Not So Doomed: Computer Game Play and Positive Adolescent Development

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Authors’ note: The Michigan Study of Life Transitions has been funded by grants from NICHD, NIMH and NSF to Eccles and by grants from NSF, the Spencer Foundation and the William T. Grant Foundation to Barber and Eccles. We wish to thank the following people for their contributions over the years to this project: Carol Midgley, Allan Wigfield, David Reuman, Harriet Feldlaufer, Douglas Mac Iver, Janis Jacobs, Constance Flanagan, Christy Miller Buchanan, Andrew Fuligni, Deborah Josefowicz, Pam Frome, Lisa Colarossi, Amy Arbreton, Laurie Meschke, Kim Updegraft, Kristen Jacobson, and Miriam Linver.

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Abstract

It has been speculated that computer game play by young people has negative correlates or consequences, though little evidence has emerged to support these fears. An alternative possibility is that game play may be associated with positive features of development, as the games reflect and contribute to participation in a challenging and stimulating voluntary leisure environment. This study examined the relationship between game play and several measures of adjustment or risk taking in a sample of over 1,100 16- to 17-year old high school students. No evidence was obtained of negative outcomes among game players. On several measures – including family closeness, physical activity involvement, positive school engagement, positive mental health, substance use and truancy – game players scored more favorably than did peers who never played computer games. It is concluded that computer games can be a positive feature of a healthy adolescence.
Computer game play

Not so doomed: Computer game play and positive adolescent development:

Computer games have become well established as a popular form of electronic entertainment among contemporary children and adolescents (Dominick, 1984; Funk, 1993; Greenfield, 1994; Kubey & Larson, 1990; Phillips, Rolls, Rouse, & Griffiths, 1995). As has traditionally been the case with the advent of any new mass medium, the games’ popularity among young people has been the focus of considerable lay and professional concern. Game playing can divert time from other activities, including schoolwork and sports, games often appear ‘mindless’ and repetitive to non-playing adults, there is the possibility that preoccupation with computers could impede social interaction, and many games involve themes of violence.

Although the amount of empirical research addressing these issues is not as extensive as work on children and television, there is a growing body of evidence on young people’s uses of computer games. This evidence helps to allay some concerns but provides inconsistent or minimal evidence in respect of others. In relation to time use, for example, several studies reveal that computer games – although certainly popular - account for only a relatively small proportion of most children’s leisure activities, much lower than television viewing (Cupitt & Stockbridge, 1996; Funk, 1993; Kubey & Larson, 1990). Short scale longitudinal studies indicate that a typical pattern of usage is that players invest a burst of initial enthusiasm in the activity, and the amount of time spent on it gradually reduces.
thereafter (Creasey & Myers, 1986; Mitchell, 1985). Only very small (< 1.0%) proportions of children are rated by teachers or self as game dependent or ‘addicted’ (Shotton, 1989).

Analyses of the cognitive and perceptual-motor aspects of the activity indicate that, rather than being an intellectually lazy pursuit, computer game play requires high levels of skill and players elect to meet increasing challenges (Greenfield, 1984, 1994; Turkle, 1984). Contrary to images of game play as the pursuit of isolated computer nerds, a high proportion of time spent with the games is spent with peers or family members (Cupitt & Stockbridge, 1996; Kubey & Larson, 1990; Phillips et al., 1995). In short, computer game play is not necessarily a monolithic, moronic and antisocial imposition on children’s lives.

Nonetheless, many computer games do contain violent images. Analyses of domestic and arcade games indicate that around 70 – 85% involve some type of violence (Braun & Giraux, 1989; Dietz, 1998; Funk, Flores, Buchman, & Germann, 1999). Variability among these estimates probably reflects sampling techniques, time of study, and coding criteria, and it is important to note that the frequency of content types is not a perfect guide to the proportion of young people’s play that is devoted to this kind of game. Even so, the overall conclusion that simulated violence is a prominent feature of many games is indisputable. Not surprisingly, this has led to lay speculation and scientific investigation into possible effects on young players.

The available evidence is at best inconsistent (see reviews by Durkin, 1995; Emes, 1997; Griffiths, 1997; Gunter, 1998; Wiegman & van Schie, 1998). A small number of experimental studies have been reported, mostly designed to test predictions derived from
social learning theory, that exposure to violent games should lead to greater post-game aggressiveness (Cooper & Mackie, 1986; Graybill, Kirsch, & Esselman, 1985; Graybill et al., 1987; Schutte, Malouf, Post-Gorden, & Rodasta, 1988; Silvern & Williamson, 1987). All of these compared experimental participants (children or adolescents) who were exposed to aggressive games with controls who played no games or non-violent games; none obtained a significant effect of game type on subsequent aggressiveness. Indeed, some experimenters (Graybill et al., 1985, 1987; Silvern & Williamson, 1987) obtained evidence of modest reductions in aggression in experimental participants.

Researchers have also employed survey and correlational techniques to measure the relation between game playing and aggressiveness in more naturalistic settings. Correlational evidence is always open to a variety of interpretations, but it would certainly be important to obtain information on any association between game play and aggressiveness. Again, few of the available studies have found strong relationships (Dominick, 1984; Fling, Smith, Rodriguez et al., 1992; Lin & Lepper, 1987; van Schie & Wiegman, 1997; Wiegman & van Schie, 1998). For example, van Schie and Wiegman (1997), in a sample of 346 schoolchildren in The Netherlands, found no correlation between amount of play and aggressiveness. They did find a slight negative relation between amount of play and a measure of prosocial behavior ($r = -0.12$). Similarly, in their 1998 study of 278 children, Wiegman and van Schie obtained no differences on measures of aggression between groups of nonplayers, moderate players and heavy players, but did find a slight difference with respect to prosocial behavior (heavy players scoring lower than the other groups). Where
positive correlations between play and aggressiveness have been obtained, they are low and they tend to concern play in arcades rather than at home (Dominick, 1984; Lin & Lepper, 1987). At the very least, the confound with location makes it inappropriate to attribute causality to the games alone. It may be that other factors associated with arcades (lack of adult supervision, exposure to delinquent peers, inner city settings) are influential. It may be that young people with higher levels of aggressiveness (and related antisocial or ‘at risk’ characteristics) are more likely to frequent out-of-home environments such as video game arcades In short, despite much debate about the consequences of playing games with aggressive content, there is very little firm evidence available to date to support claims of harmful effects upon the young.

The relation between game play and other types of risk-taking behavior has also been subject to more speculation than research (see Greenfield, 1984, for a review of early concerns). Where research is available, it tends not to indicate negative effects on social adjustment. Egli and Meyers (1984) interviewed 151 adolescents in video game arcades in California. The participants reported that they perceived very little interference with family life due to video game play, indicated that they participated regularly in sports, and disagreed quite strongly with the proposition that computer games promoted the use of drugs. van Schie and Wiegman (1997) examined the relations between amount of play and social isolation, loneliness, popularity, general school performance, language skills and arithmetic skills: and found none. In a study that compared academic records of players and nonplayers, Creasey and Myers (1986) found no differences.
The inconsistent and sometimes unexpected findings that are available should make us wary of attributing negative associations or consequences to computer game play. Nevertheless, it has been stressed that the amount of relevant research is limited. There is still less research addressed to an alternative possible account, namely that computer game play could have positive correlates.

The basis for such a proposition is twofold. First, there is experimental evidence of cognitive and/or perceptual skill gains through video game play (Greenfield, Brannon, & Lohr, 1994; Greenfield, Camaioni, Ercolani, Weiss et al., 1994; Greenfield, deWistanley, Kilpatrick, & Kaye, 1994). This does not confirm that all video game play is invariably beneficial in all respects for all players (Greenfield, 1994), but it does indicate that positive outcomes are possible in at least some domains. Importantly, cognitive and spatial skills, involvement in technologies increasingly pivotal to contemporary educational and occupational demands, interaction with the products of artificial intelligence and positive, self-efficacious attitudes towards computing are all facilitated through computer game play (Cassell & Jenkins, 1998; Greenfield, 1994).

Second, there is extensive evidence that participation in leisure activities has personal and social benefits (Ajzen, 1991; Burch & Hamilton-Smith, 1991; Larson, 2000; Tinsely & Eldredge, 1995). Leisure engagement can promote personal wellbeing (Kleiber, Larson, & Csikszentmihalyi, 1986), social cohesion in peer and family relations (Burch & Hamilton-Smith, 1991; Fine, Mortimer, & Roberts, 1990; Orthner & Mancini, 1992), self-identity affirmation (Eccles & Barber, 1999; Fine et al., 1990; Haggard & Williams, 1992),
motivation and goal setting (Ajzen, 1991; Kleiber, et al., 1986; Munson & Savickas, 1998),
cognitive stimulation and creativity (Tinsley & Elderedge, 1995), anticipatory socialization,
educational and career development (Eccles & Barber, 1999; Fine et al., 1990; Hong,
Milgram, & Whiston, 1993; Munson & Savickas, 1998). Pervasive features of adolescent
leisure are that it is usually enjoyed and that the participants elect to do it (Fine et al., 1991) –
in fact, another favorable correlate of leisure is that young people report more positive mood
during the times they are engaged in it (Larson & Richards, 1997).

Again, not all of these benefits are associated with all leisure pursuits and for all
individuals, and leisure choices are themselves likely to reflect individual differences in
needs and interests (Tinsley & Elderedge, 1995). However, accumulating evidence supports
the conclusion that activities which are motivating, structured and challenging do contribute
to positive youth development (Larson, 2000). Larson notes that among adolescents’
common activities, some - in particular, school-based activities and homework - can provide
structure and challenge, but often fail to nurture intrinsic motivation because they are ‘other-
directed’ (i.e., under the control of adults). Other activities, such as television watching and
listening to music, may be self-selected and gratifying but do not invariably demand high
levels of concentration or provide serious challenge. In contrast, Larson proposes that
voluntary, structured youth activities – such as sports and hobbies – may provide contexts
which combine intrinsic motivation with high levels of concentration and challenge.
Consistent with this view, research shows that involvement in extracurricular activities of this
type are associated with positive academic trajectories (Eccles & Barber, 1999).
Can computer game play furnish sufficient levels of motivation, concentration and challenge to serve a positive function in young people's lives? On one view, this is unlikely. If the games are banal commercial distractions, exposing children to repetitive, typically trivial and often destructive activity then their use should be associated with less favorable developmental circumstances including poorer school attainment, maladjustment (e.g., depressed mood), risky behavior (e.g., alcohol consumption, drug use, truancy), greater aggressiveness and poorer social relations. As discussed above, exactly these fears have been aired by many critics of computer game play. However, as also discussed above, young players themselves usually perceive the games quite differently. Clearly, they find computer games enjoyable, but they also claim that principal attractions include gaining greater skill and attaining higher performance (Durkin & Aisbett, 1999). In other words, computer game play is reported, by participants, to meet at least some of the criteria proposed by Larson as supportive of positive youth development. Hence, on this view, computer game play should be associated with more favorable developmental circumstances, including better academic performance, better personal adjustment, less risky behavior, lower levels of aggressiveness and better social relations. The present study was conducted to test these competing accounts. Drawing on data from a large scale survey of adolescents aged 16 to 17 years, we investigate here the relationships between computer game usage and several measures of adjustment and risk behaviors.
Methods

Sample

The data used in this study come from Wave 5 of the Michigan Study of Adolescent Life Transitions (MSALT), an on-going longitudinal investigation designed to examine participants' normative and non-normative life transitions from early adolescence through adulthood. Participants were recruited from 10 predominantly white middle- and lower-middle-class school districts in Southeastern Michigan through letters sent home in their sixth grade math classes in 1983 (see Eccles, Wigfield, Flanagan, Miller, Reuman, & Yee, 1989 for full sample details). MSALT began in 1983 when the respondents were in 6th grade in ten school districts in southeastern Michigan. Wave 5 data were collected in 1988 when the respondents were approximately 16 and 17 years old.

Procedure

Surveys were administered at the schools; students were excused from their regularly scheduled classes to complete the survey in their school cafeteria or auditorium. Students were allotted 90 minutes to respond to questionnaires with researchers present to answer questions. In addition, information about course work and grades was gathered from school records. Researchers obtained this information for all students who completed questionnaires at wave five.
Measures

Measures were obtained from student questionnaires and school record data. Video game use, adjustment, and risk behaviors were measured by students' responses to a series of items. Grades in school were gathered from official school record data.

Video game use. Video game use was measured with two questions about computer use. The first asked whether the participant ever used a computer. If they responded yes, they were then asked how often they used a computer to play video games. The responses ranged from 1 = “never” to 7 = “daily.”

Adjustment. Depressed mood was measured with a four item scale (alpha=.70). A sample item was “how often do you feel unhappy, sad, or depressed?” Responses ranged from 1= “never” to 7= “daily.” Self-esteem was measured with three items (alpha = .78). A sample item was “how often do you feel satisfied with yourself the way you are?” Responses ranged from 1= “never” to 7= “daily.” For both items, a mean score was computed.

Risk behavior. The surveys included information on the adolescents’ involvement in risky/problematic activities in tenth grade like drinking, using drugs, and being aggressive. The risk behavior measures used the following categories to indicate frequency of engaging in the activity in the previous six months: 1 = “none,” 2 = “once,” 3 = “2-3 times,” 4 = “4-6 times,” 5 = “7-10 times,” 6 = “11-20 times,” and 7 = “21 or more times.” The four constructs were aggression, disobedience, substance use and truancy. The aggression item asked about the frequency of punching and pushing around other students, and the disobedience item asked about disobeying parents on an important issue. The substance use
scale included three items about bringing alcohol or drugs to school, drinking outside of school, and using illegal drugs outside of school (alpha = .68). The two-item truancy scale was a self-report about the number of classes and days the student had skipped at school (alpha = .73).

**School records.** Student transcripts were used to obtain the number of days of school that were missed in the tenth grade. In addition, information on academic performance was obtained for all participants from their files. For these analyses, we used school records of the participants’ cumulative grade point averages (GPA’s) at the 11th grade. For those schools that did not record a cumulative GPA for the 11th grade, the 12th grade GPA was imputed.

The **family closeness** scale consisted of three items about perceived emotional support from family members and frequency of joint family activities (alpha=.80). Items were adapted from the Family Environment Scale (Moos & Moos, 1981). Sample items included “Our family enjoys doing things together” and “Members of my family are very close and get along very well.” The 7-point range of the items was from “Never” to “A lot” or “Strongly Disagree” to “Strongly Agree.” Higher scores indicated closer family relationships.

The **popularity self-concept** included two seven-point items about how popular the participants rated themselves in school, and how good they thought they were at making friends (alpha = .72).

Sports involvement was measured with a series of questions about what sports the student played regularly. The total number of **hours spent on sports** each week was estimated by the student.
Academic attachment. We collected the students’ attachment to school using one seven-point item about how much they liked school.

Results

The results are presented in three sections. First descriptive information on the three categories of video game users is provided. Second, we present group differences in adjustment, risk behavior, and school records. Finally, we examine the differences in engagement in multiple social contexts (family, peer group, sports, and school).

Computer Game Use

The participants were categorized into three groups based on their frequency of play: “None” included participants who did not use computers at all, as well as those who used computers, but never for video games; “Low” included participants who checked 2, 3, 4, or 5 for frequency of computer use to play video games; and “High” included participants who checked 6 or 7 for frequency of video game play. A Chi-squared test indicated that males and females were not evenly distributed across these three categories, $\chi^2(2, N=1157) = 59.3$, $p < .001$. Girls were overrepresented among the non-users, with a majority never playing video games (55.7%), compared to 35.9% of boys who never played. Boys were more than twice as likely (21.6%) as girls (8.9%) to be in the high use group. A substantial number of both girls (35.4%) and boys (42.5%) were in the low use group.

Differences between computer game play groups

The next analyses are presented in several steps. First, when constructs are related, they are included together in multivariate analyses of variance. After multivariate tests are
reported, the between-subjects effects are reported for each scale separately. Because cell sizes were unequal, Type III sums of squares were used in all analyses. Following omnibus tests, pairwise comparisons by the Least Significant Difference (LSD) procedure were completed to determine the differences in mean level between video game use groups (examined pairs were (1) none and low, (2) none and high, and (3) low and high). All post-hoc comparisons reported were significant at the .05 level.

**Psychological Adjustment**

A three by two (video game use x adolescent gender) multivariate analysis of variance (MANOVA) was performed to assess potential main effects of gender and video game use, as well as for interactions between video game use and gender, on depressed mood and self-esteem. MANOVA results indicated that the adjustment scales were significantly related to gender (Wilks' criterion = .91, $F(2,1135) = 55.38, p < .001$) and approached significance in their relation to video game use (Wilks' criterion = .99, $F(4,2270) = 2.31, p < .06$). The multivariate interaction of gender and video game use was not significant for adjustment.

Between-subjects tests revealed a significant main effect of video game play for depressed mood, and a main effect of gender for depressed mood and self-esteem. No interactions between gender and video game use were found. The group means and pairwise comparisons for adjustment by video game use are presented in Table 1. Depressed mood varied significantly by video game use, $F(2,1136)=3.83, p < .05$, with the low use and high use groups reporting significantly less depressed mood than their peers who did not use video games. Concerning the main effects of gender, girls reported significantly more depressed
mood ($M = 4.52$ for girls, $M = 3.62$ for boys, $F(1,1136) = 110.83$, $p < .001$), and lower self
esteem than boys ($M=4.49$ for girls and $M=4.80$ for boys, $F(1,1136) = 13.41$, $p < .001$).

Risk Behavior

Differences in reports of risk behavior between those who used video games and
those who did not were examined. A 3 X 2 MANOVA was used to examine differences
based on video game use and gender in the three risk behavior constructs. MANOVA results
indicated that the risk behavior scales were significantly related to video game play (Wilks' criterion = .97, $F(8, 2242) = 3.95$, $p < .01$) and gender (Wilks’ criterion = .92, $F(4,1121) =
25.32$, $p < .001$). The interaction of gender and video game use was not significant.

Between-subjects effects were considered for substance use, aggression, disobedience, and
truancy. Video game use was a significant predictor of both substance use, $F (2,1124)=
5.86$, $p < .01$, and truancy, $F,(2, 1124) = 8.36$, $p <.001$. LSD contrasts indicated that
compared to those who did not play video games, both low and high play adolescents
reported less substance use and less truancy (see Table 1). Video game play approached
significance as a predictor of aggression, $F (2,1124)= 2.71$, $p < .10$, with high video game
players tending to report greater frequency of punching or pushing around others. Gender
was significantly related to aggression, $F (1, 1124) = 94.15$, $p < .001$, with girls ($M = 1.48$)
reporting less aggression than boys ($M = 2.37$). Game play also approached significance as a
predictor of disobeying parents on an important issue, $F (2, 1124) = 2.84$, $p <.10$; the low
play group tended to report lower levels of disobedience.
School records

The three by two MANOVA for absences and grade point average indicated a significant multivariate effect of computer game play (Wilks' criterion = .95, F(4,1936) = 13.22, p < .001) and gender (Wilks' criterion = .97, F(2,968) = 14.77, p < .001). There was no significant multivariate interaction of game play and gender. The between-subjects effect of video game use on GPA, F (2,969) = 26.46, p < .001, demonstrated that those who reported low use of video games had higher grades than both those who never played and those who played at high levels (see Table 1), and the high users had better grades than the non-users. Those who never played computer games also missed more days of school than either the low or high users, F (2,969) = 4.16, p < .05. There was a main effect of gender on GPA, F (1,969) = 8.91, p < .01, with girls having higher grades (M = 2.70) than boys (M = 2.54) and more absences (M = 9.56 for girls and M = 7.96 for boys).

Social Contexts

Three by two (video game use x adolescent gender) ANOVAs were performed to assess main effects of gender and video game use, as well as for interactions between video game use and gender, on family and peer relationships, time spent playing sports, and attachment to school (see Table 2). For family closeness, video game use was a significant predictor, F (2,1151) = 16.46, p < .01. Adolescents who played video games either at low or high rates reported having closer family relationships than those who did not play. There was no gender difference in family closeness. No differences were found for self-concept of popularity, either by gender or by video game use.
For time spent on sports, there was a gender effect, $F (1,955)= 79.68, p < .001$, and an effect of video game use, $F (2,955)= 26.84, p < .001$. Boys ($M = 13.96$) reported playing more sports than girls ($M = 7.53$). Compared to those who did not play video games, those who played at both low and high rates reported spending more hours on sports (see Table 2). There was no interaction between gender and video game use for sports participation.

For attachment to school, there was a significant main effect of video game play, $F (2,1149) = 4.24, p < .05$. Those participants who reported high video game use were more attached to school than those who never played video games. There was no gender effect, or interaction of gender with video game use.

Discussion

In a large sample of 16- to 17-year-olds, we identified individuals whose involvement in computer game play was ‘never’, ‘low’, or ‘high’. On measures of adjustment, risk behavior and social involvement, there were several differences among these groups. In general, and contrary to common speculation, there was no evidence that computer game play is associated with negative outcomes – indeed, most of the findings suggest advantages to adolescents in the low or high play groups compared to the young people who report that they never play games. More specifically, high rates of play were positively linked to family closeness, involvement in physical activity, good school engagement, and positive mental health. Substance use was lower among low and high players than non-players. Truancy was lowest in the high play group. Clearly, these findings do not support assertions that computer game play is likely to be harmful, but instead indicate positive correlates. These results
extend those of Egli and Meyers (1984) who found that computer game players reported no interference in family life, were regularly active in sports, and rejected a link between drug use and game play.

Never-players also had the lowest GPAs, although high-players had only marginally higher GPAs, and the highest scores were those of the low-players. These findings differ from those of van Schie and Wiegman (1997) and Creasey and Myers (1986), who obtained no difference between players and non-players on measures of school performance. This discrepancy among results may be due to the statistical power available because of the large N in the present study; it would certainly be useful in future research to examine more thoroughly the relation between game play and educational attainment. For example, do computer game players do better in particular educational domains?

We did not find clear evidence of differences among the groups in self-reported aggression. In this respect, our findings are consistent with those of several experimental and field studies that have failed to provide evidence of a link between play and aggression (see the Introduction). Nevertheless, it should be acknowledged that the higher use group obtained the highest mean on the aggression measure. Because of the importance of this issue to our understanding of the effects and correlates of computer game play, these results justify closer inspection. Although an overall univariate ANOVA did not indicate a between groups effect at a conventional level of significance, post hoc pairwise comparisons revealed significant differences between the higher use group and the never and lower play groups. However, two points should be borne in mind in interpreting this finding. First, all three
groups actually reveal quite low mean scores on this measure. Participants were asked how often they had punched or pushed around another student; the mean levels indicate that adolescents in all three groups engaged in this level of aggression approximately once within the previous six months. Second, the mean differences between game play groups are magnified by the higher proportion of males in the higher play group and the lower proportion in the lower play group; males were substantially higher than females on aggression and so the means in Table 1 reflect this additive combination of gender and game play.

There were no differences among the groups in self ratings of popularity. This outcome is consistent with the findings of van Schie and Wiegman (1997). In this context, a null result is important, because it is sometimes assumed that computer game play is a solitary activity reflecting or exacerbating a lack of social skills. At least in terms of young people’s self-perceptions, the evidence from van Schie and Wiegman and the present study challenge this assumption. In fact, evidence on computer game play indicates that, while it is often undertaken alone, most players prefer to share the activity with friends or parents (Cupitt & Stockbridge, 1996; Durkin & Aisbett, 1999; Kubey and Larson, 1990).

Gender differences were obtained in our findings that were consistent with those of earlier research. Virtually all investigators have found that males report greater involvement in computer game play than do females (e.g., Barnett et al., 1977; Durkin & Aisbett, 1999; Greenfield, 1984; Kubey and Larson, 1990; Lin & Lepper, 1987). Consistent with this pattern, in the present study girls were overrepresented among the never-users, and
underrepresented among the high players. Several other significant gender differences were also consistent with previously well established patterns: girls scored higher on the measure of depressed mood, higher on GPA, lower on self-reported aggression, lower on sport participation. In general, we obtained no evidence that the patterns of any effects or correlates of computer game play differ between the sexes: the main difference is simply that boys play more.

How are we to interpret the several findings of links between frequency of play and features indicating positive adolescent development, such as family closeness, physical activity, attachment to school, school attendance, favorable mental health, lower substance use? Although we cannot confirm causal relations, at least two lines of interpretation appear possible. One is that the direction of effect is from player to activity choice. On this account, young people who are psychologically well adjusted could be expected to incorporate some degree of currently popular recreational options, such as computer games, as part of a range of activities because they like to explore and experiment with what the world has to offer; they may enjoy the activity, but it does not necessarily predominate among their leisure choices or prevent them from engaging enthusiastically in many other undertakings.

A second line of interpretation might be that the direction of effect is from the medium to the player: that is, that computer game play itself affects psychological adjustment, family relations, social behavior, school attendance and so on. Kubey and Larson (1990) found that adolescents in naturalistic environments reported higher arousal and more positive subjective states during computer game play, especially when the activity was
undertaken in the company of friends or parents. It is conceivable that playing computer games enhances young people’s leisure and promotes positive affect and social interactions. Similarly, computer game play might impact on interests in sports by stimulating interests in action and competition; many popular computer games are themselves sports based. Computer game play may have cognitive benefits, stimulating spatial skills, decision making and reaction times (Greenfield, and these may be conducive to better performance at school.

It is most likely that any relation between individual differences and game play is bi-directional, with certain types of people attracted to particular levels of play and then particular levels of play fostering certain attributes or experiences, and so on. Adolescents who have a positive attitude toward school may have more opportunities to learn about computers or to share information about computer games with their school friends. Adolescents who feel close to their families may play computer games more because of opportunities to share with other family members, or because they are in families that provide generously for educational and leisure activities, including computers. It is possible that the subjective experience of playing is different between individuals who are prone to depressed mood symptoms and those who are not, or between children in close families and peers in troubled homes. There is surprisingly little ethnographic research into the everyday contexts of computer game usage, and a dearth of longitudinal investigations of the complex interplay of individual differences and game play. The overall picture that emerges from this pattern of findings is that computer game play is one manifestation of an active and well adjusted lifestyle. Rather than disrupting family life, games are played by young people who tend to perceive their family relations as close. Rather than displacing activities such as sport, games appear to be another leisure pursuit of those who are physically active. Rather than
signifying academic problems, game play is associated with more positive engagement with school. Some of the relative advantages are greatest among high players (family closeness, attachment to school, low truancy rates, low substance use) and some among low players (GPA, lower depressed mood), but on none of the variables measured here did we find an advantage to the never players. Together, these findings support the thesis that well balanced young people make active leisure choices to complement and extend their interests and skills. Regular engagement involuntary, structured activities sustains and challenges them (Eccles & Barber, 1999; Larson, 2000) and promotes academic and personal development. Computer games are one form of voluntary leisure which many contemporary young people enjoy: they are not a miracle ingredient but can be a positive feature of healthy adolescence.
References


Table 1.

Means (and standard deviations) of adjustment, risk behavior and school records by frequency of video game use.

<table>
<thead>
<tr>
<th></th>
<th>Never Use</th>
<th>Low Use</th>
<th>High Use</th>
<th>F statistic</th>
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<tr>
<td><strong>Adjustment</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Depressed mood</td>
<td>4.29 (1.36)</td>
<td>3.96 (1.17)</td>
<td>4.05 (1.21)</td>
<td>3.83*</td>
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<tr>
<td>Self Esteem</td>
<td>4.53 (1.34)</td>
<td>4.70 (1.23)</td>
<td>4.73 (1.22)</td>
<td>1.61</td>
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<tr>
<td><strong>Risk Behavior</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Aggression</td>
<td>1.78 (1.29)</td>
<td>1.83 (1.29)</td>
<td>2.28 (1.65)</td>
<td>2.88+</td>
</tr>
<tr>
<td>Disobedience</td>
<td>3.15 (1.81)</td>
<td>2.91 (1.59)</td>
<td>3.15 (1.95)</td>
<td>2.84+</td>
</tr>
<tr>
<td>Substance Use</td>
<td>1.85 (1.11)</td>
<td>1.69 (1.05)</td>
<td>1.56 (.87)</td>
<td>5.91**</td>
</tr>
<tr>
<td>Truancy</td>
<td>1.77 (.89)</td>
<td>1.61 (.87)</td>
<td>1.49 (.72)</td>
<td>8.36**</td>
</tr>
<tr>
<td><strong>School Records</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absences</td>
<td>9.70 (7.83)</td>
<td>8.13 (6.98)</td>
<td>8.02 (6.20)</td>
<td>4.16*</td>
</tr>
<tr>
<td>GPA</td>
<td>2.49 (.70)</td>
<td>2.79 (.71)</td>
<td>2.62 (.62)</td>
<td>26.46**</td>
</tr>
</tbody>
</table>

Groups with different superscript letters are significantly different from each other.

**p < .01, *p < .05, +p < .10**
Table 2.

**Means (and standard deviations) of social context involvement by frequency of video game use.**

<table>
<thead>
<tr>
<th></th>
<th>Never Use</th>
<th>Low Use</th>
<th>High Use</th>
<th>F statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Closeness</td>
<td>4.56 (1.57)(^a)</td>
<td>4.83 (1.35)(^b)</td>
<td>5.01 (1.46)(^b)</td>
<td>7.63**</td>
</tr>
<tr>
<td>Popularity</td>
<td>4.99 (1.19)</td>
<td>4.91 (1.08)</td>
<td>4.88 (1.16)</td>
<td>0.36</td>
</tr>
<tr>
<td>Hours spent on sports</td>
<td>7.55 (8.92)(^a)</td>
<td>12.45 (9.67)(^b)</td>
<td>14.06 (10.03)(^b)</td>
<td>26.84**</td>
</tr>
<tr>
<td>Attachment to school</td>
<td>4.40 (1.77)(^a)</td>
<td>4.57 (1.59)</td>
<td>4.79 (1.67)(^b)</td>
<td>4.24*</td>
</tr>
</tbody>
</table>

\(^a\) and \(^b\) symbolize groups that are significantly different from each other.

**p < .01, *p < .05, +p < .10**