

# VIDEO GAMING SUBJECT BIBLIOGRAPHY

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of New Zealand, June 2013*

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## Anxiety/Depression (4)

Carnagey, N. L., C. A. Anderson, et al. (2007). "The effect of video game violence on physiological desensitization to real-life violence." [Journal of Experimental Social Psychology](#) **43**(3): 489-496.

*Journal Article* - [http://lol.medieraadet.dk/upload/mulige\\_aasager\\_social\\_hensynsloeshed.pdf](http://lol.medieraadet.dk/upload/mulige_aasager_social_hensynsloeshed.pdf)

*Abstract:* Past research shows that violent video game exposure increases aggressive thoughts, angry feelings, physiological arousal, aggressive behaviors, and decreases helpful behaviors. However, no research has experimentally examined violent video game effects on physiological desensitization, defined as showing less physiological arousal to violence in the real world after exposure to video game violence in the virtual world. This experiment attempts to fill this gap. Participants reported their media habits and then played one of eight violent or nonviolent video games for 20 min. Next, participants watched a 10-min videotape containing scenes of real-life violence while heart rate (HR) and galvanic skin response (GSR) were monitored. Participants who previously played a violent video game had lower HR and GSR while viewing filmed real violence, demonstrating a physiological desensitization to violence. Results are interpreted using an expanded version of the General Aggression Model. Links between desensitization, antisocial, and prosocial behavior are discussed.

Gentile, D. A., H. Choo, et al. (2011). "Pathological video game use among youths: a two-year longitudinal study." [Pediatrics](#) **127**(2): e319-e329.

*Journal Article* - <http://pediatrics.aappublications.org/content/127/2/e319.full>

*Abstract:* OBJECTIVES: We aimed to measure the prevalence and length of the problem of pathological video gaming or Internet use, to identify risk and protective factors, to determine whether pathological gaming is a primary or secondary problem, and to identify outcomes for individuals who become or stop being pathological gamers.

METHODS: A 2-year, longitudinal, panel study was performed with a general elementary and secondary school population in Singapore, including 3034 children in grades 3 (N = 743), 4 (N = 711), 7 (N = 916), and 8 (N = 664). Several hypothesized risk and protective factors for developing or overcoming pathological gaming were measured, including weekly amount of game play, impulsivity, social competence, depression, social phobia, anxiety, and school performance.

RESULTS: The prevalence of pathological gaming was similar to that in other countries (~9%). Greater amounts of gaming, lower social competence, and greater impulsivity seemed to act as risk factors for becoming pathological gamers, whereas depression, anxiety, social phobias, and lower school performance seemed to act as outcomes of pathological gaming.

CONCLUSION: This study adds important information to the discussion about whether video game "addiction" is similar to other addictive behaviors, demonstrating that it can last for years and is not solely a symptom of comorbid disorders.

King, D. L., P. H. Delfabbro, et al. (2013). "Clinical features and axis I comorbidity of Australian adolescent pathological Internet and video game users." [Aust N Z J Psychiatry](#).

*Journal Article*

**Abstract:** Objectives: Although there is growing international recognition of pathological technology use (PTU) in adolescence, there has been a paucity of empirical research conducted in Australia. This study was designed to assess the clinical features of pathological video gaming (PVG) and pathological Internet use (PIU) in a normative Australian adolescent population. A secondary objective was to investigate the axis I comorbidities associated with PIU and video gaming. Method: A total of 1287 South Australian secondary school students aged 12-18 years were recruited. Participants were assessed using the PTU checklist, Revised Children's Anxiety and Depression Scale, Social Anxiety Scale for Adolescents, revised UCLA Loneliness Scale, and Teenage Inventory of Social Skills. Adolescents who met the criteria for PVG or PIU or both were compared to normal adolescents in terms of axis I comorbidity. Results: The prevalence rates of PIU and PVG were 6.4% and 1.8%, respectively. A subgroup with co-occurring PIU and PVG was identified (3.3%). The most distinguishing clinical features of PTU were withdrawal, tolerance, lies and secrecy, and conflict. Symptoms of preoccupation, inability to self-limit, and using technology as an escape were commonly reported by adolescents without PTU, and therefore may be less useful as clinical indicators. Depression, panic disorder, and separation anxiety were most prevalent among adolescents with PIU. Conclusions: PTU among Australian adolescents remains an issue warranting clinical concern. These results suggest an emerging trend towards the greater uptake and use of the Internet among female adolescents, with associated PIU. Although there exists an overlap of PTU disorders, adolescents with PIU appear to be at greater risk of axis I comorbidity than adolescents with PVG alone. Further research with an emphasis on validation techniques, such as verified identification of harm, may enable an informed consensus on the definition and diagnosis of PTU.

Patel, A., T. Schieble, et al. (2006). "Distraction with a hand-held video game reduces pediatric preoperative anxiety." [Paediatr Anaesth](#) **16**(10): 1019-1027.

*Journal Article*

**Abstract:** BACKGROUND: Video games have received widespread application in health care for distraction and behavior modification therapy. Studies on the effect of cognitive distraction during the preoperative period are lacking. We evaluated the efficacy of an interactive distraction, a hand-held video game (VG) in reducing preoperative anxiety in children. METHODS: In a randomized, prospective study of 112 children aged 4-12 years undergoing outpatient surgery, anxiety was assessed after admission and again at mask induction of anesthesia, using the modified Yale Preoperative Anxiety Scale (mYPAS). Postoperative behavior changes were assessed with the Posthospital Behavior Questionnaire (PHBQ). Patients were randomly assigned to three groups: parent presence (PP), PP+a hand-held VG, and PP+0.5 mg.kg<sup>-1</sup> oral midazolam (M) given >20 min prior to entering the operating room. RESULTS: There was a statistically significant increase in anxiety ( $P < 0.01$ ) in groups M and PP at induction of anesthesia compared with baseline, but not in VG group. VG patients demonstrated a decrease in anxiety from baseline (median change in mYPAS -3), the difference compared with PP (+11.8) was significant ( $P = 0.04$ ). The change in anxiety in the M group (+7.3) was not statistically different from

other groups. Sixty-three percent of patients in VG group had no change or decrease in anxiety after treatment, compared with 26% in M group and 28% in PP group ( $P=0.01$ ). There was no difference in anxiety changes between female and male patients. CONCLUSIONS: A hand-held VG can be offered to most children as a low cost, easy to implement, portable, and effective method to reduce anxiety in the preoperative area and during induction of anesthesia. Distraction in a pleasurable and familiar activity provides anxiety relief, probably through cognitive and motor absorption.

## Avatars (3)

Jin, S. A. and N. Park (2009). "Parasocial interaction with my avatar: effects of interdependent self-construal and the mediating role of self-presence in an avatar-based console game, Wii." [Cyberpsychol Behav](#) **12**(6): 723-727.

### *Journal Article*

*Abstract:* The "self" concept has grown increasingly important in interactive media environments. This study investigated self-related processes in an avatar-based game console, Wii. A key feature of the Wii is its motion-sensing capability that empowers players to manipulate and interact with items on-screen via movement. The present study examined the effects of video game players' self-construal on parasocial interaction with their avatars and feelings of self-presence. In this study, parasocial interaction was operationally defined as the extent of game players' interpersonal involvement with their avatar and the extent to which game players perceive themselves as interacting with the avatar. Self-presence was defined as the degree to which video game players feel as if their avatar on the screen were their real self. Based on an experiment, the study discovered that game players with high interdependent self-construal showed closer parasocial interaction and higher level of self-presence than those with low interdependent self-construal. Results also showed that self-presence mediated the effects of interdependent self-construal on the parasocial relationship with game players' avatars. Thus, the study discovered an important individual difference factor, interdependent self-construal, affecting the degree to which people form a parasocial relationship with their virtual self that is visually manifested in the form of an avatar. In addition, the present study added empirical evidence about the mediating role played by self-presence in avatar-based video games.

Lewis, M. L., R. Weber, et al. (2008). ""They may be pixels, but they're MY pixels:" developing a metric of character attachment in role-playing video games." [Cyberpsychol Behav](#) **11**(4): 515-518.

### *Journal Article*

*Abstract:* This paper proposes a new and reliable metric for measuring character attachment (CA), the connection felt by a video game player toward a video game character. Results of construct validity analyses indicate that the proposed CA scale has a significant relationship with self-esteem, addiction, game enjoyment, and time spent playing games; all of these relationships are predicted by theory.

Additionally, CA levels for role-playing games differ significantly from CA levels of other character-driven games.

Principe, C. P. and J. H. Langlois (2013). "Children and adults use attractiveness as a social cue in real people and avatars." [J Exp Child Psychol](#) **115**(3): 590-597.

*Journal Article*

*Abstract:* Observing social interactions between children and adults is a major method in the toolkit of psychologists who examine social development and social relationships. Although this method has revealed many interesting phenomena, it cannot determine the effect of behavior independent of other traits. Research on the role of attractiveness in social development provides an example of this conundrum: Are attractive and unattractive children/adults treated differently because of their attractiveness (independent of their behavior), do they behave differently and thus elicit differential treatment, or both? Virtual world and avatar-based technologies allow researchers to control the social behaviors of targets; however, whether children and adults use the facial attractiveness of avatars as a social cue in the same way as they do with real peers is currently unknown. Using Mii avatars from the popular Nintendo Wii video game console, Study 1 found that the facial attractiveness ratings of real people strongly predicted the attractiveness ratings of avatar faces based on the former group. Study 2 revealed that adults (n=46) and children (n=42) prefer attractive avatars as social partners. The results of this set of methodological studies may help to clarify future research on the relationship between attractiveness and behavior throughout the lifespan. Furthermore, the use of avatars may allow studies to experimentally examine the effects of attractiveness in situations where such research is not ethical (e.g., peer victimization).

## Behaviour (13)

Anderson, C. A. and B. J. Bushman (2001). "Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature." [Psychological science](#) **12**(5): 353-359.

*Journal Article* - <http://lilt.ilstu.edu/mjreese/psy453/Anderson%20et%20al,%202010.pdf>

*Abstract:* Research on exposure to television and movie violence suggests that playing violent video games will increase aggressive behavior. A meta-analytic review of the video-game research literature reveals that violent video games increase aggressive behavior in children and young adults. Experimental and nonexperimental studies with males and females in laboratory and field settings support this conclusion. Analyses also reveal that exposure to violent video games increases physiological arousal and aggression-related thoughts and feelings. Playing violent video games also decreases prosocial behavior.

Barlett, C., O. Branch, et al. (2009). "How long do the short-term violent video game effects last?" [Aggressive behavior](#) **35**(3): 225-236.

*Journal Article* - <https://www.soilcarboncenter.k-state.edu/psych/research/documents/Barlettetal09.pdf>

*Abstract:* How long do the effects of the initial short-term increase in aggression and physiological arousal last after violent video game play? Study 1 (N=91) had participants complete pre- and postvideo game measures of aggressive thoughts, aggressive feelings, and heart rate. Then, participants completed Time 3 measures after 4 min or 9 min of delay. Study 2 employed a similar procedure, but had participants (N=91) complete the hot sauce paradigm to assess aggressive behavior after a 0, 5, or 10 min delay. First, results indicated that aggressive feelings, aggressive thoughts, aggressive behavior, and heart rate initially increased after violent video game play. Second, results of the delay condition revealed that the increase in aggressive feelings and aggressive thoughts lasted less than 4 min, whereas heart rate and aggressive behavior lasted 4–9 min. *Aggr. Behav.* 35:225–236, 2009. © 2009 Wiley-Liss, Inc.

Cummings, H. M. and E. A. Vandewater (2007). "Relation of adolescent video game play to time spent in other activities." [Arch Pediatr Adolesc Med](#) **161**(7): 684-689.

*Journal Article*

*Abstract:* OBJECTIVE: To examine the notion that playing video games is negatively related to the time adolescents spend in more developmentally appropriate activities. DESIGN: Nonexperimental study. SETTING: Survey data collected during the 2002-2003 school year. PARTICIPANTS: A nationally representative sample of 1491 children aged 10 to 19 years. Main Outcome Measure Twenty-four-hour time-use diaries were collected on 1 weekday and 1 weekend day, both randomly chosen. Time-use diaries were used to determine adolescents' time spent playing video games, with parents and friends, reading and doing homework, and in sports and active leisure. RESULTS: Differences in time spent between game players and nonplayers as well as the magnitude of the relationships among game time and activity time among adolescent game players were assessed. Thirty-six percent of adolescents (80% of boys and 20% of girls) played video games. On average, gamers played for an hour on the weekdays and an hour and a half on the weekends. Compared with nongamers, adolescent gamers spent 30% less time reading and 34% less time doing homework. Among gamers (both genders), time spent playing video games without parents or friends was negatively related to time spent with parents and friends in other activities. CONCLUSIONS: Although gamers and nongamers did not differ in the amount of time they spent interacting with family and friends, concerns regarding gamers' neglect of school responsibilities (reading and homework) are warranted. Although only a small percentage of girls played video games, our findings suggest that playing video games may have different social implications for girls than for boys.

Desai, R. A., S. Krishnan-Sarin, et al. (2010). "Video-gaming among high school students: health correlates, gender differences, and problematic gaming." [Pediatrics](#) **126**(6): e1414-1424.

*Journal Article*

**Abstract:** OBJECTIVE: Video game playing may negatively impact youth. However, the existing literature on gaming is inconsistent and often has focused on aggression rather than the health correlates of gaming and the prevalence and correlates of problematic gaming. METHODS: We anonymously surveyed 4028 adolescents about gaming and reported problems with gaming and other health behaviors. A total of 51.2% of the sample reported gaming (76.3% of boys and 29.2% of girls). RESULTS: There were no negative health correlates of gaming in boys and lower odds of smoking regularly; however, girls who reported gaming were less likely to report depression and more likely to report getting into serious fights and carrying a weapon to school. Among gamers, 4.9% reported problematic gaming, defined as reporting trying to cut back, experiencing an irresistible urge to play, and experiencing a growing tension that could only be relieved by playing. Boys were more likely to report these problems (5.8%) than girls (3.0%). Correlates of problematic gaming included regular cigarette smoking, drug use, depression, and serious fights. Results suggest that gaming is largely normative in boys and not associated with many health factors. In girls, however, gaming seems to be associated with more externalizing behaviors and fewer internalizing symptoms. CONCLUSIONS: The prevalence of problematic gaming is low but not insignificant, and problematic gaming may be contained within a larger spectrum of externalizing behaviors. More research is needed to define safe levels of gaming, refine the definition of problematic gaming, and evaluate effective prevention and intervention strategies.

Ferguson, C. J. (2011). "The influence of television and video game use on attention and school problems: a multivariate analysis with other risk factors controlled." [\*J Psychiatr Res\* 45\(6\): 808-813.](#)

*Journal Article*

**Abstract:** BACKGROUND: Research on youth mental health has increasingly indicated the importance of multivariate analyses of multiple risk factors for negative outcomes. Television and video game use have often been posited as potential contributors to attention problems, but previous studies have not always been well-controlled or used well-validated outcome measures. The current study examines the multivariate nature of risk factors for attention problems symptomatic of attention deficit hyperactivity disorder and poor school performance. METHOD: A predominantly Hispanic population of 603 children (ages 10-14) and their parents/guardians responded to multiple behavioral measures. Outcome measures included parent and child reported attention problem behaviors on the Child Behavior Checklist (CBCL) as well as poor school performance as measured by grade point average (GPA). RESULTS: Results found that internal factors such as male gender, antisocial traits, family environment and anxiety best predicted attention problems. School performance was best predicted by family income. Television and video game use, whether total time spent using, or exposure to violent content specifically, did not predict attention problems or GPA. INTERPRETATION: Television and video game use do not appear to be significant predictors of childhood attention problems. Intervention and prevention efforts may be better spent on other risk factors.

Ferguson, C. J., C. San Miguel, et al. (2012). "A longitudinal test of video game violence influences on dating and aggression: a 3-year longitudinal study of adolescents." [J Psychiatr Res](#) **46(2)**: 141-146.

*Journal Article*

*Abstract:* BACKGROUND: In 2011 the field of video game violence experienced serious reversals with repudiations of the current research by the US Supreme Court and the Australian Government as non-compelling and fundamentally flawed. Scholars too have been calling for higher quality research on this issue. The current study seeks to answer this call by providing longitudinal data on youth aggression and dating violence as potential consequences of violent video game exposure using well-validated clinical outcome measures and controlling for other relevant predictors of youth aggression. METHOD: A sample of 165, mainly Hispanic youth, were tested at 3 intervals, an initial interview, and 1-year and 3-year intervals. RESULTS: Results indicated that exposure to video game violence was not related to any of the negative outcomes. Depression, antisocial personality traits, exposure to family violence and peer influences were the best predictors of aggression-related outcomes. INTERPRETATION: The current study supports a growing body of evidence pointing away from video game violence use as a predictor of youth aggression. Public policy efforts, including funding, would best be served by redirecting them toward other prevention programs for youth violence.

Gentile, D. A., C. A. Anderson, et al. (2009). "The effects of prosocial video games on prosocial behaviors: International evidence from correlational, longitudinal, and experimental studies." [Personality and Social Psychology Bulletin](#) **35(6)**: 752-763.

*Journal Article* - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2678173/>

*Abstract:* Although dozens of studies have documented a relation between violent video games and aggressive behaviors, very little attention has been paid to potential effects of prosocial games. Theoretically, games in which game characters help and support each other in nonviolent ways should increase both short-term and long-term prosocial behaviors. We report three studies conducted in three countries with three age groups to test this hypothesis. In the correlational study, Singaporean middle-school students who played more prosocial games behaved more prosocially. In the two longitudinal samples of Japanese children and adolescents, prosocial game play predicted later increases in prosocial behavior. In the experimental study, U.S. undergraduates randomly assigned to play prosocial games behaved more prosocially toward another student. These similar results across different methodologies, ages, and cultures provide robust evidence a prosocial game content effect, and provide support for the General Learning Model.

Hart, G. M., B. Johnson, et al. (2009). "Effects of video games on adolescents and adults." [Cyberpsychol Behav](#) **12(1)**: 63-65.

*Journal Article*

*Abstract:* The present study compared a sample of American adolescents with a Spanish sample on a measure of video game addiction, the Problem Video Game Playing (PVP) survey developed in Spain. In addition, the study examined excessive video game playing and reported distress in social life, occupational activities, and school among high school students, college students, and adults. Samples taken from a large Eastern university, two suburban high schools, and an Internet survey were surveyed with an instrument developed by the authors and the PVP. Results show support for the PVP and a similarity between the Spanish and American samples but not for relationships between the PVP and assessments of distress in areas of daily functioning.

Mathers, M., L. Canterford, et al. (2009). "Electronic media use and adolescent health and well-being: cross-sectional community study." [\*Acad Pediatr\* 9\(5\): 307-314.](#)

*Journal Article*

*Abstract:* OBJECTIVE: To describe time adolescents spend using electronic media (television, computer, video games, and telephone); and to examine associations between self-reported health/well-being and daily time spent using electronic media overall and each type of electronic media. METHODS: Design-Cross-sectional data from the third (2005) wave of the Health of Young Victorians Study, an Australian school-based population study. Outcome Measures-Global health, health-related quality of life (HRQoL; KIDSCREEN), health status (Pediatric Quality of Life Inventory 4.0; PedsQL), depression/anxiety (Kessler-10), and behavior problems (Strengths and Difficulties Questionnaire). Exposure Measures-Duration of electronic media use averaged over 1 to 4 days recalled with the Multimedia Activity Recall for Children and Adolescents (MARCA) computerized time-use diary. Analysis-Linear and logistic regression; adjusted for demographic variables and body mass index z score. RESULTS: A total of 925 adolescents (mean +/- standard deviation age, 16.1+/-1.2 years) spent, on average, 3 hours 16 minutes per day using electronic media (television, 128 minutes per day; video games, 35; computers, 19; telephone, 13). High overall electronic media use was associated with poorer behavior, health status, and HRQoL. Associations with duration of specific media exposures were mixed; there was a favorable association between computer use (typing/Internet) and psychological distress, whereas high video game use was associated with poorer health status, HRQoL, global health, and depression/anxiety. Television and telephone durations were not associated with any outcome measure. CONCLUSIONS: Despite television's associations with obesity, time spent in other forms of media use appear more strongly related to adolescent health and well-being. This study supports efforts to reduce high video game use and further exploration of the role of computers in health enhancement.

Mentzoni, R. A., G. S. Brunborg, et al. (2011). "Problematic video game use: estimated prevalence and associations with mental and physical health." [\*Cyberpsychol Behav Soc Netw\* 14\(10\): 591-596.](#)

*Journal Article*

*Abstract:* A nationwide survey was conducted to investigate the prevalence of video game addiction and problematic video game use and their association with physical and mental health. An initial sample

comprising 2,500 individuals was randomly selected from the Norwegian National Registry. A total of 816 (34.0 percent) individuals completed and returned the questionnaire. The majority (56.3 percent) of respondents used video games on a regular basis. The prevalence of video game addiction was estimated to be 0.6 percent, with problematic use of video games reported by 4.1 percent of the sample. Gender (male) and age group (young) were strong predictors for problematic use of video games. A higher proportion of high frequency compared with low frequency players preferred massively multiplayer online role-playing games, although the majority of high frequency players preferred other game types. Problematic use of video games was associated with lower scores on life satisfaction and with elevated levels of anxiety and depression. Video game use was not associated with reported amount of physical exercise.

Padilla-Walker, L. M., L. J. Nelson, et al. (2010). "More than a just a game: video game and internet use during emerging adulthood." [J Youth Adolesc](#) **39**(2): 103-113.

*Journal Article*

**Abstract:** The purpose of this study was to gain a clearer understanding of the pattern of video game and internet use among college students and to examine how electronic leisure was related to risk behaviors (i.e., drinking, drug use, sex), perceptions of the self (i.e., self worth and social acceptance), and relationships with others (i.e., relationship quality with parents and friends). Participants included 813 undergraduate students (500 young women, 313 young men, M age = 20, SD = 1.87) who were mainly European American (79%), unmarried (100%) and living outside their parents' home (90%). Results suggested that (a) video game use was linked to negative outcomes for men and women, (b) different patterns of video game and internet use existed for men and women and (c) there were different relations to risk behaviors, feelings about the self, and relationship quality based on the type of internet use, and based on gender. The discussion focuses on the implications of electronic leisure on the overall health and development of young people as they transition to adulthood.

Walther, B., M. Morgenstern, et al. (2012). "Co-occurrence of addictive behaviours: personality factors related to substance use, gambling and computer gaming." [Eur Addict Res](#) **18**(4): 167-174.

*Journal Article*

**Abstract:** AIM: To investigate co-occurrence and shared personality characteristics of problematic computer gaming, problematic gambling and substance use. METHODS: Cross-sectional survey data were collected from 2,553 German students aged 12-25 years. Self-report measures of substance use (alcohol, tobacco and cannabis), problematic gambling (South Oaks Gambling Screen - Revised for Adolescents, SOGS-RA), problematic computer gaming (Video Game Dependency Scale, KFN-CSAS-II), and of twelve different personality characteristics were obtained. RESULTS: Analyses revealed positive correlations between tobacco, alcohol and cannabis use and a smaller positive correlation between problematic gambling and problematic computer gaming. Problematic computer gaming co-occurred only with cannabis use, whereas problematic gambling was associated with all three types of substance

use. Multivariate multilevel analyses showed differential patterns of personality characteristics. High impulsivity was the only personality characteristic associated with all five addictive behaviours. Depression and extraversion were specific to substance users. Four personality characteristics were specifically associated with problematic computer gaming: irritability/aggression, social anxiety, ADHD, and low self-esteem. CONCLUSIONS: Problematic gamblers seem to be more similar to substance users than problematic computer gamers. From a personality perspective, results correspond to the inclusion of gambling in the same DSM-V category as substance use and question a one-to-one proceeding for computer gaming.

Weaver, J. B., 3rd, D. Mays, et al. (2009). "Health-risk correlates of video-game playing among adults." [\*Am J Prev Med\* 37\(4\): 299-305.](#)

*Journal Article*

*Abstract:* BACKGROUND: Although considerable research suggests that health-risk factors vary as a function of video-game playing among young people, direct evidence of such linkages among adults is lacking. PURPOSE: The goal of this study was to distinguish adult video-game players from nonplayers on the basis of personal and environmental factors. It was hypothesized that adults who play video games, compared to nonplayers, would evidence poorer perceptions of their health, greater reliance on Internet-facilitated social support, more extensive media use, and higher BMI. It was further hypothesized that different patterns of linkages between video-game playing and health-risk factors would emerge by gender. METHODS: A cross-sectional, Internet-based survey was conducted in 2006 with a sample of adults from the Seattle-Tacoma area (n=562), examining health risks; media use behaviors and perceptions, including those related to video-game playing; and demographics. Statistical analyses conducted in 2008 to compare video-game players and nonplayers included bivariate descriptive statistics, stepwise discriminant analysis, and ANOVA. RESULTS: A total of 45.1% of respondents reported playing video games. Female video-game players reported greater depression (M=1.57) and poorer health status (M=3.90) than female nonplayers (depression, M=1.13; health status, M=3.57). Male video-game players reported higher BMI (M=5.31) and more Internet use time (M=2.55) than male nonplayers (BMI, M=5.19; Internet use, M=2.36). The only determinant common to female and male video-game players was greater reliance on the Internet for social support. CONCLUSIONS: A number of determinants distinguished video-game players from nonplayers, and these factors differed substantially between men and women. The data illustrate the need for further research among adults to clarify how to use digital opportunities more effectively to promote health and prevent disease.

## Education (6)

Adachi, P. J. and T. Willoughby (2013). "More than just fun and games: the longitudinal relationships between strategic video games, self-reported problem solving skills, and academic grades." [\*J Youth Adolesc\* 42\(7\): 1041-1052.](#)

*Journal Article*

*Abstract:* Some researchers have proposed that video games possess good learning principles and may promote problem solving skills. Empirical research regarding this relationship, however, is limited. The goal of the presented study was to examine whether strategic video game play (i.e., role playing and strategy games) predicted self-reported problem solving skills among a sample of 1,492 adolescents (50.8 % female), over the four high school years. The results showed that more strategic video game play predicted higher self-reported problem solving skills over time than less strategic video game play. In addition, the results showed support for an indirect association between strategic video game play and academic grades, in that strategic video game play predicted higher self-reported problem solving skills, and, in turn, higher self-reported problem solving skills predicted higher academic grades. The novel findings that strategic video games promote self-reported problem solving skills and indirectly predict academic grades are important considering that millions of adolescents play video games every day.

Bavelier, D., C. S. Green, et al. (2012). "Brain plasticity through the life span: learning to learn and action video games." [\*Annu Rev Neurosci\* 35: 391-416.](#)

*Journal Article*

*Abstract:* The ability of the human brain to learn is exceptional. Yet, learning is typically quite specific to the exact task used during training, a limiting factor for practical applications such as rehabilitation, workforce training, or education. The possibility of identifying training regimens that have a broad enough impact to transfer to a variety of tasks is thus highly appealing. This work reviews how complex training environments such as action video game play may actually foster brain plasticity and learning. This enhanced learning capacity, termed learning to learn, is considered in light of its computational requirements and putative neural mechanisms.

Cui, Z., S. Shah, et al. (2012). "Effect of a school-based peer education intervention on physical activity and sedentary behaviour in Chinese adolescents: a pilot study." [\*BMJ Open\* 2\(3\).](#)

*Journal Article*

*Abstract:* OBJECTIVE: To evaluate the effect on physical activity and sedentary behaviour of a pilot school-based peer education programme in urban Beijing, China. DESIGN: 4 junior high schools were matched by school size and randomised to intervention (n=346) and control group (n=336). INTERVENTION: Trained peer leaders from grade 7 by research staff delivered weekly 40-min lessons to their classmates over four consecutive weeks. Students in control schools received no intervention. OUTCOME MEASURES: A validated 7-day youth physical activity questionnaire was used to evaluate physical activity and sedentary behaviours at baseline (September 2010), 3 months (December 2010) and 7 months (May 2011). Generalised linear mixed models were applied to evaluate the effect. RESULTS: There was a significant decrease in time in sedentary behaviour on weekdays, 20 min/day at 7 months ( $p=0.020$ ) reported by students in the intervention schools compared with control schools. This reduction was mainly due to a reduction of 14 min/day in computer usage on weekdays ( $p=0.0009$ ). There were no significant differences in time on other sedentary behaviours, including television and

DVD, video game, extracurricular reading, writing, drawing and listening to music, passive commuting and sitting to talk. There was also no significant difference in time in moderate-to-vigorous physical activity between intervention and control group. CONCLUSIONS: Peer education appears to be a promising intervention in reducing sedentary behaviours in adolescents in China. These results need confirmation in a larger study. CLINICAL TRIAL REGISTRATION NUMBER: ACTRN12612000417886 at <http://ANZCTR.org.au>.

Fogel, V. A., R. G. Miltenberger, et al. (2010). "The effects of exergaming on physical activity among inactive children in a physical education classroom." [J Appl Behav Anal](#) **43**(4): 591-600.

*Journal Article*

*Abstract:* Childhood obesity, which is due in part to lack of physical activity, is a serious concern that requires the attention of the behavioral community. Although excessive video game play has been noted in the literature as a contributor to childhood obesity, newer video gaming technology, called exergaming, has been designed to capitalize on the reinforcing effects of video games to increase physical activity in children. This study evaluated the effects of exergaming on physical activity among 4 inactive children in a physical education (PE) classroom. Results showed that exergaming produced substantially more minutes of physical activity and more minutes of opportunity to engage in physical activity than did the standard PE program. In addition, exergaming was socially acceptable to both the students and the PE teacher. Exergaming appears to hold promise as a method for increasing physical activity among inactive children and might be a possible intervention for childhood obesity.

Hastings, E. C., T. L. Karas, et al. (2009). "Young children's video/computer game use: relations with school performance and behavior." [Issues Ment Health Nurs](#) **30**(10): 638-649.

*Journal Article*

*Abstract:* This study examined the amount and content of children's video game playing in relation with behavioral and academic outcomes. Relationships among playing context, child gender, and parental monitoring were explored. Data were obtained through parent report of child's game play, behavior, and school performance. Results revealed that time spent playing games was related positively to aggression and negatively to school competence. Violent content was correlated positively and educational content negatively with attention problems. Educational games were related to good academic achievement. Results suggest violent games, and a large amount of game play, are related to troublesome behavioral and academic outcomes, but educational games may be related to positive outcomes. Neither gender nor parental monitoring emerged as significant moderators of these effects.

Nije Bijvank, M., E. A. Konijn, et al. (2012). ""We don't need no education": Video game preferences, video game motivations, and aggressiveness among adolescent boys of different educational ability levels." [J Adolesc](#) **35**(1): 153-162.

*Journal Article*

*Abstract:* This research focuses on low educational ability as a risk factor for aggression and violent game play. We propose that boys of lower educational ability are more attracted to violent video games than other boys are, and that they are also higher in trait aggressiveness and sensation seeking. Participants were Dutch boys in public schools (N = 830, age-range 11-17). In the Netherlands, standardized tests are used to place students into lower, medium, and higher educational ability groups. Results showed that boys in the lower educational ability group preferred to play violent, stand-alone games, identified more with video game characters, and perceived video games to be more realistic than other boys did. Lower levels of education were also related to higher levels of aggressiveness and sensation seeking. Higher educational ability boys preferred social, multiplayer games. Within a risk and resilience model, boys with lower educational ability are at greater risk for aggression.

## Eyesight/Vision (5)

Achtman, R. L., C. S. Green, et al. (2008). "Video games as a tool to train visual skills." [Restor Neurol Neurosci](#) **26**(4-5): 435-446.

### *Journal Article*

*Abstract:* PURPOSE: Adult brain plasticity, although possible, is often difficult to elicit. Training regimens in adults can produce specific improvements on the trained task without leading to general enhancements that would improve quality of life. This paper considers the case of playing action video games as a way to induce widespread enhancement in vision. CONCLUSIONS: We review the range of visual skills altered by action video game playing as well as the game components important in promoting visual plasticity. Further, we discuss what these results might mean in terms of rehabilitation for different patient populations.

Caplovitz, G. P. and S. Kastner (2009). "Carrot sticks or joysticks: video games improve vision." [Nature neuroscience](#) **12**(5): 527-528.

*Journal Article* - <http://www.nature.com/neuro/journal/v12/n5/abs/nn0509-527.html>

*Abstract:* Playing action-based video games has been shown to improve attentional processing. A study now finds that it also induces long-lasting improvements in contrast sensitivity, a basic visual function that commonly deteriorates with age. These improvements do not happen for an equivalent group who played a non-action video game.

Green, C. S. and D. Bavelier (2007). "Action-video-game experience alters the spatial resolution of vision." [Psychol Sci](#) **18**(1): 88-94.

### *Journal Article*

*Abstract:* Playing action video games enhances several different aspects of visual processing; however, the mechanisms underlying this improvement remain unclear. Here we show that playing action video

games can alter fundamental characteristics of the visual system, such as the spatial resolution of visual processing across the visual field. To determine the spatial resolution of visual processing, we measured the smallest distance a distractor could be from a target without compromising target identification. This approach exploits the fact that visual processing is hindered as distractors are brought close to the target, a phenomenon known as crowding. Compared with nonplayers, action-video-game players could tolerate smaller target-distractor distances. Thus, the spatial resolution of visual processing is enhanced in this population. Critically, similar effects were observed in non-video-game players who were trained on an action video game; this result verifies a causative relationship between video-game play and augmented spatial resolution.

Jeon, S. T., D. Maurer, et al. (2012). "The effect of video game training on the vision of adults with bilateral deprivation amblyopia." [Seeing Perceiving](#) **25**(5): 493-520.

*Journal Article*

*Abstract:* Amblyopia is a condition involving reduced acuity caused by abnormal visual input during a critical period beginning shortly after birth. Amblyopia is typically considered to be irreversible during adulthood. Here we provide the first demonstration that video game training can improve at least some aspects of the vision of adults with bilateral deprivation amblyopia caused by a history of bilateral congenital cataracts. Specifically, after 40 h of training over one month with an action video game, most patients showed improvement in one or both eyes on a wide variety of tasks including acuity, spatial contrast sensitivity, and sensitivity to global motion. As well, there was evidence of improvement in at least some patients for temporal contrast sensitivity, single letter acuity, crowding, and feature spacing in faces, but not for useful field of view. The results indicate that, long after the end of the critical period for damage, there is enough residual plasticity in the adult visual system to effect improvements, even in cases of deep amblyopia caused by early bilateral deprivation.

Li, R. W., C. Ngo, et al. (2011). "Video-game play induces plasticity in the visual system of adults with amblyopia." [PLoS Biol](#) **9**(8): e1001135.

*Journal Article*

*Abstract:* Abnormal visual experience during a sensitive period of development disrupts neuronal circuitry in the visual cortex and results in abnormal spatial vision or amblyopia. Here we examined whether playing video games can induce plasticity in the visual system of adults with amblyopia. Specifically 20 adults with amblyopia (age 15-61 y; visual acuity: 20/25-20/480, with no manifest ocular disease or nystagmus) were recruited and allocated into three intervention groups: action videogame group (n = 10), non-action videogame group (n = 3), and crossover control group (n = 7). Our experiments show that playing video games (both action and non-action games) for a short period of time (40-80 h, 2 h/d) using the amblyopic eye results in a substantial improvement in a wide range of fundamental visual functions, from low-level to high-level, including visual acuity (33%), positional acuity (16%), spatial attention (37%), and stereopsis (54%). Using a cross-over experimental design (first 20 h: occlusion therapy, and the next 40 h: videogame therapy), we can conclude that the improvement

cannot be explained simply by eye patching alone. We quantified the limits and the time course of visual plasticity induced by video-game experience. The recovery in visual acuity that we observed is at least 5-fold faster than would be expected from occlusion therapy in childhood amblyopia. We used positional noise and modelling to reveal the neural mechanisms underlying the visual improvements in terms of decreased spatial distortion (7%) and increased processing efficiency (33%). Our study had several limitations: small sample size, lack of randomization, and differences in numbers between groups. A large-scale randomized clinical study is needed to confirm the therapeutic value of video-game treatment in clinical situations. Nonetheless, taken as a pilot study, this work suggests that video-game play may provide important principles for treating amblyopia, and perhaps other cortical dysfunctions. TRIAL REGISTRATION: ClinicalTrials.gov NCT01223716.

## Interventions (1)

Wilkinson, N., R. P. Ang, et al. (2008). "Online video game therapy for mental health concerns: a review." [Int J Soc Psychiatry](#) **54**(4): 370-382.

### *Journal Article*

**Abstract:** BACKGROUND: There has been research on the use of offline video games for therapeutic purposes but online video game therapy is still fairly under-researched. Online therapeutic interventions have only recently included a gaming component. Hence, this review represents a timely first step toward taking advantage of these recent technological and cultural innovations, particularly for the treatment of special-needs groups such as the young, the elderly and people with various conditions such as ADHD, anxiety and autism spectrum disorders. MATERIAL: A review integrating research findings on two technological advances was conducted: the home computer boom of the 1980s, which triggered a flood of research on therapeutic video games for the treatment of various mental health conditions; and the rise of the internet in the 1990s, which caused computers to be seen as conduits for therapeutic interaction rather than replacements for the therapist. DISCUSSION: We discuss how video games and the internet can now be combined in therapeutic interventions, as attested by a consideration of pioneering studies. CONCLUSION: Future research into online video game therapy for mental health concerns might focus on two broad types of game: simple society games, which are accessible and enjoyable to players of all ages, and online worlds, which offer a unique opportunity for narrative content and immersive remote interaction with therapists and fellow patients. Both genres might be used for assessment and training purposes, and provide an unlimited platform for social interaction. The mental health community can benefit from more collaborative efforts between therapists and engineers, making such innovations a reality.

## Literature review (3)

Barlett, C. P., C. A. Anderson, et al. (2009). "Video Game Effects—Confirmed, Suspected, and Speculative A Review of the Evidence." [Simulation & Gaming](#) **40**(3): 377-403.

*Journal Article* - <http://www.public.iastate.edu/~cpb6666/pubs/09BAS.pdf>

*Abstract:* This literature review focuses on the confirmed, suspected, and speculative effects of violent and non-violent video game exposure on negative and positive outcomes. Negative outcomes include aggressive feelings, aggressive thoughts, aggressive behavior, physiological arousal, and desensitization, whereas positive outcomes include various types of learning. Multiple theories predict, and empirical findings reveal, that violent video game exposure is causally related to a host of negative outcomes and a few positive outcomes. Some non-violent video games have been causally related to some specific positive learning effects as well as certain types of visual cognition (e.g., spatial rotation abilities) and may be associated with some negative effects on executive control and attention disorders.

Dill, K. E. and J. C. Dill (1999). "Video game violence: A review of the empirical literature." [Aggression and violent behavior](#) **3**(4): 407-428.

*Journal Article* - [http://gip.uniovi.es/docume/pro\\_vs/liter\\_emp\\_vv.pdf](http://gip.uniovi.es/docume/pro_vs/liter_emp_vv.pdf)

*Abstract:* The popularity of video games, especially violent video games, has reached phenomenal proportions. The theoretical line of reasoning that hypothesizes a causal relationship between violent video-game play and aggression draws on the very large literature on media violence effects. Additionally, there are theoretical reasons to believe that video game effects should be stronger than movie or television violence effects. This paper outlines what is known about the relationship between violent video-game playing and aggression. The available literature on virtual reality effects on aggression is discussed as well. The preponderance of the evidence from the existing literature suggests that exposure to video-game violence increases aggressive behavior and other aggression-related phenomena. However, the paucity of empirical data, coupled with a variety of methodological problems and inconsistencies in these data, clearly demonstrate the need for additional research.

Gentile, D. A. (2011). "The multiple dimensions of video game effects." [Child development perspectives](#) **5**(2): 75-81.

*Journal Article* - <http://www.charleston.k12.il.us/CMS/Teachers/TeamRed/LangArts/Mod3VGV.PDF>

*Abstract:* Video games are at the center of a debate over what is helpful or harmful to children and adolescents, and there is research to substantiate both sides. The existing research suggests that there are at least 5 dimensions on which video games can affect players: the amount of play, the content of play, the game context, the structure of the game, and the mechanics of game play. This article describes each of these 5 dimensions with support from the scientific literature, arguing that this approach can allow people to get beyond the typical "good-bad" dichotomous thinking to have a more nuanced understanding of video game effects and to provide testable hypotheses for future research.

## MMORPGs (2)

Cole, H. and M. D. Griffiths (2007). "Social interactions in massively multiplayer online role-playing gamers." CyberPsychology & Behavior **10**(4): 575-583.

*Journal Article -*

[http://ocw.metu.edu.tr/pluginfile.php/2372/mod\\_resource/content/1/ColeGriffiths.PDF](http://ocw.metu.edu.tr/pluginfile.php/2372/mod_resource/content/1/ColeGriffiths.PDF)

*Abstract:* To date, most research into massively multiplayer online role-playing games (MMORPGs) has examined the demographics of play. This study explored the social interactions that occur both within and outside of MMORPGs. The sample consisted of 912 self-selected MMORPG players from 45 countries. MMORPGs were found to be highly socially interactive environments providing the opportunity to create strong friendships and emotional relationships. The study demonstrated that the social interactions in online gaming form a considerable element in the enjoyment of playing. The study showed MMORPGs can be extremely social games, with high percentages of gamers making life-long friends and partners. It was concluded that virtual gaming may allow players to express themselves in ways they may not feel comfortable doing in real life because of their appearance, gender, sexuality, and/or age. MMORPGs also offer a place where teamwork, encouragement, and fun can be experienced.

Smyth, J. M. (2007). "Beyond self-selection in video game play: an experimental examination of the consequences of massively multiplayer online role-playing game play." Cyberpsychol Behav **10**(5): 717-721.

*Journal Article*

*Abstract:* There is burgeoning interest in the study of video games. Existing work is limited by the use of correlational designs and is thus unable to make causal inferences or remove self-selection biases from observed results. The recent development of online, socially integrated video games (massively multiplayer online role-playing games [MMORPGs]) has created a new experience for gamers. This randomized, longitudinal study examined the effects of being assigned to play different video game types on game usage, health, well-being, sleep, socializing, and academics. One hundred 18- to 20-year-old participants (73% male; 68% Caucasian) were randomly assigned to play arcade, console, solo computer, or MMORPG games for 1 month. The MMORPG group differed significantly from other groups after 1 month, reporting more hours spent playing, worse health, worse sleep quality, and greater interference in "real-life" socializing and academic work. In contrast, this group also reported greater enjoyment in playing, greater interest in continuing to play, and greater acquisition of new friendships. MMORPGs represent a different gaming experience with different consequences than other types of video games and appear to pose both unique risks and benefits from their use.

## Mobility impairment (2)

Bierre, K., J. Chetwynd, et al. (2005). [Game not over: Accessibility issues in video games](#). Proc. of the 3rd International Conference on Universal Access in Human-Computer Interaction.

*Conference Proceedings* - [http://www.igda.org/sites/default/files/HCI2005\\_GAC.pdf](http://www.igda.org/sites/default/files/HCI2005_GAC.pdf)

*Abstract:* An issue that has been facing the game industry recently is the need to provide accessible games. There are various legal, financial, and ethical reasons for wanting more accessible games. This paper will examine the scope of the problem by reviewing the need for accessibility, the current state of the industry, and some proposed initiatives that we feel should start to occur in the near future. We also will look at case studies of several commercial games that have provided accessibility features.

Mitchell, A. and C. Savill-Smith (2004). "The use of computer and video games for learning: A review of the literature."

*Journal Article* - <http://dera.ioe.ac.uk/5270/1/041529.pdf>

*Abstract:* The following research questions guided this review: what is the impact of the use of computer and video games on young people; why use computer games for learning; how have computer games been used for learning; what are young people's experiences and preferences in using computer games for learning and for leisure; what are the recommendations for the planning and design of educational computer games (or 'edugames')?

## Obesity (10)

Casiano, H., D. J. Kinley, et al. (2012). "Media use and health outcomes in adolescents: findings from a nationally representative survey." [J Can Acad Child Adolesc Psychiatry](#) **21**(4): 296-301.

*Journal Article*

*Abstract:* OBJECTIVE: Examine the association between quantity of media use and health outcomes in adolescents. METHOD: Multiple logistic regression analyses were conducted with the Canadian Community Health Survey 1.1 (youth aged 12-19 (n=9137)) to determine the association between hours of use of television/videos, video games, and computers/Internet, and health outcomes including depression, alcohol dependence, binge drinking, suicidal ideation, help-seeking behaviour, risky sexual activity, and obesity. RESULTS: Obesity was associated with frequent television/video use (Adjusted Odds Ratio (AOR) 1.10). Depression and risky sexual behaviour were less likely in frequent video game users (AOR 0.87 and 0.73). Binge drinking was less likely in frequent users of video games (AOR 0.92) and computers/Internet (AOR 0.90). Alcohol dependence was less likely in frequent computer/Internet users (AOR 0.89). CONCLUSIONS: Most health outcomes, except for obesity, were not associated with using media in youth. Further research into the appropriate role of media will help harness its full potential.

Chaput, J. P., T. Visby, et al. (2011). "Video game playing increases food intake in adolescents: a randomized crossover study." [Am J Clin Nutr](#) **93**(6): 1196-1203.

*Journal Article*

**Abstract:** BACKGROUND: Video game playing has been linked to obesity in many observational studies. However, the influence of this sedentary activity on food intake is unknown. OBJECTIVE: The objective was to examine the acute effects of sedentary video game play on various components of energy balance. DESIGN: With the use of a randomized crossover design, 22 healthy, normal-weight, male adolescents (mean +/- SD age: 16.7 +/- 1.1 y) completed two 1-h experimental conditions, namely video game play and rest in a sitting position, followed by an ad libitum lunch. The endpoints were spontaneous food intake, energy expenditure, stress markers, appetite sensations, and profiles of appetite-related hormones. RESULTS: Heart rate, systolic and diastolic blood pressures, sympathetic tone, and mental workload were significantly higher during the video game play condition than during the resting condition ( $P < 0.05$ ). Although energy expenditure was significantly higher during video game play than during rest (mean increase over resting: 89 kJ;  $P < 0.01$ ), ad libitum energy intake after video game play exceeded that measured after rest by 335 kJ ( $P < 0.05$ ). A daily energy surplus of 682 kJ (163 kcal) over resting ( $P < 0.01$ ) was observed in the video game play condition. The increase in food intake associated with video game play was observed without increased sensations of hunger and was not compensated for during the rest of the day. Finally, the profiles of glucose, insulin, cortisol, and ghrelin did not suggest an up-regulation of appetite during the video game play condition. CONCLUSION: A single session of video game play in healthy male adolescents is associated with an increased food intake, regardless of appetite sensations. The trial was registered at [clinicaltrials.gov](http://clinicaltrials.gov) as NCT01013246.

Goldfield, G. S., G. P. Kenny, et al. (2011). "Video game playing is independently associated with blood pressure and lipids in overweight and obese adolescents." [PLoS One](#) **6**(11): e26643.

*Journal Article*

**Abstract:** OBJECTIVE: To examine the association between duration and type of screen time (TV, video games, computer time) and blood pressure (BP) and lipids in overweight and obese adolescents. DESIGN: This is a cross-sectional study of 282 overweight or obese adolescents aged 14-18 years (86 males, 196 females) assessed at baseline prior to beginning a lifestyle intervention study for weight control. Sedentary behaviours, defined as hours per day spent watching TV, playing video games, recreational computer use and total screen time were measured by self-report. We examined the associations between sedentary behaviours and BP and lipids using multiple linear regression. RESULTS: Seated video gaming was the only sedentary behaviour associated with elevated BP and lipids before and after adjustment for age, sex, pubertal stage, parental education, body mass index (BMI), caloric intake, percent intake in dietary fat, physical activity (PA) duration, and PA intensity. Specifically, video gaming remained positively associated with systolic BP (adjusted  $r = 0.13$ ,  $\beta = 1.1$ ,  $p < 0.05$ ) and total cholesterol/HDL ratio (adjusted  $r = 0.12$ ,  $\beta = 0.14$ ,  $p < 0.05$ ). CONCLUSIONS: Playing video games was the only form of sedentary behaviour that was independently associated with increased BP and lipids. Our findings provide support for reducing time spent playing seated video games as a possible means to promote health and prevent the incidence of cardiovascular disease (CVD) risk factors in this high risk

group of overweight and obese adolescents. Future research is needed to first replicate these findings and subsequently aim to elucidate the mechanisms linking seated video gaming and elevated BP and lipids in this high risk population. TRIAL REGISTRATION: [Clinicaltrials.gov NCT00195858](https://clinicaltrials.gov/ct2/show/study/NCT00195858).

Latner, J. D., J. K. Rosewall, et al. (2007). "Childhood obesity stigma: association with television, videogame, and magazine exposure." [\*Body Image\* 4\(2\): 147-155](#).

*Journal Article -*

<http://students.kaikourahigh.school.nz/technology/yr132012/alexcuff/Images/childhoodobesitystigma.pdf>

*Abstract:* Although the stigmatization of obesity among children is highly prevalent, its origins and relationship to mass media exposure are largely unknown. Ninety boys and 171 girls aged 10–13 years (mean BMI = 19.84) were asked to rank, in order of liking, 12 figures of peers depicted both with and without various disabilities or obesity, and to rate their attitudes towards the obese child on visual analogue scales. Weekly time spent watching television, watching videogames, and reading magazines on weekdays and weekends was assessed. Total media use, magazine use, and videogame use were significantly correlated with more negative reactions to obese girls and boys. Regression analyses revealed that greater dislike of obese children relative to their non-overweight peers was uniquely predicted by magazine reading time. Thus, media exposure was associated with stigmatizing attitudes towards obese children. Mass media sources may lead children to devalue and stigmatize peers with above-average body weights.

Maddison, R., L. Foley, et al. (2011). "Effects of active video games on body composition: a randomized controlled trial." [\*The American journal of clinical nutrition\* 94\(1\): 156-163](#).

*Journal Article -* <http://ajcn.nutrition.org/content/94/1/156.long>

*Abstract:* Background: Sedentary activities such as video gaming are independently associated with obesity. Active video games, in which players physically interact with images on screen, may help increase physical activity and improve body composition.

*Objective:* The aim of this study was to evaluate the effect of active video games over a 6-mo period on weight, body composition, physical activity, and physical fitness.

*Design:* We conducted a 2-arm, parallel, randomized controlled trial in Auckland, New Zealand. A total of 322 overweight and obese children aged 10–14 y, who were current users of sedentary video games, were randomly assigned at a 1:1 ratio to receive either an active video game upgrade package (intervention, n = 160) or to have no change (control group, n = 162). The primary outcome was the change from baseline in body mass index (BMI; in kg/m<sup>2</sup>). Secondary outcomes were changes in percentage body fat, physical activity, cardiorespiratory fitness, video game play, and food snacking.

*Results:* At 24 wk, the treatment effect on BMI (–0.24; 95% CI: –0.44, –0.05; P = 0.02) favored the intervention group. The change (±SE) in BMI from baseline increased in the control group (0.34 ± 0.08) but remained the same in the intervention group (0.09 ± 0.08). There was also evidence of a reduction in

body fat in the intervention group (-0.83%; 95% CI: -1.54%, -0.12%; P = 0.02). The change in daily time spent playing active video games at 24 wk increased (10.03 min; 95% CI: 6.26, 13.81 min; P < 0.0001) with the intervention accompanied by a reduction in the change in daily time spent playing nonactive video games (-9.39 min; 95% CI: -19.38, 0.59 min; P = 0.06).

Conclusion: An active video game intervention has a small but definite effect on BMI and body composition in overweight and obese children. This trial was registered in the Australian New Zealand Clinical Trials Registry at <http://www.anzctr.org.au/> as ACTRN12607000632493.

Murphy, E. C., L. Carson, et al. (2009). "Effects of an exercise intervention using Dance Dance Revolution on endothelial function and other risk factors in overweight children." [Int J Pediatr Obes](#) 4(4): 205-214.

*Journal Article*

**Abstract:** OBJECTIVE: To determine whether an exercise intervention using an active video game (Dance Dance Revolution [DDR]) is effective in improving endothelial dysfunction (EDF) and other risk factors in overweight children. DESIGN: Thirty-five children (Body mass index  $\geq$  85(th) percentile, mean age 10.21 $\pm$ 1.67 years, 17 females) with EDF were assessed for flow-mediated dilation (FMD), lipids, insulin, glucose, NO(2)+NO(3), asymmetric dimethylarginine, symmetric dimethylarginine, l-arginine, height, weight, aerobic fitness, and blood pressure. In a subsample, tumor necrosis factor alpha, interleukin-6, C-reactive protein, and adiponectin were also assessed. Subjects were randomly assigned to 12-weeks of aerobic exercise (EX) using DDR or to a non-exercising delayed-treatment control group (DTC). RESULTS: EX had significant improvements in FMD ( 5.56 $\pm$ 5.04% compared with 0.263 $\pm$ 4.54%, p=0.008), exercise time on the graded exercise test (53.59 $\pm$ 91.54 compared with -12.83 $\pm$ 68.10 seconds, p=0.025), mean arterial pressure (MAP) (-5.62 $\pm$ 7.03 compared with -1.44 $\pm$ 2.16 mmHg, p=0.05), weight (0.91 $\pm$ 1.53 compared with 2.43 $\pm$ 1.80 kg, p=0.017) and peak VO(2) (2.38 $\pm$ 3.91 compared with -1.23 $\pm$ 3.18 mg/kg/min, p=0.005) compared with the DTC. Thirteen EX subjects achieved normal EDF while ten did not. These groups differed at baseline with regard to total cholesterol (TC) and low-density lipoprotein (LDL). CONCLUSION: Twelve weeks of DDR-use improved FMD, aerobic fitness, and MAP in overweight children. Improvements occurred without changes in inflammatory markers or nitric oxide production. The results document the need to explore relationships between obesity, endothelial function, inflammation, lipids, exercise intensity, and gender in a larger sample of overweight children.

Radon, K., B. Furbeck, et al. (2011). "Feasibility of activity-promoting video games among obese adolescents and young adults in a clinical setting." [J Sci Med Sport](#) 14(1): 42-45.

*Journal Article*

**Abstract:** One component of the recent obesity epidemic is the sedentary behaviour of children and adolescents e.g., use of video games consoles. The new generation of video games requires body movements and might thus increase activity. The aim of this study was to evaluate whether such games could have an effect on physical activity in obese adolescents in a clinical setting. Between March and

May 2007 activity-promoting video games ("apvg") were offered to all 84 inpatients (aged 13-28 years) registered in a long-term rehabilitation programme on a voluntary base. Reasons for (non-)attendance were assessed. Frequency and duration of use of the activity-promoting video game sessions were documented. Furthermore, heart rate and activity counts during use of "apvg", endurance training, and strength training were measured. Of 84 inpatients, 51 used the "apvg" at least once (69%) over the study period. The median weekly use of the intervention was 27 min during the first week (range 0-182 min), declining to zero (range 0-74 min) in week four. Mean heart rate during the sessions (mean 115 bpm; 95% confidence interval 108-122 bpm) was similar to the heart rate during strength training (106 bpm; 101-112 bpm). The results indicate that the video games could have an impact on the activity of obese adolescents and young adults. However, as the interest in the devices seems to be too low the suitability of them for weight reduction programmes in young people cannot be ensured.

Rey-López, J. P., G. Vicente-Rodríguez, et al. (2008). "Sedentary behaviour and obesity development in children and adolescents." [Nutrition, metabolism, and cardiovascular diseases : NMCD 18\(3\): 242-251.](#)

*Journal Article* - <http://linkinghub.elsevier.com/retrieve/pii/S093947530700169X?showall=true>

*Abstract:* Sedentary lifestyle patterns in children and adolescents, i.e. playing digital games, using computers and especially watching television, have been associated with obesity. However, not all sedentary behaviour has shown the same relevance to, and relationship with, obesity. Therefore, we conducted a review including published studies found in PubMed and other medical journals, dated between January 1990 and April 2007. The ages of the children and adolescents who were the object of the study ranged between 2 and 18years. For the purpose of this paper, we selected cross-sectional, longitudinal and intervention studies. Sufficient evidence exists to recommend setting a limit to the time spent watching TV, especially for younger children. However, video games and computers do not represent such a high risk compared to watching TV, when they do not replace physical activity too much. In fact, there is no evidence to suggest that sedentary behaviour displaces physical activity levels. Mechanisms that explain the link between sedentariness and obesity are also discussed. Finally, future studies should take into account important mediators such as socioeconomic status and family structure.

Sween, J., S. F. Wallington, et al. (2013). "The Role of Exergaming in Improving Physical Activity: A Review." [J Phys Act Health.](#)

*Journal Article*

*Abstract:* BACKGROUND: The high prevalence of obesity in America can be attributed to inadequate energy expenditure as a result of high levels of physical inactivity. This review presents an overview of the current literature on physical activity, specifically through active videogame systems (exergaming) and how these systems can help to increase physical activity levels. METHODS: The search strategy for this review was to identify previous studies which investigated energy expenditure levels using a single active video game or a combination of active videogames. RESULTS: Based on data from 27 studies, a

strong correlation exists between exergaming and increased energy expenditure (up to 300% above resting levels). The majority of active videogames tested were found to achieve physical activity levels of moderate intensity, which meet American College of Sports Medicine guidelines for health and fitness. CONCLUSIONS: Exergaming is a new and exciting strategy to potentially improve physical activity levels and reduce obesity among Americans.

Vandewater, E. A., M.-s. Shim, et al. (2004). "Linking obesity and activity level with children's television and video game use." Journal of adolescence 27(1): 71-85.

*Journal Article* - <http://medi506.pbworks.com/f/sdarticle-3.pdf>

*Abstract:* This study examined the links between childhood obesity, activity participation and television and video game use in a nationally representative sample of children (N=2831) ages 1–12 using age-normed body mass index (BMI) ratings. Results indicated that while television use was not related to children's weight status, video game use was. Children with higher weight status played moderate amounts of electronic games, while children with lower weight status played either very little or a lot of electronic games. Interaction analyses revealed that this curvilinear relationship applied to children under age 8 and that girls, but not boys, with higher weight status played more video games. Children ages 9–12 with lower weight status used the computer (non-game) for moderate amounts of time, while those with higher weight status used the computer either very little or a lot. This was also true for the relationship between print use and weight status for children of all ages. Results also indicated that children with higher weight status spent more time in sedentary activities than those with lower weight status.

### Parent-Child Relations (3)

Coyne, S. M., L. M. Padilla-Walker, et al. (2011). "Game on... girls: associations between co-playing video games and adolescent behavioral and family outcomes." J Adolesc Health 49(2): 160-165.

*Journal Article*

*Abstract:* PURPOSE: Video game use has been associated with several behavioral and health outcomes for adolescents. The aim of the current study was to assess the relationship between parental co-play of video games and behavioral and family outcomes. METHOD: Participants consisted of 287 adolescents and their parents who completed a number of video game-, behavioral-, and family-related questionnaires as part of a wider study. Most constructs included child, mother, and father reports. RESULTS: At the bivariate level, time spent playing video games was associated with several negative outcomes, including heightened internalizing and aggressive behavior and lowered prosocial behavior. However, co-playing video games with parents was associated with decreased levels of internalizing and aggressive behaviors, and heightened prosocial behavior for girls only. Co-playing video games was also marginally related to parent-child connectedness for girls, even after controlling for age-inappropriate

games played with parents. CONCLUSIONS: This is the first study to show positive associations for co-playing video games between girls and their parents.

He, M., L. Piche, et al. (2010). "Screen-related sedentary behaviors: children's and parents' attitudes, motivations, and practices." [J Nutr Educ Behav](#) **42**(1): 17-25.

*Journal Article*

*Abstract:* OBJECTIVE: To investigate school-aged children's and parents' attitudes, social influences, and intentions toward excessive screen-related sedentary behavior (S-RSB). DESIGN: A cross-sectional study using a survey methodology. SETTING: Elementary schools in London, Ontario, Canada. PARTICIPANTS: All grades 5 and 6 students, their parents, and their teachers in the participating schools were invited to voluntarily participate; 508 student-parent pairs completed the surveys. MAIN OUTCOME MEASURE: Children's screen-related behaviors. ANALYSIS: Data were analyzed using the Independent Student t test to compare differences of continuous variables and the chi-square test to test for differences of categorical variables. RESULTS: Children spent 3.3 +/- 0.15 (standard error) hours per day engaged in screen-related activities. Entertainment, spending time with family, and boredom were cited as the top 3 reasons for television viewing and video game playing. Compared to "low-screen users" (ie, < 2 hours/day), "high-screen users" (ie, >or= 2 hours/day) had a less negative attitude toward excessive S-RSB and perceived loosened parental rules on screen use. Parents of high-screen users had a less negative attitude toward children's S-RSB, had fewer rules about their children's screen use, and were more likely to be sedentary themselves. CONCLUSIONS AND IMPLICATIONS: Intervention strategies aimed at reducing S-RSB should involve both parents and children and should focus on fostering behavioral changes and promoting parental role modeling.

Ramirez, E. R., G. J. Norman, et al. (2011). "Adolescent screen time and rules to limit screen time in the home." [J Adolesc Health](#) **48**(4): 379-385.

*Journal Article*

*Abstract:* PURPOSE: To investigate associations between adolescent screen time behaviors, screen time rules, and presence of electronic media in the bedrooms of adolescents. METHODS: Parents and adolescents (N = 160 dyads) from the cities of Boston, Cincinnati, and San Diego were asked to complete a questionnaire which included questions related to demographics, screen time rules, availability of media devices, and screen time behavior. Separate multiple regression models were used for adolescent and parent reports to test correlates of adolescent television (TV) watching, video game play, and computer usage for entertainment. RESULTS: Data from adolescents indicated that rules for watching TV, computer usage, and total number of screen time rules were significantly correlated with time spent watching TV (beta = -.22, p < .01), playing video or computer games (beta = -.18, p < .05), and using the Internet and/or computer for entertainment (beta = -.18, p < .05), respectively. Data from parents indicated that TV rules were significantly associated with lower rates of TV viewing, and parent-adolescent agreement on rules strengthened this relationship. Data from parents as well as adolescents indicated that the presence of a TV in the bedroom was positively associated with TV viewing time (beta

= .18 and .24,  $p < .05$ , respectively). Adolescent data indicated a positive association between having at least one video game system in the bedroom and time spent playing video games ( $\beta = .19$ ,  $p < .05$ ).  
CONCLUSION: Having clear rules, setting limits on screen time, and not having screen-based media in the bedroom were associated with fewer hours of screen time for adolescents.

## Parenting (4)

Kutner, L. A., C. K. Olson, et al. (2008). "Parents' and Sons' Perspectives on Video Game Play A Qualitative Study." [Journal of Adolescent Research](#) **23**(1): 76-96.

*Journal Article* - <http://jar.sagepub.com/content/23/1/76.short>

*Abstract:* Public policy efforts to restrict children's access to electronic games with violent or sexual content are often predicated on assumptions about parental concerns. As an initial step in determining whether those assumptions are accurate, the authors conduct focus groups of 21 adolescent boys and 21 of their parents or guardians to explore parents' concerns, compare parents' and children's perceptions, and see whether these are consistent with the focus of proposed legislation and other public policy efforts. Parents' primary concern is that games not interfere with their children's schoolwork, social skills, and exercise. They worry about exposure to violent content, but definitions of and opinions about what is harmful vary and may not match proposed public policies.

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.

*Journal Article* -

[http://dmlcentral.net/sites/dmlcentral/files/resource\\_files/Olson\\_Motivations\\_for\\_Play\\_final.pdf](http://dmlcentral.net/sites/dmlcentral/files/resource_files/Olson_Motivations_for_Play_final.pdf)

*Abstract:* Electronic games are now an everyday part of childhood and adolescence. The debate has moved from whether children should play video games to how to maximize potential benefits and to identify and minimize potential harms. To do this, we must understand what motivates children to play electronic games and what needs the games meet. Drawing on a survey of 1,254 middle school children, focus groups with boys and their parents, and findings from other quantitative and qualitative research, the author describes a variety of motivations for video game play (including games with violent content) and how these may vary based on factors such as mood, environment, personality, and developmental stage. The findings are put into the context of normal development, and suggestions are given for parents, educators, and researchers.

Paez, S., A. Maloney, et al. (2009). "Parental and environmental factors associated with physical activity among children participating in an active video game." [Pediatric Physical Therapy](#) **21**(3): 245-253.

*Journal Article -*

[http://journals.lww.com/pedpt/Abstract/2009/02130/Parental\\_and\\_Environmental\\_Factors\\_Associated\\_with.5.aspx](http://journals.lww.com/pedpt/Abstract/2009/02130/Parental_and_Environmental_Factors_Associated_with.5.aspx)

*Abstract:* Purpose: Parental and intervention-specific environmental supports were examined as potential reinforcers for physical activity and use of a video game, Dance Dance Revolution (DDR), among a cohort of 7- to 8-year-old children.

Methods: Sixty children were randomized to an intervention (n = 40) or a control (n = 20) group. Physical activity was measured with accelerometry and DDR logs. Parental support for their child's physical activity was assessed via a questionnaire. DDR-specific environmental supports were captured on an environmental home screen and the DDR log.

Results: At baseline, the absence of other video games and parent DDR participation was associated with child participation in DDR. At follow-up, DDR participation of siblings and friends was associated with child participation in DDR.

Conclusion: The primary findings of this study suggest that parental and peer participation in DDR may play a role in children's initial and sustained participation in DDR.

Sharif, I. and J. D. Sargent (2006). "Association between television, movie, and video game exposure and school performance." *Pediatrics* **118**(4): e1061-e1070.

*Journal Article -* <http://www.pediatricsdigest.mobi/content/118/4/e1061.full>

*Abstract:* BACKGROUND. The relationship between media exposure and school performance has not been studied extensively in adolescents.

OBJECTIVE. The purpose of this work was to test the relative effects of television, movie, and video game screen time and content on adolescent school performance.

METHODS. We conducted a population-based cross-sectional survey of middle school students (grades 5–8) in the Northeastern United States. We looked at weekday television and video game screen time, weekend television and video game screen time, cable movie channel availability, parental R-rated movie restriction, and television content restriction. The main outcome was self-report of school performance (excellent, good, average, or below average). We used ordinal logistic-regression analysis to test the independent effects of each variable, adjusting for demographics, child personality, and parenting style.

RESULTS. There were 4508 students who participated in the study; gender was equally represented, and 95% were white. In multivariate analyses, after adjusting for other covariates, the odds of poorer school performance increased with increasing weekday television screen time and cable movie channel availability and decreased with parental restriction of television content restriction. As compared with children whose parents never allowed them to watch R-rated movies, children who watched R-rated movies once in a while, sometimes, or all of the time had significantly increased cumulative odds of poorer school performance. Weekend screen time and video game use were not associated with school performance.

CONCLUSIONS. We found that both content exposure and screen time had independent detrimental associations with school performance. These findings support parental enforcement of American Academy of Pediatrics guidelines for media time (particularly weekdays) and content limits to enhance school success.

## Physical illness (4)

Arvaniti, F., K. N. Priftis, et al. (2011). "Salty-snack eating, television or video-game viewing, and asthma symptoms among 10- to 12-year-old children: the PANACEA study." J Am Diet Assoc **111**(2): 251-257.

### *Journal Article*

*Abstract:* BACKGROUND: Salty-snack consumption, as well as the amount of time children spend watching television or playing video games, have been implicated in the development of asthma; however, results are still conflicting. OBJECTIVE: The aim of this work was to evaluate the association of salty-snack eating and television/video-game viewing with childhood asthma symptoms. DESIGN: Cross-sectional study. SETTINGS: Seven hundred children (323 male), 10 to 12 years old, from 18 schools located in the greater area of Athens were enrolled. Children and their parents completed questionnaires, which evaluated, among other things, dietary habits. Adherence to the Mediterranean diet was evaluated using the KIDMED (Mediterranean Diet Quality Index for Children and Adolescents) score. STATISTICAL ANALYSIS: The association of children's characteristics with asthma symptoms was performed by calculating the odds ratios and corresponding 95% confidence intervals. RESULTS: Overall lifetime prevalence of asthma symptoms was 23.7% (27.6% boys, 20.4% girls; P=0.03). Forty-eight percent of children reported salty-snack consumption ( $\geq 1$  times/week). Salty-snack consumption was positively associated with the hours of television/video-game viewing (P=0.04) and inversely with the KIDMED score (P=0.02). Consumption of salty snacks ( $>3$  times/week vs never/rare) was associated with a 4.8-times higher likelihood of having asthma symptoms (95% confidence interval: 1.50 to 15.8), irrespective of potential confounders. The associations of salty-snack eating and asthma symptoms were more prominent in children who watched television or played video games  $>2$  hours/day. In addition, adherence to the Mediterranean diet was inversely associated with the likelihood of asthma symptoms. CONCLUSIONS: Unhealthy lifestyle behaviors, such as salty-snack eating and television/video-game viewing were strongly associated with the presence of asthma symptoms. Future interventions and public health messages should be focused on changing these behaviors from the early stages of life.

Chuang, Y. C. (2006). "Massively multiplayer online role-playing game-induced seizures: a neglected health problem in Internet addiction." Cyberpsychol Behav **9**(4): 451-456.

### *Journal Article*

*Abstract:* As the Internet has become rapidly and widely integrated into society, Internet addiction has become a growing psychosocial problem. However, epileptic seizure, another out-of-the-ordinary health

problem, is often neglected in this regard. Ten patients who experienced epileptic seizures while playing the newest genre of electronic games -- Massively Multiplayer Online Role-Playing Games (MMORPGs) - were investigated. Patients were predominantly male young adults, and most of the events were generalized tonic-clonic seizures, myoclonic seizures, and absences. These patients should be categorized into idiopathic generalized epilepsies. Even though photosensitivity was an important factor, behavioral and higher mental activities also seemed to be significant seizure precipitants. Results demonstrated that MMORPG-induced seizures were not analogous to the ordinary video game-induced seizures. Significantly, an epileptic seizure warning did not always appear on the websites of MMORPGs and instructions for the software. While the prevalence of MMORPG-induced seizures remains unknown, it may exceed our expectations and impact our society. Not only for clinical neurologists but also for the primary physicians, educators, sociologists, and global online game publishers, there should be an awareness of this special form of reflex seizures in order to provide an appropriate health warning to MMORPG players.

Gopinath, B., L. A. Baur, et al. (2012). "Relationship between a range of sedentary behaviours and blood pressure during early adolescence." [J Hum Hypertens](#) **26**(6): 350-356.

*Journal Article*

*Abstract:* Very few studies have explored links between physical activity, sedentary behaviours and blood pressure (BP) in early adolescence. We aimed to assess the association between a range of sedentary activities (screen time, television (TV) viewing, computer usage, video game usage and time spent in homework or reading) and BP in schoolchildren. Eligible year-7 students (2353/3144, mean age 12.7 years) from a random cluster sample of 21 Sydney schools were examined during 2003-2005. Parents and children completed detailed questionnaires of activity. BP was measured using a standard protocol and high BP was defined using published guidelines. Height and weight were measured, and body mass index (BMI) calculated. After adjusting for age, sex, ethnicity, parental education, height, BMI and time spent in physical activity, each hour per day spent in screen time, watching TV and playing video games was associated with a significant increase in diastolic BP of 0.44 (P=0.0001), 0.99 (P<0.0001) and 0.64 mm Hg (P=0.04), respectively. In contrast, each hour per day spent reading was associated with a decrease of 0.91 (P=0.01) and 0.69 mm Hg (P=0.02) in systolic and diastolic BP, respectively. Our results indicate that addressing different types of sedentary activities could be a potentially important strategy to reduce the prevalence of elevated BP in children.

Thompson, D. (2012). "Designing serious video games for health behavior change: current status and future directions." [J Diabetes Sci Technol](#) **6**(4): 807-811.

*Journal Article*

*Abstract:* Serious video games for health are designed to entertain while changing a specific health behavior. This article identifies behavioral principles that can guide the development of serious video games focused on changing a variety of health behaviors, including those attempting to decrease risk of obesity and type 2 diabetes. Guidelines discussed include how to develop video games that provide a

solid foundation for behavior change by enhancing a player's knowledge and skill, ways in which personal mastery experiences can be incorporated into a video game environment, using game characters and avatars to promote observational learning, creating personalized experiences through tailoring, and the importance of achieving a balance between "fun-ness" and "seriousness." The article concludes with suggestions for future research needed to inform this rapidly growing field.

## Social skills (1)

Sakamoto, A. (1994). "Video Game Use and The Development of Sociocognitive Abilities in Children: Three Surveys of Elementary School Students1." [Journal of applied social psychology](#) **24**(1): 21-42.

*Journal Article* - <http://onlinelibrary.wiley.com/doi/10.1111/j.1559-1816.1994.tb00551.x/abstract>

*Abstract:* The purpose of the present study was to examine the validity of the popular hypothesis that video game use will prevent children from socially adjusting. Three surveys of elementary school children were reported. The primary results were as follows: (a) The frequency of video game use had no correlation with children's popularity among classmates. (b) The frequency of video game use had slightly negative correlations with boys' sociocognitive abilities such as empathy, cognitive complexity, and cognitive abstractness. (c) However, it was likely that the negative correlations were not due to the causal relation that video game use affected boys' sociocognitive abilities, which supported the hypothesis, but rather the causal relation that video game use was affected by their abilities; and (d) In the case of computer use, such as word processing or programming, the frequency of use had few correlations with sociocognitive abilities.