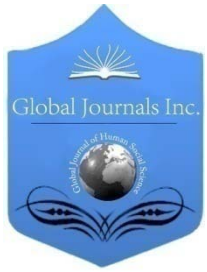
Volume 15 Issue 62
Originally issued as A11



Global Journal of human-social science: A
Arts & Humanities - Psychology
Volume 15 Issue 11 Version 1.0 Year 2015
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-460X & Print ISSN: 0975-587X

# Digital Games Cause to Brain & Psychological Behaviours

By L. K. Pulasthi Dhananjaya Gunawardhana
*Malaysia University of Science & Technology, Sri Lanka*

*Abstract-* This article discusses the ways in which digital games affect the behaviours of teenagers by promoting aggression. Also highlighted is what the field of neuroscience can tell us about the implications of using digital games, particularly with respect to their effects on teenagers' brains and, consequently, on their behaviours. In addition, this paper demonstrates the importance of conducting research on the ways in which the use of digital games affect teenagers' behaviour, values and mental health and stresses the need to find ways in which to ensure the safe use of digital games and other new entertainment media.

*Keywords: digital games, violent games, aggressive behaviour, general aggregation model, psychological effects, teenage brain.*

*GJHSS-A Classification : FOR Code: 179999*



*Strictly as per the compliance and regulations of:*



© 2015. L. K. Pulasthi Dhananjaya Gunawardhana. This is a research/review paper, distributed under the terms of the Creative Commons Attribution-Noncommercial 3.0 Unported License http://creativecommons.org/licenses/by-nc/3.0/), permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

# Digital Games Cause to Brain & Psychological Behaviours

L. K. Pulasthi Dhananjaya Gunawardhana

*Abstract-* This article discusses the ways in which digital games affect the behaviours of teenagers by promoting aggression. Also highlighted is what the field of neuroscience can tell us about the implications of using digital games, particularly with respect to their effects on teenagers' brains and, consequently, on their behaviours. In addition, this paper demonstrates the importance of conducting research on the ways in which the use of digital games affect teenagers' behaviour, values and mental health and stresses the need to find ways in which to ensure the safe use of digital games and other new entertainment media.

*Keywords: digital games, violent games, aggressive behaviour, general aggregation model, psychological effects, teenage brain.*

## I. Introduction

With the development of new technology, digital games are becoming more popular day by day. There are many different kinds of games available in the market, and their use affects individuals' lives in both good and bad ways. Many people believe that digital games are harmful to society, in general, and research suggests that overexposure to these games can lead to a number of negative effects in their users. However, although many studies have attempted to determine whether or not digital games actually result in negative impacts, there continues to be a great deal of misunderstanding and confusion about this topic. Drawing on past research papers, journal articles and research, this paper discusses the relationship between human behaviour and digital-game use. It is worthwhile to examine the content of digital games and to determine the ways in which they may enhance the lives of young individuals. However, the exposure of these young people to antisocial and violent gaming content could escalate the range of negative results to the extent that the young players may be placing their lives in danger. Even though it is impossible to know the precise causes for the younger generation's negative behaviours, there are a few possible explanations that point to the negative effects, including the promotion of aggressive behaviour, which many digital games inspire in young users. Our research found that these negative effects are linked directly to the content of digital games. The digital games which are available in the current market feature realistic backgrounds and humanoid characters who engage in battle. Unfortunately, digital games which have violent content (e.g. fighting and killing) now control the market. Approximately 80% of the digital games currently available in the market feature violent content. According to the research, the younger generation (aged 18 and above) play digital games more than 21 hours per week. A comparison of past research reveals that this usage is a trend that appears to be increasing rapidly: on average, young people are playing digital games three hours per day. Younger people throughout the world enjoy playing games that contain violent elements. Some of the more popular such games include *Call of Duty: Modern Warfare*, *Grand Theft Auto (GTA)*, and *Assassins of Creed*. *Call of Duty: Modern Warfare* made a reported profit of 550 million USD during the year 2014, while sales of *Grand Theft Auto IV* netted a 500 million USD profit. We completed a literature review to get an idea of how many younger individuals use these types of digital games and thereby expose themselves to representations of high levels of violence and antisocial behaviour.

Emes suggests that 'video game playing may be a useful means of coping with pent-up and aggressive energies' (1997). This article explores relevant literature in an attempt to determine how digital games affect young users. In order to accomplish this, we had to select a suitable basic theory to use as a framework with which to examine this research in depth. The younger generation, especially teenagers, gain life experience with their first view of society. This may explain the anxieties associated with the development of technological routines in our teens. Furthermore, this article describes research that was largely conducted with children and teenagers, as this is the age group most significant to the present study, particularly with respect to the effects of technology and digital games. The information gathered for this research reveals an exceptional case of conservation effects in the brain.

## II. The Brain

Teenagers are going through serious mental and emotional changes as they mature; however, these young people are particularly vulnerable in a society that forces them to find solutions through the world that they encounter each day. Each new experience contributes to the development of their brain and will take them into adulthood step by step. One researcher found a connection between learning and neural capacity. The

*Author: Department of IT, School of Science and Engineering Malaysia University of Science and Technology (MUST) Kelana Jaya, PJ, Selangor, Malaysia. e-mail: lkpdg87@gmail.com*



© 2015 Global Journals Inc. (US)

educational implication is that students who learn a great deal in a subject area grow more neural connections in response. Conversely, neglecting an area inhibits neural connections. Teenagers who frequently play digital games have more neural connections to the brain than those who do not. However, although it is important to place limits on the amount of time one deliberates about the features of a task, it is not as simple as we may think: the time we spend on the task contributes toward brain development.

A core characteristic of the brain, flexibility is the ability that helps to change the lifecycle of the brain in all individuals, be they infants, teenagers or adults. Flexibility helps to make new connections and to remove unwanted memories. Costandi (2010) states that flexibility helps teenagers grow in proportion to their life experience. At each stage of growth, the brain increases in knowledge, learns new skills and adapts to the environment (Costandi, 2010). Moreover, there are some who believe that brain cells have the ability to reproduce themselves, a specific implication that is apparent through the teenage stage. The teenage brain is undergoing an incomparable transformation and is remarkably flexible in adapting to any given situation.

The most vital factor at work within the teenage brain is that it is constantly producing emotions in response to different situations and growing over time and as a result of new knowledge and the feelings experienced. In contrast to the adult brain, which has already completed the development and learning process, the teenage brain is involved in activities related to complex thoughts. Adult brains are capable of making thoughtful decisions because they possess the ability to examine a situation logically, while the brain of a teenager is in the early stage of conversion and progressing from a mode of emotional reactions to one of clear, intellectual thinking.

This finding confirms the neuroscience which suggests that the teenage brain is in a transitional stage. These adjustments are significantly dependent upon the teenager's early experiences. Generally, technology plays a main role in this transition. As Anderson (2004) highlights, it is essential that both parents and teachers be alert to what teenagers are doing in order to prevent them from going in the wrong direction. The value of the technology they use depends on the purpose for which they are using it. It is important to note that education and other positive academic applications do not result in any negative outcomes (Anderson, 2004).

## III. Digital Games

Today, games are used as an educational tool in most European countries. According to some research, about 80% of Europe's teachers and students are using digital games as instructional tools. In addition, the brain's neurotransmitter release higher amounts of dopamine while playing digital games: it provides the intellect for a participant to react happily, and it just as easily generates feelings of satisfaction and delight. This motivates teenagers to play digital games; it is this motivation that plays a significant role in the learning process (Clark & Ernst, 2010). One of the best digital gaming tools which is currently used for education is Nintendo. Fundamental mathematics involves more brain-exercise activities than playing digital games. It seems, however, that even though we use digital games as an educational tool, their learning outcomes are less satisfactory than traditional learning activities. Another study found that even if satisfaction and motivation are increased, educational achievement does not improve as the result of using digital games (Kinzie & Joseph, 2008).

Two research articles we reviewed reveal that there are specific consequence for the many teenagers who spend hours playing digital games. One study found that digital games are addictive in the same way that drugs and alcohol are addictive. Habitual game players are much more driven than those who play the games less frequently. Most of the digital games include addictive activities that may result in the release of a large amount of dopamine (Duven, Müller & Wölfling, 2011). Neuroscientists believe that the teenage brain tends to be exposed to addictive things that are harmful, which may lead to changes in the brain. The purpose for being spontaneous is to interrupt the inclination to over-engage the amygdala and to make the frontal lobes sleep, thereby balancing the brain and rendering teenagers capable of considering options and making serious decisions.

Though most digital games are not allowed in schools, teenagers frequently play them at home. When playing digital games that contain violent elements, testosterone levels, which are controlled by the brain- and possibly the reactions of the amygdale-escalate, which may cause the user to experience tension. Researchers have found that these kinds of digital games aggravate those who play them and increase violent behaviour. Therefore, we have to think twice when considering whether to play violent digital games.

## IV. The Effects of Digital Games

An interest in digital games could be challenging for most young people, a problem which appears to be widespread. Halpin states that 'To-date, there has been no conclusive research to prove a causal link between playing digital games and social behaviour' (2004). If you agree with this statement, you must be misinterpreting how behavioural science has been accompanied. No research study can be exclusively decisive; researchers are always forming theories as a part of their research process. If

© 2015 Global Journals Inc. (US)

researchers begin their study with the assumption that playing digital games is a strong factor that is associated with violent behaviour, they would conduct their research without wasting time by going round and round the problem. One study found a number of variables which could be related both to playing digital games and to violent behaviour, such as personality, anger, level of education and observing and controlling media.

According to Gentile, 'teenage extreme gamers prefer to play games approximately 35 hours per week, and those who do not belong to the extreme gamer category play approximately 14 hours per week, or about 2 hours per day' (2011). Gentile found that those who are labelled extreme gamers could experience higher levels of depression and social phobia. In addition to extreme gaming being a potential reason for increased aggression, it also could be the reason for poor marks on exams. This evidence about the causes of aggression described above could be a reason to support current guidelines. From time to time, digital games offer rewards that provide their users with real-world experiences. According to the research, it helps to release dopamine equivalent to the psycho-stimulant effect occurring in the brain.

At the moment, there is no agreement as to the diagnostic standards that tell us how to control extreme gamers and addiction to the use of digital games with violent content. This could be tolerated by the human brain, as there are many cases of inappropriate behaviour, although unusual, which could themselves be generating psychiatric disorders. Therefore, these types of problems are hard to control; consequently, the use of digital games could be seen as an addiction. It is anticipated that, with time, the significance of pathologies with respect to digital-game addiction will be clear, but there is currently a lack of agreement. Using digital games without time limits could be unhealthy. As researchers have found, there should be guidelines that limit the use of games, ideally a maximum of 2 hours per day for children and teenagers.

## V. The Psychological Effects of Digital Games on the Teenage Brain

According to researchers, there are different clarifications regarding the effects of digital video games. These core effects are discussed in the paragraphs below.

*a) Simulating*

Simulation assists with processes such as quickly learning core behaviours by imitating human actions. Simulation, which is not cooperative, highlights antisocial behaviour and thereby has the potential to negatively influence society. We know that teenagers choose to emulate certain experiences they observe throughout society, and once they see any kind of violent behaviour, they tend to duplicate it. This tendency can result in significant harm to society. We also know that teens are likely to imitate familiar game characters: they are more likely to follow them just to draw attention from those around them in an attempt to be viewed as heroes, to receive rewards or to achieve a high social status. Through digital-game characters, teenagers are introduced to a thug lifestyle when the game focuses only on the 'bad side' of a society, in which people become heroes by killing or robbing. Reed reports that an '18-year-old youth in Thailand stabbed a taxi driver to death trying to find out if it was as easy in real life to rob a taxi as it was in the game' (2008). According to Leung (2005), an 18-year-old boy, after playing *Grand Theft Auto*, murdered three police officers and got arrested for carjacking. The boy said, 'Life is like a video game. Everybody's got to die sometime' (2005).

A couple of risk factors that are likely to promote the violent or forceful behaviour of teenagers have been confirmed as being associated with the use of digital games. It is difficult to recognize that these risk factors are dynamic when considering them in conjunction with aggressive behaviour. However, simulating violence in digital games appears to play some role. There are a few other factors which cause aggressive behaviours while imitating digital games. Most of the players are actively following the same scenarios that occur in the digital games.

*b) Interactivity and Digital Games*

Active participation in class activities as a method to help individuals to learn easily is an idea that needs to be explored. Performing a task without the assistance of others could help an individual to use his or her memory to retain knowledge relevant to the task (Gentile & Gentile, 2008). Digital games are extremely interactive with the players. With the latest technology, games which feature violent elements allowed players to use model weapons, such as guns, swords, and pistols. This could help to increase interactivity with the game and to bring the player closer to the game itself to give the feeling of a real-world situation. The technique of interactivity with the game and frequent practicing translate into effective learning. The main purpose of these digital games should be to function as powerful tools for educational purposes and not to build 'killing machines'. If violent elements are passed to individuals through digital games, significant negative outcomes will permeate society: hatred for each other, an increased number of robberies, perhaps even reasons to start a third world war. To stop antisocial behaviour, we have to refrain from welcoming digital games to society that promote aggressive and violent behaviour.



© 2015 Global Journals Inc. (US)

*c) Duplicating*

It is well recognized that duplication of behaviours creates memories; this improves the skill and power of the digital-game player during every learned response. In addition, one must repeat the entire behavioural system, which is more effective than repeating each part of the whole system. Most non-violent digital games are tedious when compared with games that include fighting, shooting, and other violent behaviours. Players who like to play these types of games are habitually involved in duplicating their interactivity, and those who repeat the same behaviours unique to a particular game will achieve the capability to have similar thoughts and feelings while imitating the actions that occur in these games; these players present society with the same arrogant attitudes they observe in the game. Basically, the inappropriate behaviours learned through violent games are perfect for learning violent attitudes and acting out violent characters in everyday behaviour.

## VI. The General Aggression Model (GAM)

The general aggression model (GAM) theoretically tells us how the violent contents of digital games are exposed to humans and that these aggressive effects can affect the human brain, both on a short-term and long-term basis. The GAM explains what will ensue psychologically in an event of aggression. Each human being brings his or her own willingness to diverge from their own beliefs and attitudes with respect to aggression, personality and other constant elements. Each and every situation which they face daily may trigger feelings of aggression. Once a teen encounters a potential cause for an aggressive act, numerous applicable perceptions are activated, such as memories, attitudes, and behaviour, emotions (e.g. fear or anger) and a stage of physiological provocation.

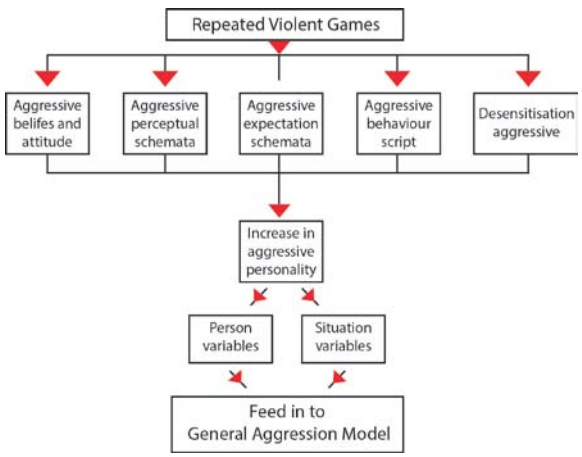



*Figure 1 :* General Aggression Model

The consequence of these motivational understandings and feelings, and also the level of provocation, could cause teenagers to have a sudden reaction. When teenagers have both the time and the ability to be more deliberate in their response, they will assess their choices and will make a final decision as to how they will act. If they are strongly provoked by the situation, however, they could be compelled to take a rash action. This would most likely be an ensuing reaction. The sudden response could be very aggressive and could prompt a social reaction, after which the incident is set into memory. As soon as the memory becomes ingrained, it can influence the teenager's response, depending on the situation. Researchers have found that, irrespective of personal characteristics and the extent to which they are inclined by digital games, the teenager's characteristics are significant and potentially responsible for how they react to certain situations. It also has been acknowledged that most of the digital games which have violent content serve as the causes of aggressive behaviour by stimulating aggressive feelings and could escalate the provocation level.

The arrogant behaviour, ideas and scripts for digital games which feature violent content lead to building perpetual understanding, attitudes, preferences in intellectual and encounter determination and inclinations that include aggressive behaviour (see Figure 1). This could escalate the fundamentals of aggressiveness in the teenager's character and promote the teen's aggression causes regarding a lieu where a high level of inclination to vilify. Concerning the model, we can conclude both short-term and long-term results.

## VII. Conclusion

This article discusses the extent to which digital games with violent content are harmful. If adults can help teenagers to self-regulate with respect to the games they are playing, it would be very helpful to the teenager's psychological and educational well-being. It would be particularly helpful for teenagers to have opportunities to play digital games which offer a range of educational elements, and it would be better for them to avoid exposure to games which contain harmful elements. As many psychological researchers clearly highlight, playing games which feature aggressive elements could be a cause of violent behaviour. Most digital games have no limitations and drawbacks. But researchers suggest that an addiction to digital games could result in reduced attention to classroom activities in school, as well as serving as the reason for aggressive behaviours. These results are worrisome and require adults to pay more attention when the teenagers in their charge become involved with digital games. We think that it is time to move this discussion to the public forum so that society can take action to reduce teenagers' exposure to violent digital games. All parents have to decide how their teenage children will use

© 2015 Global Journals Inc. (US)

computers, as well as what types of games they will play and how much time they will spend playing them. Parents should be able to monitor the usefulness of the digital games their teenagers play and should have at least a fair idea of their appropriateness.

## References Références Referencias


1. Emes, C. E. (1997). Is Mr. Pac Man eating our children? A review of the effect of video games on children. Canadian Journal of Psychiatry, 42, 409-414.
2. Costandi, M. (2010). Blackmore: Plasticity made us human.
3. Anderson, T. (2004). Teaching in online learning context. In T. Anderson & F. Elloumi (Eds.), Theory and practice of online learning (pp. 273–294). Athabasca, AB, Canada: Athabasca University.
4. Clark, A. C., & Ernst, J. (2010). Gaming research for technology education. Journal of STEM Education: Innovations & Research, 10(1), 25–30.
5. Kinzie, M., & Joseph, D. (2008). Gender differences in game activity preferences of middle school children: Implications for educational game design. Educational Technology Research and Development, 56(5/6), 643–663.
6. Duven, E., Müller, K.W., & Wölfling, K. (2011). Internet and computer game addiction – a review of current neuroscientific research. European Psychiatry, 26, 416.
7. Halpin, H. (2004, September 24). IEMA criticizes Governor Schwarzenegger Press Release.
8. Ortutay, B. (2011). 'Call of Duty: Black Ops' sets earnings record for its 1st day.
9. Dill, KE, Gentile, DA, Richter, WA, & Dill, JC (2005). Violence, sex, age and race in popular video games: A content analysis. In E Cole & J Henderson-Daniel (eds), Featuring Females: Feminist Analyses of Media (pp 115–130).
10. Shotton, M. Computer addiction a study of computer dependency, 1989.
11. Gentile, D. A. et al. (2011). Pathological Video Game Use among Youths: A Two-Year Longitudinal Study. Pediatrics 127.
12. Reed, J (2008). Thailand bans Grand Theft Auto IV. BBC News Online, 4 August. Accessed 14 April 2011.
13. Leung, R (2005). Can a video game lead to murder? Did 'Grand Theft Auto' cause one teenager to kill?
14. Gentile, DA, & Gentile, JR (2008). Violent video games as exemplary teachers: A conceptual analysis. Journal of Youth and Adolescence, 9, 127–141.




© 2015 Global Journals Inc. (US)

This page is intentionally left blank

© 2015 Global Journals Inc. (US)