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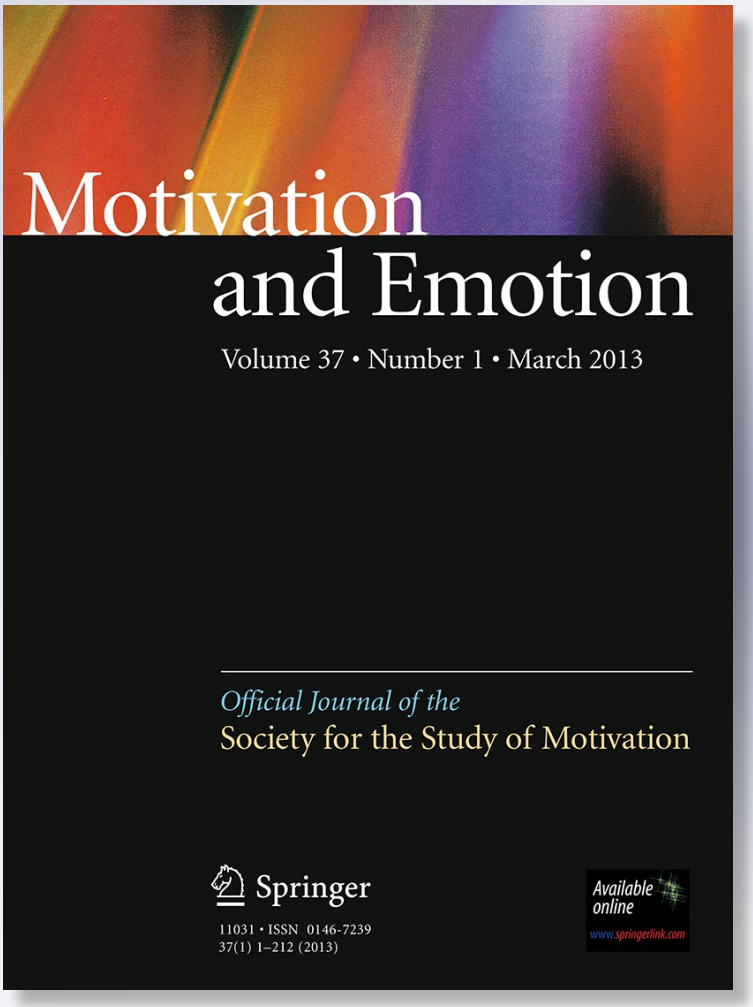

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ORIGINAL PAPER

Friends, fun, frustration and fantasy: Child motivations for video game play

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Abstract Although a considerable amount of attention has examined potential positive and negative consequences of video game play in children, relatively little research has examined children's motivations for using games. The current study hopes to address this gap in the literature by examining children's motivations for video game play in a large sample of youth ($n = 1254$). Results indicated that video game use was common, and often a social activity. Social play was mainly predicted by motivations related to socialization, fun/challenge and current stress level. Preference for violent games was more common in males and predicted by fun/challenge motivations and beliefs such games could be cathartic for stress. Children with clinically elevated levels of depressive and ADHD symptoms did not play more games, or more violent games, but were more inclined to endorse catharsis motivations for video game use. Results from this study provide understanding of what motivates children to use games, and how the motivations of children with symptoms of psychosocial problems (as identified via subscales of the Pediatric Symptom Checklist) may differ from others.

Keywords Self determination · Adolescence · Computer games · Video games · Mental health

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Introduction

Since the advent of simple games such as "Pong" in the 1970s, video games have soared in popularity as a youth pastime. Surveys of young people consistently show that most play video games at least occasionally, and many—especially boys—do so almost daily (Desai et al. 2010; Ferguson et al. 2009; Olson et al. 2007). Electronic games are now as much a part of our cultural and economic life as are films and books. For example, in late 2010, the game *Call of Duty: Black Ops* took in over $650 million worldwide in its first 5 days of release, several times more than the top-grossing movie, *The Dark Knight* (Bilton 2010). A number of scholars have explored, and sometimes vigorously debated, the potential positive and negative influences of video games (see Ferguson 2010a for an overview). It's clear that males are more likely than females to select violent games (Ferguson et al. 2009; Olson et al. 2007). However, little is known about why children decide to play video games, and why they opt to spend time with certain types of games. The current article is meant to address some of these gaps in the literature by examining motivations for video game play in a large sample of youth.

Most available studies involving children have focused on psychological and health factors associated with video game play. For instance, Willoughby (2008) found relatively few differences between frequent and infrequent gamers in friendship quality, parental relationships or general well-being, although frequent gamers were slightly less academically oriented ($\beta = .04$). Desai et al. (2010) similarly found few mental health correlates to video game use among youth, although a small percentage of youth reported difficulty managing urges to play and needing to play to relieve tension (4.9%). Desjarlais and Willoughby

(2010) found video game and computer use among youth to be positively associated with friendship quality, particularly among socially anxious boys, suggesting that socialization may be one motivation for video game use among youth. Relatively little research has examined children's specific motivations for video game play, however.

Motivational models of video game play

Some research has examined the motivation for video game use among young adults. Przybylski et al. (2010) present a motivational model for video game play, itself based on several empirical studies (Przybylski et al. 2009; Ryan et al. 2006). Grounded in self-determination theory, this approach suggests that motivations for video game play are related to their potential to satisfy basic psychological needs related to competence, autonomy and socialization. From this perspective, video game use or exposure is not something that is *done to* individual players, but rather is internally motivated and directed. Westwood and Griffiths (2010) similarly found that video games fell within several distinct motivational categories, including those motivated by the storyline of the game, or by opportunities for socialization. This approach is fairly consistent with the views of other scholars who have argued that video game play can meet basic developmental needs in children (Olson 2010) or that games such as massively multiplayer on-line games (MMOs) provide basic socialization needs (Barnett and Coulson 2010). Yee (2006), in his work with on-line adult gamers similarly found motivations to fall within three overarching components (achievement, socialization, immersion).

Motivations for video game play

As noted above self-determination theory (Przybylski et al. 2010) presents the most comprehensive model currently for understanding video game play. As applied to video games this theoretical model suggests that video games play may present opportunities for meeting basic human needs whether or not these needs are easily met within the real world. Competence needs may be seen as general needs to have fun, achieve victories and successes and be good at something. Social relatedness needs suggest that video games may provide opportunities for individuals to connect socially through game play, much as through other play activities. This conflicts with the common stereotype of gaming (particularly among non-gamers) as socially limiting and isolating, yet is well supported by data on youth suggesting that video game use tends to be highly social (Lenhart et al. 2008). The autonomy need suggests that individuals may use video games as an outlet where they may feel as if they have some control and, indeed, even powerful, perhaps in ways that are not possible in the real world.

To some degree, it could easily be argued that the autonomy need, in particular, may fit within the view of catharsis, in which individuals turn to video games to reduce stress, or meet needs for control not met in their real lives. Given that theories about video game related behavior have generally focused on social learning or social cognitive perspectives, acceptance of catharsis has been met with hostility in much of the scholarly community (Sherry 2007) although most of the discussion has focused on aggression (see Ferguson 2010a) rather than on a general reduction of stress or sadness. Motivations for playing violent video games may be understood in this context, with players seeking out violent games as a means of stress reduction. From this it would be expected that stressed, unhappy or individuals with mental health symptoms would be more inclined to use video games with the motivation of reducing stress. There is some evidence that violent games may be effective in this realm. For instance Ferguson and Rueda (2010) found that individuals who played greater amounts of violent games were better able to handle stress tasks in a laboratory setting. Allahverdipour et al. (2010) similarly found that moderate young gamers tended to have the best mental health outcomes, better than either non-gamers or excessive gamers.

The impact of other variables

Although the intrinsic motivational factors that lead children to select video game play, or play of violent games specifically is a central interest of this paper, it is unlikely that such motivations arise in a vacuum, independent of other social factors. Perhaps the most consistent finding in video game research is that boys play more video games, and are more likely to select violent games than girls (Lenhart et al. 2008; Olson et al. 2007). This gender difference may reflect biological and evolutionary differences between males and females, in which males are more drawn to action oriented outlets. These consistent findings argue for the basic inclusion of gender as a control variable in all research involving video games.

Other research has identified family influences as central to the relationship between video games, motivation and behavioral outcomes. For example, Ferguson and Garza (2011) found that children who played violent games along with their parents had the most positive outcomes related to prosocial and civic behaviors in relation to non-gamers or children who played violent games alone. As such it may be of particular importance to consider family input variables as a further control variable routinely in video game research.

Comparatively little research has examined individual differences in motivations for video game play. For example individuals who are experiencing stress or mental health difficulties may be particularly motivated by the intent to reduce stress through media use. This motivation is generally termed "mood management" For instance Reinecke (2009) identified that a subgroup of players play video games more after stressful events in belief that the games will help them reduce stress. Tested experimentally, prior research suggests that video game use is effective in reducing stress including autonomic nervous system activity and increasing positive mood (Russoniello et al. 2009), and individuals with prior violent video game use histories handle stressful tasks with less hostility and depression (Ferguson and Rueda 2010). With these data in mind there is value in examining whether children with mental health issues may be differently motivated in their video game use in comparison with other children. As of yet this question has not received much scholarly attention.

Why is it important to understand children's motivations for video game play

As noted earlier, most of the research on video games and children has focused on the potential for video games to have deleterious effects particularly in the realm of aggression.[1] This body of research, though always controversial, culminated in statements by the American Psychological Association (2005) linking violent game play with increased aggression. However, other scholars warned that the research to support such links was neither as high quality or consistent as advertized and that the scholarly community may ultimately sacrifice credibility on a quixotic quest to conclude links exist despite evidence to the contrary (e.g., Hall et al. 2011). These concerns proved prescient when the conclusions of the APA were thoroughly repudiated as unconvincing during a recent decision on a video game regulation law by the US Supreme Court (Brown v EMA 2011) as well as in a review of the literature by the Australian Government (2010) and more recently by the Swedish Government (2011). Some scholars (e.g., Ferguson 2010a, b; Hall et al. 2011; Savage 2008) have expressed the concern that the psychological community essentially put the cart before the horse, pursuing an advocacy goal to demonize violent games without pursuing a careful and objective course of scientific inquiry in advance of formulating rigid beliefs in this regard. Concerns over video games are not limited to violence, but also to more general effects on mental health, academics, pathological use (i.e., addiction), etc., all areas of great controversy and potential for advocacy to take the place of good science (Barnett and Coulson 2010).

Given these issues and the recent loss of credibility to much of the video game research field, there is arguably great value in taking a step back and attempting to understand the phenomenon of video game playing from a "ground up" view. That is to say, much of the research has arguably come from the view that video games are something that are *done to* children. By contrast it seems reasonable to argue that before attempting to understand the long term influence of video games, groundwork should be established to understand why children elect to play such games in the first place. In other words there may be great value in understanding video games as something children *choose to do* rather than something *done to* them. The potential influence (or lack thereof) of video games may be put into a different context, coming from this view.

There is a history of this line of inquiry among communication researchers that may not be familiar to psychologists. Often referred to as the "uses and gratifications" approach, This approach essentially reverses the traditional psychological process of inquiry of "outside–in" to examine how personal motivation direct media use and how people respond to media or essentially "inside–out." For instance as far back as 1961 Schramm et al. (1961) argued there was greater value in examining how children used television rather than assuming television was something *done to* children.

More recently scholars have argued for the value of applying this approach to the use of video games (Ruggiero 2000; Sherry et al. 2006; von Salisch et al. 2006). Greenberg et al. (2010) found that fantasy motivations were particularly strong in younger children, and competition motives strong in older children, with males being more motivated to play video games than females in general. Hamlen (2011) similarly found children to be motivated by challenges in video games to play them whereas Colwell et al. (1995) found social motives to be prevalent as have Lenhart et al. (2008). Some scholars have argued (e.g., Chory and Goodboy 2011) that integrating the uses and gratifications approach with "traditional" psychological approaches to understanding media use may provide considerable insights into the motivational and social context

[1] Despite that most concerns regarding video games focus on children, most of the research done has actually been on college students particularly in the realm of aggression. This is of particular importance as meta-analytic reviews suggest that studies of college students display greater effect sizes than do those of children (e.g., Sherry 2007) the inverse of what would be expected under developmental theories that posit children are more easily influenced than adults. The effects for college students may be explained by the high potential for demand characteristics, particularly in experimental studies, and the degree to which many college students may already have been taught the hypotheses of the studies in classes they have attended. These issues point out the importance of distinguishing studies with college students from those with children and not generalizing one to the other. We find that, historically, an academic field highly dependent on college student research using controversial "aggression" measures has been readily generalized to youth violence despite the inability of most of the research to be so generalized.

of children's media use above and beyond the traditional mechanistic media effects model. Indeed the uses and gratifications approach appears to fit well with Self-Determination theory. Further research along these lines may help elucidate active pathways by which children select and respond to media rather than merely assuming that children's media use is a passive process.

The current study

The literature currently available on motivations for video game play suggests that such motivations may fall within several categories as described by self-determination theory. Past research suggests that motivations for playing violent games may differ to some degree than for playing non-violent games, and that stress reduction may be one motivation for playing games particularly among those with higher levels of stress. Further social relatedness may be a particular motivation for game play. At present, however, most of this research has been conducted with young adults. Relatively little research has examined these issues with younger children. The current study seeks to address this limitation in the current literature.

The current study looks specifically at motivational factors for video game use among children, answering the following questions:

1. Are there consistent, identifiable motivations for video game play among children?
2. What variables motivate social play in children?
3. Which motivations are associated with children's preferences for video games with violent content?
4. Do children with symptoms suggestive of depression or attention/hyperactivity problems (based on a self-report screening instrument) express differing motives for video game play compared to their peers?

From these four research questions we test the following hypotheses.

1. Consistent with self-determination theory we believe that children's motivations for video game will fall along several distinct lines related to gaining autonomy (and perhaps reducing stress from lack of autonomy in the "real world"), competence and social connectedness.
2. Motivation for social play will be motivated primarily by social connectedness motivations rather than other motivations.
3. Consistent with prior work, we believe motivation for violent game play will fit within the context of normal development. We predict violent game play will be more common among males and motivated by a desire to reduce stress.
4. Likewise it is hypothesized that children with mental health symptoms will show greater motivations related to autonomy and stress reduction than other children.

Methods

Participants

Seventh and eighth grade students at four middle schools in the mid-Atlantic region of the United States were included in the current study. All students were invited to participate, aside from those with significant English-language difficulties or cognitive impairment (see Kutner and Olson 2008, for a full description of methods). A total of 1,254 students completed the survey: virtually all eligible students in attendance at school on that day. Regarding gender, 584 (47%) of the students identified themselves as male, and 653 (53%) as female. Of the students, 664 (53%) were from comparatively affluent suburban located schools, and 590 (47%) from schools located in a lower socioeconomic status urban environment. The ethnic makeup of students in the urban school was 50% white, 43% black, 2% Asian, 5% Hispanic and less than 1% other. The ethnic makeup of students in the suburban school was 90% white, 4% black, 4% Asian, 1% Hispanic and 1% other. Mean age of the students was 12.9 ($SD = 0.76$).

Measures

The following measures reflect not only children's potential motivations for game play, but also elements such as parental involvement, stress, and social support which we theorized may influence both player motivations as well as other outcomes.

Parental involvement

To measure parents' involvement with their children, sharing media consumption with children and making media consumption decisions for them, a nine-item Likert scale was created for this study. Examples of questions included in this scale are "My parents play electronic games with me," "My parents spend time with me," "My parents are home when I am home" and "My parents tell me I can't play a particular electronic game." Coefficient alpha for the current sample was .68.

Stress

The Stressful Urban Life Events scale (SULE; Attar et al. 1994), a 19 item yes/no scale, was used to measure total

stress that children in the current sample had experienced during the past year. The SULE addressed stressors such as getting suspended from school, getting poor grades on one's report card, or experiencing the death of a family member. Coefficient alpha for the total stress scale was .67 for the current sample.

Support from others

We compiled a 16-item Likert scale measure of perceived support from peers and family. This measure was based on two existing measures (Lerner et al. 2005; Phillips and Springer 1992) of peer support and family support. Overall coefficient alpha for the resultant scale was .87.

Exposure to video game violence

Based on methods used in several previous studies (Lenhart et al. 2008; Olson et al. 2007), existing Entertainment Software Ratings Board (ESRB) video game ratings were used as an estimate of violence exposure. Respondents were asked to write the names of five video games that they had "played a lot" in the past 6 months. ESRB ratings were then obtained for each game, and ordinally coded (a maximal score of 5 for "Mature," 4 for "Teen," etc.; no "AO" rated games were reported). This ordinal coding system was designed to correspond to the levels of the ESRB rating system (although at the time of data collection, the E10+ rating was not yet being used).

Many factors go into an ESRB rating, including language, sexual content, and use of (or reference to) drugs or gambling. However, among those factors that determine the age-based rating, violence appears to take priority. (Of the 30 "content descriptors" that accompany ratings, ten concern violence.) Descriptors of listed games were reviewed to ensure that high ratings had not been obtained primarily for sexual content; this was not the case for any of the games. The ratings were summed across the 5 games listed, then multiplied by the number of hours per week that the child reported playing video games. As with all attempts to assess game content exposure, this is only an estimate; however, it removes some of the subjectivity inherent in previous methods such as asking children themselves to rate the violence level of games.

Depression/attention symptoms

Symptoms of depression and attention-deficit/hyperactivity problems were assessed using the relevant subscales of the youth self-report version of the Pediatric Symptom Checklist—17 (PSC; Gardner et al. 1999). This instrument is a validated, brief screening device for mental health problems in children, and provides clinical cut-offs to identify children whose symptoms merit further evaluation. With the current sample, coefficient alpha for the ADHD subscale was .75 and for the depression subscale .80.

Social video game play

An eight-item scale assessed the degree to which children played video games with other individuals including siblings, parents, friends (in person and on the Internet) and strangers on the Internet. Coefficient alpha for this scale was .62.

Video game motivations

To assess potential motivations for video game use in children, a scale of 16 Likert scale motivation items was developed. These items are presented in Table 1. A review of research and discussions with video game players (see

Table 1 Factor analysis results for child motivations for video game play

	Fun/ challenge	Catharsis	Social	Bored
I like to play electronic games because…				
a. My friends like to play	*	*	.60	*
b. It's something to do when I'm bored	*	*	*	.75
c. It helps me relax	*	.67	*	*
d. I like to teach other kids how to play	*	*	.73	*
e. It helps me feel less lonely	*	.66	*	*
f. It helps me make new friends	*	*	.69	*
g. I like to learn new things	.57	*	*	*
h. I like to create my own world	*	.56	*	*
i. It's just fun	.70	*	*	*
j. I like to compete with other people and win	.69	*	*	*
k. I like the challenge of figuring the game out	.73	*	*	*
l. It helps me get my anger out	*	.83	*	*
m. It helps me forget my problems	*	.85	*	*
n. There is nothing else to do	*	*	*	.80
o. I like to mod games (change the game using computer code)	*	*	.38	*
p. It's exciting	.81	*	*	*

Coefficients in the Table represent factor loadings

Kutner and Olson 2008) generated a list of 16 likely motivations for video game play. Subjects were asked to respond to the overall question, "I play electronic games because…" by rating each item on a four-point scale from "strongly disagree" to "strongly agree." (A write-in option generated only a handful of responses.) These items were assessed with factor analysis to determine specific clusters of motivations children acknowledge regarding video game play. The factor analysis is presented in the results section.

Procedure

Study protocols and materials were approved by the Partners Healthcare System human research committee and were designed to comply with American Psychological Association standards for the ethical treatment of human participants. Parents were notified about the study through school newsletters and via notices sent home with students, which included contact information for the study principal investigator. An "opt out" procedure was employed for parental consent. A youth assent for participation, including information about the study and the voluntary nature of participation, was read aloud to students from a standardized script on the day of participation. Identifying information was removed from the surveys and discarded prior to data analysis. Teachers were not involved in any aspect of data collection. All data were compiled into SPSS software. Primary data analysis used for the testing of the study hypotheses were hierarchical multiple regressions, as well as factor analysis for the motivational questionnaire. All students were included in all analyses to maximize generalizability.

Results

A p-value of .01 was used for significance to control for spurious findings/Type I error due to the large sample size. Although there are reasons to argue for both the .05 and .01 standard, we feel that with a large sample, type I error is more likely than type II, and therefore feel that using the .01 alpha standard is more conservative. We used G*Power to calculate the minimal effect sizes we could detect with our parameters ($\alpha = .01, 1 - \beta = .80, n = 1254$) and found that effect sizes of approximately $r = .09$ would be detectable, which are below traditional "trivial" criterion sizes (Cohen 1992; Ferguson 2009). Increasing the $1 - \beta$ assumption to .95 only increases the minimal effect size detectable to point .12. Thus, we are comfortable in using the .01 standard.

Factor analysis of children's motivations

We examined the 16-item motivational questionnaire using exploratory factor analysis with one half of our sample ($n = 627$) to determine whether children's motivations for video game usage reliably formed clusters. The sixteen items were entered into factor analysis using Principal Components extraction with Promax rotation. The resultant four-factor model explained 58% of the variance in children's motivations for game play. Factor loadings of individual items onto the four factors are presented in Table 1. The four factors identified are:

Fun/challenge factor (fun/challenge)

The first identified factor, consisting of five items, appeared to best represent play motivations due to the fun or excitement elements of the games themselves. Coefficient alpha for the items comprising this subscale was .78.

Catharsis/autonomy factor (catharsis)

The second scale, also comprising five items, appeared to represent a cluster of motivations related to releasing anger or frustration or generally escaping the problems of the "real world." Coefficient alpha for this subscale was .80.

Social relatedness factor (social)

The third subscale, consisting of four items, appeared related to social motives for video game play. Coefficient alpha was .59.

Bored factor (bored)

The final two-item subscale represented motives for video game play that simply involved having little else better to do. Coefficient alpha for the two items was .62.

These factors were subsequently retested using Confirmatory Factor Analysis in AMOS software with the second half of the sample ($n = 627$). The factor analysis revealed that the factor structure identified here was a satisfactory fit to the data (χ^2 (99) = 421.9; CFI = .90, RMSEA = .07). Taken together these factor analysis results provide initial support for the factorial validity of this scale of children's motivations for video game play.

The individual motivation subscales correlated with each other. Intercorrelations between the motivational subscales are presented in Table 2.

With the exception of the bored motivation [$t(1153) = -.88$], males were more likely to endorse the fun/challenge motivation [t (1108.71) = 10.12; males: $M = 16.17$, $SD = 3.01$, females: $M = 14.15$, $SD = 3.70$; $r = .29$, 95% CI = .24, .34], catharsis motivation [t (1130) = 5.89; males: $M = 11.77$, $SD = 4.02$, females: $M = 10.35$, $SD = 4.08$; $r = .17$, 95% CI = .12, .22] and social motivation

Table 2 Intercorrelations between motivational subscales

	Engagement/fun	Catharsis	Social	Bored
Fun/challenge	1.00	.60*	.53*	.30*
Catharsis		1.00	.57*	.27*
Social			1.00	.19*
Bored				1.00

* $p \leq .01$

Table 3 Scale means and standard deviations for all variables

	Mean	Standard deviation
1) Parental involvement	18.68	3.99
2) Stress	3.93	2.92
3) Support from others	47.30	9.84
4) Social video game play	7.47	4.59
5) Video game violence use	30.34	29.64
6) Total video game use (hours/week)	10.80	17.67
7) Depressive symptoms	2.67	2.06
8) ADHD symptoms	3.97	2.42
9) Fun/challenge motivation	15.10	3.54
10) Catharsis motivation	11.01	4.12
11) Social motivation	7.41	2.62
12) Bored motivation	5.98	1.62

[t (1125) = 7.34; males: $M = 7.99$, $SD = 2.68$, females: $M = 6.87$, $SD = 2.43$; $r = .21$, 95% CI = .16, .26].

Scale means and standard deviations are presented in Table 3.

Predictors of social play

Intercorrelations between all predictor variables are provided in Table 4.

Video game playing was a social activity, not an isolating activity, for the children in this study. The vast majority (91.5%) reported playing video games with other individuals at least occasionally. Given that 92.2% of the current sample reported playing video games at least once within the prior 6 months, the overlap between game play and social game play is fairly considerable. To examine the factors that motivated social play, a hierarchical multiple regression was used. Gender was entered on the first step; social influences related to parental involvement, stress and support from others was entered on the second step; and the motivational factors entered on the final step. This order of variables was used to control for other potentially important variables, primarily gender but also social factors with motivational factors added last to be most conservative. Results of the final model, including all three steps, were significant [$R = .57$, $Adj\ R^2 = .32$, F [8, 812] = 48.05, $p \leq .001$]. Collinearity diagnostics indicated little problem with multicollinearity, with a lowest tolerance of .53 and highest VIF of 1.88. Standardized regression coefficients (Betas) for all variables are presented in Table 5. Social play was predicted by social motivation ($\beta = .28$), fun/challenge motivation ($\beta = .29$) and level of stress ($\beta = .15$).

Preference for violent games

To examine the factors that motivated use of violent games, a hierarchical multiple regression was used. Gender was entered on the first step, social influences related to parental involvement, stress and support from others was entered on the second step, and the motivational factors entered on the final step. Results of the final model, including all three steps, were significant [$R = .56$, $Adj\ R^2 = .31$, F [8, 800] = 45.67, $p \leq .001$]. Collinearity diagnostics indicated little problem with multicollinearity with a lowest tolerance of .54 and highest VIF of 1.87. Standardized regression coefficients (Betas) for all variables are presented in Table 5. Violent game play was inversely predicted by female gender ($\beta = -.37$), and positively predicted by fun/challenge motivation ($\beta = .22$) and catharsis motivation ($\beta = .11$).

Table 4 Intercorrelations between predictor variables

	1	2	3	4	5	6	7
1) Female gender	1.00	−.01	−.13*	.19*	−.45*	.18*	.05
2) Parental involvement		1.00	−.04	.31*	−.01	.00	−.06
3) Stress			1.00	−.27*	.14*	.14*	.23*
4) Support from others				1.00	−.17*	−.19*	−.21*
5) Video game violence use					1.00	−.07	.06
6) Depressive symptoms						1.00	.37*
7) ADHD symptoms							1.00

* $p \leq .01$

Table 5 Standardized regression coefficients

	Social play regression	Violent game regression	Total hours playing regression
Female gender	−.03	−.37 (−.32, −.42)	−.18 (−.13, −.23)
ΔR^2	.03*	.21*	.07*
Parental involvement	.03	−.08	.01
Stress	.15 (.10, .20)	−.01	.06
Support from others	.01	−.04	−.02
ΔR^2	.07*	.01	.02*
Fun/challenge motivation	.29 (.24, .34)	.22 (.17, .27)	.09
Catharsis motivation	−.02	.11 (.06, .16)	.18 (.13, .23)
Social motivation	.28 (.23, .33)	.06	.12 (.07, .17)
Bored motivation	.08	−.02	−.01
ΔR^2	.25*	.10*	.09*

Numbers in parentheses are 95% confidence intervals for coefficients significant at the $p = .01$ level

Overall game play

To examine the factors that motivate general game play, a similar hierarchical multiple regression was used. Gender was entered on the first step, social influences related to parental involvement, stress and support from others was entered on the second step, and the motivational factors entered on the final step. Results of the final model, including all three steps, were significant [$R = .42, Adj\, R^2 = .16, F\,[8, 725] = 19.02, p \leq .001$]. Collinearity diagnostics indicated little problem with multicollinearity with a lowest tolerance of .54 and highest VIF of 1.87. Standardized regression coefficients (Betas) for all variables are presented in Table 5. Total game play was inversely predicted by female gender ($\beta = -.18$), and positively predicted by social motivation ($\beta = .12$) and catharsis motivation ($\beta = .18$).

Depressive and ADHD symptoms and game play motivations

Differences in motivation and game play patterns were examined for children with and without clinically elevated depressive (internalizing) symptoms. Children were categorized as "depressive" if they met or exceeded the validated clinical cut-off score for the PSC. *T* test analyses were used to compare these children with children who were not clinically elevated in depressive symptoms regarding differences in motivation for game play, as well as violent game exposure, social play and total time spent gaming. Only in the case of Catharsis Motivation was Levene's test for inequality of variance significant, and the data reported are for equal variance not assumed.

Children with clinically elevated depressive symptoms did not differ from non-depressive children in violent game exposure [$t\,(977) = .22$], social play [$t\,(987) = .74$] or total time spent gaming [$t\,(938) = .41$]. Nor did they differ with respect to fun/challenge motivation [$t\,(906) = .57$] or social motivations [$t\,(900) = 2.14$]. However, depressive children were more likely than non-depressive children to endorse catharsis motivation [$t\,(267.81) = 4.92$; depressive: $M = 12.17$, $SD = 4.34$, non-depressive: $M = 10.44$, $SD = 3.97$; $r = .20$, 95% CI = .15, .25]. Depressive children were also more likely to endorse bored motivation [$t\,(926) = 2.80$; depressive: $M = 6.22$, $SD = 1.61$, non-depressive: $M = 5.85$, $SD = 1.65$; $r = .11$, 95% CI = .06, .16].

Differences in motivation and game play patterns were examined for children with and without clinically elevated attention and hyperactivity symptoms. Children were categorized as "ADHD" if they met or exceeded the validated clinical cut-off score for the PSC. *T* test analyses were used to compare these children with children who were not clinically elevated in ADHD symptoms regarding differences in motivation for game play, as well as violent game exposure, social play and total time spent gaming. Levine's test for equality of variances was not significant in any case.

Children with clinically elevated ADHD symptoms did not differ from non-ADHD children in violent game exposure [$t\,(1232) = .26$], social play [$t\,(1250) = 2.30$] or total time spent gaming [$t\,(1187) = .09$]. Nor did they differ with respect to fun/challenge motivation [$t\,(1151) = .61$], social motivation [$t\,(1139) = 2.07$] or bored motivation [$t\,(1151) = .61$]. However, ADHD children were more likely than non-ADHD children to endorse catharsis motivation [$t\,(1144) = 3.56$;

ADHD: $M = 11.85$, $SD = 4.06$, non-ADHD: $M = 10.79$, $SD = 4.10$; $r = .12$, 95% CI = .07, .17].

Discussion

Much previous literature has examined potential positive and negative influences of video games on children. By contrast, only a few studies have examined motivations for video game use (Przybylski et al. 2010; Willoughby 2008; Yee 2006). The current study aimed to fill some of the gaps in this sparse literature by examining motivations for video game use in a large sample of middle-school-aged children.

Our results indicated several motivations may drive children's interest in video games, including a belief that games can be fun or that games may reduce stress (catharsis), a desire for social interaction with others, and a need to fill time and avoid boredom. With the exception of the bored motivation, males demonstrated higher levels of endorsement of the other three motivations: fun/challenge, catharsis and social. In this sense, males appear to generally be more "motivated" to play video games than females; this is consistent with observed gender differences in the prevalence of video game play. Although our results suggested a fourth motivation (Bored), our results otherwise appear consistent with Self-Determination Theory. Motivations for children's game play fell within Fun/Challenge, Social Relatedness and Catharsis/Autonomy needs much as would be expected by Self-Determination Theory. Given that the boredom motivation didn't predict engagement beyond the Fun motivation, we see little that conflicts with Self-Determination Theory. This may be because the boredom motivation reflects a simple time-filler. Children may sometimes play games not because they are particularly engaged with them, but simply because there seems to be little else to do. A child playing through an old game they've already completed on a rainy day home from school would be such an example. In such circumstances they may not be particularly engaging with the game, but playing it is better than nothing.

Our results are particularly intriguing in relation to the Catharsis/Autonomy motivation, which appears to be particularly related to stress reduction. Children were generally more likely to select violent games when seeking stress reduction and children with clinically elevated mental health symptoms were more likely to be motivated by Catharsis/Autonomy than other children. This suggests that the Autonomy need proposed under Self-Determination Theory, at least as is related to video game play, may be particular important for those individuals who feel that their autonomy needs are not being met in real-life. Previous work has indicated that this approach may, in fact, have utility (Ferguson and Rueda 2010; Reinecke 2009; Russoniello et al. 2009). As part of this issue it may help to reconceptualize the way the brain, even the brains of minors, processes the information in fictional media. Historically it has been proposed (e.g., APA 2005) that the processing of media messages is automatic with little distinction between fictional and non-fictional portrayals. However, it may be that children process fictional media differently than they do real events. Consistent with both mood management theory and self-determination theory, the fantasy elements of video game use may help players meet needs not met in real life and thus reduce stress. Interestingly, children with mental health issues were no more or less likely to play violent games, suggesting that violent content is not perceived as necessary for catharsis. We encourage researchers to further investigate the use of video games to reduce stress and mental health symptoms.

As with the findings of Lenhart et al. (2008), video gaming was a social activity for the majority of youth in our sample. The stereotype of "loner" gamers as well as concerns that games may reduce social interaction need to be reconsidered (Williams et al. 2008). Interestingly, social play was more common among children who felt stressed.

Consistent with previous work, a preference for violent games was more common among males than females. Catharsis/Autonomy needs also appear to predict preference for violent games, and children may view such games as a positive way to reduce stress (Colwell 2007). Some research has suggested that individuals who play violent games may indeed handle stress better (Ferguson and Rueda 2010), although it is also possible that children may be mistaken in these beliefs; the catharsis hypothesis has been controversial (Sherry 2007). Further longitudinal work may help elucidate whether children under stress find a positive outlet through violent game use, or if some types or amounts of violent game use may exacerbate problems.

Interestingly, children with symptoms of psychosocial problems as indicated by the Pediatric Symptom Checklist did not differ from their peers in regards to quantity of video game use overall or preference for violent games. However, children who met screening cutoffs for symptoms of depression or ADHD were more likely to endorse catharsis/autonomy motivations for video game use. Given that these youth show no greater use of violent games, it appears that children use both violent and non-violent games in order to reduce stress and psychosocial symptoms. Importantly, these results also suggest that video game use is not directly related to mental health problems in youth—an observation generally consistent with results from Desai et al. (2010). However, the potential remains that some children may exhibit pathological patterns of video game use; that issue is not addressed in the current study.

As with all research, the current study has limitations that must be addressed. First, the study is correlational in nature; no causal attributions can be made. Second, a positive score on the PSC or its subscales is *not* a mental health diagnosis; further studies are needed with children who have been formally diagnosed with depression, ADHD or other disorders. Third, although the current research did look at influence of parental involvement, more recent game systems such as the Wii and Kinect may be changing the dynamics of family and social involvement in video game play. It would be worth future research to examine the social impact of these newer game systems.

Conclusion

The analyses presented here offer some preliminary insights into the complex motivations children have for playing video games. We conclude that, for the majority of children, the inclination to engage in video game playing is probably healthy and developmentally appropriate. We hope our findings will inspire additional research, particularly of understudied subgroups such as youth with psychosocial problems, and further the trend toward more sophisticated and nuanced contemplation of a medium that is—and likely will remain for the foreseeable future—an important part of youth entertainment and socializing.

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