Once again, we suspect that they argue against pronounced automatic processes.

Limitations and Conclusions

As with all research, the current study has limitations. Most pronounced, to our own mind, were the limitations during the prospective analysis. Given that our study is unfunded, we did not have the infrastructure necessary to make home visits to reassess the KBIT and WRAT, in particular. Obviously there would be great value in longitudinally studying the effects of violent games on visuospatial cognition and academic achievement. However, the present study was unable to achieve this. Further, the data

discussed in the present study are correlational, and causal inferences should not be drawn from our results. Several measures (antisocial personality and civic behaviors) had relatively low reliability and the potential remains that outcomes involving these measures may be truncated. The exposure to video game violence measure employed here, while improving on past efforts, nonetheless does not pick up on the nuances of game play and exposure to violent content. It is increasingly being recognized that simply measuring exposure to media content is not a very sophisticated way of understanding media use. The current study was designed to examine the direct exposure hypothesis, although future research employing more sophisticated measures of video game use and user experiences would be highly welcome.

In conclusion, the current study found no evidence that video game violence is predictive of either positive or negative outcomes in youth. Exposure to video game violence did not predict either aggressive behaviors or cognitive outcomes in correlational data, or aggressive outcomes or civic behaviors in prospective analyses. Developmental analyses suggested that patterns in exposure to video game and their influence are stable across the developmental stages considered in the current article. Although past literature has been mixed, these findings fit with past literature suggesting that video game influences on youth are minimal (e.g. Kutner and Olson 2008), and extending this to cognitive outcomes as well as prospective analyses of aggression and civic behaviors. As such, results from this article offer further cautionary note that the purported influences of video game violence, both positive and negative, may be at risk of being over-reported (Hall, Day and Hall, 2011).

References

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for ASEBA school-age forms & profiles*. Burlington, VT: University of Vermont.

Adachi, P. C., & Willoughby, T. (2010). The effect of violent video games on aggression: Is it more than just the violence? *Aggression and Violent Behavior*. doi:10.1016/j.avb.2010.12.002.

Adachi, P. C., & Willoughby, T. (2011). The effect of video game competition and violence on aggressive behavior: Which characteristic has the greatest influence? *Psychology of Violence, 1*(4), 259–274. doi:10.1037/a0024908.

American Academy of Pediatrics. (2009). Media violence policy statement. *Pediatrics, 124*(5), 1495–1503.

American Psychological Association. (2005). *Resolution on violence in video games and interactive media.* Retrieved 7/3/11 from: http://www.apa.org/about/governance/council/policy/interactive-media.pdf.

Australian Government, Attorney General's Department. (2010). *Literature review on the impact of playing violent video games on aggression*. Commonwealth of Australia.

Baumrind, D., Larzelere, R., & Cowan, P. (2002). Ordinary physical punishment: Is it harmful? Comment on Gershoff (2002). *Psychological Bulletin, 128*(4), 580–589. doi:10.1037/0033-2909.128.4.580.

Beaver, K. M., Barnes, J. C., May, J. S., & Schwartz, J. A. (2011). Psychopathic personality traits, genetic risk, and gene-environment correlations. *Criminal Justice And Behavior, 38*(9), 896–912. doi:10.1177/0093854811411153.

Beck, A. (1996). *Beck depression inventory II – manual*. San Antonio, TX: Psychological Corporation.

Boerger, E. A., Tullos, A., & Woolley, J. D. (2009). Return of the Candy Witch: Individual differences in acceptance and stability of belief in a novel fantastical being. *British Journal Of Developmental Psychology, 27*(4), 953–970. doi:10.1348/026151008X398557.

Boot, W., Blakely, D., & Simons, D. (2011). Do action video games improve perception and cognition? *Frontiers in Psychology, 2*, 226. doi:10.3389/fpsyg.2011.00226.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.

Brown v EMA. (2011). Retrieved 7/1/11 from: http://www.supremecourt.gov/opinions/10pdf/08-1448.pdf.

Chabris, C., & Simons, D. (2010). *The invisible gorilla: And other ways our intuitions deceive us*. New York, NY USA: Crown Publishers/Random House.

Childstats.gov. (2011). *America's children: Key national indicators of well-being, 2010.* Retrieved 7/1/11 from: http://www.childstats.gov/.

Cohen, J. (1994). The earth is round ($p < .05$). *American Psychologist, 49*(12), 997–1003. doi:10.1037/0003-066X.49.12.997.

Cooper, J., & Mackie, D. (1986). Video games and aggression in children. *Journal of Applied Social Psychology, 16*, 726–744.

Dye, M. G., Green, C., & Bavelier, D. (2009). Increasing speed of processing with action video games. *Current Directions in Psychological Science, 18*(6), 321–326. doi:10.1111/j.1467-8721.2009.01660.x.

Federal Trade Commission. (2009). *Marketing violent entertainment to children*. Retrieved 3/14/10 from: http://www.ftc.gov/os/2009/12/P994511violententertainment.pdf.

Ferguson, C. J. (2007). The good, the bad and the ugly: A meta-analytic review of positive and negative effects of violent video games. *Psychiatric Quarterly, 78*, 309–316.

Ferguson, C. J. (2010). Blazing Angels or Resident Evil? Can violent video games be a force for good? *Review of General Psychology, 14*(2), 68–81.

Ferguson, C. J. (2011). Video games and youth violence: A prospective analysis in adolescents. *Journal of Youth and Adolescence, 40*(4), 377–391.

Ferguson, C. J., & Dyck, D. (2012). Paradigm change in aggression research: The time has come to retire the General Aggression Model. *Aggression And Violent Behavior, 17*(3), 220–228. doi:10.1016/j.avb.2012.02.007.

Ferguson, C. J., & Garza, A. (2011). Call of (civic) Duty: Action games and civic behavior in a large sample of youth. *Computers in Human Behavior, 27*, 770–775.

Ferguson, C. J., & Kilburn, J. (2009). The Public health risks of media violence: A meta-analytic review. *Journal of Pediatrics, 154*(5), 759–763.

Ferguson, C. J., San Miguel, C., Garza, A., & Jerabeck, J. (2012). A longitudinal test of video game violence influences on dating and aggression: A 3-year longitudinal study of adolescents. *Journal of Psychiatric Research, 46*(2), 141–146. doi:10.1016/j.jpsychires.2011.10.014.

Ferguson, C. J., San Miguel, C., & Hartley, R. D. (2009). A multivariate analysis of youth violence and aggression: The

influence of family, peers, depression and media violence. *Journal of Pediatrics, 155*(6), 904–908.
Gentile, D. A., & Gentile, J. (2008). Violent video games as exemplary teachers: A conceptual analysis. *Journal of Youth and Adolescence, 37*(2), 127–141. doi:10.1007/s10964-007-9206-2.
Gill, R. (2012). Media, empowerment and the 'sexualization of culture' debates. *Sex Roles, 66*(11–12), 736–745. doi:10.1007/s11199-011-0107-1.
Green, C. S., & Bavelier, D. (2006). Enumeration versus multiple object tracking: the case of action video game players. *Cognition, 101*, 217–245.
Hall, R., Day, T., & Hall, R. (2011). A plea for caution: violent video games, the supreme court, and the role of science. *Mayo Clinic Proceedings, 86*(4), 315–321.
Kaufman, A. S., & Kaufman, N. L. (2004). *Kaufman brief intelligence test* (2nd ed.). Bloomington, MN: Pearson.
Kirsh, S. J. (2003). The effects of violent video games on adolescents: The overlooked influence of development. *Aggression And Violent Behavior, 8*(4), 377–389. doi:10.1016/S1359-1789(02)00056-3.
Kutner, L., & Olson, C. (2008). *Grand theft childhood: The surprising truth about violent video games and what parents can do*. New York: Simon & Schuster.
LeBel, E. P., & Peters, K. R. (2011). Fearing the future of empirical psychology: Bem's (2011) evidence of psi as a case study of deficiencies in modal research practice. *Review Of General Psychology, 15*(4), 371–379. doi:10.1037/a0025172.
Lenhart, A., Kahne, J., Middaugh, E., MacGill, A., Evans, C., & Mitak, J. (2008). *Teens, video games and civics: Teens gaming experiences are diverse and include significant social interaction and civic engagement.* Retrieved 7/2/11 from: http://www.pewinternet.org/PPF/r/263/report_display.asp.
Markey, P. M., & Markey, C. N. (2010). Vulnerability to violent video games: A review and integration of personality research. *Review of General Psychology, 14*(2), 82–91. doi:10.1037/a0019000.
Mishra, J., Zinni, M., Bavelier, D., & Hillyard, S. A. (2011). Neural basis of superior performance of action videogame players in an attention-demanding task. *The Journal of Neuroscience, 31*(3), 992–998. doi:10.1523/JNEUROSCI.4834-10.2011.
Olson, C. K. (2010). Children's motivations for video game play in the context of normal development. *Review of General Psychology, 14*(2), 180–187. doi:10.1037/a0018984.
Olson, C., Kutner, L., Baer, L., Beresin, E., Warner, D., & Nicholi, A. (2009). M-rated video games and aggressive of problem behavior among young adolescents. *Applied Developmental Science, 13*(4), 1–11.
Olweus, D. (1996). *The revised olweus bully/victim questionnaire*. Bergen, Norway: University of Bergen.
Paik, H., & Comstock, G. (1994). The effects of television violence on anti-social behavior: A meta-analysis. *Communication Research, 21*, 516–546.
Parent Teacher Association. (2008). *ESRB and PTA launch new national campaign to educate parents about game ratings, parental controls and online video game safety.* Retrieved 3/14/10 from: http://www.pta.org/2787.htm.
Paternoster, R., & Mazerolle, P. (1994). General strain theory and delinquency: A replication and extension. *Journal of Research in Crime and Delinquency, 31*(3), 235–263.
Pinker, S. (2002). *The blank slate: The modern denial of human nature*. New York, NY: Penguin.
Rentfrow, P. J., Goldberg, L. R., & Zilca, R. (2011). Listening, watching, and reading: The structure and correlates of entertainment preferences. *Journal of Personality, 79*(2), 223–258. doi:10.1111/j.1467-6494.2010.00662.x.
Rosser, J., Lynch, P., Caddihy, L., Gentile, D., Klonsky, J., & Merrell, R. (2007). The impact of video games on training surgeons in the 21st century. *Archives of Surgery, 142*, 181–186.
Ryan, R. M., Rigby, C., & Przybylski, A. (2006). The motivational pull of video games: A self-determination theory approach. *Motivation And Emotion, 30*(4), 347–363. doi:10.1007/s11031-006-9051-8.
Savage, J. (2004). Does viewing violent media really cause criminal violence? A methodological review. *Aggression and Violent Behavior, 10*, 99–128.
Savage, J. (2008). The role of exposure to media violence in the etiology of violent behavior: A criminologist weighs in. *American Behavioral Scientist, 51*, 1123–1136.
Sherry, J. (2001). The effects of violent video games on aggression: A meta-analysis. *Human Communication Research, 27*, 409–431.
Sherry, J. (2007). Violent video games and aggression: Why can't we find links? In R. Preiss, B. Gayle, N. Burrell, M. Allen, & J. Bryant (Eds.), *Mass Media Effects Research: Advances Through Meta-analysis* (pp. 231–248). Mahwah, NJ: L. Erlbaum.
Sherry, J. L., Lucas, K., Greenberg, B. S., & Lachlan, K. (2006). Video game uses and gratifications as predicators of use and game preference. In P. Vorderer, J. Bryant, P. Vorderer, J. Bryant (Eds.), *Playing video games: Motives, responses, and consequences* (pp. 213–224).
Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology: Undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological Science, 22*(11), 1359–1366. doi:10.1177/0956797611417632.
Spence, I., & Feng, J. (2010). Video games and spatial cognition. *Review of General Psychology, 14*(2), 92–104. doi:10.1037/a0019491.
Steinberg, L., & Monahan, K. C. (2010). Adolescents' exposure to sexy media does not hasten the initiation of sexual intercourse. *Developmental Psychology,*. doi:10.1037/a0020613.
Straus, M., Hamby, S., & Warren, W. (2003). *The conflict tactics scales handbook*. Los Angeles, CA: WPS.
U.S. Department of Health and Human Services. (2001). *Youth violence: A report of the Surgeon General.* Retrieved 3/20/09 from: http://www.surgeongeneral.gov/library/youthviolence/report.html.
Valadez, J. J., & Ferguson, C. J. (2012). Just a game after all: Violent video game exposure and time spent playing effects on hostile feelings, depression, and visuospatial cognition. *Computers in Human Behavior, 28*, 608–616.
von Salisch, M., Vogelgesang, J., Kristen, A., & Oppl, C. (2011). Preference for violent electronic games and aggressive behavior among children: The beginning of the downward spiral? *Media Psychology, 14*(3), 233–258. doi:10.1080/15213269.2011.596468.
Wallenius, M., & Punamäki, R. L. (2008). Digital game violence and direct aggression in adolescence: a longitudinal study of the roles of sex, age, and parent-child communication. *Journal of Applied Developmental Psychology, 29*, 286–294.
Wilkinson, G. S., & Robertson, G. J. (2006). *Wide range achievement test 4 professional manual*. Lutz, FL: Psychological Assessment Resources.
Willoughby, T., Adachi, P. C., & Good, M. (2012). A longitudinal study of the association between violent video game play and aggression among adolescents. *Developmental Psychology, 48*(4), 1044–1057. doi:10.1037/a0026046.
Woolley, J., & Van Reet, J. (2006). Effects of context on judgments concerning the reality status of novel entities. *Child Development, 77*, 1778–1793.
Ybarra, M., Diener-West, M., Markow, D., Leaf, P., Hamburger, M., & Boxer, P. (2008). Linkages between internet and other media violence with seriously violent behavior by youth. *Pediatrics, 122*(5), 929–937.

Author Biographies

Christopher J. Ferguson is a clinical psychologist and department chair of Psychology and Communication at Texas A&M International University. His main research focus is on causes of violent behavior, including video games and other media. His first novel, *Suicide Kings*, was published in 2012.

Adolfo Garza is a graduate student in the counseling psychology program at Texas A&M International University. He has worked on several past projects related to video game violence as well as media impact on body image in teenage girls.

Jessica Jerabeck is a graduate student in the general psychology program at Texas A&M International University. She has been involved in both longitudinal and experimental work on violent video game effects on player aggression.

Raul Ramos is an undergraduate student at Texas A&M International University. His recent student thesis work considered the effects of violent television shows on viewer empathy. He intends to attend medical school in the future.

Mariza Galindo is an undergraduate student at Texas A&M International University. She has been an instrumental part of several projects considering video game influences on behavior. She recently attended a study abroad class in Forensic Psychology taught in London.