THE CORRELATION OF
VIDEO GAMES WITH POSITIVE AFFECT AND NEGATIVE AFFECT
AMONG
UTAR (PERAK CAMPUS) UNDERGRADUATE STUDENTS

LIM YONG QUAN

CHEONG HUI QI

SAW SHI QI

A RESEARCH PROJECT
SUBMITTED INPARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE BACHELOR OF SOCIAL SCIENCE (HONS) PSYCHOLOGY
FACULTY OF ARTS AND SOCIAL SCIENCE (FAS)
UNIVERSITY TUNKU ABDUL RAHMAN

OCTOBER 2015

Table of Contents

Abstract

Video games are becoming increasingly popular especially among students. There are also recent tragedies involving students who might have issues with psychological well-being. Since video games are popular among students and students are vulnerable to various emotions, this study aimed to assess the correlation of hours spent on video games and student's positive and negative affect. It was hypothesised that hours spent on video games is correlated with both positive and negative affect. 300 UTAR-PK students were recruited in this study. The participants were asked to report their total hours spent on video games in the past four weeks and assessed with SPANE (Diener et al., 2009) for their positive and negative affect. The result indicated that hours spent on video games has a statistically significant positive correlation with positive affect of students but no significant correlation with negative affect. Implications and limitations of this study were discussed and recommendations for future studies were made.

Keywords: hours, video games, positive affect, negative affect

Introduction

Background of Research

Video games has been one of the fastest growing industries among the entertainment line of product (Entertainment Software Association [ESA], 2014). As cited in ESA (2014), it is also expected that global video game sales will reach over 100 billion U.S. Dollar (USD) by 2015. In other words, the video game industry is growing tremendously.

Video games are generally divided into three platforms: computer, console and mobile. Computer games and console games are generally similar while mobile games have completely different set of game experience. The main difference between them is the play time and the usability. In term of play time, computer games and console games usually have a long play time while mobile games use only a short play time. For example, a normal match in computer games and console games usually last at least 30 minutes but a mobile game match usually last only within 5 minutes or less. In term of usability, computer games uses a computer, monitor, keyboard and mouse; console games require a console, console-specific controllers and usually a TV screen; mobile games only require a smartphone or a tablet device.

According to Hsu and Lu (2004), one of the reason people play video games is driven by the flow experience they get. They further explained that players achieve flow experience by the in-game challenges and their skill level in achieving in-game goals. In other words, it is the intrinsic motivation that drive players to play video games as it also provides players with the sense of control by achieving goals (Ferguson & Rueda, 2010). Besides, multiple past research had also found consistent result that video game playing triggers positive emotions (e.g., Ferguson & Rueda, 2010; Russoniello, O'Brien, & Parks, 2009; Aldao, Nolen-Hoeksema, & Schweizer, 2010). However, these researches were all conducted outside

of Southeast Asian countries. Therefore, it raised questions to the present study that whether playing video games will influence players' positive emotion also in Malaysian context.

Positive affect becomes the focus of the present study as suicide cases of students around Malaysia have been frequent and the variable is related to suicidal ideation (Rajappa, Gallagher, & Miranda, 2012). According to the Health Minister, Datuk Seri Liow Tiong Lai, in 2012, suicide rates are climbing in Malaysia where the most prevalent victims belong to the productive age group (24-44 years old) of population with 48% of which are Chinese (Sipalan, 2012). This further driven the interest of the present study to investigate on the positive emotion as it is negatively related to negative affect (i.e., depression). Thus, the present study aimed to investigate the relationship between video games playing behaviour and players positive emotion.

Moreover, according to broaden-and-build theory, one of the advantages of exposing to positive experiences is the reduction of one's negative affect and increased resiliency (Fredrickson, 2001; Fredrickson, 2004). Therefore, playing video games could be effective as a strategy in regulating one's emotional well-being, which is important in term of reducing suicidal ideation too (Rajappa et al., 2012). In fact, some past researches also found results that indicate the absence or decrement of negative affect by playing video games, including violent ones (see Ferguson & Rueda, 2010; Ryan, Rigby, & Przybylski, 2006).

Besides, following the rapid development of both video games and internet, most video games now offer online gameplay where players can connect with people across the globe to compete against or cooperate with each other. Players are free to communicate with anyone in-game and these games sometimes also offer in-game group membership. These memberships and communications in turn provide players with sense of belonging to their online game friends which leads to positive affect (Baumeister & Leary, 1995; Ryan et al.,

2006) as these in-game communications are almost equivalent with those in real-life situations (Barnett & Coulson, 2010).

It is unarguably true that the popularity of video games has grown following its rapid development. Taking the town of Kampar for example, there are at least six cybercafés within the *Bandar Baru Kampar* alone, each with at least 50 units of computers for its customers. Some have even upgraded their computer tools specialised for gaming (i.e., mouse, keyboard), user database with fingerprint scanner for log-in and luxurious sofa for maximum long-hour gaming comfortability. In other words, the gaming population is growing in Kampar. Therefore, this popularity of video games could be utilised in improving psychological well-being of its players. Hence, this draw the attention to the present study and drives the investigation of the effect of video games playing to positive experiences on the population of undergraduate students in Universiti Tunku Abdul Rahman (Perak Campus; UTAR-PK) who play video games.

Statement of Problem

Over the years researches have been conducted in huge amount to investigate on the impacts of media usage to an individual. However, video games are relatively new compared to television and films thus researches on video games are comparably less. Yet, most researchers of video games playing set their focus mainly on the negative aspects of the impact (e.g., violence), and the number of these researches are so comparably vast that the researches focusing on the positive counterparts (e.g., relaxation) are being outnumbered to negligible.

A more balanced perspective is needed.

It is undeniable that playing video games do have negative impacts, however, the positive ones should not be ignored but instead, be appreciated and applied. According to Granic, Lobel and Engels (2014), video games, including violent ones, are significant in

improving children's and teen's various psychological milestones (e.g., autonomy, social skills, etc.) or emotional regulations. Therefore, this study is sought to find out the relationship between video games playing and one's positive experience.

Furthermore, there are many conflicting literatures in the past where some findings suggested that video games cause negative affect while some found the opposite. Besides, majority of the researches were done focusing on the western cultures (i.e., United States) which the findings may not be accurate when applied in Malaysian context. The cultural difference between westerners and Malaysians might bring different effect to individuals who play video games. The Malaysian's exposure to video games is also different comparing to westerners where Malaysians play more easily available and playable games while westerners have more resources to access games that requires more expensive devices.

Significance of Study

The present study is aimed to provide a more balanced perspective of influences of video games playing instead of polarising it to the negative side. It could provide an insight to the video games supporters on harnessing its positive side of impact to be applied in the society, such as in rehabilitation programs or in clinical settings and so on. In term of psychology, it could also help in understanding the phenomena of increasing popularity of video games among students, or further, the role of video games in promoting better mental health.

Besides, the study could possibly also strengthen the position and importance of video games in term of aiding child development, emotional regulations and other helpful usages. It also motivates game developers to create more video games with specific integrated helpful elements, such as encouraging autonomy among children, stabilising mood, increasing self-awareness and improving satisfaction with life, instead of sole entertainment purposes.

The present study taking place in Malaysian context will also shed light on the impacts consistent with the Malaysian culture. While most researches on video games were taking place in western settings (i.e., Unites States), their findings might not best suit in understanding the context in Malaysia. Therefore, a study focusing on Malaysian population will provide more accurate understanding of the effects of video games.

Research Questions

The research questions of the present study are as follow:

1. Is there a significant relationship between hours spent on video games and positive affect?

2. Is there a significant relationship between hours spent on video games and negative affect?

Hypotheses

The hypotheses, H_{x-i}, where x refers to either null (as 0) or alternative (as 1) and i refers to the index of research question in relation to the above, are as follow:

H_{0-1}:   There is no significant relationship between hours spent on video games and positive affect.

H_{1-1}:   There is a significant relationship between hours spent on video games and positive affect.

H_{0-2}:   There is no significant relationship between hours spent on video games and negative affect.

H_{1-2}:   There is a significant relationship between hours spent on video games and negative affect.

Definition of Concepts

Video games. Video games collectively mean a game which its gameplay experience largely depend on the human-machine interaction through an electronically displayed

graphical interface outputted by a device. It includes three platforms of video games: computer games, mobile games and console (Gameboy, PlayStation, Wii, Xbox, etc.) games.

Besides, following the development of video games and internet, video games now usually comes with online gameplay where players could compete or cooperate with other players throughout the globe through internet to achieve in-game goals. For example, Call of Duty series allow its players to cooperatively complete non-competitive challenging in-game missions and to compete with other team of players with counteractive in-game objectives (e.g., destroy an object vs. protect an object). Some of the most popular multiplayer games with most players are also free-to-play (e.g., Dota 2, Clash of Clans), meaning the full version of the game can be downloaded or is directly playable usually through the developer websites, giving the players more opportunities to play them even without paying.

Therefore, the operational definition of video games in this study refers to any virtual environment and experience which requires one or more voluntary participants to achieve virtual goals with or without internet connections that involve human-machine interactions and probable human-human communications through any electronic graphical display device.

Positive affect. Positive affect is defined as the pleasant emotional experience (Diener, 1984). It is an equivalent term with positive experience. It includes both the positive emotions and positive feelings into account. It comprises the feelings or experiences like positive, good, pleasant, happy, joyful and contented (Diener et al., 2009).

This should not be confused as being the opposite of negative affect as they are two separate independent states of well-being according to researches (Diener, 1984; Diener et al., 2009; Baker, Cesa, Gatz, & Mellins, 1992; Russell & Carroll, 1999; Watson, Carroll, & Tellegen, 1988b; Watson, Carroll, & Carey, 1988a). This imply that one can simultaneously feel positive and negative, instead of high in one feeling equals to low in the other (Folkman & Moskowitz, 2000).

The operational definition of positive affect in this study is the positive score of Scale of Positive and Negative Experience (SPANE; SPANE-P; Diener et al., 2009), where the minimum score is 6 and the maximum is 30. The lower the score, the lower the positive affect one experiences, vice versa.

Negative affect. Negative affect is the experiences of emotional distress or unpleasant engagement experienced by an individual (Watson et al., 1988a; Watson et al., 1988b). In contrast to positive affect, it stresses both the negative emotions and negative feelings, for instance, negative, bad, unpleasant, sad, afraid and angry (Diener et al., 2009). As described earlier, this should not be confused as the bipolar end of positive affect. It is an independent emotional dimension that has no significant correlation with positive affect (Watson et al., 1988b). For example, one can feel unpleasant to lose a video game match but contented because of the cooperation with friends in the match (Greitemeyer, 2013).

The operational definition of negative affect in this study is the negative score of SPANE (SPANE-N; Diener et al., 2009) where the lowest possible score is 6 and highest is 30. The lower the score, the lesser the negative affect one experiences, vice versa.

<div align="center">

Literature Review

</div>

Positive Affect and Negative Affect

Positive Affect. Diener (1984) defined positive affect as the "pleasant emotional experience" (p. 543). It was described that positive affect is one of three definitions of subjective well-being (Diener, 1984). According to this definition, a person with positive affect implies that he or she is either experiencing a positive experience or predisposed with this kind of emotions regardless of current experience while these positive experiences includes positive emotions and positive moods. As it is part of subjective well-being, level of positive affect relies primarily to an individual's self-reported perception or individual experiences instead of to a general definition or threshold (Diener, 1984).

Positive affect is found to be beneficial in many ways. According to Fredrickson and Losada (2005), positive affect is found to be predictive to one's flourishing and other effects similar to those suggested in broaden-and-build theory (see Fredrickson, 2004). Human flourishing is the optimal functioning of an individual which includes relatedness, competence, optimism, purpose in life and self-esteem (Diener et al., 2009; Fredrickson & Losada, 2005). Fredrickson and Losada (2005) categorised benefits of positive affect into three classification: cognition (e.g., creativity), physiological (e.g., reduction in stroke) and mental (e.g., resilience).

Negative affect. Negative affect is defined as the "general dimension of subjective distress and unpleasant engagement" (Watson et al., 1988b, p. 1063). It is the combination of negative experiences, moods and emotions. Some of the examples that are related to negative affect include fear, hostility, disgust, guilty, nervousness and stressful (Watson et al., 1988a; Watson et al., 1988b; Folkman & Moskowitz, 2000).

It is popularly believed that high level of negative affect indicates frequent encounter of negative experiences or emotions while low level of it indicates happiness. However, according to Watson et al. (1988b), while high level of negative affect is indeed an indication of frequent negative experiences or emotions, low level of negative affect, contrary to popular beliefs, does not mean the opposite. Instead, it is only indicating that one is feeling calm and peaceful. Further explanation of this is discussed below.

Independency and co-existence of positive and negative affect. Folkman and Moskowitz (2000) raised a question of the presence of positive affect in stressful events. They found that positive affect co-exists with negative affect, which they are popularly believed to be at the different end of a bipolar emotional dimension. In fact, multiple researches have found little to no significant statistical correlation between positive affect and

negative affect (e.g., Diener, 1984; Diener et al., 2009; Baker et al., 1992; Russell & Carroll, 1999; Watson et al, 1988a; Watson et al, 1988b).

In other words, positive affect and negative affect are, contrary to popular belief, two different emotional dimensions that one will encounter simultaneously. For example, a clinical patient who has just received news about his or her newly discovered cancer (a stressful negative event that causes negative affect) is feeling hopeful and positive to the condition.

Video Games and Positive Affect

A study by Russonniello et al. (2009) concluded that casual video games, particularly Bejeweled II (BJW2), can improve moods and decrease stress level. The study aimed to find interventions for stress-related medical diseases by examining the effectiveness of video games in decreasing stress level. The study used BJW2, a puzzle genre game, in their testing. Electroencephalography (EEG) monitoring, a method to record brain activity, illustrated that playing BJW2 did indeed changed the brain activity that is consistent with positive mood. The level of tension, depression and many other negative emotions of players of BJW2 players were also improved post-play. The study had provided an important insight in game development as an intervention, not only on psychological disorders (e.g., mood disorder) but also medical disorders (e.g., diabetes; Russonniello et al., 2009), though it did not explain in detail how.

Sherry (2004), on the other hand, stated that video games allow players to achieve state of flow during gameplay. Flow is a positive psychological state where an individual experiences optimal and pleasurable experience when engaging an activity with full concentration to the extent that sense of time is distorted (Chen, Wigand, & Nilan, 2000). This state of flow achieved by video game players, might in turn generates positive emotions (Granic et al., 2014). This positive emotion generated by experiencing flow was also

identified by Csikszentmihalyi (n.d.) and was noted its importance by Manzano, Theorell, Harmat and Ullén (2010), which further strengthened the importance of video games in regulating one's well-being. Further, Fredrickson (2001) also explained using broaden-and-build theory that continuous experience of positive emotion, which in this case triggered by playing video games, may lead an individual to more effectively cope with failure, which in turn increases subjective well-being in long-term.

Why does video games playing important in emotion regulation? According to Aldao et al. (2010) and Gross and John (2003), one of the adaptive emotion regulation strategies – *reappraisal*, is associated with less negative emotion together with other negative emotional symptoms. Reappraisal is a coping strategy that involves reinterpreting a negative situation with a more positive attitude that reduces the emotional impact of the particular negative stressor (Gross & John, 2003). This is important because reappraisal strategy is fundamental in almost every video game. For example, StarCraft II (SC2) is a real-time strategy (RTS) game that constantly change a whole system of rules following different species of character along the storylines which force players to constantly relearn completely different set of skills, advantages and vulnerabilities of different species, often frustrating the players. The use of reappraisal strategy by the players here can diminish the effect of frustration, which in turn reinforce the usage of this strategy while they play and after play. In other words, video game playing may promote the players to effectively deal with negative experience with adaptive emotion regulation strategies in long-term and thus experience greater positive affect eventually (Gross & John, 2003; Granic et al., 2014).

Other than the gameplay itself, team or group membership within a game could also contribute to one's positive experience (Barnett & Coulson, 2010). Many online video games offer players the ability to create and join guilds or party to effectively communicate with each other. According to Barnett and Coulson (2010), these in-game communities are very

similar to those of real-world groups to the extent that it is able to imitate the real-world impact of communications. For example, Invasion is a mobile RTS war game that heavily depends on players' effective communications to strategically battle with enemy players. It recommends its players to join guilds which have hierarchical positions within with different extent of authority to rule the guild. Players with strong guild membership can also strive to be a government in-game which grants the ability to rule an entire game server. Players not only join these kind of group for achieving greater in-game goals but also for the sense of belonging (as cited in Barnett & Coulson, 2010). This sense of belonging, or relatedness, in turn lead them to better psychological well-being (Baumeister & Leary, 1995; Ryan et al., 2006).

Video Games and Negative Affect

Multiple past researches have also focused on the common worry about video games that include violent content. Carnagey and Anderson (2005) found that exposure to violent video games increases hostile emotion, regardless the presence of either reward or punishment. In fact, this finding had already been found by and is consistent with some other researchers prior to their findings (e.g., Anderson & Ford, 1986; Funk, Flores, Buchman, & Germann, 1999) and this hostility triggered by these kind of video games is considered a negative experience to a player. This onset of negative affect was explained by Whitaken and Bushman (2009) as the effect from *priming* (exposed stimulus increase accessibility of particular memory), *mimicry* (copy actions) and *stimulation of physiological arousal*.

However, contradict to the findings mentioned above, Ferguson and Rueda (2010) found through their study that violent video games could reduce one's depressive mood through mood management. They explained that violent video games provide depressed players with the sense of control, dominance in-game and opportunity to achieve tangible goals in-game. They further explained that although nonviolent games could assert the same

outcome, violent video games give players unique opportunity to deal with their real-life negative emotions (e.g., frustration). Their findings were also consistent with a prior study by Ryan et al. (2006) where they explained that video games lead to psychological well-being (i.e., positive emotions), including the violent ones. Besides, Adachi and Willoughby (2011) also added that the aggressive behaviours and emotions seemingly stemmed from violent video games is more likely to be caused by the competitive nature of a game rather than the violent element.

Theoretical Framework

       Broaden-and-Build Theory. The research questions of this study is built upon this foundation. Following the foundation where positive psychology is being built on, the theory highlights that exposure to positive experiences broadens one's cognition processes and generates more positivity to one's life (Fredrickson, 2001; Fredrickson, 2004). As discussed above with past researches, video game playing is capable of generating positive experiences and emotions among players. According to this theory, players exposed to these positive experiences generated from playing video games would increase their likelihood of leading a generally flourishing life. It conveys that exposure to positive experiences drives people to optimal well-being.

       Fredrickson (2004) listed, in relation to the theory, that positive experiences (1) broadens people's cognitive capabilities; (2) recovers one from persistent negative experiences; (3) promotes one's resiliency to psychological wounds; (4) facilitates one's flourishing (optimal human functioning); (5) builds and accumulates one's psychological regulation resources for the future.

       By playing video games, players experience positive experiences and emotions through many ways (see Russoniello et al., 2009; Sherry, 2004; Granic et al., 2014; Csikszentmihalyi, n.d.; Manzano et al., 2010; Gross & John, 2003; Aldao et al., 2010;

Ferguson & Rueda, 2010; Ryan et al., 2006; Barnett & Coulson, 2010). These positive experiences and emotions in turn broaden a players cognitive processes as stated above which then further improve their psychological well-being that includes more positive affects and emotions. Futher, it also reduce the negative affect of a player as positive experiences promotes resiliency to unpleasant experiences and recovers one from it and build immunity to other negative affect (Fredrickson, 2004). It is also worth noting that these effects are the long-term effects of playing video games, instead of momentary experiences.

Maslow's hierarchy of needs. This theory is a humanistic approach to understand human as a whole. Green (2000), citing Maslow (1943), stated five needs to be satisfied by any human with a hierarchical order as follow: physiological, safety, love, esteem and self-actualisation. The first four needs are described as the deficiency needs as lacking of either one stresses us up.

Video game playing, as reported by Barnett and Coulson (2010) and Johnson, Jones, Scholes and Carras (2013), enables players to learn how to get along with people, in order to help promote the development of positive interpersonal relationship. Gamers can share the game experience and resources to create common activities through websites, forums and other communication platform. For example, players of Dota 2 will need to communicate teamwork among strangers within each match and learn new skills from the game forums. Thus, the relationship between video games and gamers is not a simple human-computer interaction model, yet a relationship which contains discussion, collaboration and reflection on the process of peer groups. This suggests that video game playing is helpful in fulfilling the love needs according to the hierarchy of needs, which included belongingness or relatedness.

Besides, finding of Ferguson and Rueda (2010) that suggested video game playing could assert players with sense of control, dominance and goal achievement have suggested

that video game could also fulfil one's esteem need as well. As some individuals often feel frustrated or helpless in real-life, video game playing experience provides these players with the ability to control the game, for instance, by winning the game while competing with other players. The victory boosts the players' sense of self-worth that they are better than some other people and provides a safe, lawful and entertaining platform for them to prove their capabilities without harm instead of some possibly harmful self-proving activities.

Methodology

Participants

Three hundred participants were recruited in this study. All participants are current undergraduate students from five different faculties of UTAR-PK: (1) Institute of Chinese Studies (ICS); (2) Faculty of Arts and Social Science (FAS); (3) Faculty of Information and Communication Technology (FICT); (4) Faculty of Business and Finance (FBF); (5) Faculty of Science (FSc); (6) Faculty of Engineering and Green Technology (FEGT). The participants were recruited using a combination of convenient sampling and opportunity sampling method.

These nonprobability sampling methods were used because it is impractical for this study to access name lists of every student of every faculty in UTAR-PK for probability sampling purpose. It is also impractical to do stratified sampling because students are often having their classes in faculties other than theirs (e.g., FAS students having class in FICT). Therefore, participants were recruited mainly from the library, bus stations and cafeterias where students from different faculties will converge. Participants were also recruited in the main walkways or corridors between and within all faculties.

Instrument

Scale of Positive and Negative Experiences (SPANE; Diener et al., 2009) is selected to be used in this study because it has many certain unique characteristics over other popular

scales to assess subjective well-being, for instance, the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988b) scale. PANAS is a widely used popular psychometric to assess one's positive and negative affective state. However, Diener et al. (2009) argued that PANAS used many items that are not representing actual emotions (e.g., strong, active) and focused more on high arousal emotions (e.g., hostile, excited, ashamed, etc.) which has omitted the lower arousal emotions like happy, contented and loving. Furthermore, other scales including PANAS inquire very specific feelings will impose certain cultural incongruent measurement error as different culture value different emotions differently (Diener et al., 2009).

SPANE, on the other hand, neutralised the above stated disadvantages by using a more general term to describe certain emotions. The advantage of using general term instead of specific ones is that it captures the accurate self-report of the emotions, feelings or experiences without the biases from source, arousal level and cultural definitions of emotions (Diener et al., 2009). This way, SPANE can be used in general anywhere in the world regardless of participant's cultural and experience differences. In addition, SPANE asks for participants rating of different emotions only in the past four weeks which allows participants to more accurately recall actual experiences instead of blind self-concept of feelings (Diener et al., 2009). One other reason to use SPANE is that the initial reliability and validity measurements are based on student samples which will greatly increase the accuracy of this study on student.

SPANE is separated into 3 subscales: SPANE-P, SPANE-N and SPANE-B. SPANE-P reports only positive affect; SPANE-N reports negative affect and SPANE-B reports the affect balance or the balance between positive and negative affect. The Cronbach's alpha and temporal stability of (1) SPANE-P are 0.87 and 0.62; (2) SPANE-N are 0.81 and 0.63; (3) SPANE-B are 0.89 and 0.68 respectively (Diener et al., 2009). It also has good convergent

validity with other scales measuring similar aspects (e.g., Satisfaction with Life Scale; see Diener et al., 2009). In short, SPANE has high reliability and good construct validity.

Procedures

The participants were then given a set of questionnaire that includes an informed consent, demographic information and SPANE (Diener et al., 2009). This involves stating down their respective total hours spent on video games in the past four weeks and rating the frequencies of various positive and negative feelings (i.e., joyful, afraid, happy, sad) using a 5-point scale ranging from 1 (very rarely or never) to 5 (very often or always). The data were then collected and computed using SPSS 20.

From the 300 responses, eleven responses were removed from the study because the responses were either incomplete or too unclear to be comprehended. The remaining 289 responses were then being analysed for its normality and correlations using Shapiro-Wilk Test and Spearman's rank correlation coefficient respectively. The reason behind using Shapiro-Wilk Test and Spearman's correlation is that it is suitable to use Shapiro-Wilk Test for sample size as big as this study and the results returned that the data collected is not normally distributed, hence, Spearman's correlation, instead of Pearson's correlation, is used.

<div align="center">Findings and Analyses</div>

Basic Statistics

From the remaining 289 responses, there is a total of 127 male (44%) and 162 female students (56%). In term of faculties, there is one from ICS, 81 from FAS, 103 from FBF, 35 from FEGT, 12 from FICT and 57 from FSc. The median age of the participants is 22 years old (*IQR* = 21 to 22). The median was reported instead of mean because there are some outliers in term of age that is not a data collection nor input error and therefore not applicable to be removed.

The Shapiro-Wilk Test was run to determine the normality of data of: (1) hours spent on video games; (2) SPANE-P scores and; (3) SPANE-N scores. All results returned indicated that these data sets were not normally distributed ($p < 0.01$).

It is also worth noting that there was a few outliers in the data collected. Some participants had reported to have engaged in video game playing for a total of more than 250 hours up to 336 hours in their past four weeks, which is, they have spent more than ten hours on video games per day on average. As there is no way to justify whether they have really engaged in video games for such an unusual time and it is actually not impossible to have such an unusual video game engagement, the decision is to include these outlier values into the analysis. As the data are not normality assumed and outliers were present, the medians, instead of means, of the data were reported to more accurately illustrate the data sets and Spearman's rank order correlation coefficient test would be run for testing the correlation of the variables as it is less sensitive to outliers and does not assume normality in its measure.

The medians of hours spent on video games, SPANE-P scores and SPANE-N scores of the participants are shown in Table 1. If those who have not spent any time on video games were excluded, the medians are shown in Table 2.

Table 1
Median when zero-hour cases are included

Variables	N	M	UQ	LQ
Hours	289	10	40	2
SPANE-P	289	22	24	19
SPANE-N	289	14	18	12

Note: N = sample size. M = median. UQ = upper quartile. LQ = lower quartile.

Table 2
Median when zero-hour cases are excluded

Variables	N	M	UQ	LQ
Hours	243	14	50	4
SPANE-P	243	22	24	19
SPANE-N	243	14	18	11

Note: N = sample size. M = median. UQ = upper quartile. LQ = lower quartile.

Correlation of Hours Spent on Video Games and Positive Affect

The Spearman's correlation was run to determine the relationship between hours spent on video games and positive affect (R_{H-PA}) of the 289 students. The result returned that the two variables have statistically significant positive correlation, $r_s (287) = 0.19$, $p < 0.01$ (see Table 3). However, it was reported that 46 of total participants reported that they spent zero hour on video games, meaning that they do not engage in video game playing at all. In this case, when cases of zero-hour are excluded, the Spearman's correlation result was slightly different but still returned a statistically significant positive correlation, $r_s (241) = 0.18$, $p < 0.01$ (see Table 3). Hence, decision is to reject the null hypothesis. This indicated that the hours spent on video games is positively related to one's positive emotions, feelings and experiences. In other words, the longer a person spend time on video games, the more the person is going to experience positive emotion, feelings or experiences, or vice versa, though it is worth noting that the significant correlation is not strong.

Table 3
Spearman's correlation coefficient of R_{H-PA}

	N	r	p
R_{H-PA}	289	0.187*	0.001
	243	0.183*	0.004

Note: *$p < 0.005$.

Nevertheless, it is worth noting that the result was from a correlational measure thus does not provide valid causal inference. Therefore, it cannot be concluded that longer hours spent on video games will contribute to more positive emotions, feelings and experiences one will find. Besides, as this is a preliminary study of the targeted context, various confounding variables might be causing the correlation found but were not focused and targeted in this study. These confounding variables might help in explaining the statistically significant but weak positive correlation found in this study.

Correlation of Hours Spent on Video Games and Negative Affect

For the relationship between hours spent on video games and negative affect (R_{H-NA}), Spearman's correlation was also run to determine the relationship. In contrast with the R_{H-PA}, the result returned showed no statistically significant correlation in R_{H-NA}, r_s (287) = -0.02, p = 0.80 (see Table 4). The result was similar when zero-hour cases were excluded, r_s (241) = -0.02, p = 0.78 (see Table 4). Therefore, the decision is to retain the null hypothesis. This indicated that playing video games is not related to one's experiences of negative affect. In other words, playing video games, regardless the length of playing, has nothing to do with one's experience of negative affect, at least in this study.

Table 3
Spearman's correlation coefficient of R_{H-NA}

	N	r	p
R_{H-NA}	289	-0.015	0.796
	243	-0.018	0.779

The lacking correlation between hours spent on video games and one's negative affect has eliminated the possibility of video games playing influencing one's negative emotions, feelings and experiences. As much as it sounds seemingly good, this indication has also eliminated possibility of video games playing that helps in neutralising one's negative affect. The major downside of this finding is that engagement in video games does not necessarily helps in reducing one's negative affect. Yet, the bright side is that video game engagement cannot cause more negative affect to someone as well. However, it is worth noting that various other confounding variables are present and were not tested in this study and therefore the findings may change when these confounding variables were being considered.

Discussion

It can be concluded in this study that hours spent on video games is statistically significantly positively correlated with positive affect and no statistically significant relationship was found with negative affect.

While this is merely a correlational study, no causal relationship can be deduced from the results. However, it can be speculated that hours spent on video games is more likely be the determining factor of the positively related positive affect judging from many past researches (e.g., Russonniello et al., 2009; Sherry, 2004; Aldao et al., 2010; Barnett & Coulson, 2010) combining with justification from the Broaden-and-Build theory as discussed earlier. Besides, Maslow's hierarchy of needs could also explained the positive correlation as playing video games give players (1) sense of control (see Ferguson & Rueda, 2010) which fulfilled the esteem need and; (2) sense of belongings (see Johnson et al., 2013; Barnett & Coulson, 2010) which fulfilled the love and belongingness need. However, it is also possible that it is actually the positive affect experienced by the students that drives them for longer playing hour though there is no supporting theory and past researches to our knowledge that supports the possibility *yet*.

In fact, the current finding of positive R_{H-PA} have been consistent to many past studies. According to these studies, some the possible explanation behind the positive R_{H-PA} is that players have (1) experienced positive experience (e.g., state of flow) which in turn generates more positive affect (Sherry, 2004; Granic et al, 2014; Manzano et al., 2010); (2) learned emotional regulation skills (i.e., reappraisal) from video games (Aldao et al., 2010; Gross & John, 2003); (3) gained sense of belongings with online acquaintances (Barnett & Coulson, 2010; Baumeister & Leary, 1995; Ryan et al., 2006); (4) achieved catharsis effect by releasing negative affect onto video games (Ferguson & Rueda, 2010) and; (5) brain

physiological reactions that improve moods after exposure to video games (Russonniello et al., 2009).

On the other hand, the insignificant correlation of R_{H-NA} found in this study has provided an important insight to the field. For instance, the possibility of video game playing to both induce and reduce negative affect could be eliminated, meaning that video game playing is less likely to make someone feel emotionally negative and less likely to improve one's negative moods. Since there is no statistically significant relationship between the two variables, it can be concluded that neither of each could influence the other. In this situation, whether or not negative affect can influence hours one spent on video games may not be of much interest to the field of psychology but the fact that playing video games is less likely to be influencing one's negative affect according to the finding can be important.

However, the finding of statistically insignificant R_{H-NA} was inconsistent with the finding of Carnagey and Anderson (2005) and Anderson and Ford (1986) who found that exposure to video games might expose players with more negative affect, primarily hostility. In other words, the aforementioned past studies have reported a positive relationship between video game playing and negative affect while the current study did not. The current finding that indicated no significant relationship between video game playing and negative affect has also found to be contrasting with Ferguson and Rueda (2010) who found that playing video games can reduce negative emotions.

Possible explanation of the inconsistency is that their findings were generally focused on the violent video games (e.g., Battlefield, Counter-Strike, etc.) and not the nonviolent video games (e.g., Candy Crush, The Sims, etc.). In contrast, the current study did not focus on a specific type of video games. Thus, the element difference of video games being targeted might confound the current findings with the past ones'. Besides, past studies were mostly experimental studies and may not appropriately suggest the real world situation

(Ferguson & Rueda, 2010). Cultural dissimilarities might also to some extent explain the inconsistency as targeted population of most past studies were centred around western countries and they have access to wider range of variety of video games compared to Malaysia where most players play free-to-play video games. One other important possible explanation suggested by Adachi and Willoughby (2011) is that it is not the video game itself that emotionally influences its players but the competitiveness that is influencing.

Regardless, these correlational findings were still subjected to the influences of many confounding variables. There are in fact many variables that could simultaneously account for the duration one would spent on video games and their positive and negative affect. Some of which that are likely to influence the current research variables includes nature of the video games and the competitiveness of the video games. Neither of these confounding variables were tested in this study and they may result in different findings regardless of statistical significance.

Implication of the Study

Combining the views of the two correlation findings, it indicated that while video games are very unlikely to bring negative affect to the players, it is very likely that video games can positively enhance one's positive emotions, feelings and experiences. This indication has given a huge potential to video games as an agent to improve one's, particularly students', positive affect without risking their exposure to negative affect. Since video games are getting increasingly popular (ESA, 2014) and players play video games for its fun and joyful elements (Lin, Lin, & Yang, 2015), using video games as an agent to foster positive affect of people would be very applicable to many real-life situations (e.g., classroom, therapeutic centres, home school, etc.).

To utilise the finding of statistically insignificant $R_{H\text{-}NA}$, game developers could use this information to start developing games with less limitations stemmed from the previous

fear and unethicality of creating games that could possibly harm one's well-being. Combining with the findings by Ferguson and Rueda (2010) who reported that even violent games could also foster positive affect to certain, not all, populations, game developers could even create more creative games as more limitations and ethical issues were eliminated. This could possibly open a whole new category or genre in gaming industry which could possibly foster positive emotions, feelings and experiences of the public and at the same time generate positive economic activities.

The findings may also to some extent help in justifying the phenomenon of increasing popularity of video games among adolescents and young adults where a considerable number of them are students. As suggested by the findings, players might be engaging on to video games possibly because of the positive affect yielded from the play. Broaden-and-Build theory explained that this experience of positive affect will yield more different kind of positive affect and this yielding in turn reinforces the players to engage more on video games as explained by behavioural theories of behavioural reinforcement. Thus, the players will continue to play video games and when more players start to play, some members of the society, particularly friends of the players, will tend to conform to the phenomenon (Cialdini & Goldstein, 2003) hence video games become more popular.

Conclusion

Current evidences have suggested that hours spent on video games is positively related to one's positive affect and has no relationship to one's negative affect. However, it is noteworthy that these evidences were based solely on 300 students from UTAR-PK with convenient sampling method. One limitation of this study is that the study did not specifically target a particular type of video games and this might have yielded an ambiguous result. Without targeting specific types of video games, it would be difficult in making useful inferences of whether different type of games can produce different correlation with positive

and negative affect. For instance, puzzle games might stimulate positive affect and violent games might contribute to negative affect. Therefore, it has no control on the participants' preference of video games. In short, without a clear examination, it is hard to generalise the findings to all kinds of video games. Besides, the samples were based solely on undergraduate students in UTAR-PK. The results might not generalise to students from other universities or even other campus of UTAR. The results might also not be able to be generalised to other groups of students like graduate students, secondary school students and pre-university students although these populations of students are prone to video games and potentially problematic emotional states too.

Future studies are suggested to use probability sampling methods in the process of participant recruitment to ensure the unbiasedness of the data collected. Larger sample size may also be used to determine the relationship of the variables. Future research may also expand its focus to undergraduate students in general or from solely students to general populations of adolescents, young adults or even children and elderlies to assess the correlation in every age group. Besides, future research may even run a causal study to assess the actual effects of video game engagement to one's positive and negative affect. The confounding variables can also be assessed together with the original variables in the future to make a more sound inference.

References

Adachi, P. J., & Willoughby, T. (2011). The Effect of Video Game Competition and

Violence on Aggressive Behavior: Which Characteristic Has the Greatest Influence?

Psychology of Violence, 1(4), 259-274. doi:10.1037/a0024908

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies

across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*,

217–237. Retrieved 15 November, 2015, from

http://gruberpeplab.com/teaching/psych131_summer2013/documents/Lecture17_Alda

o2010_Emotionregulationstrategies.pdf

Anderson, C. A., & Ford, C. M. (1986). Affect of the Game Player: Short-Term Effects of

Highly and Mildly Aggressive Video Games. *Personality and Social Psychology

Bulletin, 12*(4), 390-402. Retrieved 12 November, 2015, from

https://public.psych.iastate.edu/caa/abstracts/1985-1989/86AF.PDF

Baker, L. A., Cesa, I. L., Gatz, M., & Mellins, C. (1992). Genetic and Environmental

Influences on Positive and Negative Affect: Support for a Two-Factor Theory.

Psychology and Aging, 7(1), 158-163.

Barnett, J., & Coulson, M. (2010). Virtually Real: A Psychological Perspective on Massively

Multiplayer Online Games. *Review of General Psychology, 14*(2), 167-179.

doi:10.1037/a0019442

Baumeister, R. F., & Leary, M. R. (1995). The Need to Belong: Desire for Interpersonal

Attachments as a Fundamental Human Motivation. *Psychological Bulletin, 117*(3),

497-529. Retrieved 13 November, 2015, from

http://persweb.wabash.edu/facstaff/hortonr/articles%20for%20class/baumeister%20an

d%20leary.pdf

Carnagey, N. L., & Anderson, C. A. (2005). The Effects of Reward and Punishment in

Violent Video Games on Aggressive Affect, Cognition, and Behaviour. *Psychological

Science, 16*(11), 882-889. Retrieved 10 November, 2015, from

http://public.psych.iastate.edu/caa/abstracts/2005-2009/05ca.pdf

Chen, H., Wigand, R. T., & Nilan, M. (2000). Exploring Web users' optimal flow experiences.

Information Technology & People, 13(4), 263-281. Retrieved 18 November, 2015,

from http://cm.nsysu.edu.tw/~hschen/p263.pdf

Cialdini, R. B., & Goldstein, N. J. (2003). Social Influence: Compliance and Conformity.

Annual Reviews of Psychology, 55, 591-621.

doi:10.1146/annurev.psych.55.090902.142015

Csikszentmihalyi, M. (n.d.). *CREATIVITY: Flow and the psychology of discovery and

invention - Mihaly Csikszentmihalyi.* Retrieved 20 November, 2015, from

Bioenterprise: http://www.bioenterprise.ca/docs/creativity-by-mihaly-

csikszentmihalyi.pdf

Diener, E. (1984). Subjective Well-Being. *Psychological Bulletin, 95*(3), 542-575. Retrieved

15 November, 2015, from

http://internal.psychology.illinois.edu/~ediener/Documents/Diener_1984.pdf

Diener, E., Wirtz, D., Tov, W., Kim-Pierto, C., Choi, D., Oishi, S., & Biswas-Diener, R.

(2009). New Well-being Measures: Short Scales to Assess Flourishing and Positive

and Negative Feelings. *Social Indicators Research, 97*, 143-156. doi:10.1007/s11205-

009-9493-y

Entertainment Software Association. (2014). *Games: Improving the Economy.* Retrieved 26

November, 2015, from Entertainment Software Association:

http://www.theesa.com/wp-content/uploads/2014/11/Games_Economy-11-4-14.pdf

Ferguson, C. J., & Rueda, S. M. (2010). The Hitman Study: Violent Video Game Exposure

    Effects on Aggressive Behavior, Hostile Feelings, and Depression. *European*

    Psychologist, 15(2), 99–108. Retrieved 11 November, 2015, from

    http://www.christopherjferguson.com/hitman.pdf

Folkman, S., & Moskowitz, J. T. (2000). Positive Affect and the Other Side of Coping.

    American Psychologist, 55(6), 647-654. doi:10.1037//0003-066X.55.6.647

Fredrickson, B. L. (2001). The Role of Positive Emotions in Positive Psychology: The

    Broaden-and-Build Theory of Positive Emotions. *American Psychologist, 56*(3), 218-

    226. doi:10.1037/0003-066X.56.3.218

Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical*

    Transactions of the Royal Society of London. Series B: Biological Sciences, 359,

    1367–1377. doi:10.1098/rstb.2004.1512

Fredrickson, B. L., & Losada, M. F. (2005). Positive Affect and the Complex Dynamics of

    Human Flourishing. *American Psychologist, 60*(7), 678–686. doi:10.1037/0003-

    066X.60.7.678

Funk, J. B., Flores, G., Buchman, D. D., & Germann, J. N. (1999). RATING ELECTRONIC

    GAMES: Violence Is in the Eye of the Beholder. *Youth & Society, 30*(3), 283-312.

    Retrieved 12 November, 2015, from http://studysites.sagepub.com/frankfort-

    nachmiasstudy4/Funk.pdf

Granic, I., Lobel, A., & Engels, R. C. (2014). The Benefits of Playing Video Games.

    American Psychologist, 69(1), 66-78. doi:10.1037/a0034857

Green, C. D. (2000). *A. H. Maslow (1943) A Theory of Human Motivation*. Retrieved 5

    December, 2015, from Classics in the History of Psychology:

    http://psychclassics.yorku.ca/Maslow/motivation.htm

Greitemeyer, T. (2013). Playing Video Games Cooperatively Increases Empathic Concern. *Social Psychology, 44*(6), 408–413. doi:10.1027/1864-9335/a000154

Gross, J. J., & John, O. P. (2003). Individual Differences in Two Emotion Regulation Processes: Implications for Affect, Relationships, and Well-Being. *Journal of Personality and Social Psychology, 85*(2), 348–362. doi:10.1037/0022-3514.85.2.348

Hsu, C. L., & Lu, H. P. (2004). Why do people play on-line games? An extended TAM with social influences and flow experience. *Information & Management, 41*, 853–868. Retrieved 20 November, 2015, from http://citeseerx.ist.psu.edu/viewdoc/download? doi =10.1.1.505.6970&rep=rep1&type=pdf

Johnson, D., Jones, C., Scholes, L., & Carras, M. C. (2013). *Videogames and Wellbeing: A Comprehensive Review*. Melbourne: Young and Well Cooperative Research Centre. Retrieved 30 November, 2015, from https://www.youngandwellcrc.org.au/wp-content/uploads/2014/03/Videogames_and_Wellbeing.pdf

Lin, Y. L., Lin, H. W., & Yang, Y. T. (2015). Players' Value Structure in Digital Games. *Games and Culture*, 1-28. doi:10.1177/1555412015581710

Manzano, O., Theorell, T., Harmat, L., & Ullén, F. (2010). The Psychophysiology of Flow During Piano Playing. *Emotion, 10*(3), 301-311. doi:10.1037/a0018432

Rajappa, K., Gallagher, M., & Miranda, R. (2012). Emotion Dysregulation and Vulnerability to Suicidal Ideation and Attempts. *Cognitive Therapy and Research, 36*, 833-839. doi:10.1007/s10608-011-9419-2

Russell, J. A., & Carroll, J. M. (1999). On the Bipolarity of Positive and Negative Affect. *Psychological Bulletin, 125*(1), 3-30. Retrieved 30 November, 2015, from https://www2.bc.edu/~russeljm/publications/psyc-bull1999.pdf

Russoniello, C. V., O'Brien, K., & Parks, J. M. (2009). EEG, HRV and Psychological Correlates while Playing Bejeweled II: A Randomized Controlled Study. *Annual*

Review of Cybertherapy and Telemedicine, 7, 189 - 192. Retrieved 18 November, 2015, from http://www.ecu.edu/cs-hhp/biofeedback/upload/EEG-HRV-and-Psychological-Correlates-while-Playing-Bejeweled-II-A-Randomized-Controlled-Study.pdf

Ryan, R. M., Rigby, C. S., & Przybylski, A. (2006). The Motivational Pull of Video Games: A Self-Determination Theory Approach. *Motivation and Emotion, 30*(4), 344-360. doi:10.1007/s11031-006-9051-8

Sherry, J. L. (2004). Flow and Media Enjoyment. *Communication Theory, 14*(4), 328-347. Retrieved 19 November, 2015, from http://icagames.comm.msu.edu/flow.pdf

Sipalan, J. (5 June, 2012). *Suicide rate on the rise in Malaysia*. Retrieved 20 November, 2015, from The Star Online: http://www.thestar.com.my/News/Nation/2012/06/05/Suicide-rate-on-the-rise-in-Malaysia/

Watson, D., Clark, L. A., & Carey, G. (1988a). Positive and Negative Affectivity and Their Relation to Anxiety and Depressive Disorders. *Journal of Abnormal Psychology, 97*(3), 346-333. Retrieved 25 November, 2015, from http://psych.colorado.edu/~carey/reprintPDFs/pdfs/watson_PosNegAff.pdf

Watson, D., Clark, L. A., & Tellegen, A. (1988b). Development and Validation of Brief Measures of Positive and Negative Affect: The PANAS Scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070. Retrieved 28 November, 2015, from http://www.cnbc.pt/jpmatos/28.Watson.pdf

Whitaker, J. L., & Bushman, B. J. (2009). A Review of the Effects of Violent Video Games on Children and Adolescents. *Washington and Lee Law Review, 66*, 1033-1051. Retrieved 1 December, 2015, from http://law2.wlu.edu/deptimages/Law%20Review/66-3WhitakerBushmanVideo.pdf

Appendices