

## POSITIVE EFFECTS OF ONLINE GAMES: A REVIEW

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Online games have become a significant part of the adolescent's lifestyle now. Playing online games not only helps the adolescents to recreate, have fun and release stress but also to experience a host of other psychosocial benefits. The existing literature, however, highlights more negative than positive influences of gaming amongst the adolescents. Wherein, relatively fewer studies explore how online games enhance the cognitive, biological, psychological, emotional and social functioning of the individual if utilized optimally. And realizing the fact that games have now become an 'inevitable' part of the adolescent's lifestyle, exploring its positive influences may actually provide an opportunity to practitioners, parents, and significant others to use online games to improve the mental health of the adolescents. For this purpose, the current investigation attempts to, *firstly*, review the 'Positive Effects of Online Games'. *Secondly*, list findings based on the reviewed literary studies and *thirdly*, provide strategies of using games to improve the overall functioning of the adolescent. The study, therefore, attempts to invite future empirical researches which further explore the positive aspects of online games and provide strategies to facilitate the adolescent mental health based on the same.

**Keywords:** Online games, positive effects, adolescents

Over the recent years online gaming culture has gained popularity especially amongst the younger generation, whereby, 90-97% of children play online games on a daily basis (Lenhart et al., 2008; Olson, 2010; De Argaes, 2013). Online games not only help them to have fun or recreate but cope with daily stressors, escape boredom, socialize and kill their free time in a fun way by such ongoing and continuous play (Wan & Chiou, 2006; Wood & Griffiths, 2007). Excessive online gaming, however, may actually have negative influences upon the individual and hamper their psychosocial, physiological and emotional wellbeing (Kuss, Griffiths, Karila, & Billieux, 2014). Griffiths, Kuss, and King (2012) second the above study and depict that online games if played in excess do negatively influence the overall mental health of the adolescent. However, other recent studies of Eichenbaum, Bavelier, and Green (2014) in contradiction to the above listed findings depict that rather than having harmful effects or being mere sources of entertainment 'new age games' may have varied positive effects for different age groups, for e.g. games may be helpful to train children in complex skills, adults in professional skills and elders in memory based and cognitive skills. Further, studies of Adachi and Willoughby (2012); Jackson et al., (2012); Lobel, Granic, Stone, and Engels (2014) posit that playing online games, therein, contributes to the overall behavioural, social and professional development of the individual. Kim and Ross (2006); Colwell (2007), further, suggest that gaming may also help the individual to socialize, form interpersonal relationships and overcome isolation. Olson (2010) adds that games, thus, not only help the adolescents to recreate but also learn from their age mates in a healthy and fun manner. In fact, over the past few years, games have emerged as the most effective tools to educate and train young minds in various conceptual skills (Gee 2003, 2005; Gentile & Gentile, 2008). For instance, a specific game genre called Real-Time Strategy Games i.e. RTS (which according to Dan, 2006; Bruce, 2007 are based on resource gathering, securing one's position in the game and building a base etc.) helps the individuals in enhancing their working memory and further in improving their overall cognitive capacity

(Glass, Maddox, & Love, 2013). In fact, longitudinal studies also suggest positive effects of gaming and posit that excessive online gaming may actually reduce the risk of engaging in later ineffective behavior such as substance abuse amongst the adolescents (Liu, 2014).

Keeping in lieu the above listed findings it becomes evident that online games are likely to have various positive effects on the social, psychological, physiological, professional and emotional wellbeing of the individual apart from some negative effects. Since, various studies enlist different potential benefits of online games; clarity in this domain may help in gathering an understanding of how online games may be utilized to enhance the overall functioning of the individual.

### POSITIVE EFFECTS OF ONLINE GAMES

Online games have a variety of positive effects as per different studies. The following is a summarization of positive effects of playing online games:

1. **Training in Complex Skills:** Over the years gaming has improved in terms of its graphics, content and complexity. Incorporating realistic effects, designs, role play and imagery online games help the individual to enhance their complex skills such as (Przybylski, Rigby, & Ryan 2010):

*a. Autonomy:* Autonomy refers to a belief that one can attain a goal independently. This skill gets enhanced via gaming since most of the recent games are 'task based' which require the gamer to complete a task single-handedly (especially single player games) before proceeding to the next level or even for defeating a fellow gamer (as in multiplayer games). So in the process of doing so, the individual learns to produce ways to accomplish a goal autonomously which may further be generalized to their real life setting.

*b. Competence:* This refers to one's ability to utilize their internal and external resources effectively to successfully adapt to their environment. Wherein, online games limit the access of gamers to the resources required for survival in the game or change one's moves in accordance with the guild, hence enhancing their 'competence'.

*c. Relatedness:* This refers to socializing with others so as to feel a sense of affinity and belongingness. Multiplayer games, wherein, are best fitted to enhance the skill of relatedness amongst the gamers because they require the gamer to connect or form interpersonal relations, and socialize with fellow gamers to proceed in the game.

*d. Competitiveness:* Games also help the gamer to engage in a healthy competition with fellow gamers as well as provide an opportunity to learn from their own age group while completing team tasks such as in MMORPGS (Olson, 2010).

*e. Academic Skills:* Apart from the above psychological skills, games could also help in enhancing the *Academic skills* of the adolescents by improving their knowledge base in particular subjects such as Maths, English, Science etc (Corbett, Koedinger, & Hadley, 2001; Murphy, Penuel, Means, Korbak, & Whaley, 2001).

*f. Professional Skills:* Games may also enhance *Professional skills* of gamers such as marketing skills, sales, human resource management, logistics etc., for e.g. the multinational company 'Volvo' utilized a game to train their employees in sales based skills (Entertainment Software Association, 2011).

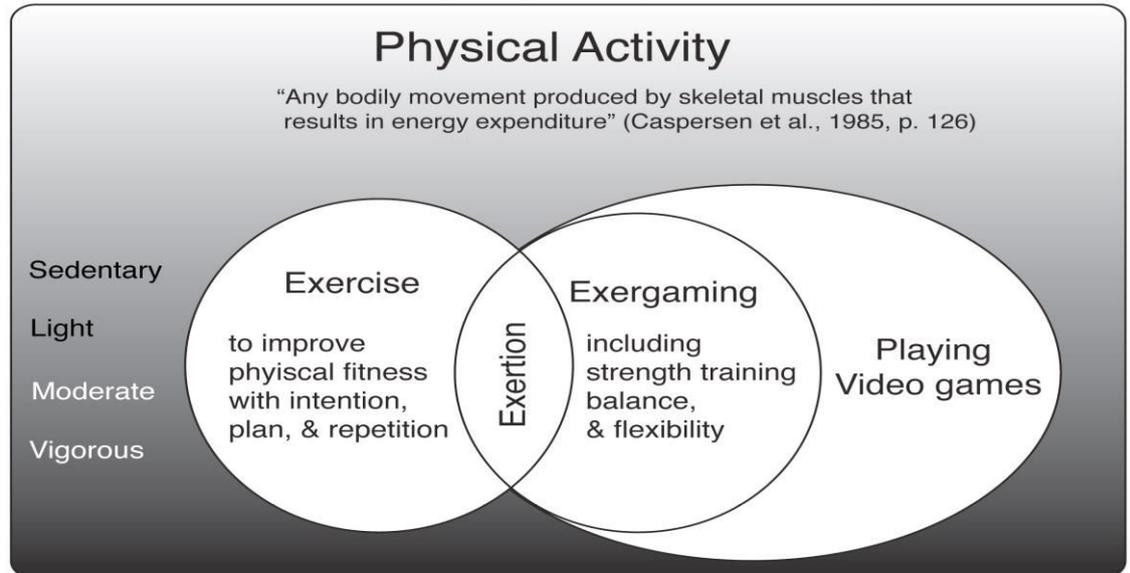
2. **Enhancing Visual, Spatial and Attentional Skills (Eichenbaum et al., 2014):**

*a. Visual skills:* Online games have progressed in terms of its visuals and graphics, whereby, some particular game genres such as action based

games may enhance the gamers' visual acuity skills i.e. their ability to discriminate fine details of contrast, luminance, and contrast sensitivity etc., in the visual field (Li, Uri, Walter, & Bavelier, 2009).

- b. Selective Attention:* Usually games make use of various audiovisual cues simultaneously. This requires the gamers, therefore, to selectively attend to their own cues and ignore the simultaneous cues of their opposing team/opponents e.g. in FPS (first person shooter games) or MMORPG's (massively multiplayer online role playing games) etc, resulting in enhancing selective attention capacities of the gamers (Green & Bavelier, 2003, 2006; Awh, Vogen, & Oh, 2006; Feng, Spence, & Pratt, 2007; Cohen, Green, & Bavelier, 2007; Spence, Yu, Feng, & Marshman, 2009; Li, Polat, Scalzo, & Bavelier, 2010; Mishra, Zinni, Bavelier, & Hillyard, 2011).
- c. Visual-spatial Skills:* Recent games are usually set in real time i.e. one's which are designed using three dimensionality, making use of first-person perspective, mental object rotation, cognitive mapping and spatial attention. Therefore, gamers as compared to non-gamers have better visual spatial skills (Green & Bavelier, 2003; Achtman, Green, & Bavelier, 2007; Green & Bavelier, 2008).
- 3. Improving Helping Behavior:** Massively Multiplayer Online Role Playing Games are the most popular game genre compared to other games because of the 'social' element attached to them. They make use of role play, whereby, the gamer can choose and personalize the characteristics of their avatar as well as be part of a narrative as the game proceeds. A basic requirement of MMORPG's, thus, is to be able to play as a team and help other players of the team so as to proceed further in the game. So these games help to enhance the prosocial and empathetic behaviors of gamers while reducing their negative behaviors, violent and aggressive tendencies (Narvaez, Mattan, MacMichael, & Squillace, 2008; Sestir & Bartholow, 2010; Anderson, Gentile, & Dill, 2012). Longitudinal studies, further, add that online games may enhance positive and sharing behaviors amongst gamers such as empathy, adaptability and other prosocial skills (Gentile et al., 2009).
- 4. Improving physiological functioning:** A usual perception is that online games make the individual sedentary as they replace the physical activity of the individual by the screen time. Contrary to which, studies of Bogost (2007) suggest that many online games such as WCTM (World Class Track Meet) require the gamer to walk, run and jump in order to play and proceed forward in the game. Another such game is *Pokemon Go* in which the gamer is required to catch pokemons by walking a particular distance in real time and earn points in the game. So rather than reducing the physical activity online games may enhance the physical activity of the individual. And such games which require some physical activity in real life on the part of the gamer may be called

‘Exergames’ i.e. ‘exertion’ + ‘gaming activity’ (Oh & Yang, 2010).



Source: Oh and Yang (2010)

Exergames, therefore, make physical activity fun and interesting by making physical exercise a part of play (Sall & Grinter, 2007). They especially are effective in enhancing the physical activity of individuals who lack physical exercise completely. For instance studies of Mellecker and McManus (2008); Graf, Pratt, Hester, and Short (2009); Biddiss and Irwin (2010) posit that Exergames being online games having visuals and sounds seem fun and are played for a longer duration of time which also ends up enhancing the physical activity of individuals who lack it on a regular basis. According to Klein and Simmers (2009); Rosenberg et al., (2010) these games enhance the psychophysical wellbeing of the individual by enhancing their motivation to workout and reducing symptoms of subsyndromal depression, busting daily stress etc.

- 5. Improving Executive Functioning Skills:** Playing online games can enhance the decision making, problem solving skills and reasoning capacity of the gamers. However, recent studies of Oei and Patterson (2013) posit that gaming may not actually improve the cognitive skills of the gamer but rather actively train the cognitive capacity/area/skill being utilized by the gamer in the game and consequently improving their executive capacity of that particular area. Similarly, Chiappe, Conger, Liao, Caldwell, and Vu (2013), posit that online games can enhance multitasking skills of the gamer by playing games which may further be easily generalized to their real life. Apart from enhancing multitasking skills, however, online games may also help the gamer to learn how to shift from one complex task to another while committing minimal errors (Anderson, Bavelier, & Green, 2010; Green & Bavelier, 2012); Colzato, vanden Wildenberg, & Hommel, 2014). While, still other studies of Basek, Chandramallika, Boot, Voss, and Kramer (2008); Torres (2011) reveal that online games may enhance the cognitive capacity of the individual i.e. their working memory, self concept and quality of life. Such games, therein, are likely to enhance the problem solving ability of the individual as they improve their overall functioning by bringing clarity regarding concepts related to themselves and others. For instance a study of Baboo and Vasimalairaja (2017) on 10-13 year old adolescents depicted that

online games may enhance problem solving skills of the adolescents when they 'play' them rather than simply 'watching' them (which is likely to be greater for males as compared to females).

6. **Improving Psychological Wellbeing, Quality of Life, Knowledge acquisition & Interpersonal Relationships:** Gaming is likely to enhance the psychological, social and overall wellbeing of the individuals. For instance studies of **Jason et al., (2013)** posit that gamers are susceptible to have a better psychological wellbeing and experience greater positive emotions as compared to non-gamers. The reason for this difference in wellbeing of gamers and non-gamers is explained by various studies, for e.g. a recent study of **Zhao, He, and Zheng (2011)**, depicts that online games give the gamers an opportunity to constructively channelize their aggressive energies via virtual medium and consequently improve their wellbeing. Still other studies of **Wang and Liu (2012)** add that online games enhance the experience of positive emotions of the gamers as well as reinforce ethics and morals in a light hearted and fun manner. While, earlier studies of **Williamson and Facer (2003)** depict that online games not only enhance positive experiences but also help the gamers in forming various interpersonal and peer relationships via virtual interactions.
7. **Enhancing Motivation:** Studies suggest that online games are likely to increase motivational levels of gamers by providing them with ample opportunities to accomplish a goal/task even after repeated failure. For instance, games make use of varied challenges that the gamer needs to fulfil so as to earn some credits/points in the game (**Granic, Lobel & Engels, 2014**). And since online games are fun, continuous and ongoing, the gamer in order to reach that goal or accomplish a task tries relentlessly to achieve it without a pause. Whereby, the points earned in the game act as 'reinforcers' for the gamer in exchange of their 'efforts' to meet their goals (**Sweetser & Wyeth, 2005**). This repeated process of persistently striving towards the game goals, thus, becomes a cue for the gamer in real life to suggest that following one's goals judiciously even when faced with failure may actually result in finally achieving them just like they result in earning points in case of the game (**Ventura, Shute, & Zhao, 2013**). This is seconded by another recent study of **McGonigal (2011)** as per which gamers are highly motivated to accomplish their goal if faced with a challenge/repeated failure to attain that goal and this is likely to even translate later to their real lives e.g. attaining educational success (**Ventura et al., 2013**).
8. **Experiencing Positive Emotional States:** According to **Olson (2010)** online games help the gamer to not only experience positive emotional states but to enhance their emotional regulation strategies. Studies of **Aldao, Nolen-Hoeksema, and Schweizer (2010)** support this viewpoint and depict that apart from helping the gamer to experience positive emotional states online games help to promote an adaptive emotional regulation strategy and also reduce maladaptive emotional regulation strategies amongst the gamers. Additionally, **Russoniello, O'Brien, and Parks (2009)**; **Ryan, Rigby, and Przybylski, (2006)** posit that online games improve the negative mood states of the gamer by inducing relaxation, reducing nervousness and consequently increasing their positive emotional experiences. While, **Sherry (2004)**, further depicts that playing online games may sometimes result in providing a 'flow experience' to the gamer (a positive state of mind while

being immersed in some activity) and improve their emotional experience. However, **Granic et al., (2014)** points out that whether this ‘flow experience’ experienced by the gamer due to being immersed in the game can be translated to positive emotional states in real life setting or not is still doubtful.

**9. Helping in socialization:** Online games have diversified in terms of its graphics, content and types. One popular type of games, whereby, are Massively Multiplayer Online Role Playing Games (MMORPGs) which are most played compared to other subtypes due to the ‘social element’ attached to them. Role playing games, wherein, help in providing the gamers with an opportunity to form and expand their social/peer relationships and improve their socialization skills. Studies of **Gentile and Gentile (2008); Gentile et al., (2009)** second the above viewpoint that multiplayer games by its virtue give gamers a chance to know how to make social decisions, understand who to accept/reject within the clan as well as learn how to establish trust within the group via role play. Further, recent studies of **Entertainment Software Association (2012)** reveal that more than 70% of gamers are likely to play online games with their friends or significant others. So games help the gamer to improve socialization skills and enhance prosocial, empathetic, cooperative and prosocial behaviors (**Ewoldsen et al., 2012**) for e.g. **Lenhart et al., (2008)** depict that individuals engaged in games making use of social organization skills (organizing individuals in social groups and leading them e.g. *Guild Wars 2*) are likely to be more prosocial and helpful as compared to others.

**10. Other Benefits:** Some other benefits of playing online games include:  
**a. Anand (2007); Jackson et al., (2008)** in their studies depict that online games may enhance some visual-spatial skills of the gamers that help in improving their academic performance in various academic disciplines.  
**b. More recently Anderton (2018)** in an article depicts statistical analysis of Forbes according to which there are various benefits of playing online games as reported by the respondents viz.,

- 93% depict no relationship between aggression/violence and online games
- 89% agree games to have social benefits
- 66% depict games help in forming peer associations
- 44% agree online games may help in emotional regulation of gamers
- While 30% approve of games as a via media for cognitive enhancement

**c. Lastly, studies of Tumobokon (2019)** reveal online games to have varied other benefits such as improving decision making, visuo-spatial skills, memory, reasoning, pattern recognition, planning, simultaneous processing, analyzing, strategizing, concentration, teamwork and management etc.

## **SUGGESTIONS & FINDINGS**

Based on the above literary review it becomes evident that online games are likely to have numerous psychosocial and physiological benefits for the individual if used effectively. The following findings and strategies are thus enlisted based on the above review i.e.:

### **Findings:**

Different genres of games may contribute to different potential benefits i.e.

- Exergames may help in reducing lethargy/obesity and improving reaction time of the individual.

- Action Games may help the adolescent in releasing their pent up aggression, frustration and anger.
- Strategy based Games may help them in improving reasoning, planning, analogy, memory, decision making and problem solving abilities of the adolescents.
- MMORPG's may help in enhancing social and prosocial behavior.
- Games involving academic themes may help in enhancing the subject knowledge and learning skills of the adolescent.
- Other games may simply help the adolescent in recreating and alleviating stress.

**Suggestions:**

The following strategies can be utilized to enhance adolescent mental health on the basis of above listed findings:

- Since online games are a non-threatening means to socialize with others (as one can keep their identity anonymous while playing) they can be utilized with patients of social phobia or social anxiety so as to reduce its symptom severity and improve interpersonal relationships.
- Online Games involve the use of graphics, sounds, colours and themes which may be used to enhance the creativity and imagery of adolescents.
- Since 'virtual reality' is a vital part of the adolescents' routine, parents may use multiplayer games to establish a healthy rapport with their child and become a part of their inner circle.
- Practitioners could make use of online games to enhance working memory and other cognitive functions in patients of intellectual disability and other memory based problems.
- Online games with educational themes could be used to train those with Learning Disabilities, Expressive Language Disorders, Mixed Receptive Expressive Language Disorder, Social Pragmatic Communication Disorder, Phonological Problems, Articulation problems and Autism Spectrum Disorder.
- Clients with Depression and Binge Eating Disorder could be made to play Exergames or MMORPG's so as to engage in some meaningful physical and social activity while having fun.
- Increased anger, irritability and aggression are a common problem enlisted by parents concerning adolescents. So online games may help in releasing anger and channelizing negative energy of adolescents in a non-threatening and constructive manner.
- With an increase in academic, social, parental and peer pressure, online games may act as mediators in reducing stress and functioning healthily in difficult circumstances. So practitioners may use games as a part of their interventional plans for adolescents facing Stress related or Anxiety based problems.
- Adolescents lacking the ability to sustain concentration on a particular activity, having weak self concepts, low self esteem, anxiety or low motivation could play online games in moderation on a regular basis that would help in improving all the above listed conditions.

The above listed strategies could be combined heuristically with the findings of further empirical researches so as to design interventional plans utilizing online games to enhance adolescent mental health.

## REFERENCES

- Achtman, R. L., Green, C. S., & Bavelier, D. (2008). Video games as a tool to train visual skills. *Restorative Neurology and Neuroscience*, 26, 435-446.
- Adachi, P. J. C., & Willoughby, T. (2012). Do video games promote positive youth development? *Journal of Adolescent Research*, 28, 155–165.
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, 30, 217–237. doi:10.1016/j.cpr.2009.11.004
- Anand, V. (2007). A study of time management: The correlation between video game usage and academic performance markers. *CyberPsychology and Behavior*, 10(4), 552-559.
- Anderson, A.F., Bavelier, D., & Green, C. S. (2010). Speed-Accuracy Tradeoffs in Cognitive Tasks in Action Game Players. *Journal of Vision*, 10, 748.
- Anderson, C. A., Gentile, D. A., & Dill, K. E. (2012). Prosocial, antisocial, and other effects of recreational video games. In D. G. Singer & J. L. Singer (Eds.), *Handbook of children and the media* (2<sup>nd</sup> ed.) (pp. 249-272). Thousand Oaks, CA: Sage.
- Anderton, K. (2018, June 25). The Impact of Gaming: A Benefit to Society [Infographic] [Blogpost]. Retrieved from <https://www.forbes.com/sites/kevinanderton/2018/06/25/the-impact-of-gaming-a-benefit-to-society-infographic/#224afd3e269d>
- Awh, E., Vogen, E. K., & Oh, S. H. (2006). Interactions between Attention and Working Memory, 139, 201–08.
- Baboo, S., & Vasaimalairaja. (2017). Playing and watching videogames- Impact on the problem solving and prosocial behavior of middle school students. *RJPSSs*, 43(2), 106-113.
- Basak, Chandramallika, Boot, W. R., Voss, M. W., & Kramer, A. F. (2008). Can Training in a Real-Time Strategy Video Game Attenuate Cognitive Decline in Older Adults? *Psychology and Aging*, 23, 765–77.
- Biddiss, E., & Irwin, J. (2010). Active video games to promote physical activity in children and youth. *Archives of Pediatrics and Adolescent Medicine*, 164, 664-672.
- Bogost, I. (2007). *Persuasive Games: The Expressive Power of Videogames*. The MIT Press.
- Bruce, G. (2007). A History of Real-Time Strategy Games. *GameSpot*. Retrieved on May 29, 2007.
- Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public health reports*, 100 (2), 126.
- Chiappe, D., Conger, M., Liao, J., Caldwell, J. L., & Vu, K. L. (2013). Improving Multi-Tasking Ability through Action Videogames. *Applied Ergonomics*, 44, 278–84.
- Cohen, J. E., Green, C. S., & Bavelier, D. (2007). Training Visual Attention with Video Games: Not All Games are Created Equal. In O’Neil, H. & Perez, R. (Eds.), *Computer Games and Team and Individual Learning* (pp. 205–28).
- Colwell, J. (2007). Needs met through computer game play among adolescents. *Personality and Individual Differences*, 43, 2072–2082. doi:10.1016/j.paid.2007.06.021
- Colzato, L., vandenWildenberg, W. P., & Hommel, B. (2014). Cognitive Control and the COMT Val (158) Met Polymorphism: Genetic Modulation of Videogame Training and Transfer to Task-Switching Efficiency. *Psychological Research*, 78, 670–78.
- Corbett, A. T., Koedinger, K. R., & Hadley, W. (2001). Cognitive tutors: From the research classroom to all classrooms. In P.S. Goodman (Eds.), *Technology Enhanced Learning* (pp. 235-263). Mahwah, NJ: Lawrence Erlbaum.
- Dan, A. (2006). The State of the RTS. *IGN*. Retrieved on May 31, 2007.

- De Argaez, E. (2013). Internet World Users by Language. *Internet World Stats*. Retrieved from <https://www.internetworldstats.com/stats7.htm> on 1 March 2018 at 2:00 p.m.
- Eichenbaum, A., Bavelier, D., & Green, C. S. (2014). Video Games Play That Can Do Serious Good. *American Journal of Play*, 7(1), 51-71.
- Entertainment Software Association (2011). *Games: Improving Education*. Retrieved from [http://www.theesa.com/games-improving-what-matters/ESA\\_FS\\_Education\\_2011.pdf](http://www.theesa.com/games-improving-what-matters/ESA_FS_Education_2011.pdf)
- Entertainment Software Association.(2012). *Essential facts about the computer and video game industry*. Retrieved from [www.theesa.com/facts/pdfs/ESA\\_EF\\_2012.Pdf](http://www.theesa.com/facts/pdfs/ESA_EF_2012.Pdf)
- Ewoldsen, D. R., Eno, C. A., Okdie, B. M., Velez, J. A., Guadagno, R. E., & DeCoster, J. (2012). Effect of playing violent video games cooperatively or competitively on subsequent cooperative behavior. *Cyberpsychology, Behavior, and Social Networking*, 15, 277–280. doi:10.1089/cyber.2011.0308
- Feng, J., Spence, I., & Pratt, J. (2007). Playing an Action Video Game Reduces Gender Differences in Spatial Cognition. *Psychological Science*, 18, 850–55.
- Gee, J. P. (2003). *What Video Games have to Teach Us about Learning and Literacy*. New York: Palgrave/Macmillan.
- Gee, J. P. (2005). Learning by Design: Good Video Games as Learning Machines, *E-Learning*, 2, 5–16.
- Gentile, D. A., & Gentile, J. R. (2008). Violent Video Games as Exemplary Teachers: A Conceptual Analysis. *Journal of Youth & Adolescence*, 37, 127–41.
- Gentile, D. A., Anderson, C. A., Yukawa, S., Ihori, N., Saleem, M., Ming, L. K., . . . Sakamoto, A. (2009). The effects of prosocial video games on prosocial behaviors: International evidence from correlational, longitudinal, and experimental studies. *Personality and Social Psychology Bulletin*, 35, 752–763. doi:10.1177/0146167209333045
- Glass, B. D., Maddox, W. T., & Love, B. C. (2013). Real-Time Strategy Game Training: Emergence of a Cognitive Flexibility Trait. *PLoS One* 8.
- Graf, D. L., Pratt, L. V., Hester, C. N., & Short, K. R. (2009). Playing active video games increases energy expenditure in children. *Pediatrics*, 124, 534-540.
- Granic, I., Lobel, A., & Engels, R. C. M. E. (2014). The Benefits of Playing Video Games. *American Psychologist*, 69(1), 66-78.
- Green, C. S., & Bavelier, D. (2003). Action Video Game Modifies Visual Selective Attention. *Nature*, 423, 534–538.
- Green, C. S., & Bavelier, D. (2006). Effect of Action Video Game Playing on the Spatial Distribution of Visual Selective Attention. *Journal of Experimental Psychology: Human Perception and Performance*, 32, 1465–78.
- Green, C. S., & Bavelier, D. (2006). Enumeration versus Multiple Object Tracking: The Case of Action Video Game Players. *Cognition*, 101, 217–45.
- Green, C. S., & Bavelier, D. (2007). Action video game experience alters the spatial resolution of attention. *Psychological Science*, 18 (1), 88-94.
- Green, C. S., & Bavelier, D. (2012). Learning, Attentional Control, and Action Video Games. *Current Biology*, 22, R197–R206.
- Griffiths, M. D., Kuss, D. J., & King, D. L. (2012). Video game addiction: Past, present and future. *Current Psychiatry Reviews*, 8, 308–318.
- Jackson, L. A., Witt, E. A., Games, A. I., Fitzgerald, H. E., Von Eye, A., & Zhao, Y. (2012). Information technology use and creativity: Findings from the Children and Technology Project. *Computers in Human Behavior*, 28, 370–376.
- Jackson, L., Zhao, Y., Kolenic III, A., Fitzgerald, H., Harold, R., & Von Eye, A. (2008). Race, gender, and information technology use: The new digital divide. *CyberPsychology and Behavior*, 11(4), 437-442.

- Jason, C. A., McLaughlin, A. C., Trujillo, A., Whitlock, L. A., LaPorte, L. & Gandy, M. (2013). Successful Aging through Digital Games: Socioemotional Differences between Older Adult Gamers and Non-Gamers. *Computers in Human Behavior*, 29, 1302-1306. <http://dx.doi.org/10.1016/j.chb.2013.01.014>
- Kim, Y., & Ross, S. D. (2006). An exploration of motives in sport video gaming. *International Journal of Sports Marketing and Sponsorship*, 8 (1), 34–46.
- Klein, M., & Simmers, C. S. (2009). Exergaming: Virtual inspiration, real perspiration. *Young Consumers*, 10, 35-45.
- Kuss, D., Griffiths, M., Karila, L., & Billieux, J. (2014). Internet addiction: A systematic review of epidemiological research for the last decade. *Current Pharmaceutical Design*, 20, 4026–4052.
- Lenhart, A., Kahne, J., Middaugh, E., Macgill, A. R., Evans, C., & Vitak, J. (2008). *Teens, video games, and civics*. Pew Internet & American Life Project. Retrieved from <http://www.pewinternet.org> on 7 August 2018 at 5:30 p.m.
- Lenhart, A., Kahne, J., Middaugh, E., Macgill, A. R., Evans, C., & Vitak, J. (2008). Teens, video games, and civics: Teens' gaming experiences are diverse and include significant social interaction and civic engagement. *Pew Internet & American Life Project*. Retrieved from the Pew Internet & American Life Project website: <http://www.pewinternet.org/Reports/2008/Teens-Video-Games-and-Civics.aspx>
- Li, R., Polat, U., Scalzo, F., & Bavelier, D. (2010). Reducing Backward Masking through Action Game Training. *Journal of Vision*, 10, 1–13.
- Li, R., Uri, P., Walter, M., & Bavelier, D. (2009). Enhancing the Contrast Sensitivity Function through Action Video Game Training. *Nature Neuroscience*, 12, 549–51.
- Liu, C. (2014). *Long term effects of video and computer game heavy use on health, mental health and education outcomes among adolescents in the U.S.* (Doctoral Dissertation). University of Illinois at Urban-Champaign, Illinois, U.S.A.
- Lobel, A., Granic, I., Stone, L. L., & Engels, R. C. (2014). Associations between children's video game playing and psychosocial health: Information from both parent and child reports. *Cyberpsychology, Behavior and Social Networking*, 17, 639–643.
- McGonigal, J. (2011). *Reality is broken: Why games make us better and how they can change the world*. New York, NY: Penguin Press.
- Mellecker, R. R., & McManus, A. M. (2008). Energy expenditure and cardiovascular responses to seated and active gaming in children. *Archives of Pediatrics and Adolescent Medicine*, 162, 886-891.
- Mishra, J., Zinni, M., Bavelier, D., & Hillyard, S. A. (2011). Neural Basis of Superior Performance of Action Videogame Players in an Attention-Demanding Task. *Journal of Neuroscience*, 31, 992–98.
- Murphy, R., Penuel, W., Means, B., Korbak, C., & Whaley, A. (2001). *E-desk: A review of recent review on the effectiveness of discrete educational software*. Menlo Park, CA: SRI International.
- Narvaez, D., Mattan, B., MacMichael, C., & Squillace, M. (2008). Kill bandits, collect gold or save the dying: The effects of playing a prosocial video game. *Media Psychology Review*, 1(1).
- Oei & Patterson. (2013). Enhancing cognition with video games: a multiple game training study. *Pubmed*, 8, (3).
- Oh, Y., & Yang, S. (2010). Defining exergames & exergaming. Retrieved from <https://www.researchgate.net/publication/230794344> on June 29, 2019.
- Olson, C. K. (2010). Children's Motivation for Video Game Play in the Context of Normal Development. *Review of General Psychology*, 14 (2), 180-187.

- Przybylski, A. K., Rigby, C. S., & Ryan, R. M. (2010). A Motivational Model of Video Game Engagement. *Review of General Psychology, 14*, 154–66.
- Rosenberg, D., Depp, C. A., Vahia, I. V., Reichstadt, J., Palmer, B. W., Kerr, J.,...Jeste, D. V. (2010). Exergames for subsyndromal depression in older adults: A pilot study of a novel intervention. *American Journal of Geriatric Psychiatry, 18*, 221-226.
- Russoniello, C. V., O'Brien, K., & Parks, J. M. (2009). EEG, HRV and psychological correlates while playing Bejeweled II: A randomized controlled study. In B. K. Wiederhold & G. Riva (Eds.), *Annual review of cybertherapy and telemedicine 2009: Advance technologies in the behavioral, social and neurosciences* (Vol. 7, pp. 189–192). Amsterdam, The Netherlands: Interactive Media Institute and IOS Press. doi:10.3233/978-1-60750-017-9-189
- Ryan, R. M., Rigby, C. S., & Przybylski, A. (2006). The motivational pull of video games: A self-determination theory approach. *Motivation and Emotion, 30*, 347–363. doi:10.1007/s11031-006-9051-8
- Sall, A., & Grinter, R. E. (2007). Let's Get Physical! In, Out and Around the Gaming Circle of Physical Gaming at Home. *Computer Supported Cooperative Work (CSCW), 16*(1), 199-229.
- Sestir, M. A., & Bartholow, B. D. (2010). Violent and nonviolent video games produce opposing effects on aggressive and prosocial outcomes. *Journal of Experimental Social Psychology, 46*, 934-942.
- Sherry, J. L. (2004). Flow and media enjoyment. *Communication Theory, 14*, 328–347. doi:10.1111/j.1468-2885.2004.tb00318.x
- Spence, I., Yu, J. J., Feng, J., & Marshman, J. (2009). Women Match Men When Learning a Spatial Skill. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 35*, 1097–1103.
- Sweetser, P., & Wyeth, P. (2005). GameFlow: A model for evaluating player enjoyment in games. *Computers in Entertainment, 3*(3), Article 3A. doi:10.1145/1077246.1077253
- Torres, A.C.S. (2011). Cognitive Effects of Video Games on Old People. *International Journal on Disability and Human Development, 10*, 55–58.
- Tumbokon, R. (2019, April 28). 25+ Positive and Negative Effects of Video Games [Blogpost]. Retrieved from <https://www.raisesmartkid.com/3-to-6-years-old/4-articles/34-the-good-and-bad-effects-of-video-games>
- Ventura, M., Shute, V., & Zhao, W. (2013). The relationship between video game use and a performance-based measure of persistence. *Computers & Education, 60*, 52-58. doi:10.1016/j.compedu.2012.07.003
- Wan, C. S., & Chiou, W. B. (2006). Why are adolescents addicted to online gaming? An interview study in Taiwan. *The impact of the Internet, multimedia and virtual reality on behavior and society, 9*, 762–6.
- Wang, D., & Liu, D. H. (2012). Review of Correlative Research of Young People's Network Game. *Advertising Panorama, 12*, 53-61.
- Williamson, B., & Facer, K. (2003). More than “Just a Game”: The Implications for Schools of Children's Computer Games Communities. *Education, Communication and Information, 4*, 253-268.
- Wood, R. T., & Griffiths, M. D. (2007). A qualitative investigation of problem gambling as an escape-based coping strategy. *Psychology and Psychotherapy, 80*, 107–25.
- Zhao, Y. L., He, Y., & Zheng Y. (2011). Negative Effects of Video Games and Disputes. *Advances in Psychological Science, 19*, 1788-1797.